FREE ENERGY GENERATOR

A Project submitted in partial fulfillment of the requirement for the Award of Degree of Bachelor of Science in Electrical and Electronic Engineering.

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January 2019

Certification

This is to certify that this project and thesis entitled "**Free Energy Generator**" is done by the following students 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 of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering. The presentation of the work was held on January 2019.

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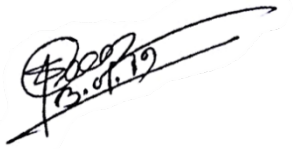

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The project entitled **" Free Energy Generator,"** submitted by **S. M. Rashidul Islam**, ID No: 153-33-2960, and **Liton Chandra Dev Sharmma**, ID No: 153-33-2987, Session: Fall 2015 has been accepted as satisfactory in partial fulfillment of the requirements for the degree of **Bachelor of Science in Electrical and Electronic Engineering** on October 2018.

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DEDICATION

We dedicate this project to our parents.

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LIST OF ABBREVIATIONS

A	Ampere
AC	Alternative Current
DC	Direct Current
C	Capacitance
F	Farad
GND	Ground
IC	Integrated Circuit
I/O	Input Output
K	Kilo
KB	Kilo Byte
LED	Light emitting Diode
mA	Mile Ampere
N/O	Normally Open
N/C	Normally Close
PCB	Printed Circuit Board
R	Resistance
SPST	Single Pole Single Throw
DPDT	Double Pole Double Throw
USB	Universal Serial Bus
V	Voltage
Vin	Input Voltage
Vout	Output Voltage
USB	Universal Serial Bus
MOSFET	Metal-Oxide-Semiconductor Field-Effect Transistor

LIST OF SYMBOLS

Ω	ohm
µF	Microfarad
nF	Nano farad
Q	Charge

ACKNOWLEDGEMENT

First of all, we give thanks to Allah or God. Then we would like to take this opportunity to express our appreciation and gratitude to our project and thesis supervisor **Dr. M. Shamsul Alam, Professor** of **Department of EEE** for being dedicated in supporting, motivating and guiding us through this project. This project can't be done without his useful advice and helps. Also thank you very much for giving us opportunity to choose this project.

Apart from that, we would like to thank our entire friends for sharing knowledge; information and helping us in making this project a success. Also thanks for lending us some tools and equipment.

To our beloved family, we want to give them our deepest love and gratitude for being very supportive and also for their inspiration and encouragement during our studies in this University.

ABSTRACT

At first, we want to say it is not a new invention, it is just a concept that will help us to generate extra energy at a low cost. In this case, we have used one 12v DC motor (need three or more 12v DC motor to get more power) to produce electrical energy. We know it can work as an alternator if we rotate its stator. We have used rotating energy of ceiling fan to rotate its stator. As a result, we get Direct current (DC) from the motor's output(basically it was motor's input terminal) terminal. Then we have used a voltage regulator (Booster Converter) to regulate the voltage to get stable and regulated voltage in the output. we have used a 12V automatic battery charger to charge the battery. It is a backup power source to stand by the whole system when the ceiling fan is switched off. We have also used a 12v solar panel as a backup power source to run the electric generation system when the ceiling fan is not used in the winter season. Then we have used a relay for switching the system to provide uninterrupted power to inverter, converter and 12v DC output port. In Inverter Section, it is inverted 12v to 220v to use AC Appliance. In Converter Section, we have converted 12v to 5v for mobile charging. There is also a 12V output port to use some electrical appliance that needs to operate 12v energy.

CHAPTER 1

INTRODUCTION

1.1 Introduction

There is no such thing as Free Energy. Any electric power from Solar cells, Tidal, Geothermal, Wind, Hydro-electric is only free after we starting up these methods for generating electric power by providing some capital cost. Energy becomes free only after some point since we do not have to pay charges for electric power generated through these non-conventional methods for generating electric power. Hence the concept of using the magnet in the generation of electricity has been around us for a long time.

For many years simple magnets have been used for their magnetic field to produce electric power. They are placed in the inside core of the motors & generators. The basic principle of power generation lies under the magnetic effect. It states that “When a conductor is rotated in a magnetic field, a voltage is induced in the conductor”.

A basic dc motor/generator comprises of a rotor and a stator. The stator of the machine does not move and typically is the external casing of the machine; the rotor is allowed to move and regularly is the inward piece of the machine. Them two are typically comprised of ferromagnetic materials. Spaces are cut on the inward outskirts of the stator and the external fringe of the rotor. Conductors are put in these openings of the stator or rotor. These are interconnected to shape round windings. The twisting in which voltage is initiated is called armature windings and which current is passed field winding. Changeless magnets are utilized in a few machines to give the principle motion of the machine.

The internal windings of the dc motor which is behaving as a generator. The windings are coiled around a cavity in which the shaft is inserted & rotated to produce the electric power.

1.2 Background Study

Electricity crisis is the burning question in our country now. Our main source of electricity production is the natural gas which is a shortage and is going to run out. Some power stations are furnace controlled and some others are oil dependent. This sort of power stations is more expensive and they are not environmental friendly. They produce greenhouse gas and it destroys the Ozone layer which is cause for global warming. There are some possible solutions for that, but they have not been widely adopted. We can also move towards renewable resources. In summer season we use ceiling fans. It's a common thing for everybody. But using this ceiling fan if we can generate electricity it will be a plus point for us.

1.3 Problem Statement

Free Energy Generator came into existence because of the Crisis of power in our country and it is one of the major problems in country. Day by day the gap between demand and production is increasing. In addition, the majority of the power plants are gas based which will be eliminated later on. Abuse, framework misfortune and debasement in the influence area are the primary issue with respect to this emergency. It is conceivable to control stack request by utilizing a minimal fluorescent light (CFL), the change of the occasion, appropriate load the executives, empowering Independent Power Producers (IPP) and decreasing transmission misfortune. It is possible to solve the problem but needs more time. Our free energy generator can solve this problem by generating energy.

1.4 Objectives

The main goal or objective is to create the Free Energy Generator to produce electrical energy at a low cost. Also, some of the objectives are,

1. To solve the electricity problem in our country.
2. To provide uninterrupted electricity.
3. To generate free energy at a low initial cost.
4. To save energy for saving the world.
5. To reduce electricity bills.
6. To reduce load shedding and ensure electricity for every house.

1.5 Scopes

In this paper, by integrating the basics of a generator and a motor, we successfully have a newer concept of free energy generator which can run on a small amount input & gives a good amount of electric energy and it can be used for many purposes. The paper revolves around the construction, working & applications of free energy generator & its future enhancements. This structure may turn out to be a pioneer in the field of research of free vitality. Now it is possible to generate free electricity from this which can be used our home. This concept of free energy is can be made using simple DC motors.

1.6 Research Methodology

Electricity crisis is a common problem in our country. Day by day we producing more energy but it is not enough for the demand. Our free energy generator can solve the problem. Free Energy Generator can produce Direct Current (12v and 5v) and Alternating Current (220v, 50Hz). It generates the energy section wise. If one section is unable to generate electricity other section will continuously generate the electricity. There are also three types of power input system.

During the preparation of the report help from supervised by faculty Dr. M. Shamsul Alam, Professor of Daffodil International University. Although there were several sources but here some are mentioned as for the proper references.

1.7 Project Outline

This project is organized as follows:

Chapter 1 : Introduction.

