POWER GENERATION, MOTOR CONTROL, INVERTER TRANSFORMER DESIGNE ETC

A Project and Thesis submitted in partial fulfillment of the requirements for the Award of Degree of

Bachelor of Science in Electrical and Electronic Engineering

by

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October 31

Certification

This is to certify that this internee ”**Power Generation, Motor Controlling And Inverter Circuit Etc.**’’ is done by the flowing student under my direct supervision and this work has been carried out by them in the laboratories of the department of electrical and electronic engineering under the faculty engineering of daffodil international university in partial fulfillment of the requirements for the degree of bachelor of science in electrical and electronic engineering .this presentation of the work was held on 31th October, 2019

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Dedicated to

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Teacher & friends

With love& Respect

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List of Abbreviations

AC		Alternating current
DC		Direct current
VCB		Vacuum circuit breaker
EMI		Immune to Electromagnetic Interference
KV		Kilo volte
CT		Current transformer
PCB		Printed circuit board
LED		Light Emitting Diodes
IC		Integrated circuit
RAM		Read access memory
ROM		Read only memory

PMD		Polarization Mode Dispersion

List of Symbols

λ		Wavelength
Z		Position along the grating
N		Mode index
F		Fundamental Frequency
ω		Angular frequency
M		Modulation Index

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.

ABSTRACT

This is on power generation of electricity power is fundamental we can't think our cutting edge existence without power. In this nation there is an enormous hole between power age and request. In these exploration different wellsprings of intensity for coal power plant and hydroelectric power plant of power generation etchant extensive vital report has been done on existing power plant. Plausibility of power generation in Bangladesh likewise considered by contrasting the power generation in this I examine about various situation of Bangladesh and interested limited age of various power generation. The power generation can be one of the significant wellsprings of our capacity age. Power generation can satisfy the interest of power. So it is imperative to keep.

CHAPTER-1

METHODS OF SPEED CONTROL

1.1Introduction

Exact speed control is a necessity in numerous mechanical and procedure control framework. The fundamental qualities of such a framework are its consistent state mistake and unsettling influence dismissal properties.

1.2 What is motor

AC motor converts the alternating current into mechanical power it is called motor. It is an electrical engine is an electrical machine that changes over electrical vitality into mechanical vitality. Most electrical engine work through the connection between the engine attractive field and electrical flow in a wire twisting to product power as revelation a pole

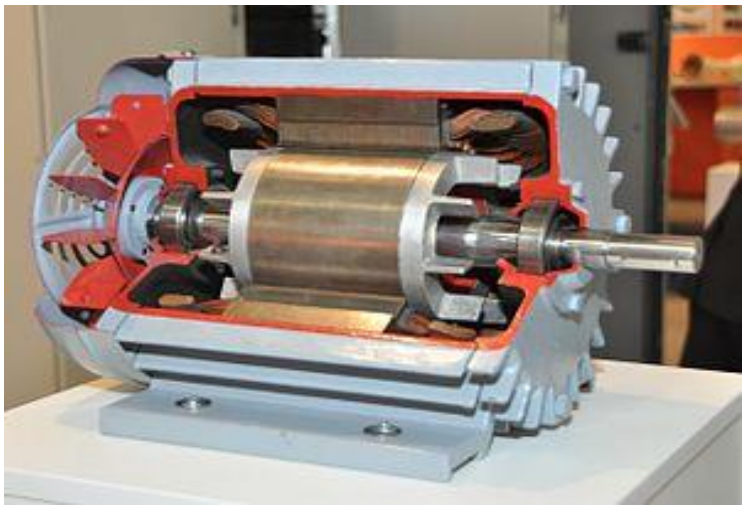


Figure: 1.2-Cutaway view through stator of induction motor

1.3 Types of motor

Electrical motor two types such as

1. AC Motor
2. DC Motor

AC motor three types such as:

1. Linear Motor
2. Synchronous Motor
3. Induction Motor

DC Motor two types:

1. Self-Excited DC motor
2. Separately DC Motor

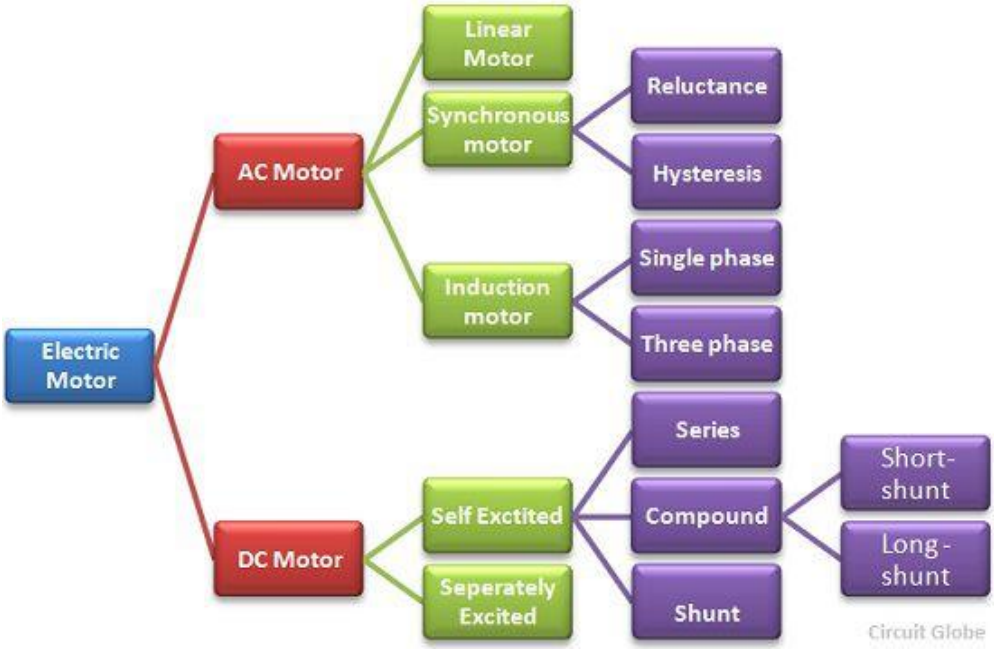


Figure: 1.3-Types of motor

1.4 How do work motor?

Electric motors work by converting Electrical energy to mechanical energy in order to made motion. Pressure is generated within the motor through the interaction between a magnetic field and winding alternating or direct current. As the strength of a current increase so does the strength of the magnetic field Keep Ohm's law (v=I*R)in mind voltage must increase in order to maintain the same current as resistance increases.

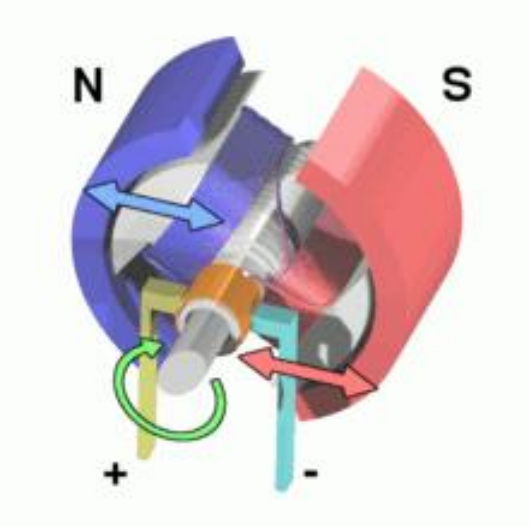


Figure: 1.4-Operation of a brushed DC electric motor

1.5 Operation of motor

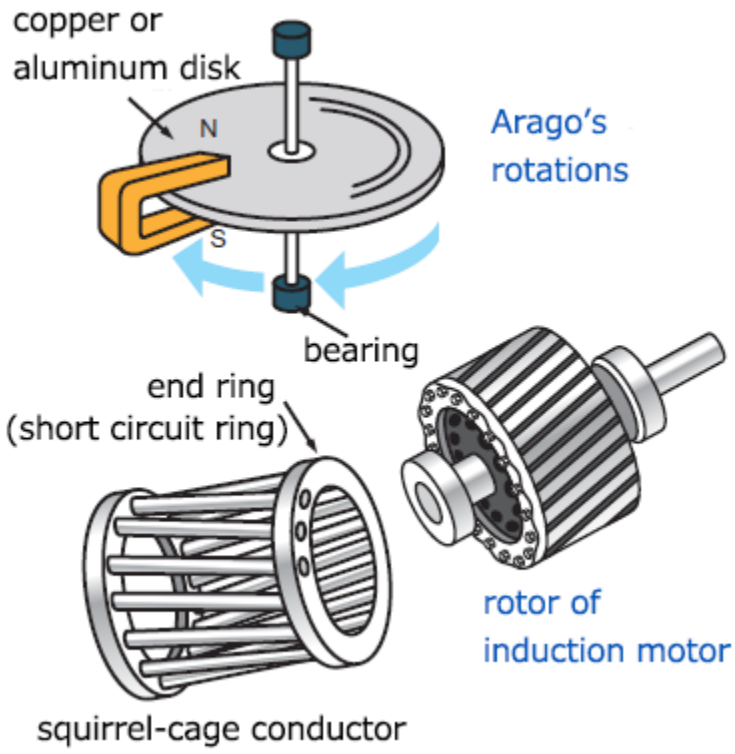


Figure: 1.5-Ac motor of basic part

CHAPTER-2

Generation part

2.1 Introduction

Electrical power at work can be seen wherever you go. In your home, office, diversion territories, etc. how is electrical power produced. This is the first of 8 talks that will examine how power stations are utilized to create electrical power.

2.2 Definition of Single line diagram:

Single line diagram means that the diagram uses the diagram to make the correct connection between each element, such as current, voltage, resistance etc. this method is called as single line diagram.

