ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

Analysis and Performance of High DC to DC Converter by Using PV Cell with MPPT Logic System

Dr.V.Thirumurugan[1], S.Krishnabalaji[2], P.Sakthivel[2], M.Hariharan[2], S.Arunasalam[2]

AP, Department of EEE, The Kavery Engineering College, Salem, Tamil Nadu, India[1]

UG Scholar, Department of EEE, The Kavery Engineering College, Salem, Tamil Nadu, India[2]

ABSTRACT: A DC-DC converter nothing but step-up converter is a power converter with an output dc voltage greater than its input dc voltage.Battery powered systems often stack batteries in series to achieve higher voltage. However, stacking batteries is not possible in many high voltage applications due to lack of space. Boost converters can increase the voltage and reduce the num.ber of cells. Two battery-powered applications that use boost converters are (HEV) and lighting systems.

KEYWORDS: solar panel, Microcontroller ,dc to dc converter**.** Lcd display ,dc motor**,** mppt logic system.

I. INTRODUCTION

Now a day the demand of electricity generation from renewable energy is increasing for domestic to industrial applications. The electricity generated from fossil fuels causes rising of toxic gases in the atmosphere.

These fossil fuels are decreasing bit by bit in the environment. Solar energy is one of the most abundant renewable energy resource, eco-friendly, and pollution free. Sunlight is converted into electricity via solar cell using the photovoltaic effect .For solar energy system installation cost only needed, if once installed it can run for a long duration and it can also save the overall maintenance cost. Solar energy having versatile in nature, it can be used for different power applications from tiny torch to satellite.

PIC Microcontroller is the heart of the device which handles all the sub devices connected across it. We have used as microcontroller. It has flash type reprogrammable memory. It has some peripheral devices to play this project perform.It also provides sufficient power to inbuilt peripheral devices. We need not give individually to all devices.The peripheral devices also activates as low power operation mode. These are the advantages are appear here.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

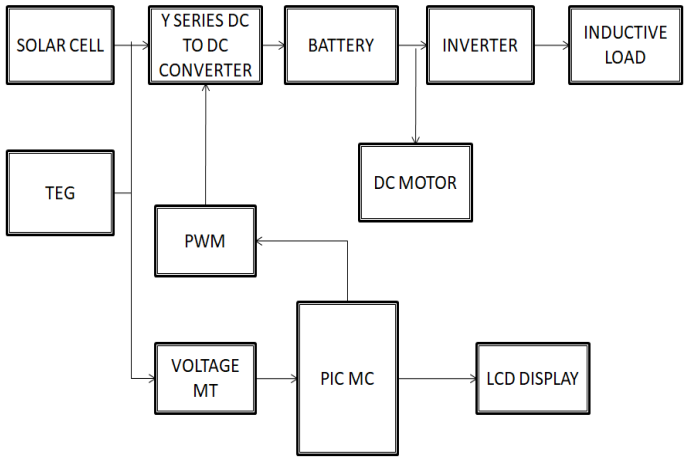
International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

II. BLOCK DIAGRAM



Fig(1) Block Diagram

BRIEF METHODOLOGY:

This project is designed with

(i) PIC
(ii)LCD display
(iii)DC input(SOLAR PANEL)
(iv)Quasi y source Converter
(v)Battery
(vi)CFL Inverter

Solar panel is interface with microcontroller through voltage measurement. The PIC microcontroller receives the value from Solar panel then the voltage is displayed in LCD display. The PIC microcontroller transmits set voltage to boost converter (SEPIC Converter). The Single ended primary inductor converter (SEPIC) get DC voltage from PV panel this input is very low voltage so we can used to boost converter to convert the voltage according to set value then it will give to Battery.

Here we used one voltage sensing circuit it will sense the voltage from load and given to microcontroller the microcontroller compare then it will give error voltage according to this voltage the boost converter convert the voltage it will give to Battery.