Chapter 2 : Analysis of the system component.

Chapter 3 : Hardware development.

Chapter 4 : Result and discussions.

Chapter 5 : Conclusions

CHAPTER 2

ANALYSIS OF THE SYSTEM COMPONENT

2.1 Introduction

Our project Free Energy Generation has seven section. This chapter will be explaining about the main components of the sections of this project.

2.2 Component

The Free Energy Generator has the following main components.

2.2.1 Power Input section:

i. 12v DC motor.
ii. Lithium Ion Battery.
iii. DPDT Switch.
iv. Power Jack.

2.2.2 Inverter section:

i. 12-0-12, 3000mA Transformer.
ii. IC-CD4047.
iii. MOSFET (IRFZ44N).
iv. Resistor (100 Ω/0.5W).
v. Potentiometer (22kΩ).
vi. Capacitor (0.22µF).
vii. Aluminum Heat Sink

2.2.3 Power Converter Section:

i. Voltage Regulator IC- LM7805.
ii. Voltage Regulator IC- LM7812.
iii. Aluminum Heat Sink.
iv. Connecting Wires.

2.2.4 Automatic Switching Section:

i. 12v Relay (8 Pin).
ii. Relay Base.

2.2.5 Automatic Battery Charger Section:

i. SCR1-TYN612.
ii. SCR2-TYN604.
iii. LED(Green, Red)
iv. Diode(1n4007).
v. Potentiometer (10kΩ)
vi. Capacitor (100µF/25v)
vii. Zener Diode(6.8v/1w)
viii. Resistor(2.2KΩ, 1.5KΩ, 10KΩ, 560Ω).
ix. Connecting Wires.

2.2.6 Cooling Section:

i. 12v DC Cooling Fan.
ii. Power Switch(SPST).
iii. Connecting Wires

2.2.7 Power Output Section:

i. USB Port(Female).

ii. LED(Green, Red)

iii. 220v, 6A Power Switch (SPST).

iv. 220v, 6A Socket (2 Pin).

v. Fuse Holder.

vi. Fuse.

vii. Connecting Wires.

2.3 Transformer

Fig. 2.1 Transformer

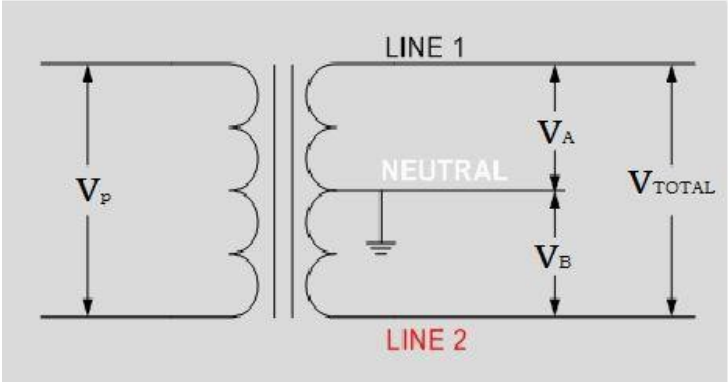

Fig. 2.2 Transformer circuit representation

A Transformer is a device and it transfers electric current from one circuit to another, usually by the principal of mutual induction. During this process, the frequency remains constant whereas the voltage can be increased or decreased according to the need.

2.3.1 Working of the Transformer

The two voltages, between neutral and line 1 and between line 2 and neutral can be named as VA and VB respectively. Then the mathematical relation of these two voltages shows, they are dependent upon the primary voltage as well as the turn ration of the transformer.

$VA = (NA / NP) * VP$

$VB = (NB / NP) * VP$

One important thing here is that both the outputs VA and VB respectively are equal in magnitude but opposite in direction, which means that they are 180 degrees out of phase with each other. So, we also use a full wave rectifier with a center tapped transformer, to make both the voltages in phase with each other.

2.4 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. Transfers are utilized where it is important to control a circuit by a different low-control flag, or where a few circuits must be controlled by one flag. The first transfers were utilized in long separation broadcast circuits as intensifiers: they rehashed the flag rolling in from one circuit and re-transmitted it on another circuit. Transfers were utilized widely in phone trades and early PCs to perform sensible tasks.

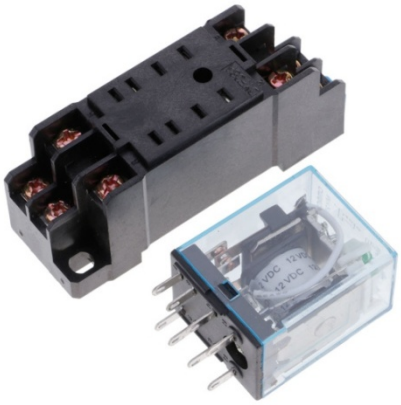

Fig : 2.3 12v Relay (8 pin)

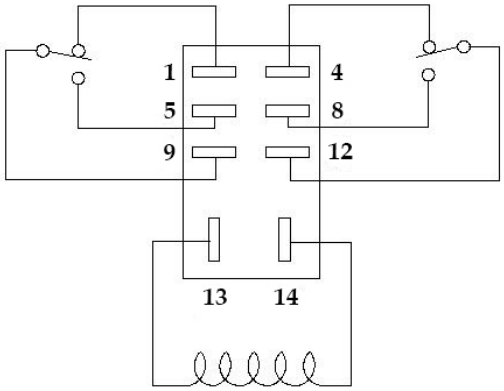

Fig : 2.4 Wire diagram of 8 pin relay

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".

2.5 IC CD4047:

It is very popular IC for us. It can work both Astable and Monostable mode in a circuit. Main this IC is used for generating clock pulse like sine wave, square wave and many others. This IC is also used in application of timing delay circuits, frequency multiplier and frequency divider. This IC is very helpful to generate an envelope signal from the original signal.

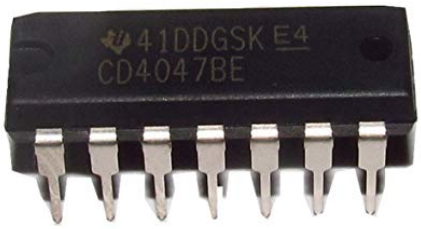

Fig : 2.5 CD4047 IC

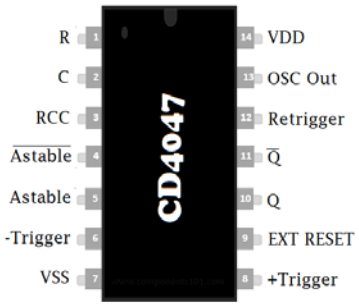

Fig : 2.6 pin function of CD4047 IC

2.5.1 Features

- Power Consumption is low
- Can work Monostable mode and Astable mode
- High noise resistance
- Only one resistor and capacitor required externally
- Standardized, symmetrical output characteristics

2.5.2 Monostable Features

- Retrigger able option for pulse width expansion
- Positive and negative edge trigger
- Output pulse width independent of trigger pulse duration

2.5.3 Astable Features

- It can perform free operating modes
- Duty cycle is good, its about 50%
- Output measureable in Oscillator
- Stability of Astable frequency is good

2.6 MOSFET :

The MOSFET (Metal Oxide Semiconductor Field Effect Transistor) transistor is a semiconductor device and it is widely used for switching and amplifying electronic signals in the electronic devices. It is a core of integrated circuit and it can be designed and fabricated in a single chip because of these very small sizes. The MOSFET is a four terminal device with source(S), gate (G), drain (D) and body (B) terminals. The body of the MOSFET is frequently connected to the source terminal so making it a three terminal device like field effect transistor. The MOSFET is the most common transistor and it can be used in both analog and digital circuits.