Figure: 2.2-High voltage substation design

2.3 Representation of Single line diagram system:

At first single line diagram from pass my line through the cable from the electric pool to the VCB. From there, I took and transmitted it to the low voltage substation with a transformer. Then again, the line is pulled down and transmitted to the switch gear via high voltage to low voltage substation.

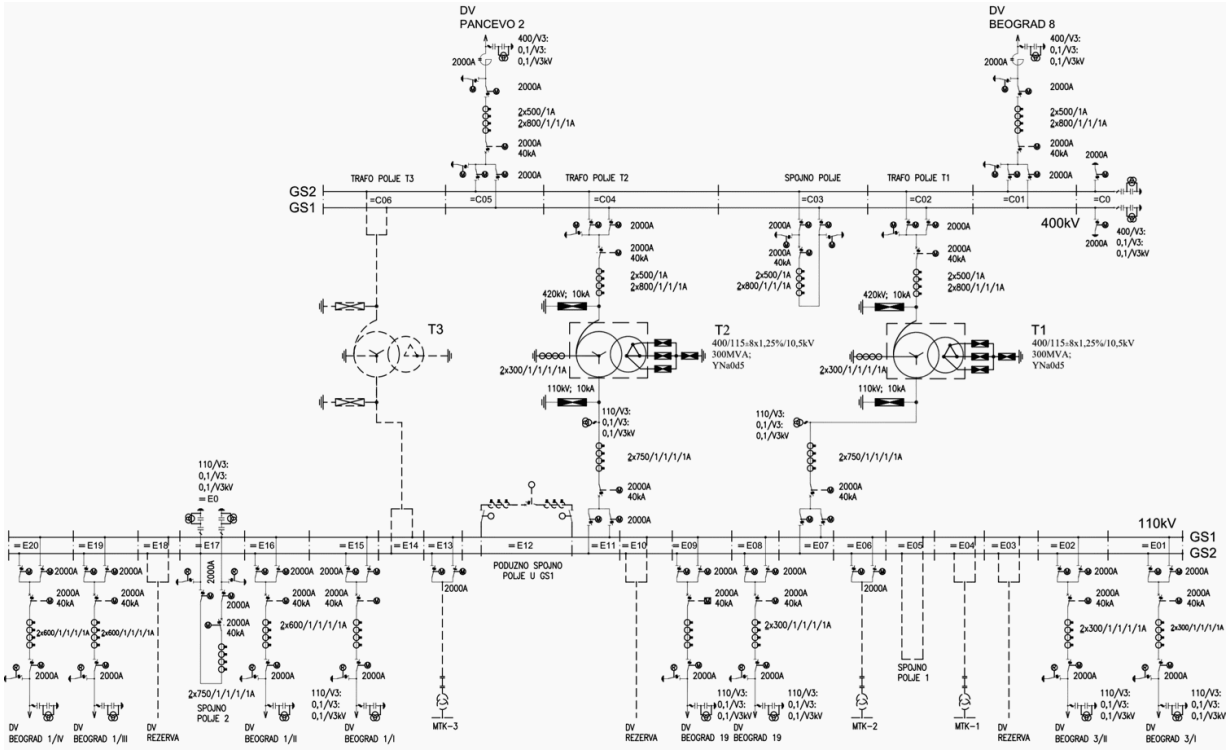


Figure: 2.3-Single line diagram of substation

Circuit breaker represented by rectangular blocks. The figure shown below represents the single line diagram of a typical block system. It is difficult to draw the single line diagram of the few components.

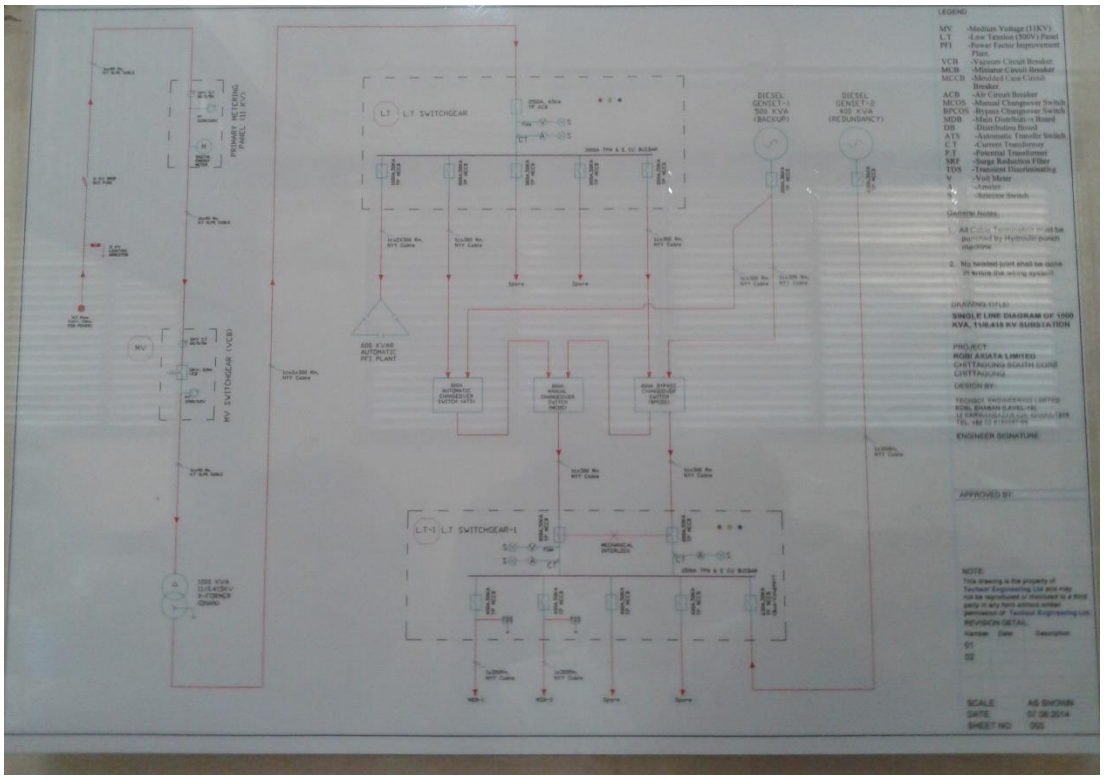


Figure: 2.3: single line diagram second figure

So, for simplification, the impedance diagram is used for representing the power system components.

2.4 Explain Single line diagram of power System:

The electrical energy is produced is generating station, and through the transmission network, it is transmitted to the consumers.

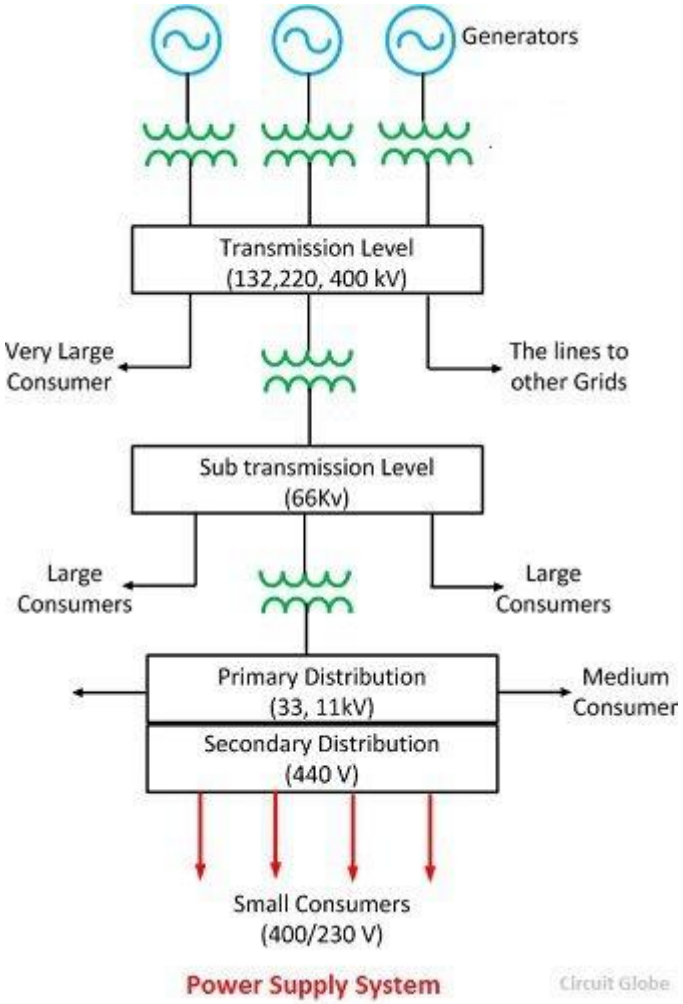


Figure: 2.4-Power supply system diagram

The voltage is too low for transmission over long distance. It is, therefore, stepped up to 132,220,400 kV, or more by step-up transformers.