Here the microcontroller to maintain the load voltage according to set voltage. Battery output connects to CFL Lamp through CFL inverter. Here the microcontroller may be Atmel or PIC both are flash type microcontroller in which we have already programmed. Here the microcontroller is the flash type reprogrammable microcontroller in which we have already programmed.

III. PIC MICROCONTROLLER

Microcontroller is a general purpose device, which integrates a number of the components of a microprocessor system on to single chip. It has inbuilt CPU, memory and peripherals to make it as a mini computer. A microcontroller combines on to the same microchip:

- The CPU core
- Memory(both ROM and RAM)
- Some parallel digital i/o

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

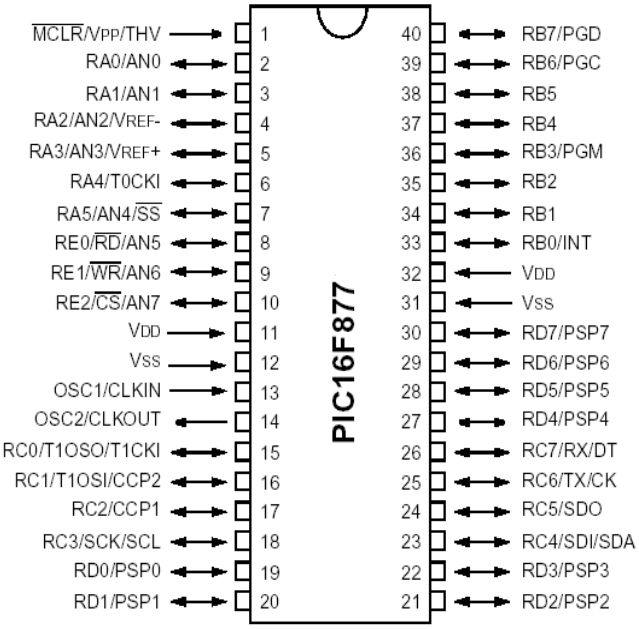
International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

PIN DIAGRAM:



Fig(2) Pin diagram of PIC16F877

PORTA is a 6-bit wide bi-directional port. The corresponding data direction register is TRISA. Setting a TRISA bit (=1) will make the corresponding PORTA pin an input, i.e., put the corresponding output driver in a Hi-impedance mode.

PIC (16F877) :

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed.Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877.

Microcontrollers will combine other devices such as:

- A timer module to allow the microcontroller to perform tasks for certain time periods.
- A serial i/o port to allow data to flow between the controller and other devices such as a PIC or another microcontroller.
- An ADC to allow the microcontroller to accept analogue input data for processing.

Microcontrollers are :

- Smaller in size
- Consumes less power
- Inexpensive

Micro controller is a standalone unit, which can perform functions on its own without any requirement for additional hardware like i/o ports and external memory.

The heart of the microcontroller is the CPU core. In the past, this has traditionally been based on a 8-bit microprocessor unit. For example Motorola uses a basic 6800 microprocessor core in their 6805/6808 microcontroller devices.In the recent years, microcontrollers have been developed around specifically designed CPU cores, for example the microchip PIC range of microcontrollers.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

IV. LCD DISPLAY

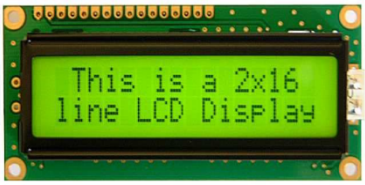


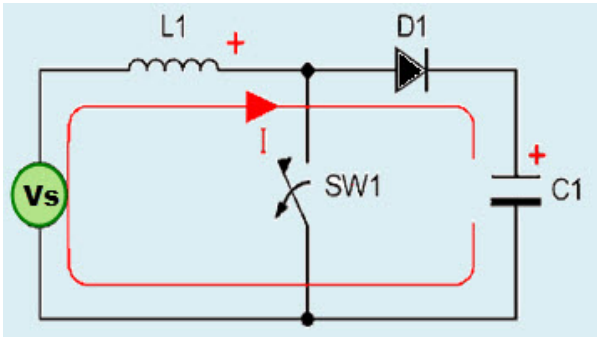
FIG:3

A **liquid crystal display** (**LCD**) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly.