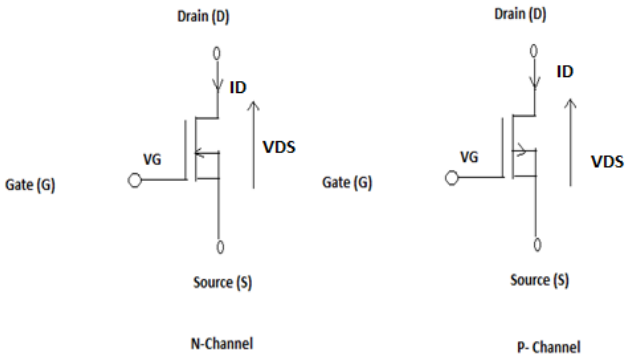

Fig : 2.7 Deflection-mode of MOSFET

2.6.1 IRFZ44N:

IRF-Z44N is a power MOSFET and basically belongs to the family of Metal Oxide Semiconductor Field Effect Transistor (MOSFET). It belongs to the N-channel family. It uses "**Trench**" technology and it is enveloped in a plastic structure. Its state resistance is very low. It has zener diode which provides ESD protection up to 2 kilo-volt. Its price is very low and can provide higher efficiency. It is commonly available in the electronic shops these days and is mostly known because of its vast applications.

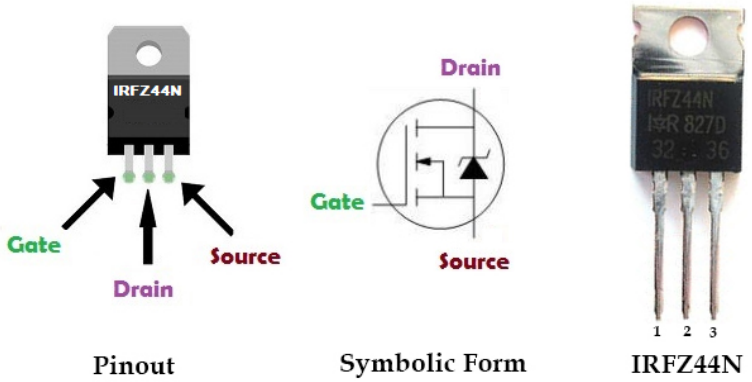

Fig : 2.8 IRFZ44N

IRFZ44N Pin Name	
Sr. No	Pin Name
1	Gate
2	Drain
3	Source

Table : 2.1 pin function of IRFZ44N

IRFZ44N Ratings		
Parameters	**Values**	**Units**
Drain source voltage (V_{DS})	55	V
Drain current (DC)	49	A
Drain source on state resistance	22	mΩ
Total power dissipation (P_{total})	110	W
Junction temperature (T_j)	175	°C

Table : 2.2 Ratings of IRFZ44N

2.7 Boost Converter

DC-DC boost converter is a step-up power module and it has a high-precision potentiometer, and it uses XL6009E1 with the second generation of high-frequency switching technology as core chip, as a result its performance is much higher than the first-generation technology LM2577. I has a high switching frequency of 400KHz, even small-capacity filter capacitors can bring with very nice results, while the ripple is less and the size is smaller.

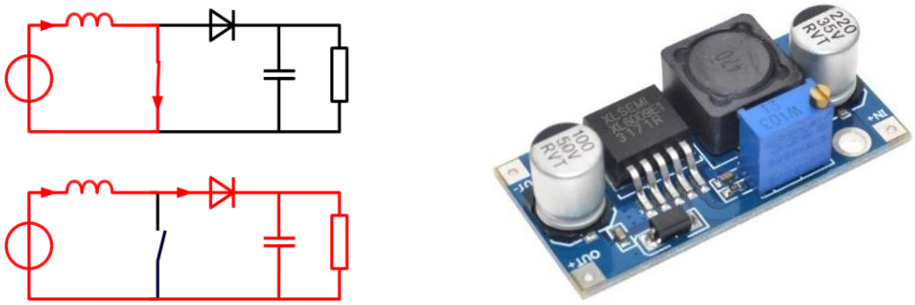

Fig: 2.9 Schematic Diagram and Module of Boost Converter.

2.8 Power Source:

We have used Battery, DC motor and a Solar Panel (optional) as a power supply or power source.

2.8.1 DC Motor:

Motor is a device that can transforms the electrical energy into mechanical energy. The working principle of the motor is the interaction between the magnetic field and the current to produce a force within the motor which helps the motor to do work. Its principle is basically based on Faraday's Law, which states that, it is the conservation of electrical and mechanical energy.

DC motor is one type of motor and it uses the DC current to convert electrical energy into mechanical energy. When the electric current passes through a coil in a magnetic field, a magnetic force will be generated, which produces a torque in the DC motor.

2.8.1.1 Main parts of DC motor:

1. Stator
2. Rotor
3. Winding
4. Air gap
5. Commutator

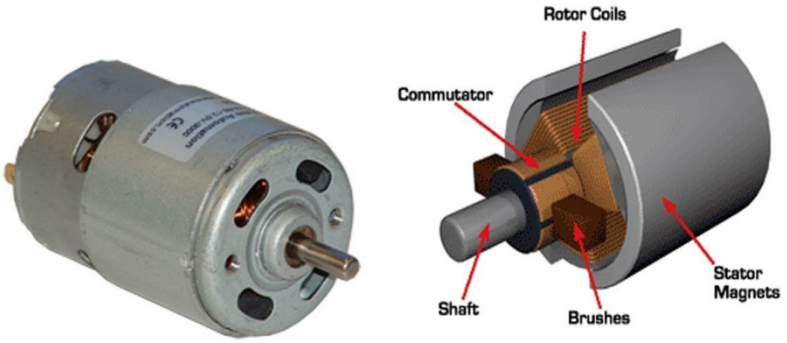

Fig : 2.10 DC Motor and its component name

A 12v DC motor is small and inexpensive, yet powerful enough to be used for many applications.

2.8.2 Battery:

Batteries are a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit. The three basic components of a batteries are: an anode, a cathode, and some kind of electrolyte.

At the point when the anode and cathode of a battery is associated with a circuit, a substance response happens between the anode and the electrolyte. This response makes electrons move through the circuit and once again into the cathode where another substance response happens. When the material in the cathode or anode is consumed or no longer able to be used in the reaction, the battery is unable to produce electricity.

We use two type of battery, number one is 3.7-volt li-polymer battery for transmitter

circuit inside of helmet, and number two is 12-volt sulfuric acid battery from Motorcycle for Receiver Circuit.

Fig: 2.11 18650 Li-Polymer Battery.

2.8 Solar Panel:

Solar panel is a device which is used to absorb the sun's rays and convert them into electricity or heat.

A solar panel is actually a collection of solar or photovoltaic cells. It can be used to generate electricity through photovoltaic effect. These cells are arranged in a grid like a pattern on the surface of solar panels.