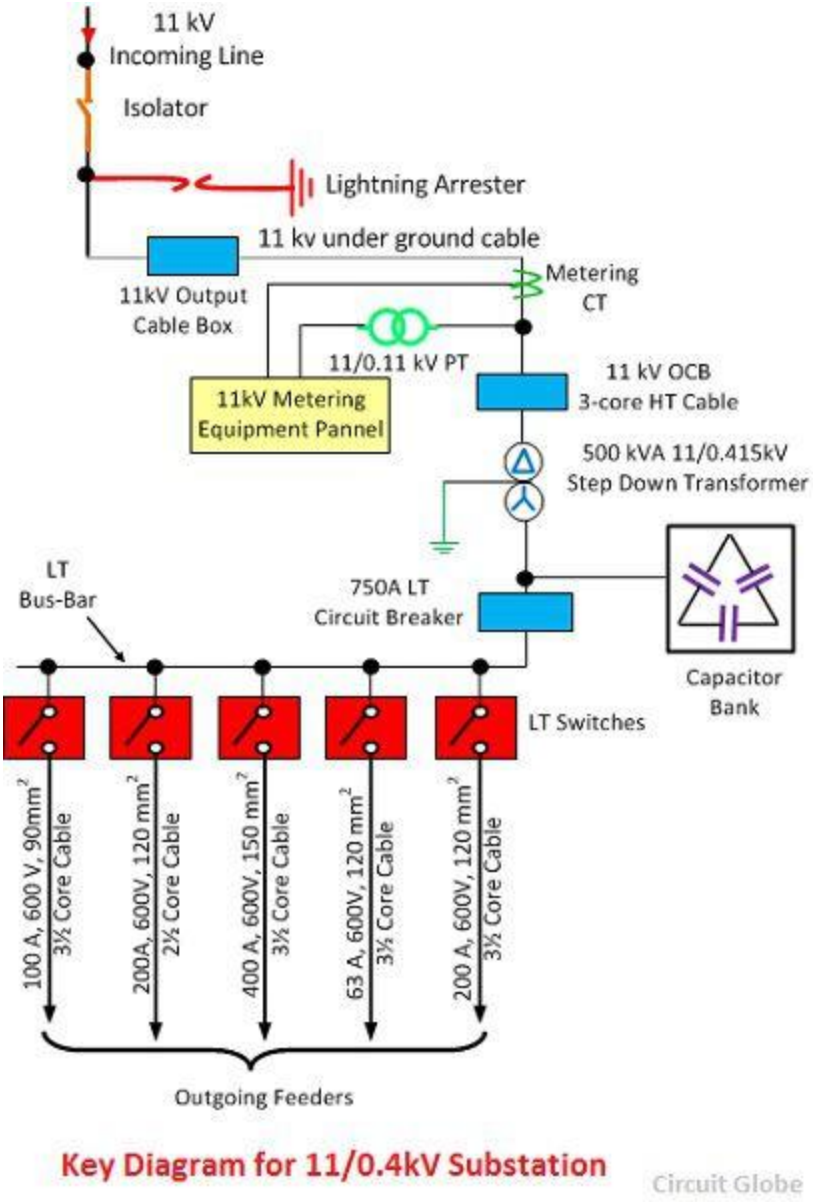


Figure: 2.5- Main component 11 kV substation

2.5 Main component of single line diagram of 11 kV substations:

The working of the electrical equipment used in the substation is explained below in details.

1. **Isolato**r- The isolator connects or disconnects the incoming circuit when the supply is already interrupted. It is also used for breaking the charging current of the transmission line.

2. Lighting arrester-The Lighting arrester is a protective device which protects the system from lighting effects. it has two terminal one is high voltage and the other is the ground voltage.

3. CT Metering- The metering CT measure and records the current when their secondary terminal is connected to the metering equipment panel.

4. Step-down Transformer-The step-down transformer Convert the high voltage current into low voltage current.

Figure: 2.5-DB board connection

It is enables overall economic generation by optimum uses the high capacity economical generation plant. The interconnection between network is done either by HVAC (High voltage direct current) links.

CHAPTER-3

CAPACITOR

3.1 Introduction

Capacitor are basic latent gadget that can store are an electrical charge on their plates when associated with a voltage source. The capacitor is a segment which has the capacity or limit to store vitality as an electrical charge delivering a potential distinction over it plates.

3.2 What is Capacitor?

A capacitor is a passive element designed to store energy in it is electric field. Beside resistors capacitor and the most common electrical equipment

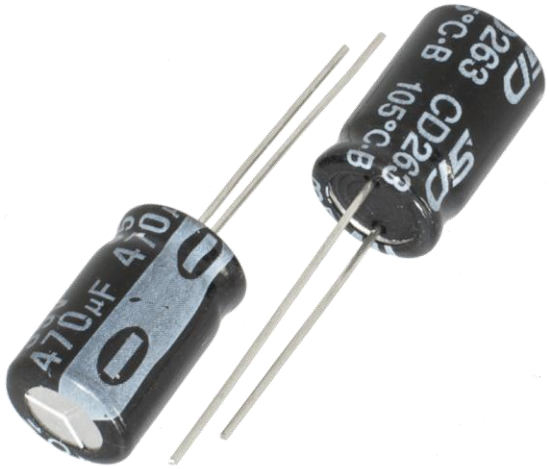


Figure: 3.2-Electronic Capacitor

3.3 Types of capacitor

1. Ceramic Capacitor
2. Mica capacitor
3. Electrolytic capacitor

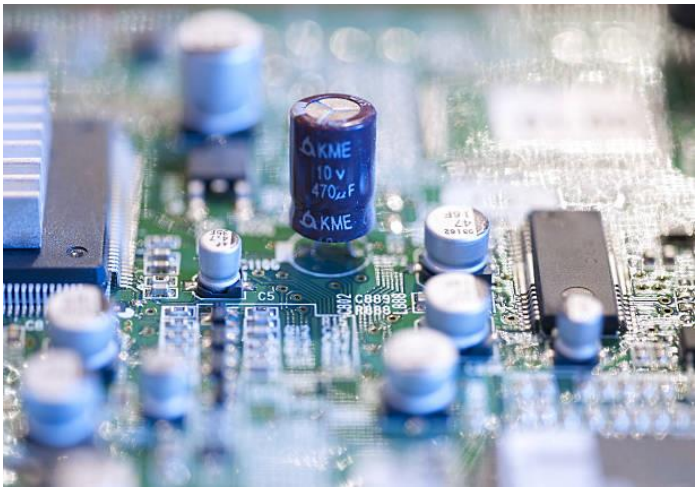


Figure 3.3-PCB with capacitor

3.4 How Capacitor Is Made

The Schematic symbol for a capacitor actually closely resemble show it made. A capacitor is made out of two metal plate and insulator materials called a dielectric. The metal plate in placed very close to each other in parallel

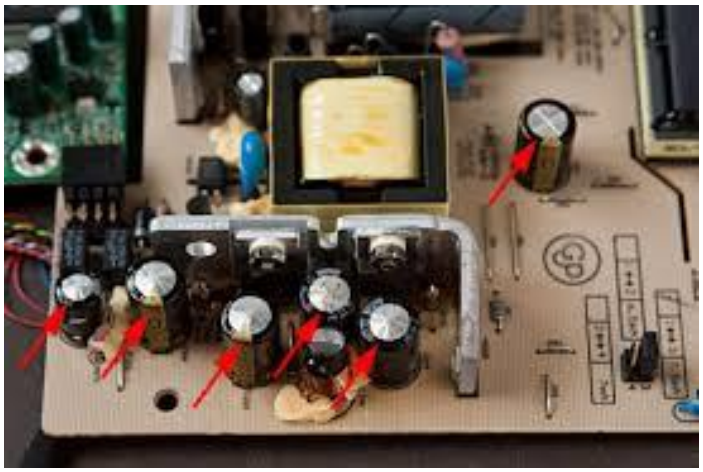
. 

Figure 3.4: Acer Al 1716 LED capacitor

3.5 How a Capacitor Works

This is flow of electrical charge which is electrical components to light up do whatever they do.

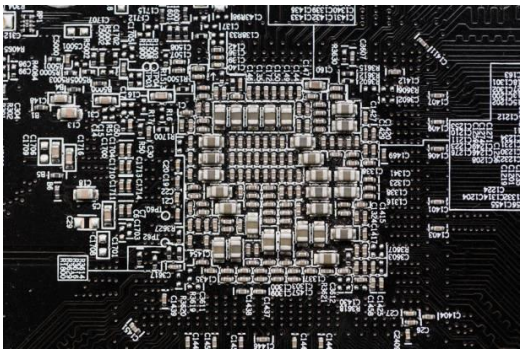


Figure 3.5-Dep Capacitor in PCB

The positive and negative charge on each plate each other because that is what opposite charge do.

Figure 3.6-High power capacitor

.

Ceramic Capacitors

Figure 3.7-Various type capacitor

This is Circuit current voltage relationship for a capacitor assuming the passive sign convention.

Figure: 3.8-Electric pole with capacitor

If you tear apart any AC-to-DC power supply, you're bound to find at least one rather large capacitor. Below are the guts. Notice any capacitors in there?

CHAPTER-4

INVERTER CIRCUIT

4.1 Introduction

In the present instructional exercise, I am going to share the introduction to inverters. An inverter change over dc voltage or current you can likewise say that it moves or change over power from DC source to an AC load.

4.2 What is Inverter circuit?

An inverter circuit is an electronics device that changes direct current to alternating current. The input voltage and output voltage and frequency and power handling depend on the design of the specific device or circuit.

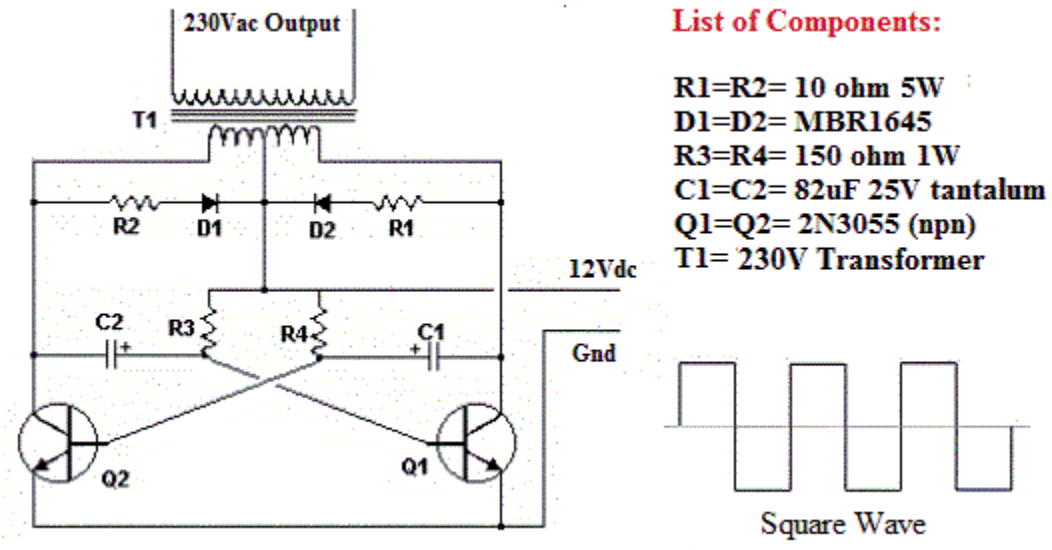


Figure: 4.2-Schematic of a square wave inverter

4.3 What is an inverter used?

A power inverter changes direct current from battery into alternating current that you can use to operate all kinds of devices TV, Radio etc.

