

A Dual input single output converter for PV hybrid system

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Engineering Degree in
Electrical and Electronics Engineering

By

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**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade "A" by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **M. VIJAYASRI** (Reg. No. 37140049) and **M. MAHALAKSHMI** (Reg. No. 37140050) who carried out the project entitled "**A Dual input single output converter for PV hybrid system**" under our supervision from December 2020 to April 2021.

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DECLARATION

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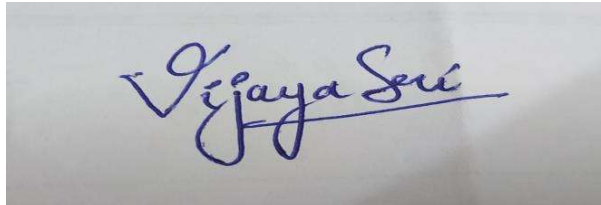
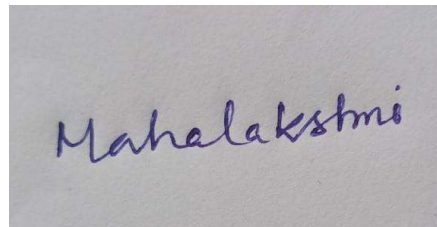
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ABSTRACT

Enhancing the power generation capacity is the only way to satisfy the global electrical energy demand since it is steadily rising. Increasing prices of fossil fuels and awareness of global warming have boosted the importance of green energy sources in the modern day power generation. The sources like Solar PV (SPV), wind, fuel cell, ultra capacitor, battery etc., are widely used for the cost effective and eco-friendly power generation can be located at or near loads. This type of power generation can be named as distributed generation. In Recent days, Using of Renewable Energy has become common mode to sustain with normal needs ,Some use to decrease the electricity bill and few replace some things like using small things like Solar lamps ,Solar Water heater, Solar Ventilation and so on...Renewable Energy such as Wind Energy, Photovoltaic Cells, are increasing Rapidly and their Importance also .However this type of energy are available in nature in free of cost it's become very easy to get, But the main problem is how to utilize effectively and proper storage device. In such case integrating different types of input with some suitable converter to get an output is a way to solve this. So, Integrating Dual Input with an individual converter to get a one output is designed and presented in this module. This is Combination of Two Inputs dc sources with Isolated Resonant Converter with Zero Voltage Switching to get a one output. This is mainly used in Mining areas and islands where we can get the Diesel or any big transformer to get power supply so in this case we can use. Here we are integrating two different dc sources to get an efficient output. The one Input will be Solar and another is a battery which also acts as input source. It even stores and activates when the power from solar is low. To propose and investigate a novel single stage cost effective, simple and efficient converter topology. To estimate optimal sizing of Wind/PV systems to power rural health care loads. In Some places we don't have proper electricity in those places we can use this method and develop few places. The Main use of this converter is when any unequal input voltages occur then the converter continues to maintain soft-switching and voltage regulation.

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CHAPTER 1

INTRODUCTION

1.1 GENERAL INTRODUCTION

Enhancing the power generation capacity is the only way to satisfy the global electrical energy demand since it is steadily rising. Increasing prices of fossil fuels and awareness of global warming have boosted the importance of green energy sources in the modern day power generation. The sources like Solar PV (SPV), wind, fuel cell, ultra capacitor, battery etc., are widely used for the cost effective and eco-friendly power generation can be located at or near loads. This type of power generation can be named as distributed generation. Compared to conventional bulk power generation, distributed generation has several advantages like efficient power generating capability, lossless transmission, environmental friendly and sustainable power generation, etc. The Solar PV system is a best solution for the distributed power generation. The Solar PV system produces DC power when photon strikes on the Solar PV without causing any environmental pollution. According to different applications, solar PV system can be operated in standalone and hybrid modes. Hybrid energy combination is essential for the efficient performance of distributed generation system recently, many applications uses hybrid combination of different sources for obtaining the reliable power form these sources. A combination of Solar PV and battery source is considered in this paper. Individual DC-DC power electronic converters are used for the integration of SPY and battery source. However, this type of integration is more complex, high cost, and less reliable. Hence, an efficient power electronic converter is mandatory for this energy source integration to attain a required power level. Thus the concept of Multi Input DC-DC Converter (MICs) is developed to overcome the demerits in the conventional ways of integration. In Recent days, Using of Renewable Energy has became common mode to sustain with normal needs ,Some use to decrease the electricity bill and few replace some things like using small things like Solar lamps ,Solar Water heater, Solar Ventilation and so on. Renewable Energy such as Wind Energy, Photovoltaic Cells, are