They are used in a wide range of applications including: computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc.

V. QUASI Y SOURCE CONVERTER

A **DC-DC converter** is an electronic circuit that is used to convert a source of direct current (**DC**) from one voltage level to another. These offer a method to increase voltage from a partially lowered battery voltage saving space. **DC to DC converters** also regulate the output voltage.



A DC-DC converter is a power electronics device that accepts a DC input voltage and also provides a DC output voltage.

The output voltage of DC to DC converter can be greater than the input voltage or vice versa. The converter output voltages are used to match the power supply required to the loads.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

VI. BATTERY

FIG:4

An electrical **battery** is one or more electrochemical cells that convert stored chemical energy into electrical energy.[1] Since the invention of the first battery (or "voltaic pile") in 1800 by Alessandro Volta, batteries have become a common power source for many household and industrial applications. According to a 2005 estimate, the worldwide battery industry generates US$48 billion in sales each year, with 6% annual growth.

VII. DC MOTORS

FIG :5 DC MOTOR

OPERATION:

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field.

As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

VIII. INVERTER

An **inverter** is an electrical device that converts direct current (DC) to alternating current (AC); the converted AC can be at any required voltage and frequency with the use of appropriate transformers, switching, and control circuits.

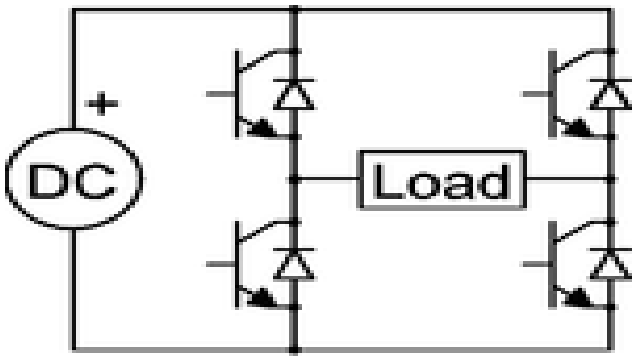
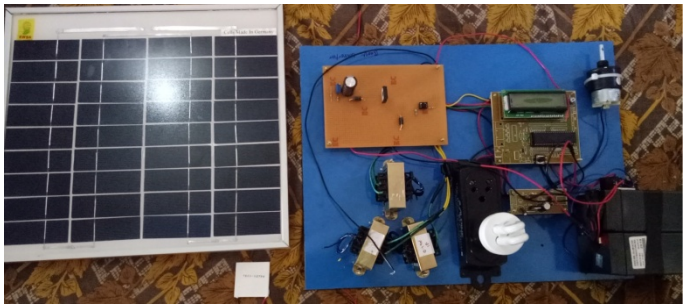


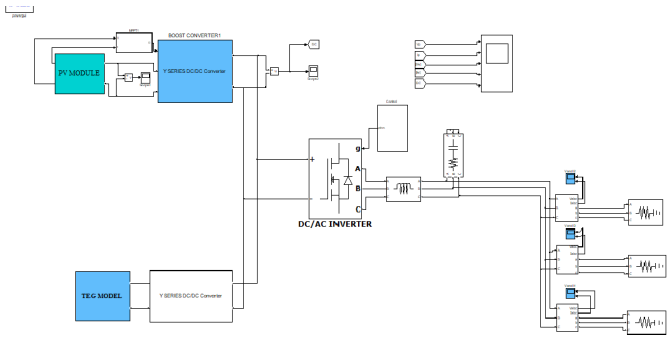
FIG:6 INVERTER CIRCUIT DIAGRAM

Static inverters have no moving parts and are used in a wide range of applications, from small switching power supplies in computers, to large electric utility high-voltage direct current applications that transport bulk power.Inverters are commonly used to supply AC power from DC sources such as solar panels or batteries.