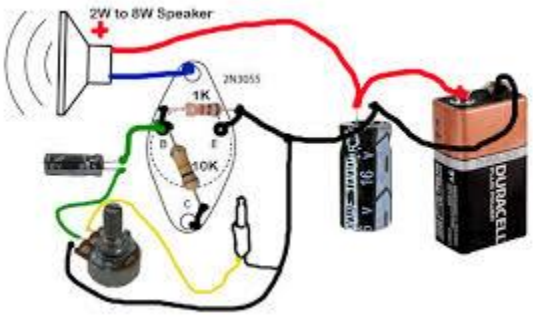


Figure: 4.3-Inverter used system

4.4 Working principle of Inverter Circuit

An inverter is an electrical circuit cable of turning direct current power into alternating power while at the same time regulating voltage current and frequency.In some solution like when the direct current voltage is low we cannot use the low DC voltage in a home appliance.so due to like this because, an inverter can be used whenever we utilize solar power panel.

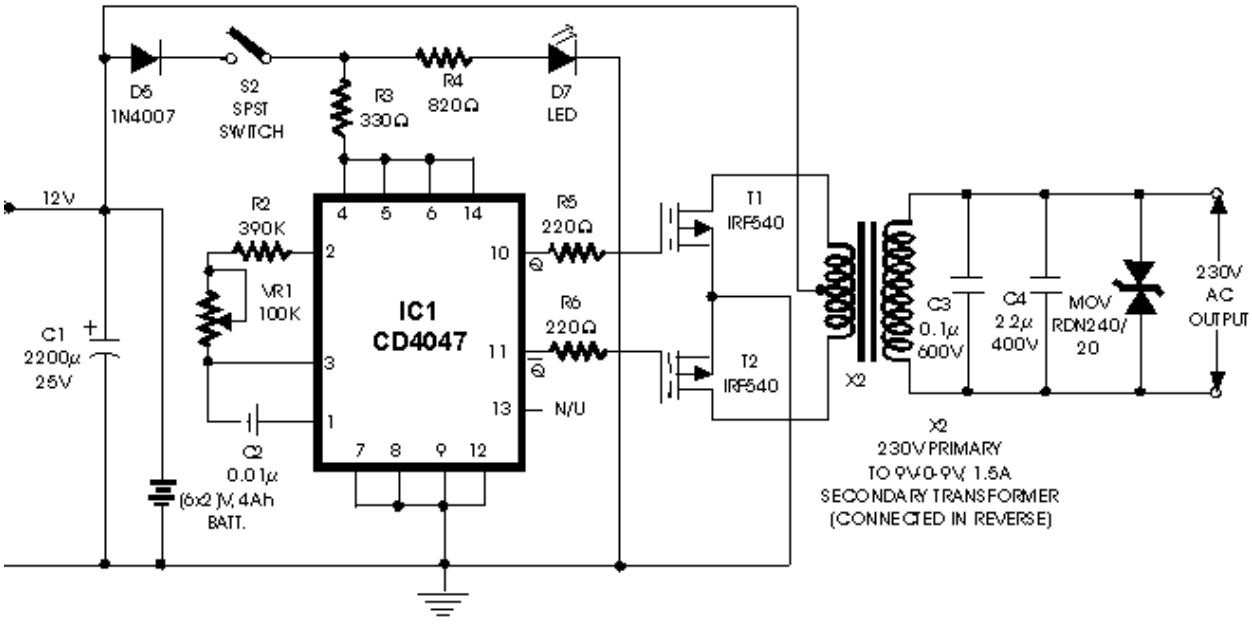


Figure 4.4: mechanism of inverter

CHAPTER: 5

TRANSFORMER

5.1 Introduction

Today I will talk about the introduction to transformer. I will open the total subtleties of its working standard, development, types, and applications. It is broadly utilized for the change of electrical vitality.

5.2 What is transformer definition?

A transformer is a important device which transfer electrical energy from one circuit to another circuit the process of electromagnetic induction. It is most common used to increase and decrease voltage level between circuit.

Figure: 5.2-Transformer

5.3 What do we use transformer

It is need for efficient transmission of electricity transformer is used to step up and step down voltage. In order to prevent this electricity is transmitted at high voltage and low voltage current instead of high current and low voltage.

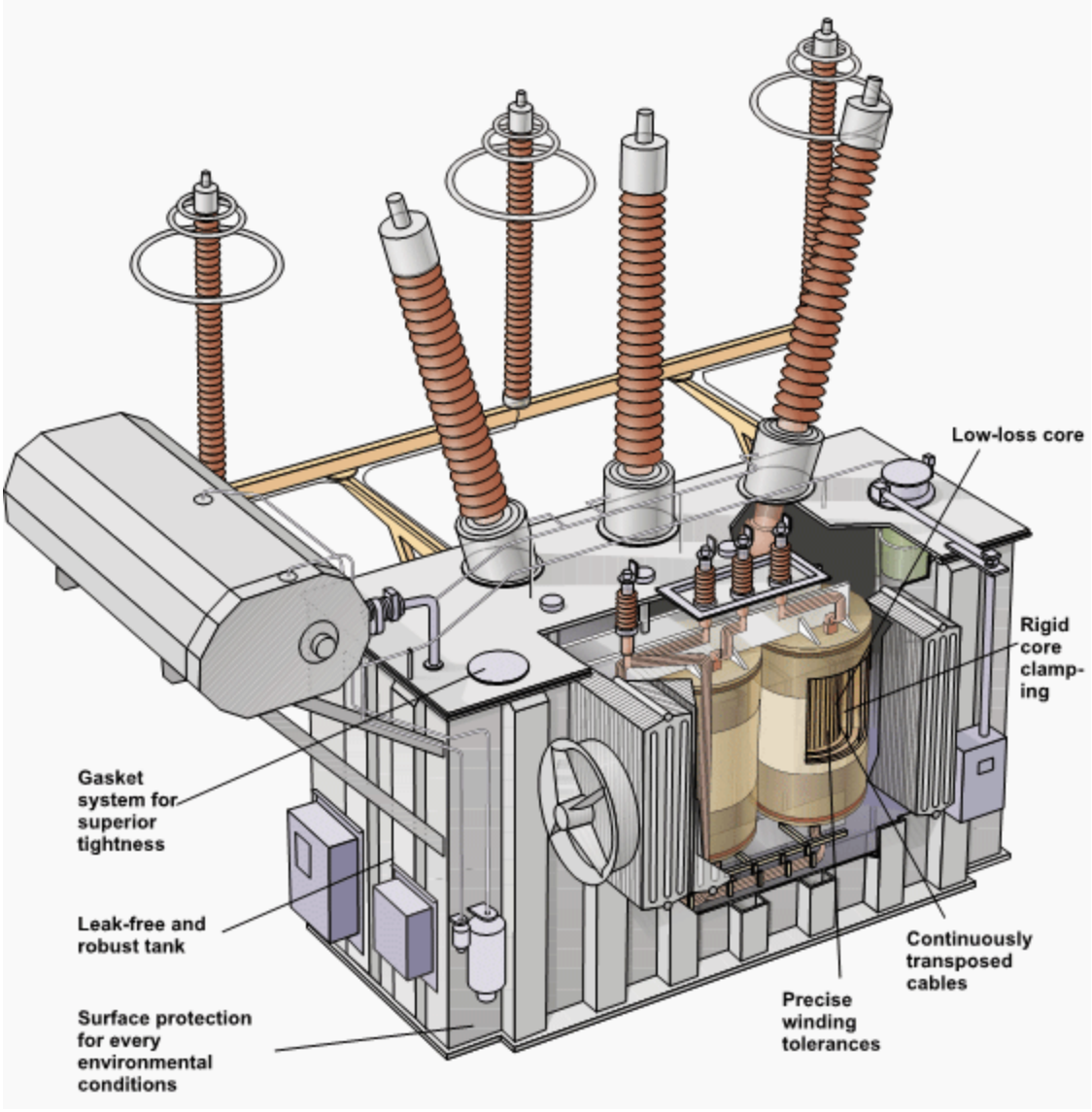


Figure: 5.3-Mechanizm of transformer

5.4 Working principle of transformer

Transformer is a electrical device that consist of wire and oil that very important two parts such as primary and secondary side at first primary side high voltage supply and secondary side

output low voltage. When a transformer primary high voltage supply it transfer low voltage her output.