increasing rapidly and their Importance also . However this type of energy is available in nature in free of cost it's become very easy to get, but the main problem is how to utilize effectively and proper storage device. In such case integrating different types of input with some suitable converter to get an output is a way to solve this. So Integrating Dual Input with an individual converter to get a one output is designed and presented in this module. This is Combination of Two Inputs dc sources with Isolated Resonant Converter with Zero Voltage Switching to get a one output. This is mainly used in Mining areas and islands where we can get the Diesel or any big transformer to get power supply so in this case we can use. Here we are integrating two different dc sources to get an efficient output. The one Input will be Solar and another is a battery which also acts as input source. It even stores and activates when the power from solar is low. To propose and investigate a novel single stage cost effective, simple and efficient converter topology. To estimate optimal sizing of Wind/PV systems to power rural health care loads. In Some places we don't have proper electricity in those places we can use this method and develop few places. The Main use of this converter is when any unequal input voltages occur then the converter continues to maintain soft-switching and voltage regulation.

CHAPTER 2

LITERATURE SURVEY

Behdad Faridpak et al., (2020) Developed a super-lift Luo-converter with integration of buck converters for electrical vehicle applications. During this paper, a DC-DC multi-port device is introduced by integration a super-lift and a buck device (SLBC). The projected single-input dual-output (SIDO) device has typical positive output voltage super-lift benefits whereas at the same time generating a change of magnitude voltage by Luo-converter and a reduction voltage by the buck device. During this structure, while not utilizing power.

QijunSu et al., (2020) Developed High-gain high-efficiency IPOS LLC device with coupled electrical device and current sharing capability .In this paper, AN input-parallel output-series (IPOS) LLC resonant device with a coupled electrical device and current sharing capability is projected for high-gain high-efficiency applications like the renewable energy grid association. The coupled electrical device is employed to scale back the core size and core loss by implementing the magnetic flux cancellation technique, which achieves a natural balance of output voltage at the same time. A two hundred kilocycle per second a hundred V/1.2 kV 3.6 kilowatt two-module IPOS LLC resonant device example is constructed to verify the projected technique.

Jakub Kucka et al., (2020) Concentrates on the best quasi-two-level PWM operation mode for standard structure converters, wherever the interior currents among the device aren't controlled. The paper proposes AN optimized style approach for the device parameters and shows many challenges within the sensible style. the most downside of the studied device operation mode is that the dependency of the device behavior on several parasitic parameters which will considerably vary within the device production Moreover; the paper shows that once the device losses area unit low, the optimized device inductances area unit below the values expected for realistic device construction.

Samprajani Rout et al., (2018) Developed organ signal acquisition with high property and accuracy of the high-pass cut-off frequency imposes a challenge on the implementation of the analog preprocessing and together the knowledge device. This paper describes a state-space-based methodology for arising with high-pass sigma-delta (HP $\Sigma\Delta$) topologies with high property, targeting high accuracy of the high-pass cut-off frequency. Associate orthonormal HP $\Sigma\Delta$ modulator is meant to be enforced in zero.18 eighteen CMOS technology is tested with real recorded graph signals.

Yun-Rae Jo et al.,(2014)Developed CMOS Flat-Panel X-ray Detector With Dual-Gain Active constituent Sensors and Column-Parallel Readout Circuits .This paper proposes a CMOS flat-panel X-ray detector (FPXD) with dual-gain active constituent sensors (APSS) and column-parallel readout circuits to cut back the random noise. The column-parallel readout circuits embody single-slope analog-to-digital converters (SS-ADCs) and charge-summing circuits for constituent binning and analog double delta sampling (DDS).The measured random noises in high and low sensitivity modes unit of measurement 366 four hundred and four and four, severally, at the resolution of twelve bits and together the frame rate of thirty bureau.

V Beulin et al.,(2018)Developed the look of Ultra-Lift Nilotic device for Pumping Applications presently a days, utilizing of the dc-dc converters unit of measurement exaggerated thanks to the large applications like locomotives, mobile charging and for utilizing the facility generated from Solar and energy plants. The voltage-lift (VL) technique was with success applied within the style of DC-DC converters. Exploitation the Voltage-lift technique the device will acquire high-voltage transfer gain. The super-lift technique has been given a good deal of attention since it yields high-voltage transfer gain. The Ultra-lift (UL) LUO-converter is introduced as a awfully distinctive approach to the new technology, ultra-lift technique, produces higher voltage transfer gain.