Fig: 2.12 Solar Panel with connecting wire

2.9 Power Switch

Power switch is very common and important element in electrical design. It is a controlling device. It can "make" or "break" an electrical circuit, interfering with the flow or redirecting it starting with one conduit then onto the next. The system of a switch expels or reestablishes the directing way in a circuit when it is worked. A switch will have at least one arrangements of contacts, which may work at the same time, successively, or on the other hand. Switches in powerful circuits must work quickly to counteract ruinous arcing, and may incorporate unique highlights to aid quickly intruding on a substantial current.

Fig: 2.13 DPDT Switch.

Fig: 2.14 SPST Switch.

2.10 Power Connector

Barrel connectors are ordinarily found on minimal effort purchaser hardware which can be connected to divider control by means of massive AC divider connectors. Divider connectors are generally accessible, in an assortment of intensity evaluations and voltages, making barrel connectors a typical means for interfacing capacity to little tasks.

The female barrel connector can be obtained in a few assortments: PCB mounted link mount, or board mount. A portion of these connectors will have an extra contact that enables the application to identify whether a power supply is connected to the barrel

jack or not, in this manner enabling the gadget to sidestep batteries and spare battery life when running on outside power.

Fig: 2.15 Power Connector (Male and Female).

2.11 Voltage regulator IC

The LM78XX series of three terminal positive regulators are available in the TO-220 package and its several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. In a suitable heat sink it can deliver over 1A output current. It is designed primarily as fixed voltage regulators but now a days these devices can be used with external components to obtain adjustable voltages and currents.

2.11.1 Specification of LM7805 Voltage Regulator IC

i. Input voltage range 7V to 35V.

ii. Current rating I_C = 1 A.

iii. Output voltage range V_{Max} = 5.2V, V_{Min} = 4.8V.

2.11.1.1 Pin Function of LM7805 Voltage Regulator IC.

Pin NO	Pin Name
1	Input pin
2	Ground pin
3	Output pin

Table: 2.3 Pin Function of LM7805 IC.

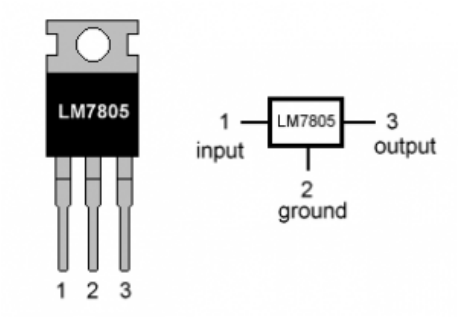

Fig: 2.16 Voltage Regulator IC.

2.11.2 Specification of LM7812 Voltage Regulator IC

i. Input voltage range 7V to 35V.

ii. Current rating I_C = 1 A.

iii. Output voltage range V_{Max} = 12.5V, V_{Min} = 11.5V.

2.11.2.1 Pin Function of LM7812 Voltage Regulator IC.

Pin NO	Pin Name
1	Input pin
2	Ground pin
3	Output pin

Table: 2.4 Pin Function of LM7812 IC.

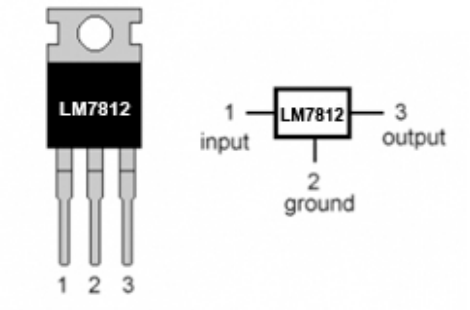

Fig: 2.17 Voltage Regulator IC.

2.12 Resistor

The resistor is a very important electrical part to make opposition in the stream of electrical flow. They can be found in every electrical system and electrical circuits. Its obstruction is estimated in ohms. It is the opposition that happens when a current of one ampere goes though a resistor with a one volt drop over its terminals. The current is relative to the voltage over the terminal closures. This proportion is spoken to by Ohm's law and it is given by,

$$R = \frac{V}{I}$$

Resistor are used for some reasons. A couple of models incorporate delimiter electric flow, warm age, voltage division, control gain, coordinating and stacking circuits, and fix time constants. They can be utilizes to as electric brakes to disperse motor vitality from trains, or be litter than a square millimeter for gadgets.

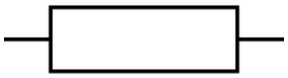

Fig: 2.18 Fixed Resistor Symbol.

Fig: 2.19 Fixed Resistor Symbol (ANSI).

2.12.1 Type of Resistor

i. Fixed Resistor.
ii. Variable Resistor.
   a. Potentiometer.
   b. Rheoter.
   c. Trimpot.
iii. Resistance depend on a physical quantity.
   a. Thermistor.
   b. Photo Resistor.
   c. Varistor.
   d. Magneto Resistor.
   e. Strain Gauges Resistor.
iv. Material base.
   a. Carbon composition.
   b. Carbon film.
   c. Metal film.
   d. Metal oxide film.
   e. Wire-wound.
   f. Foil.

2.12.2 Resistor Color Code

The obstruction esteem and resistance are shown with a few hued groups around the segment body. This stamping method of electronic segments was at that point created in the 1920's. Printing innovation was as yet not far created, what made printed numerical codes excessively troublesome on little segments. These days, the shading code is as yet utilized for most hub resistors up to one watt. In the figure a precedent is appeared with four shading groups. In this precedent the two first groups decide the noteworthy digits of the obstruction esteem, the third band is the duplicating factor and the fourth band gives the resistance. Each shading speaks to an alternate number and can be gazed upward in a resistor shading code table.

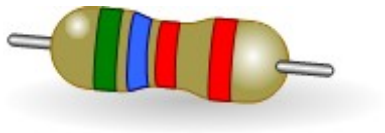

Fig: 2.20 Resistor.

Color	Value	Multiplier	Tolerance
Black	0	1 ohm	
Brown	1	10 ohm	1%
Red	2	100 ohm	2%
Orange	3	1 k ohm	
Yellow	4	10 k ohm	
Green	5	100 k ohm	0.5%
Blue	6	1 M ohm	0.25%
Violet	7		0.1%
Grey	8		
White	9		
Gold			5%
Silver			10%
No Color			20%

Table: 2.5 Resistor color code

There are another method to memorized resistor color code value. That is, “BB ROY Good Boy Very Good Worker” in this system every capital word have a number, which is start from 0 to 9. That mean,

B = Black	= 0	G = Green	= 5
B = Brown	= 1	B = Blue	= 6
R = Red	= 2	V = Violet	= 7
O = Orange	= 3	G = Grey	= 8
Y = Yellow	= 4	W = White	= 9

2.12.3 Example 2.1: There are a resistor which first band is Red = 2, Second band is Violet = 7, Third band is Orange = 3, and fourth band is Gold = 5%, Then calculate the resistor value of R=?

Solution:

Given,

First band = 2

Second band = 7

Third band = 3

Fourth band = 5%

We know that,

R = First band Second band x 10^Third band

R= 27 x 10^3

R= 27000 ohm = 27 K ohm

So, this is the answer of Resistor R= 27 K ohm

2.12.4 Series and Parallel Resistor formula

2.12.4.1 Series:

Formula: $R_T = R1 + R2 + R3 + R4 + etc.$

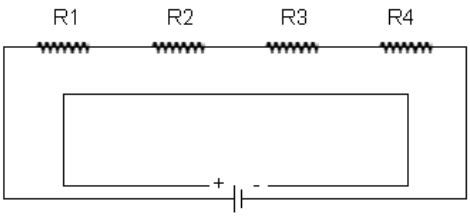

Fig: 2.21 Resistor Series Circuit.