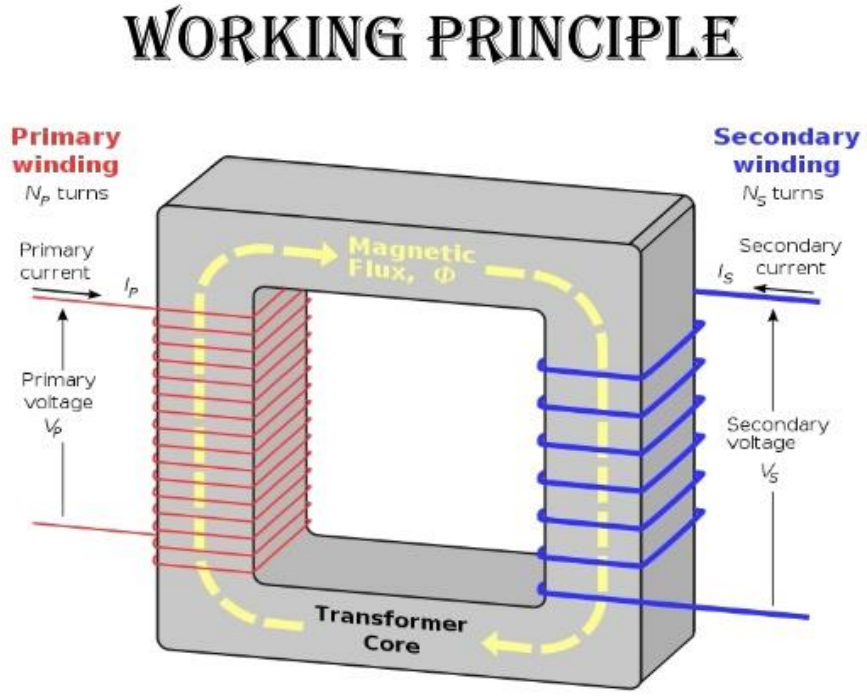


Figure 5.4- Transformer core design

current can then be cut do a lower, safe and useable voltage level when it can be used to supply electrical equipment in my homes and other place and this possible thanks to the basic voltage transformer.

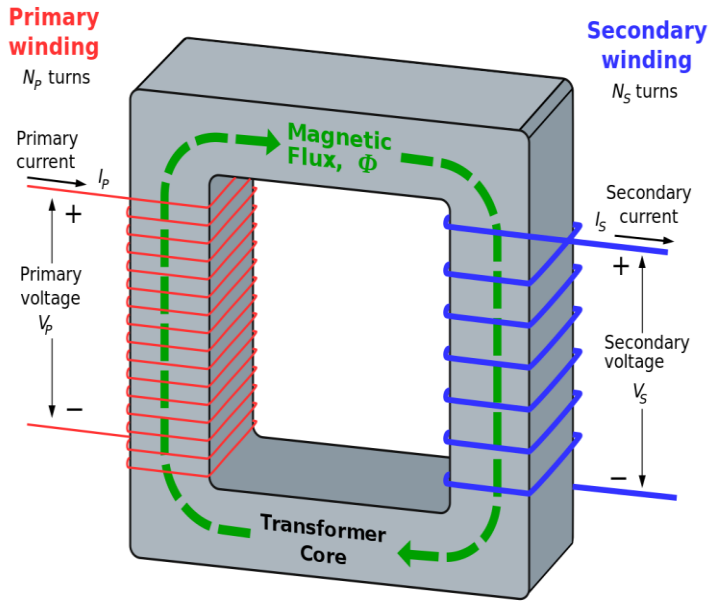


Figure: 5.5-Transformer core

Figure: 5.6-Substation of transformer

The voltage transformer can be through of as an electrical component rather than an electronic component.

CHAPTER-6

PRINTED CIRCUIT BOARD

6.1 Introduction

Printed circuit board (PCB) is the regular name that has been generally talk in electronic or electrical language. it is an electronic circuit that has made with a slim conductive material strip for example copper and it is scratched from fixed layer to protecting material sheet.

6.2 What's a PCB?

Printed circuit board is the most common name but may also be called "printed wiring boards" or "printed wiring cards". Before the advent of the PCB circuits were constructed through a laborious process of point-to-point wiring. This led to frequent failures at wire junctions and short.

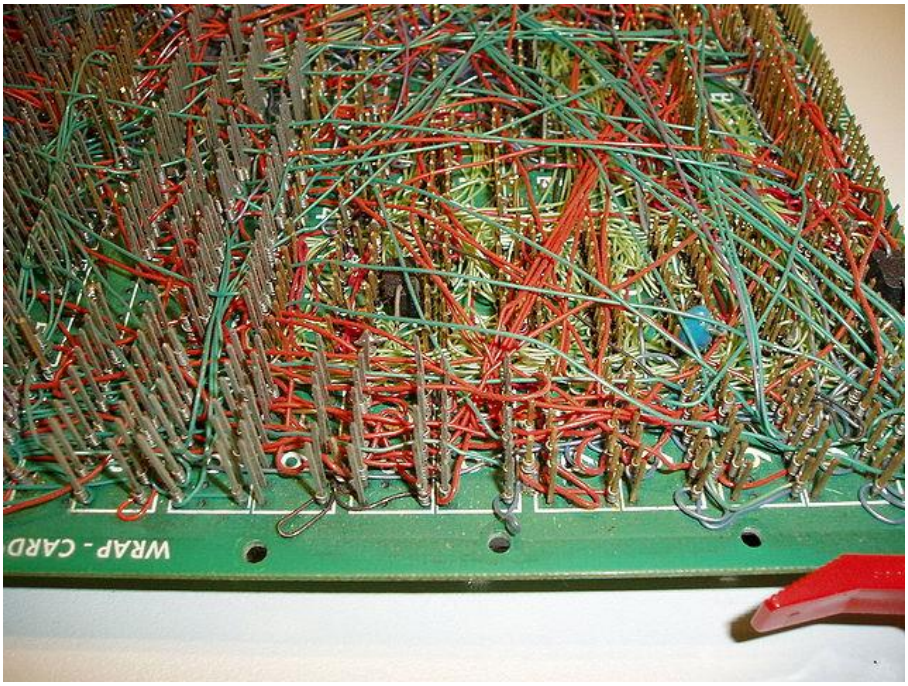


Figure 6.2-Printed circuit board wire connection

A significant advance was the development of where a small gauge wire is literally wrapped around a post at each connection point, creating a gas-tight connection which is highly durable and easily changeable. As electronics moved from vacuum tubes and relays to silicon and integrated circuits, the size and cost of electronic components began to decrease.

6.3 Composition

A PCB is sort of like a layer cake or lasagna- there are alternating layers of different materials which are laminated together with heat and adhesive such that the result is a single object.

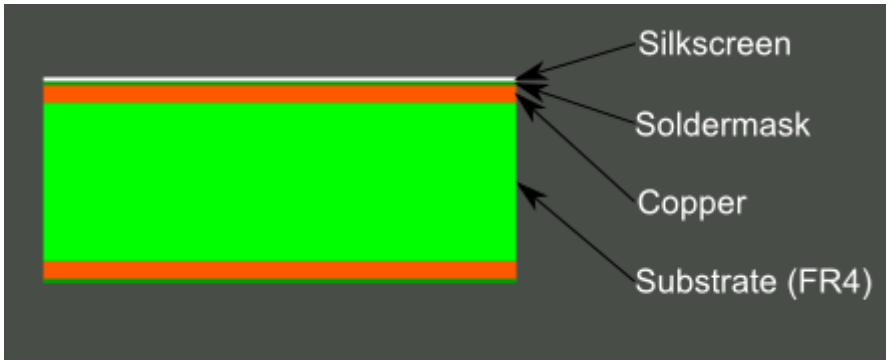


Figure: 6.3-Fiberglass PCB layer

The base material, or substrate, is usually fiberglass. Historically, the most common designator for this fiberglass is "FR4". This solid core gives the PCB its rigidity and thickness. There are also flexible PCBs built on flexible high-temperature plastic (Kempton or the equivalent).

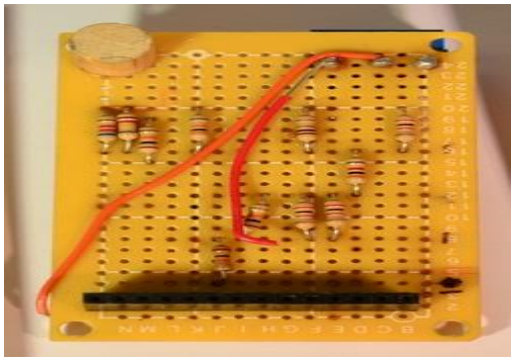


Figure 6.3-Desgine resistor with PCB

Cheaper PCBs and per boards (shown above) will be made with other materials such as epoxies or phenol which lack the durability of FR4 but are much less expensive. You will know you are working with this type of PCB when you solder to it - they have a very distinctive bad smell. These types of substrates are also typically found in low-end consumer electronics.

6.4 Copper

The next layer is a thin copper foil, which is laminated to the board with heat and adhesive. On common, double sided PCBs, copper is applied to both sides of the substrate. In lower cost electronic gadgets, the PCB may have copper on only one side.

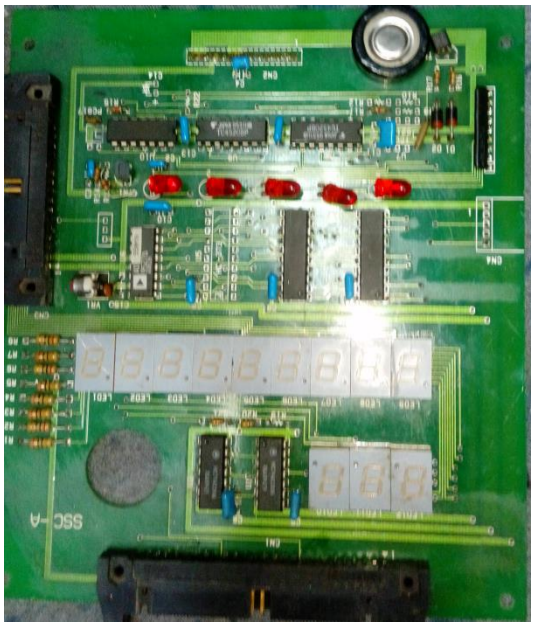


Figure 6.4-Seven segment display with PCB

PCB with copper exposed, no solder mask or silkscreen. The copper thickness can vary and is specified by weight, in ounces per square foot. The vast majority of PCBs have 1 ounce of copper per square foot but some PCBs that handle very high power may use 2- or 3-ounce copper.