K. Sarasvathi et al., (2018) analyzed and developed the look of Super lift Nilotic Boost device A DC-DC conversion technique exploitation Positive Output Super-lift Nilotic Boost device circuit. This DC-DC conversion unit of measurement usually handily obtained by Super-lift Nilotic Boost device. Output voltage is exaggerated step by step in progression through voltage elevate technique. Super-lift Nilotic converters unit of measurement usually helpful for prime output voltage applications over the years. These converters enhance the voltage transfer gain terribly effectively. A simulation of Super-lift Nilotic Boost device is administrated exploitation MATLAB/Simulink.

Shruti Narayan Kamat et al., (2018) developed the planning and Analysis of Positive Output Self carry Luo convertor the convertor is meant to control beneath continuous mode of conductivity and is sculptured victimization state house analysis technique. The control system management relies on time domain approach and current mode separate inflammatory disease controller so designed tunes the system in such the way that the convertor necessities area unit happy. The Luo convertors along side the controller so designed is powerful, has correct output voltage regulation and there isn't any signs of any overshoots or undershoots and is very economical.

Maxime Berger et al., (2019) researched the Large-signal modelling of three-phase twin active bridge converters for magnetic attraction transient analysis in DC grids. As for ancient AC grids, the eminent integration of power electronic converters in DC grids needs correct time-domain system-level studies. During this paper, a generalized average model is developed, that permits system-level simulation of DC grids with 3p-DAB converters in magnetic attraction transient kind (EMT-type) programs. The projected model is strictly compared with various modeling techniques: ideal-model, switching-function and state-space averaging.

Matteo Pizzotti et al., (2019) Done AN Experimental analysis of typical buck and boost convertor with integrated twin output convertor several convertor topologies area unit out there beneath this class. Integrated twin Output convertor (IDOC) is one amongst the only inputs multi output topologies. IDOC could be a DC-DC power convertor that

performs each buck and boosts operations at identical time with one power offer. IDOC comes from the traditional boost convertor victimization few power switches. With the shoot through development each the switches within the IDOC is connected asynchronous and operated to get the boost and buck voltage at the same time. This paper, the fundamental operation of IDOC is bestowed and compared with typical buck and boost convertor

Mudadla Dhananjaya et al., (2019) Developed a style and Implementation of a Multi-Input Single-Output DC-DC device Multi-input converters (MICs) have a high regard for integration of various of the energy sources used in electrical vehicle (EVs) and grid applications. Further, it offers the foremost economic operation and improves the performance of the system over the traditional solutions that use multiple single converters in multi-input applications.

He Liu, Mohamed Dahidah et al., (2017) developed a multi-terminal high-octane DC/DC device configuration supported hybrid MMC topology with fault obstruction capability for interconnecting HVDC systems. Its main functions embrace bifacial power flow change of magnitude and change of magnitude operation and fault isolation adore a DC breaker. against this to the traditional MMC based mostly DC/DC device, the planned DC/DC device with hybrid MMC configuration has the advantage of having the ability to dam the DC/DC device terminal connecting to faulty DC grid section, whereas continue operational the opposite terminals connected to healthy DC grid sections.

Mena ElMenshawy et al., (2019) Developed a High-voltage high-octane DC-DC converters area unit a necessary demand for constructing HVDC networks since voltage levels, likewise because the network configuration, don't seem to be standardized. Consequently, this paper focuses on multimodal DC-DC converter-based twin Active Bridge (DAB) for high-voltage high-octane renewable energy sources like PV plant and wind farms.

XiaomingZha et al., (2014) developed a DC Micro grid is extremely penetrated by numerous DC-DC power converters for a correct management. Many technologies of DC-DC power devices are intimate with for reaching an appropriate topology of converter systems providing high performances of DC Micro grid distribution

Miguel-Sánchez et al., (2016) Generated a DC-DC device supported IGBT switches is planned. Basically, the device consists of 2 bifacial IGBT bridges connected by a try of energy storage capacitors. It capable of MW power transfer and might attain terribly high voltage ratios. Moreover, the device will alleviate the overvoltage and over current issues once a DC fault happens on either facet

Zbigniew Waradzyn et al., (2017) developed a DC distribution and transmission provides an economical, value effective and reliable various to ancient AC systems for offshore power station integration. High power DC-DC converters square measure key parts to understand future offshore voltage DC grids and multi-terminal HVDC systems. Completely different DC-DC device topologies are planned for this application.