PHOTOGRAPHY OF THE PROJECT:



SIMULATION:



ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

OPERATION MODE.:

Thus, if the PV panel's voltage is lower than the system's peak voltage, the PV inverter will switch between buck mode and boost mode depending on the instantaneous system voltage as shown in Fig. 4. However, if the PV panel's voltage is higher than the system's peak voltage, it will always run at buck mode.

Instead of a dc bus in the middle, the voltage across the capacitor C in boost/buck PV inverter varies with the system, if PV panel's voltage is lower than the System's peak voltage as shown in the fig. However, if PV panel's voltage is higher than system's peak voltage, C's voltage will be the same as the PV panel's voltage.

SIMULATION DC OUTPUT:

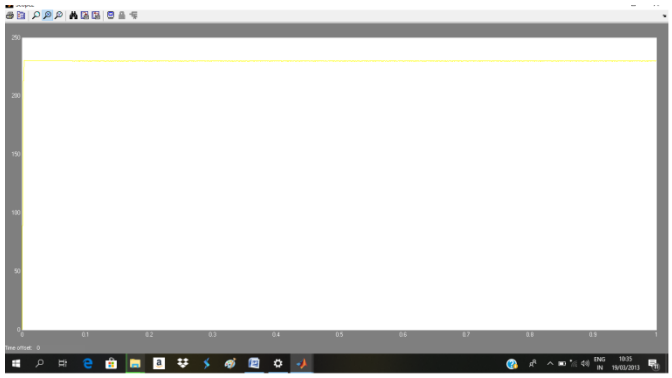


Fig:7

A.Boost Mode:

When the PV panel's voltage is lower than the instantaneous reference voltage, it will operate in boost mode, in which S will be switched ON and OFF with the duty cycle 0.5<K<1.

B. Buck Mode:

When the PV panel's voltage is higher than the instantaneous reference voltage, it will operate in buck mode, in which S will be switched ON and OFF with the duty cycle 0<K<0.5.

6.2 ADVANTAGES:

- LOW COST.
- HIGH EFFICEINCY.
- EASY TO IMPLEMENTATION.
- VOLTAGE UPTO 600V OBTAINED.

6.3 APPLICATIONS:

This project is used in offices, homes, industries etc… Especially This project is very useful to the In the rural Areas. Because in rural areas frequently load state will be happen.

IX. CONCLUSION

The progress in science & technology is a non-stop process. New things and new technology are being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place.The proposed system based on Atmel microcontroller is found to be more compact, user friendly and less complex, which can readily be used in order to perform.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijareeie.com

Vol. 8, Issue 3, March 2019

REFERENCES

[1].Mill man j and hawkies c.c. "integrated electronics" mcgraw hill, 1972
[2].Roy choudhury d, shail jain, " linear integrated circuit", new age international publishers, new delhi,2000
[3].The 8051 microcontroller and embedded system" by mohammad ali mazidi.
[4] Fardoun(Garden), E. H. Ismail, IEEE Trans. on Industrial Applications, 46, 2025 (2010).
[5] J. A. R. Hernanz, et al., International Conference on Renewable Energies and Power Quality (ICREPQ '10), 2010, pp-1–5.
[6] T. Esramand, P. L. Chapman, IEEE Transactions on Energy Conversion, 22, 439 (2007).
[7] Subiyanto,et al., International Review of Electrical Engineering, 52, 2535 (2010).
[8] V. Salas, et al., Solar Energy Materials & Solar Cells 90, 1555 (2006).
[9] Subiyanto, et al., International Review of Electrical Engineering, 5, 2535 (2010).

BIOGRAPHY

Thirumurugan.v is a ME.,PH.D working as Assistant Professor, with Department of Electrical and Electronics Engineering, The Kavery Engineering College, Mecheri, Salem District,Tamil Nadu, India.

Krishnabalaji.s,sakthivel.p,hariharan.m,arunasalam.s
were U.G scholors, Department of Electrical and Electronics Engineering, The Kavery Engineering College, Mecheri, Salem District,Tamil Nadu, India.