6.5 Silkscreen

The white silkscreen layer is applied on top of the solder mask layer. The silkscreen adds letters, numbers, and symbols to the PCB that allow for easier assembly and indicators for humans to better understand the board. We often use silkscreen labels to indicate what the function of each pin or LED.

Figure 6.5-Silk screen diagram

- **Pad** - a portion of exposed metal on the surface of a board to which a component is soldered.
- **Panel** - a larger circuit board composed of many smaller boards which will be broken apart before use. Automated circuit board handling equipment frequently has trouble with smaller boards, and by aggregating several boards together at once, the process can be sped up significantly.

Figure 6.6-PCB connection

A PTH resistor inserted into the PCB ready to be soldered. The legs of the resistor go through the holes. The plated holes can have traces connected to them on the front of the PCB and the rear of the PCB.

CHAPTER- 7

RESISTOR

7.1 Introduction

A resistor is a segment that opposes the progression of power. This progression of power is called current. Every resistor has a worth is known as the ohm, letter omega.

7.2 What is Resistor?

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

Figure 7.2: Simple resistor

7.3 The different types are used resistor such as

Wire wound resistors

Metal film Resistors

Thick film and Thin film resistors

Surface mount resistors

Network resistor

Variable resistors

Light dependent Resistors

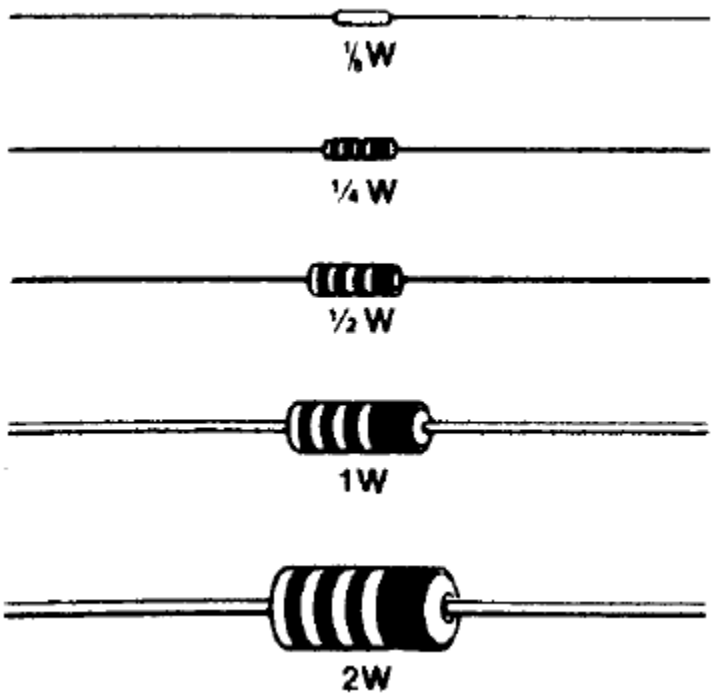


Figure7.3-Types of resistor

7.4 How make a Resistor

To create a wire of resistor one piece of wire has to serve as the path for the electrical current to flow from the resistor to the other. To create a resistor with a small resistance value, use a thicker shorter wire as the path between the two electrical leads.

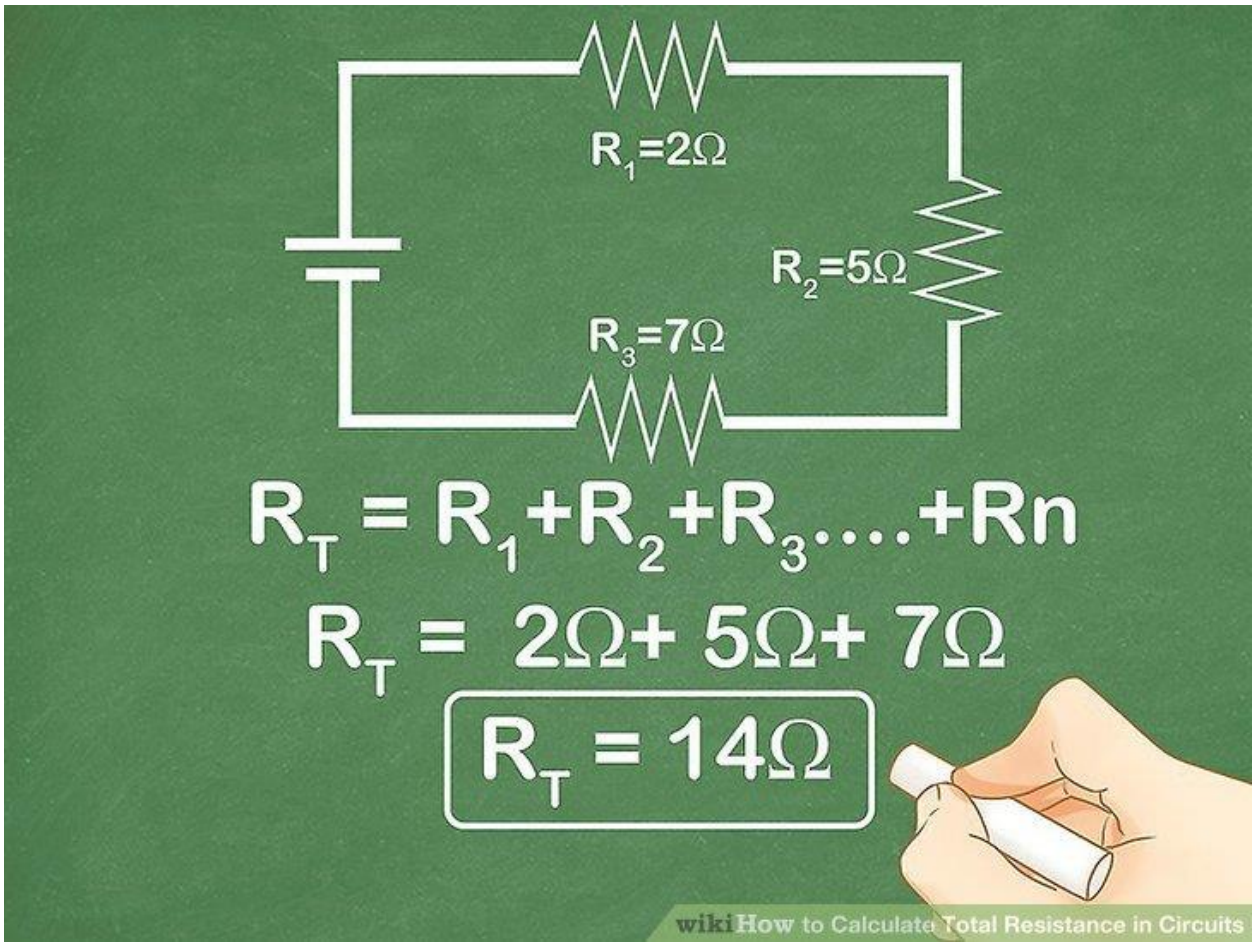
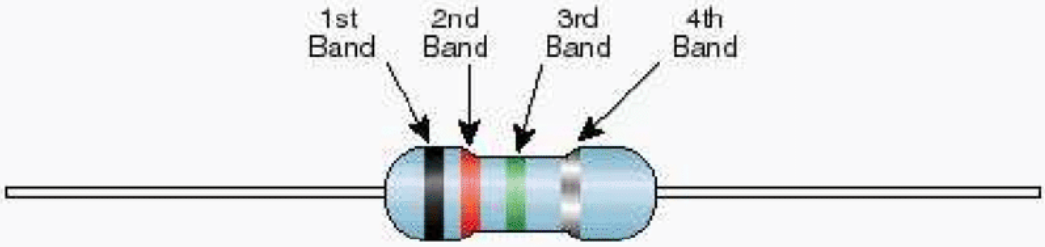


Figure 7.4: How to calculate resistance

7.5 Resistor color code identify

The color code on the first two or three bands correspond to the number from 0 to 9 which represent the significant digit of the resistor ohm value. The last band gives the multiplier. For example, A resistor with brown green and green bands is rested at 15 mega ohms.

Standard EIA Color Code Table 4 Band: ±2%, ±5%, and ±10%



Color	1st Band (1st figure)	2nd Band (2nd figure)	3rd Band (multiplier)	4th Band (tolerance)
Black	0	0	10^0	
Brown	1	1	10^1	
Red	2	2	10^2	±2%
Orange	3	3	10^3	
Yellow	4	4	10^4	
Green	5	5	10^5	
Blue	6	6	10^6	
Violet	7	7	10^7	
Gray	8	8	10^8	
White	9	9	10^9	
Gold			10^{-1}	±5%
Silver			10^{-2}	±10%

Figure 7.5: Calculated color code

7.6 What is the Resistor Function?

The resistor main function in a circuit control the over flow **of** current to other components. Example for LED If the many current flow in the circuit an LED is destroyed. So, a resistor in used to limit current.