Hiramnay Samantha et al., (2019) created a unidirectional DC/DC device which will be accustomed transfer power from distributed resources like Solar PV or Fuel Cells into a DC micro grid. The device is predicated on the LLC topology however designed to work in an exceedingly specific region of the gain curve that has many edges to integration of renewable energy sources into a continuing DC bus.

Chang Liu et al., (2019) fashioned a biface three-phase dc-ac device with embedded dc-dc device for biface storage interface is planned during this paper. With the assistance of the embedded dc-dc device, the voltage of the galvanic battery will vary in an exceedingly big selection. To attenuate the ability rating and power losses of the embedded dc-dc device, an easy carrier-based pulse dimension modulation (PWM) strategy with zero-sequence injection is planned.

Chang Liu et al., (2019) Developed a Multiport dc-dc autotransformer (multiport dc auto) that's accustomed interconnect multiple HVDC systems with completely different voltage levels. The multiport dc machine is ready to scale back 50-80% the device value compared with typical dc-ac-dc technology. Completely different from the traditional dc-ac-dc technology victimization magnetic coupling at the ac sides of the converters, there's direct electrical association between the interconnected dc systems within the multiport dc machine.

Ataollah Mokhberdoran et al., (2018) Developed a DC power flow are often controlled though N-1 completely different DC lines/cables in an exceedingly DC grid having N individual AC/DC converters. An outsized meshed DC grid will have a lot of DC lines, and since we tend to cannot management power all told lines/cables, AN overload might result. The opposite methodology includes putting in DC/DC device at one among the DC line/cable ends with the aim of DC power flow management.

Changliang Xia et al., (2013) Created the Brushless dc motor still suffers from commutation force ripple, that principally depends on speed and transient line current within the commutation interval. This paper presents a completely unique circuit topology and a dc link voltage management strategy to stay incoming and outgoing section currents dynamic at an equivalent rate throughout commutation. A dc-dc single-ended primary electrical device convertor (SEPIC) and a switch choice circuit area unit used ahead of the electrical converter.

Ciprian Bejenar et al., (2020) fashioned a Special demands area unit created on DC-DC convertor by renewable energy power grid, composing of such inexperienced power as electric cell, solar cell, etc. For these needs, the high-energy increase, diminution and step-up/down DC-DC converters, designed and developed by the analysis cluster at Bei suspend University on the applying of high-energy DC-DC convertor in recent years, area unit introduced, specializing in analysis of the planning of their topologies and management methods.

Nilofar Ghanbari et al., (2019) generated the resonant clubbers power-assisted half-bridge soft switch PWM inverter electrical convertor kind dc-dc high power converter for

DC bus feeding power plants. The projected dc-dc power convertor consists of typical voltage supply fed half-bridge high frequency PWM electrical converter with a high frequency electrical device two-dimensional link additionally to dc transit line aspect.

Sara Hasanpour et al., (2020) Designed a step-up cascaded DC-DC convertor is given. The primary stage of the projected convertor could be a buck-boost convertor with changed convertor topology. The second stage could be a boost convertor with coupled electrical device and voltage number cells. The energy keep within the leak electrical device of the coupled electrical device is recycled by a passive voltage clamp to a condenser thereby raising the potency. Besides, the obstruction voltage across the MOSFET switch is reduced within the projected topology thanks to voltage clamp circuit.

Choirul Anamlskak et al., (2019) Recently Developed the high voltage DC feeding system has been researched and developed to avoid wasting power and to create use of the inexperienced energy from the photovoltaic cell, turbine so forth. This paper presents a unique high potency DC-DC convertor for isolation in high voltage DC feeding systems. The image four.0kW biface DC-DC convertor has been created and tested. As a result, within the forward and regenerative operation modes, the most power potency over is ninety eight.4% and therefore the regulation degree of the output voltage is among a pair of beneath the output power condition from zero.1 kW to 4.0kW.

GAPS IN LITRATURE:-

Many converter topologies explained in the above literature. They are explaining about the existing system and having the idea of proposed system. The Existing system has many modules such as single input to single output, single input to multi output, Multi input to multi output with dc-dc converter, Luo converter, and buck-book converter and so on. In this way many converters are used, with various types of integration of inputs and outputs. But main thing is switching loses should be controlled and High efficiency should be there, the existing system has not controlled so we used isolated resonant Converter in order to reduce switching loses and to get efficient output. In existing system any type of switching is not included here we add Zero Voltage Switching. So, from the above literature surveys we can understand the fault of the existing system. At the same we can understand the innovative of the present proposed system.