2.12.4.2 Parallel :

Formula: $R_T = 1 / (1/R1 + 1/R2 + 1/R3 + 1/R4 + etc.)$

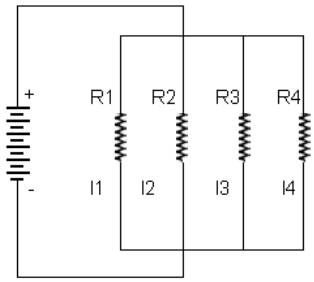

Fig: 2.22 Resistor Parallel Circuit.

2.13 Potentiometer

A Potentiometer is a three terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. If only two terminals are used, one end and the wiper, it acts as a variable resistor or rheostat. Potentiometers are commonly used to control electrical devices such as volume controls on audio equipment. Potentiometers operated by a mechanism can be used as position transducers, for example, in a joystick, potentiometers are rarely used to directly control significant power, since the power dissipated in the potentiometer would be comparable to the controlled load.

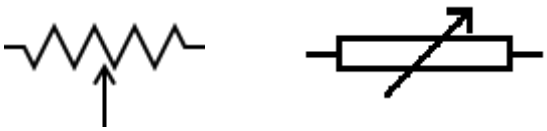

Fig: 2.23 Symbol of Potentiometer.

Fig: 2.24 Different Type of Potentiometer.

2.14 Capacitor

Capacitor is a passive two-terminal electrical component used to store energy in an electric field. The forms of practical capacitors vary widely, but all contain at least two conductors separated by a non-conductor. Capacitors used as parts of electrical systems, for example consist of metal soils separated by a layer of insulating film. A capacitor is passive electronic component consisting of a pair of conductors separated by a dielectric (insulator) when there is a potential difference (voltage) across the detected on one plate and negative charge on the other plate. Energy is stored in the electrostatic field and is measured in farads.

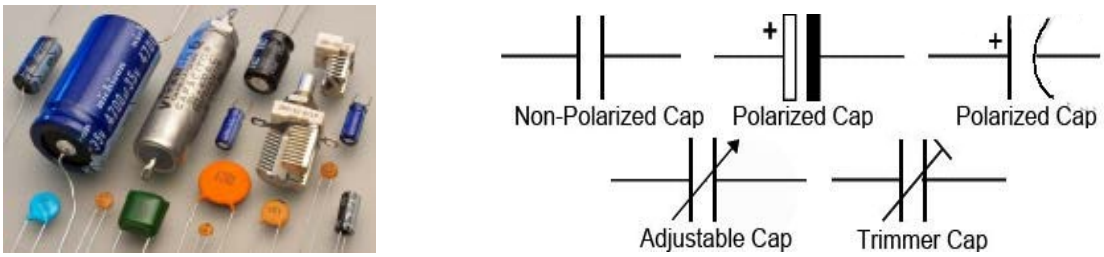

Fig. 2.25 Capacitors & Capacitor symbols.

2.14.1 Theory of Operation

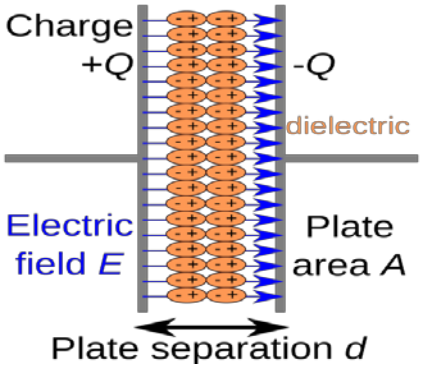

Fig : 2.26 Internal constriction of capacitors

A capacitor consists of two conductors separated by a non-conductive region. The non-conductive region is called the dielectric. In simpler terms, the dielectric is just an electrical insulator. Examples of dielectric media are glass, air, paper, vacuum, and even a semiconductor depletion region chemically identical to the conductors. A capacitor is assumed to be self-contained and isolated, with no net electric charge and no influence from any external electric field. The conductors thus hold equal and opposite charges on their facing surfaces, and the dielectric develops an electric field. In SI units, a capacitance of one farad means that one coulomb of charge on each conductor causes a voltage of one volt across the device.

An ideal capacitor is wholly characterized by a constant capacitance C, defined as the ratio of charge ±Q on each conductor to the voltage V between them:

$$C=\frac{Q}{V}$$

Because the conductors (or plates) are close together, the opposite charges on the conductors attract one another due to their electric fields, allowing the capacitor to store more charge for a given voltage than if the conductors were separated, giving the capacitor a large capacitance.

Sometimes charge build-up affects the capacitor mechanically, causing its capacitance to vary. In this case, capacitance is defined in terms of incremental changes:

$$C=\frac{dQ}{dV}$$

2.15 Diode

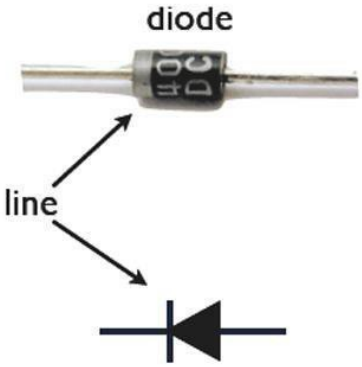

Fig. 2.27 Diode and symbol

The term diode usually implies a small signal device with current typically in the milliamp range. A semiconductor diode consist of a PN unction and has two (2) terminals, an anode (+) and cathode (-) current flows from anode to cathode within the diode. Diodes are semiconductor device that might be described as passing current in one direction only. The latter part of that statement applies equally vacuum tube diodes. Diodes however are far more extremely versatile in fact. Diode can be used as rectifier,

voltage regulators, turning devices in radio frequency tuned circuit, frequency multiplying device in radio frequency circuit, mixing devices application or can be used to make logic decision in digital circuit.

2.15.1 Characteristics

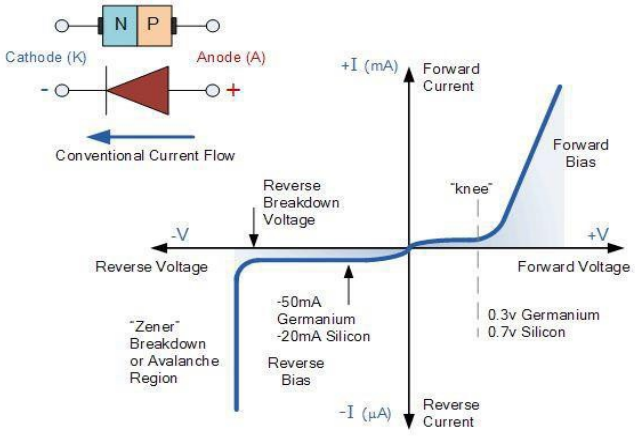

Fig. 2.28 Junction diode symbol and static I-V characteristics

There are two operating regions and three possible “biasing” conditions for the standard Junction Diode and these are:

- 1. Zero Bias – No external voltage potential is applied to the PN junction Diode

- 2. Reverse Bias – The voltage potential is connected negative, (-ve) to the P type material and positive, (+ve) to the N-type material across the diode which has the effect of Increasing the PN junction diode’s width.