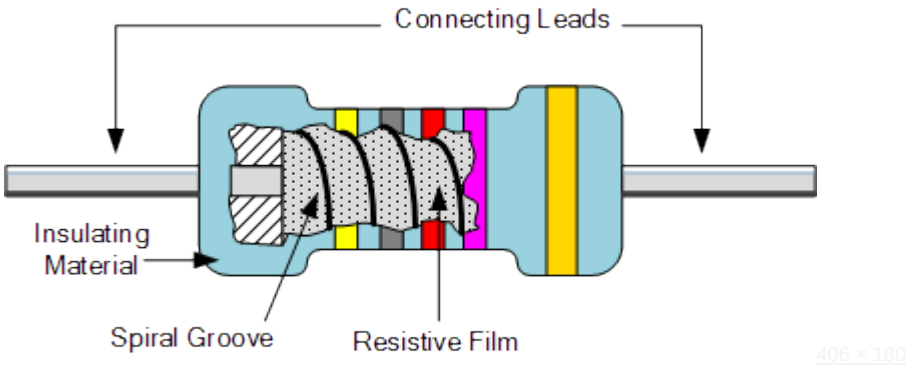


Figure 7.6: Carbon resistor function

7.7 How does a resistor work?

A conductor has a low resistance, that a insulator have much higher. Device called resistor let us introduce controlled amounts of resistance into electrical circuits. A resistor work by converting electrical energy into heat energy by the electrical circuit

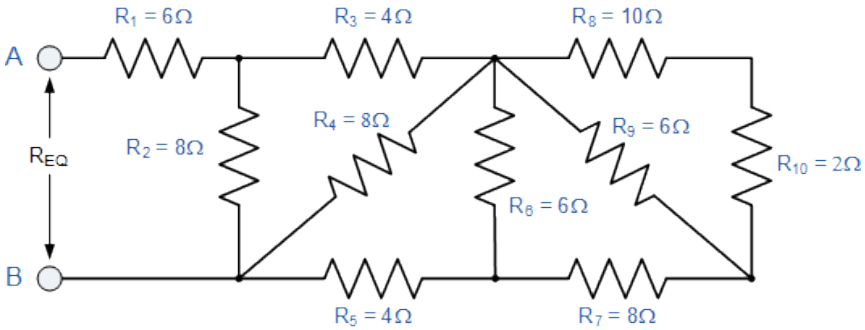


Figure 7.7: Series and parallel work connection

7.8 Advantage or Disadvantage of resistor

Advantage:

The big advantage of resistor is the ability to with stand high energy pulse

When current flows through the resistor the entire body conducts the energy.

Resistor is very cheap and easy to replace.

Disadvantage

It is requires lot of wire.

We cannot increase multiply voltage in circuit

Chapter 8

Integrated circuit

8.1 Introduction

Coordinated circuits have a significant influence in gadgets. Most are extraordinarily made for a particular undertaking and contain up to a huge resistor. Specific reasons for existing IC is for example FM radio, rational squares, controller and even an entire miniaturized scale PCs as a smaller scale controller can be fitted inside a modest bundle.

8.2 What is Integrated Circuit?

A coordinated circuit (IC) now and again called a chip or microchip is a semiconductor wafer on which thousands or a huge number of small resistors, semiconductors, and transistor are manufactured. An IC can work as an enhancer, oscillator, clock, counter, pc memory or microprocessor

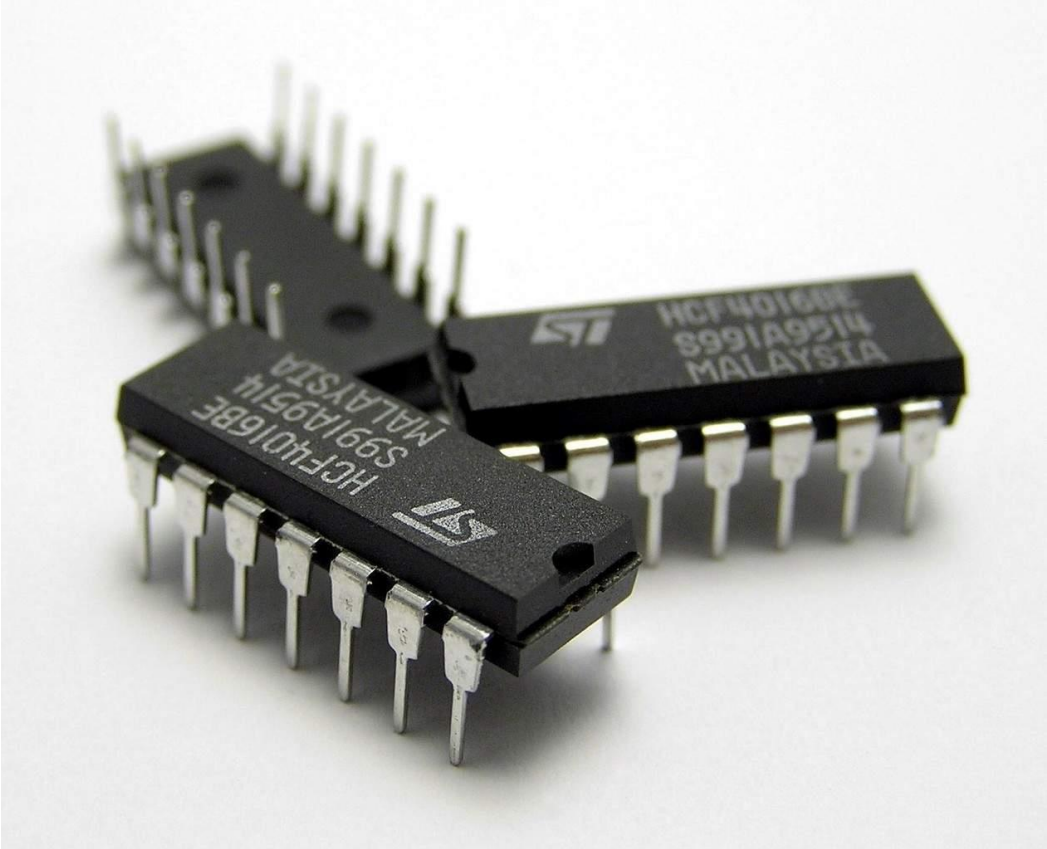


Figure 8.2: Integrated circuit (IC)

8.3 What is the work of integrated circuit?

Sometime called as a chip or microchip is a semiconductor wafer on which a thousand or millions of tiny resistors, capacitors, and transistors are fabricated. An IC can function as a amplifier, oscillator, timer, counter, Computer memory or microchip. Careful IC is ordered as either straight (simple) or advanced relying upon its future application. Incorporated circuits mutilated all that. The key thought was to get a total circuit, with bunches of parts and the associations among them, and reproduces the entire thing in an infinitesimally small structure on the outside of a bit of silicon. It was a staggeringly smart thought and it has made conceivable a wide range of "microelectronic" contraptions extending from advanced watches and pocket number crunchers to Moon-landing rockets and arms with worked in satellite route.

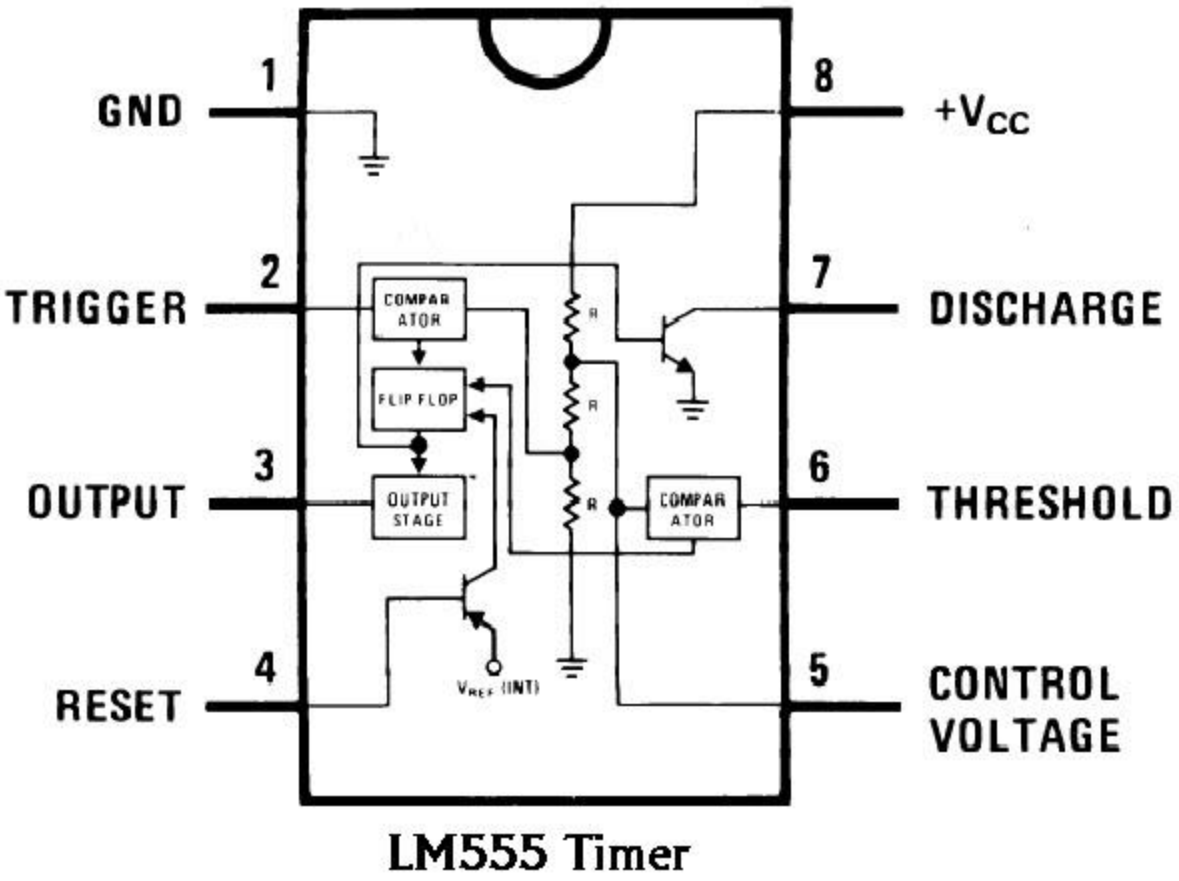


Figure 8.3: Indore connection of integrated circuit(IC)

8.4 How integrated circuit are made

Segments are formed. In a coordinated circuit, electronic segments, for example, resistor, capacitors, diodes, and transistors are shaped straight forwardly on to the outside of a silicon precious stone different do pants bond with the silicon to deliver locales where they do pant jotas have space to take one electron. Traditionally, individuals consider gear fitting into two flawless classes: those that enable power to move through them promptly (conductors) and those that don't (covers).