- 3. Forward Bias – The voltage potential is connected positive, (+ve) to the P type material and negative, (-ve) to the N-type material across the diode which has the effect of Decreasing the PN junction diodes width.

2.15.2 Types of Diode :

There are different types of diodes are available for electronics design, namely; a Backward diode, Gunn Diode, BARITT diode, Laser diode, Schottky diodes, Light emitting diodes, Photodiode, PIN diode, PN Junction, , Step recovery diode, Varactor diode, Tunnel diode and a Zener diode.

2.15.3 Full Wave Rectifier:

A rectifier is an electronic circuit that converts AC voltage to DC voltage. It can be implemented using a capacitor diode combination. The unique property of diodes, permitting the current to flow in a single direction is utilized in here. It converts an ac voltage into a pulsating dc voltage using both half cycles of the applied ac voltage. Bridge rectifier is a full wave rectifier circuit using the combination of four diodes to form a bridge. It has the advantage that it converts both the half cycles of AC input into DC output.

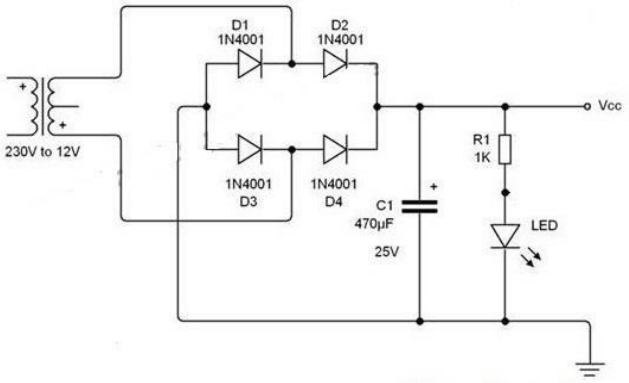

Fig. 2.29 Bridge rectifier circuit

2.15.3.1 Working of a Bridge Rectifier

❖ During the positive half cycle of secondary voltage, diodes D2 and D3 are forward biased and diodes D1 and D4 are reverse biased. Now the current flows through D2–
>Load–>D3.

❖ During the negative half cycle of the secondary voltage, diodes D1 and D4 are forward biased and rectifier diodes D2 and D3 are reverse biased. Now the current flows through D4–>Load>D1

❖ In both the cycles, load current flows in the same direction. Hence we get a pulsating DC voltage.

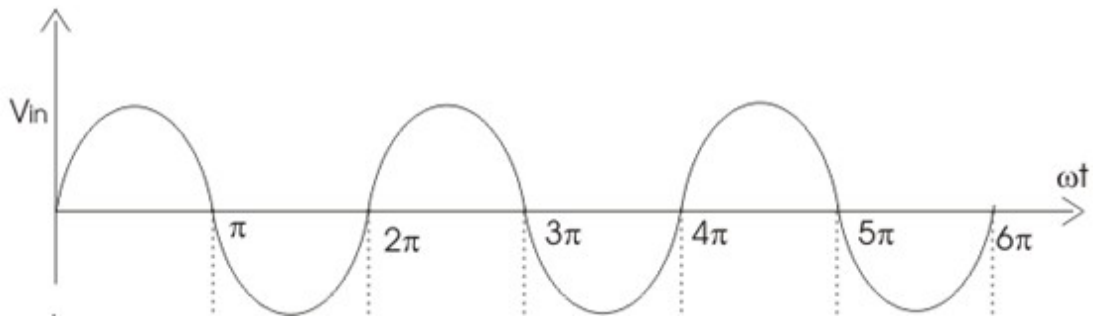

Fig. 2.30 Input sine wave

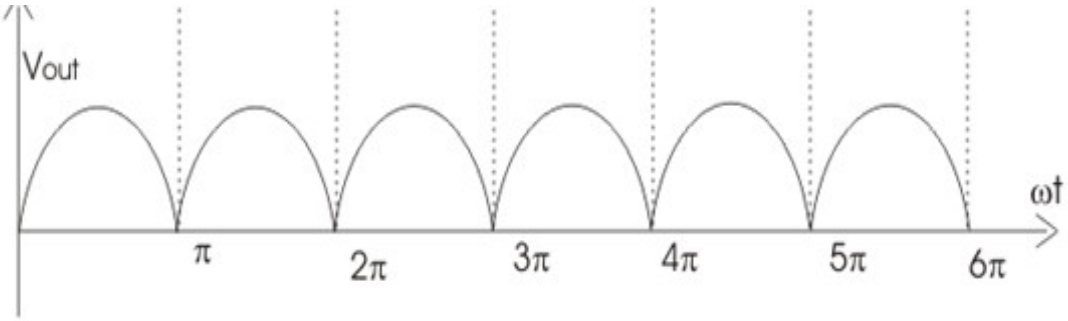

Fig. 2.31 Pulsating DC output

❖ Addition of a capacitor at the output converts the pulsating DC voltage to fixed DC voltage.

Up to a time period of t=1s input voltage is increasing, so the capacitor charges up to peak value of the input. After t=1s input starts to decrease, then the voltage across the capacitor reverse biases the diodes D2 and D4 and therefore it will not conduct. Now capacitor discharges through the load, then voltage across the capacitor decreases.

❖ When the peak voltage exceeds the capacitor voltage, diodes D2 or D4 forward biases and as a result capacitor again charges to the peak value. This process continues. Hence we get almost smooth DC voltage as shown in fig (3.7).

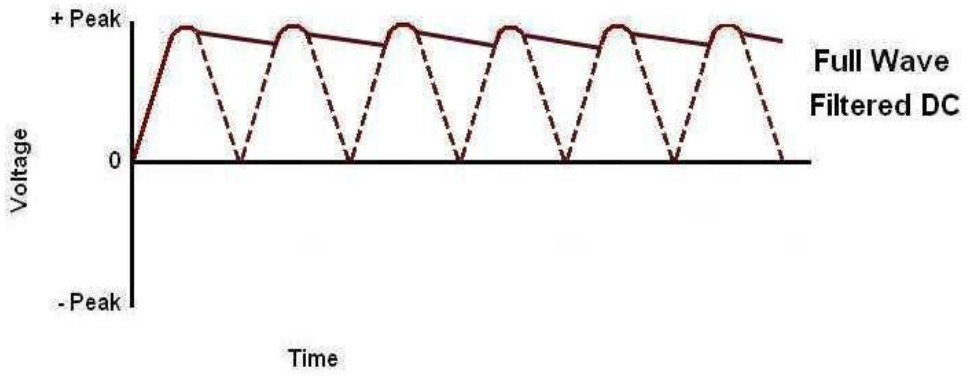

Fig. 2.32 Filtered output

2.16 Vero Board:

Strip board or vero board is the generic name for a widely used type of electronics prototyping board characterized by a 0.1 inch (2.54 mm) regular (rectangular) grid of holes and it has wide parallel strips of copper cladding running in one direction all the way across one side of the board. It is commonly also known by the name of the original product Vero board, which is a trademark, in the UK, of British company Vero Technologies Ltd and Canadian company Pixel Print Ltd. In using the board, breaks are made in the tracks, usually around holes, to divide the strips into multiple electrical nodes. With care, it is possible to break between holes to allow for components that have two pin rows only one position apart such as twin row headers for IDCs.