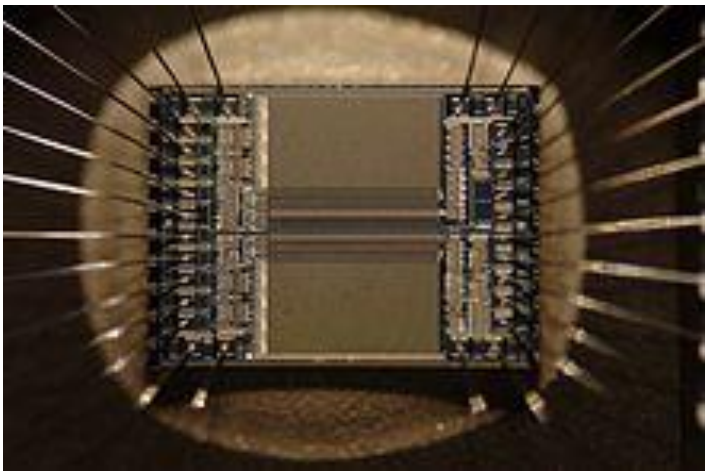


Figure 8.4: Main component of IC

Metals make up the majority of the channels, while nonmetals, for example, plastics, wood, and glass are the protectors. Indeed, the impacts are unquestionably more unpredictable than this, especially with regards to characterizing components in the focal point of the occasional table (in bunches 14 and 15), remarkably silicon and germanium. For the most part, covers are the components that are set up to perform increasingly like conductors in the event that we embed little amounts of polluting influences to them in a method known as doping.

8.5 How is integrated circuit design?

Expected set of responsibilities for an integrated circuit designer IC planner's research plan and regulated circuit structure and generation Creators may be included from venture organization through conclusive generation or be answerable for a specific period of improvement. Integrated

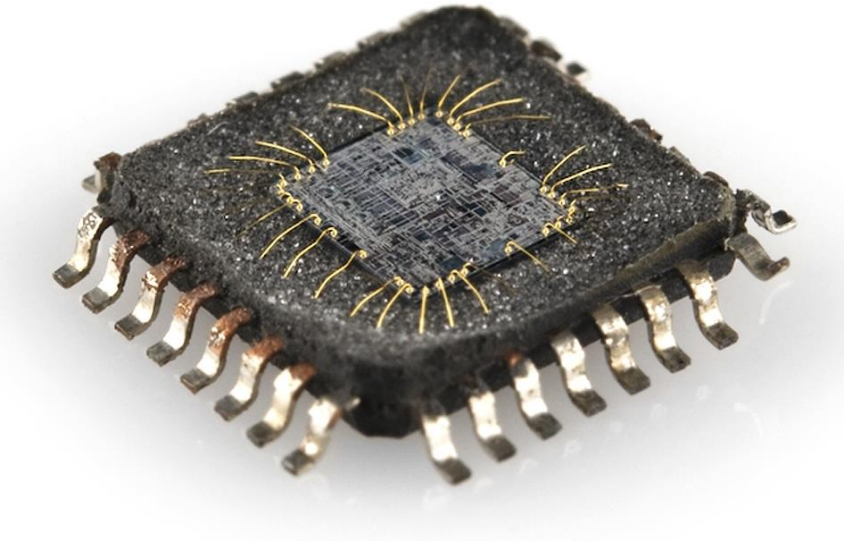


Figure 8.5: Design of integrated circuit

circuit design, or IC design, is a subset of electronics engineering, encompassing the particular logic and circuit design techniques required to design integrated circuits, or ICs. ICs consist of miniaturized electronic components built into an electrical network on a monolithic semiconductor substrate by photolithography. IC design can be divided into the broad categories of digital and analog IC design. Digital IC design is to produce components such as microprocessors, FPGAs, memories (RAM, ROM, and flash) and digital ASICs. Digital design focuses on logical correctness, maximizing circuit density, and placing circuits so that clock and timing signals are routed efficiently.

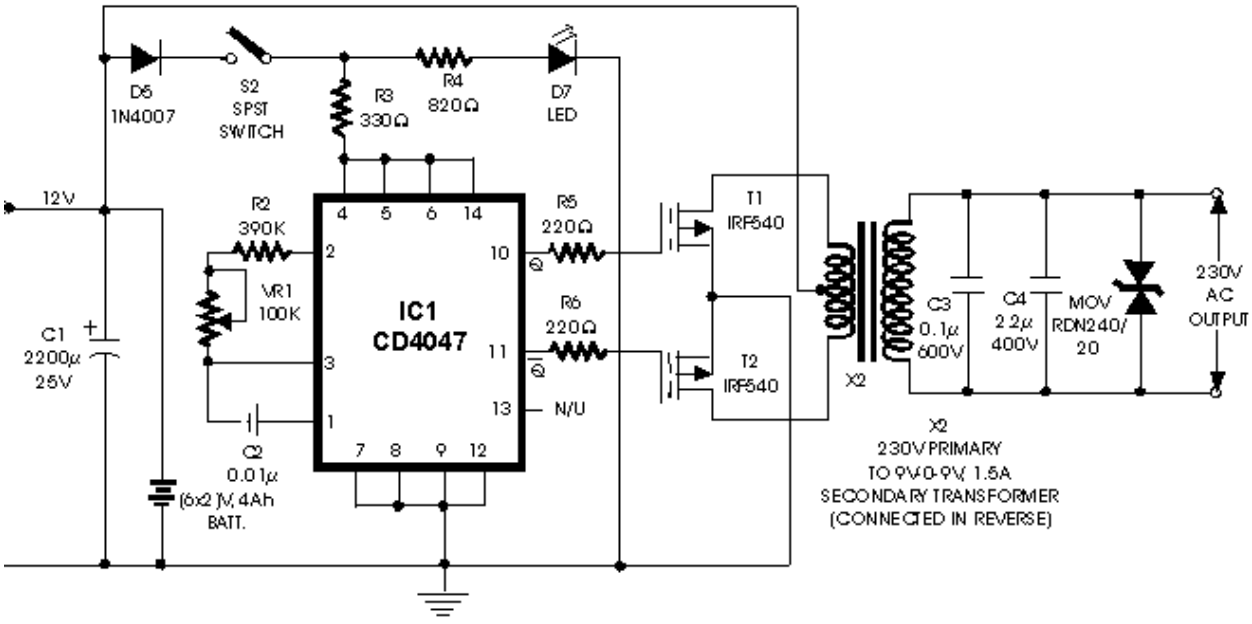


Figure 8.6: fundamental design of IC

Analog IC design also has specializations in power IC design and RF IC design. Analog IC design is used in the design of op-amps, linear regulators, phase locked loops, oscillators and active filters. Simple plan is progressively worried about the material science of the semiconductor gadgets, for example, increase, coordinating, control scattering, and obstruction. Constancy of simple sign intensification and separating is normally basic and accordingly, simple ICs utilize bigger region dynamic gadgets than advanced structures and are typically less thick in hardware.

Figure 8.7: PCB board with IC connection

Present day ICs are tremendously confounded. A normal work station chip, starting at 2015, has more than 1 billion transistors. The guidelines for what can and can't be produced are likewise incredibly intricate. Normal IC procedures of 2015 have in excess of 500 guidelines. Moreover, since the assembling procedure itself isn't totally unsurprising, fashioners must record for its factual nature. The multifaceted nature of present day IC configuration, just as market strain to deliver structures quickly, has prompted the broad utilization of mechanized plan apparatuses in the IC configuration process.

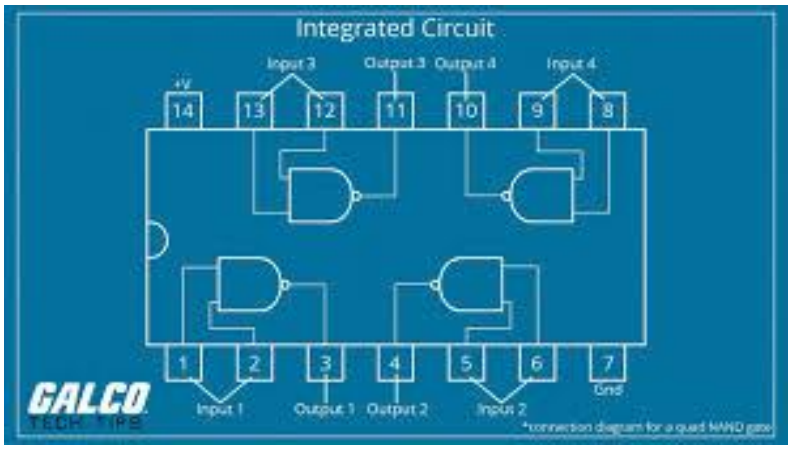


Figure 8.8: Calculation of IC pin number

To put it plainly, the structure of an IC utilizing EDA programming is the plan, test, and check of the directions that the IC is to do.

CHAPTER- 10

Conclusion

I have completed my industrial attachment successfully by the grace of Allah. Industrial attachment sends me to the expected destiny of practical life. The completion of the two-month attachment at Beximco textile Ltd I have got the impression that factory is one of the most modern export oriented composite complex in Bangladesh. It is also possible to use power generation businesses any location. Power generation founds everywhere under the earth surface in Bangladesh. Many power Generation Company in Bangladesh and another country. But am complete my attachment that's power generation company.to increase the base load electricity in Bangladesh need to take long term development project for generation of electricity.to increase the production and the energy cost more down, other country. And finally my attachment is very successfully complete.

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