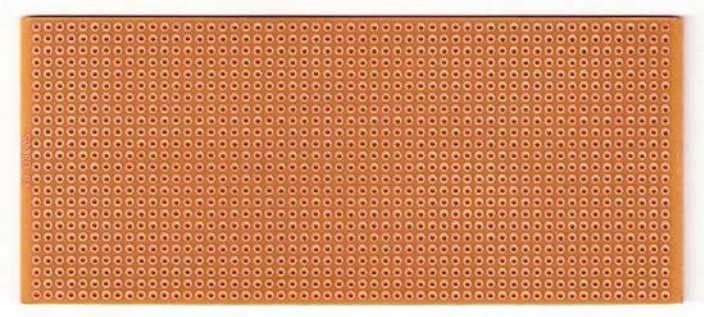

Fig: 2.33 Vero Board.

2.17 Connecting Wire

A wire is a single, flexible strand, usually cylindrical or rod of metal. They are used to bear mechanical loads or electricity or telecommunications signals. So, it is very important element for those departments. It is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number. The term *wire* is also used more loosely to refer to a bundle of such strands, as in 'multi stranded wire', which is more correctly termed a wire rope in mechanics, or a cable in electricity.

Fig: 2.34 Connecting Wire.

2.18 Cooling Fan:

Fig: 2.35 Cooling Fan

Cooling system is key in keeping a system in working order. It directly effects the system's ability to dissipate heat if a cabinet does not have proper airflow, as a result whole system can be destroyed. A fan with high static pressure is more effective at forcing air through restricted spaces, such as the free gaps in the heat sink.

2.19 Heat sink:

A heat sink is a passive heat exchanger that transfers the heat generated by an electronic or a mechanical device to a fluid medium, often air or a liquid coolant, where it is dissipated away from the device, thereby allowing regulation of the device's temperature at optimal levels.

Fig: 2.36 Heat sink

Without a quality heat sink, our electronic component is at risk of overheating, which could destroy our entire system, costing us a lot.

2.20 Summary

The components used are studied individually. Their purpose in the system is explained along with their ratings, pinouts and connections.

CHAPTER 3

HARDWARE DEVELOPMENT

3.1 Introduction

This chapter will be explaining about the construction of the main sections of this project.

3.2 Block Diagram:

There are only one block diagram for the whole system.

3.2.1 Block Diagram of "Free Energy Generator".

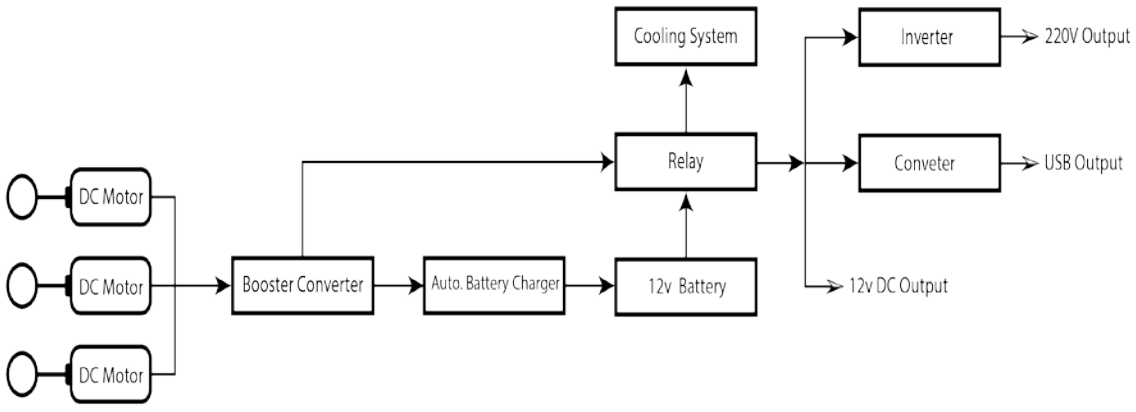

Fig : 3.1 Block Diagram of Free energy generator

3.3 Circuit Diagram and Construction

There are many circuit deigning software, we have used “Proteuse” in our project for deigning the circuit diagrams.

3.3.1 Circuit Diagram of 12v Auto. Battery Charger

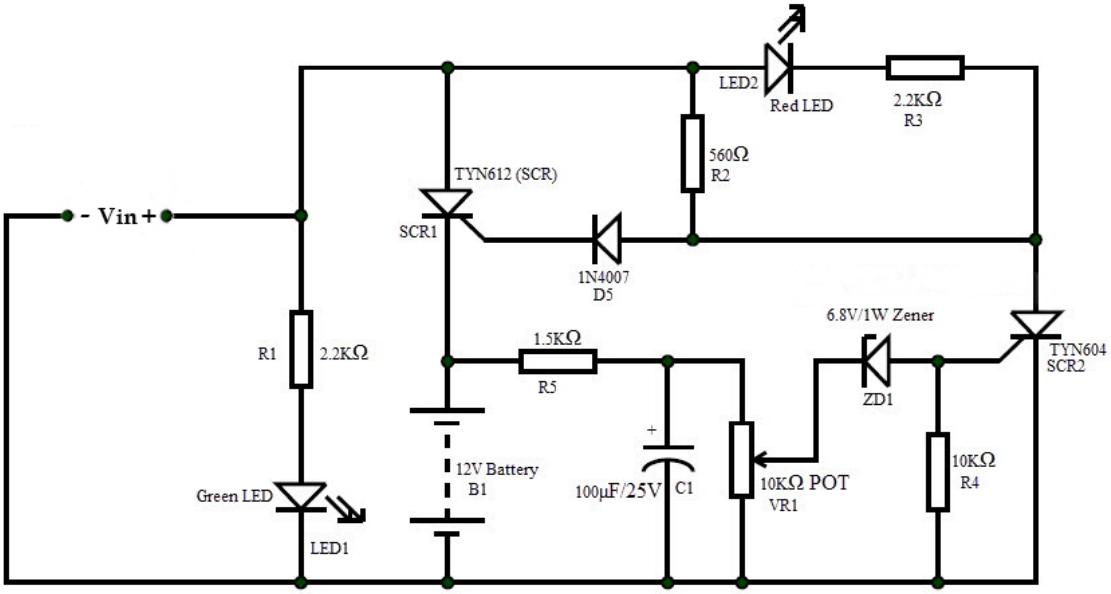

Fig: 3.2 Circuit Diagram of 12v Auto. Battery Charger.

3.3.1.1 Construction of 12v Auto. Battery Charger Circuit

We are providing 13.5v DC from the booster output terminal and the Red LED is turned on.

We know as SCR stops conducting only when the supply voltage is 0 or disconnected from supply and it is possible only with pulsating DC.

At the Initial time, SCR1 starts conducting as it receives a Gate voltage from R2 and D5. When SCR1 is conducting, 13.5v DC will flow through the battery and the battery will start to charge. When the charge on the battery is almost full, it opposes the flow of current and the current starts to flow via R5.

This is filtered with C1 and when the potential reaches 6.8V, Zener ZD1 starts conducting and supplies enough Gate voltage to SCR2 to turn it on.

As a result, the current flows through SCR2 via R2 and SCR1 is turned off as both gate voltage and supply voltage are cut off. The Green LED is turned on indicating a full charge on the battery.

3.3.2 Circuit Diagram of Inverter

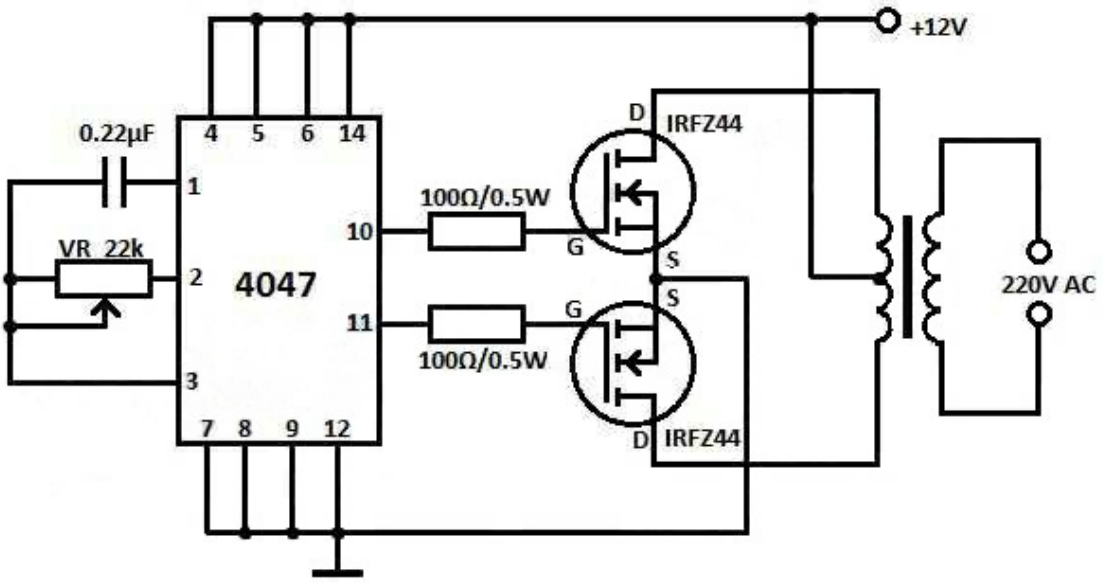

Fig: 3.3 Circuit Diagram of Inverter

3.3.2.1 Construction of Inverter Circuit

- CD4047 is a multivibrator IC and it is used to get 50Hz frequency in the DC current.
- PIN 1,2 and 3 are the adjusting pin to get the desired frequency. We used here a RC circuit to get a frequency of 50Hz.
- We have connected a variable resistor of 10K between pin 2 and pin 3 then adjust the resistance to 39.1Ω.

- Then we have connected a ceramic capacitor of capacitance of 0.22µf (104) between pin-1 and pin-3.
- PIN 4,5,6 and 14 are connected to the +ve terminal of the battery as shown in the schematic diagram.
- PIN 10 and PIN 11 are the outputs which are connected to the Gate of the MOSFETs.
- PIN 7,8,9 and 12 are connected to the -ve terminal of the battery, refer the schematic.
- The Drain terminal of the MOSFETs are connected to the end terminals of the transformers.
- The Source terminal of these MOSFETs are grounded (-12 volts).
- A fast switching diode 4148 is connected between the drain and the source of the MOSFETs.
- The Central-Tapped terminal of the Transformer is connected to the +12 Volts.
- Since the Transformer is of 3 Amp you will get the maximum wattage of 12 volts × 3 Amp = 36 watts.

3.4 Working Principle

The motor is working as an alternator and it is producing electricity. Its output terminal voltage is 3v to 11.5v. (There is also a 12v solar panel as a backup power source to run the electric generation system when the ceiling fan is not used in the winter season.)

Voltage Regulator or boost converter is regulating the output voltage of the motor. A 12v automatic battery charger receiving 13.5v from the voltage regulator or boost converter to charge the battery. (Battery the backup power source to stand by the whole system when the ceiling fan is switched off.)

In this project, the relay is working as an automatic switching device to provide uninterrupted power to inverter, converter and 12v DC output port. When DC is available from motor or solar panel it will provide the power from DC motor or solar panel but

those are unable to provide power relay will be switched off and power will provide dc battery to the inverter, converter, and 12v DC output port.

In Inverter Section, it is inverted 12v to 220v to use AC Appliance. In Converter Section, it is converted 12v to 5v for mobile charging. There is also a 12V output port to use some electrical appliance that needs to operate 12v energy.

3.5 Summary

A circuit diagram (electrical diagram, elementary diagram, electronic schematic) is a graphical representation of an electrical circuit. A pictorial circuit diagram uses simple images of components, while a schematic diagram shows the components and interconnections of the circuit using standardized symbolic representations. The presentation of the interconnections between circuit components in the schematic diagram does not necessarily correspond to the physical arrangements in the finished device.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

This chapter will present all the results, calculations, and relevant discussions.

4.2 Result

The experimental model was made according to the circuit diagram, and the results were as expected. Free Energy Generator can produce Direct Current (12v and 5v) and Alternating Current (220v, 50Hz). It generates the energy section wise. If one section is unable to generate electricity other section will continuously generate the electricity.

4.3 Advantage of Free Energy Generator

1. It does not cause any environmental pollution.
2. Its size is quite small.
3. Installation process is easy.

4.4 Disadvantage of Free Energy Generator

1. Initial cost is high.

4.5 Cost Estimation of the Project

Serial No	Particulars	Quantity	Cost in BDT
01	12v DC motor	1	120
02	12-0-12, 3000mA Transformer	1	160
03	12v Relay (8 Pin)	1	60
04	Relay Base	1	60
05	12v DC Cooling Fan	1	55
06	Voltage Regulator IC (LM-7805)	3	30
07	Voltage Regulator IC (LM-7812)	1	10
08	IC-CD4047	1	5
09	Capacitor 47uF	2	10
10	Capacitor 100uF	2	14
11	Resistor 100 ohm	2	2
12	Resistor 1K ohm	2	2
13	Resistor 10k ohm	1	1
14	Potentiometer 10k ohm	1	5
15	Switch SPDT	2	30
16	Power port	2	10
17	Boost Converter	1	110
18	Li-Polymer Battery (3.7V)	12	1160
19	Switch DPDT	1	10
20	SCR1-TYN612	1	40
21	SCR2-TYN604	1	40
22	LED(Green, Red)	2	4
23	Diode(1n4007)	1	2
24	Zener Diode(6.8v/1w)	1	6
25	Socket (2 Pin).	1	30
26	Fuse Holder with fuse	1	20
27	Connecting Wires	-	50
28	Heat Sink	10	60
Total			2104

Table: 4.1 Price list and component quantity.

4.6 Summary

All components are basic and available in the electronic shop. We have design our project very simply otherwise it can increase the cost as well as the complexity of the system. We have developed a rather simpler but efficient model of a Free Energy Generator.

CHAPTER 5

CONCLUSION

5.1 Conclusions

The goal of the Free Energy Generator project is to generate electricity in a safe process and that is also safe for the environment. Its initial cost is not so high. It can be a friendly electricity generator for every family to provide uninterrupted electricity. It can reduce load shedding and ensure electricity for every house. It can save energy for saving the world.

5.2 Future Scopes of Modification

In this paper, we have discussed developing a “Free Energy Generator: a small and safe electricity generating system that can be used in the rural area to produce electricity. It can be used as a portable power station for camping and traveling.

- Can be modified for more electricity generation.
- It can be used as an emergency power generator.

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10) https://www.electronicshub.org/automatic-battery-charger-circuit/