CHAPTER 3

OBJECTIVE AND SCOPE OF THE PRESENT INVESTIGATION

3.1 OBJECTIVE OF THE PROJECT:-

A Detailed and Effective analysis of getting output with best efficiency and a smaller number of switching losses has been carried out. In mining areas due to unavailability of electrical sources, we can use this project as to get electricity. So, in this project we have used solar and wind as an input sources with an isolated resonance converter with zero switching, by this we can reduce the harmonics and switching losses. So, according to this project we can measure the output power with good efficiency. Also, it is expressing the characteristics of the dual input power with switching characteristics.

3.2 SCOPE OF THE PRESENT INVESTIGATION:-

To propose and estimate a novel single stage simple and efficient converter topology. To estimate optimal sizing of PV systems with battery sources to power mining areas and rural health care loads. In some places we don't have proper electricity in those places we can use this method and create the availability of electrical sources. The main use of this converter is when any unequal input voltages occur then the converter continues to maintain soft-switching and voltage regulation.

CHAPTER 4

MATERIAL AND METHODS USED

4.1 METHOD

4.1.1 Proposed Method

But for the best integration of these hybrid sources, a proper method of interfacing of circuit's is mandatory so we integrate Battery and Solar PV system. The proposed converter consists of two controllable switches for integrating two separate dc sources like battery and Solar, to get a good efficiency and soft switching over wide range. Here we integrate two inputs with only one converter to get a one output. While using multi inputs we get more switching loses, to compensate that High frequency resonance converter is used. This system also uses Zero Voltage Switching in order reduce harmonics and get an output easily. That is well-ried by the simulation in MATLAB. The simulation is showing the ZVS characteristics.

4.2 BLOCK DIAGRAM

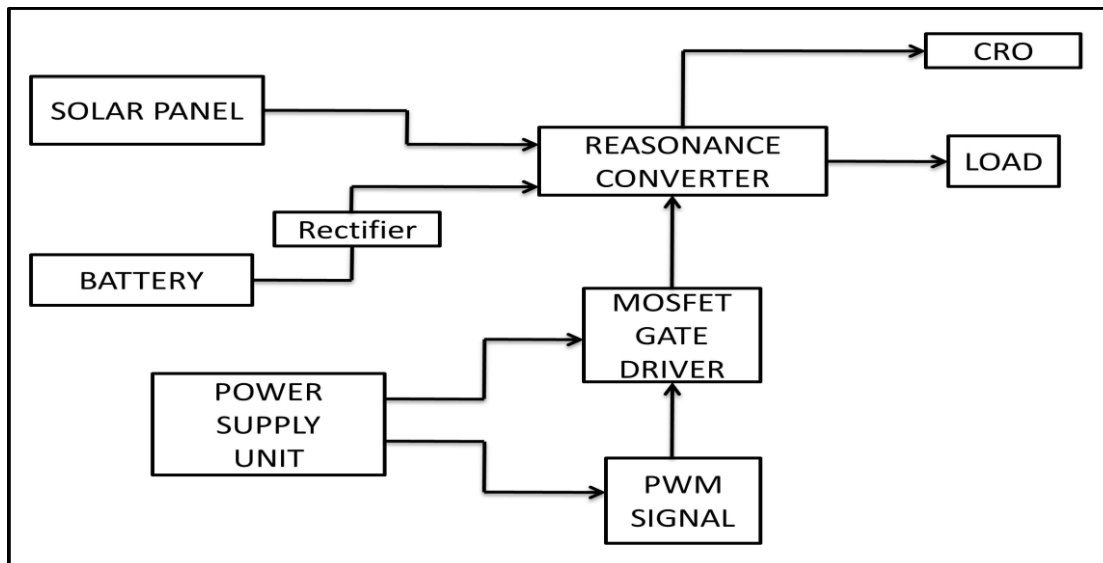


Fig 4.1 Block Diagram

This Block Diagram consists of two input sources, one from Solar and another from Wind, then the converter called isolated Resonance Converter, Power supply Unit,

Mosfet Gate Driver, PWM signal, CRO, load. Two Input dc sources are Solar Panel and Wind, as wind is AC, so it is connected to rectifier to convert into dc current. Power supply unit is given to PWM signal and MOSFET gate driver. These connections are given to Resonance converter, from this converter given to load. Those two input sources are connected to Converter and supply also connected, when the switch is on boosting take place, load value is increased. For Zero Voltage Switching the graphs can be seen in CRO.

4.3 HARDWARE SETUP

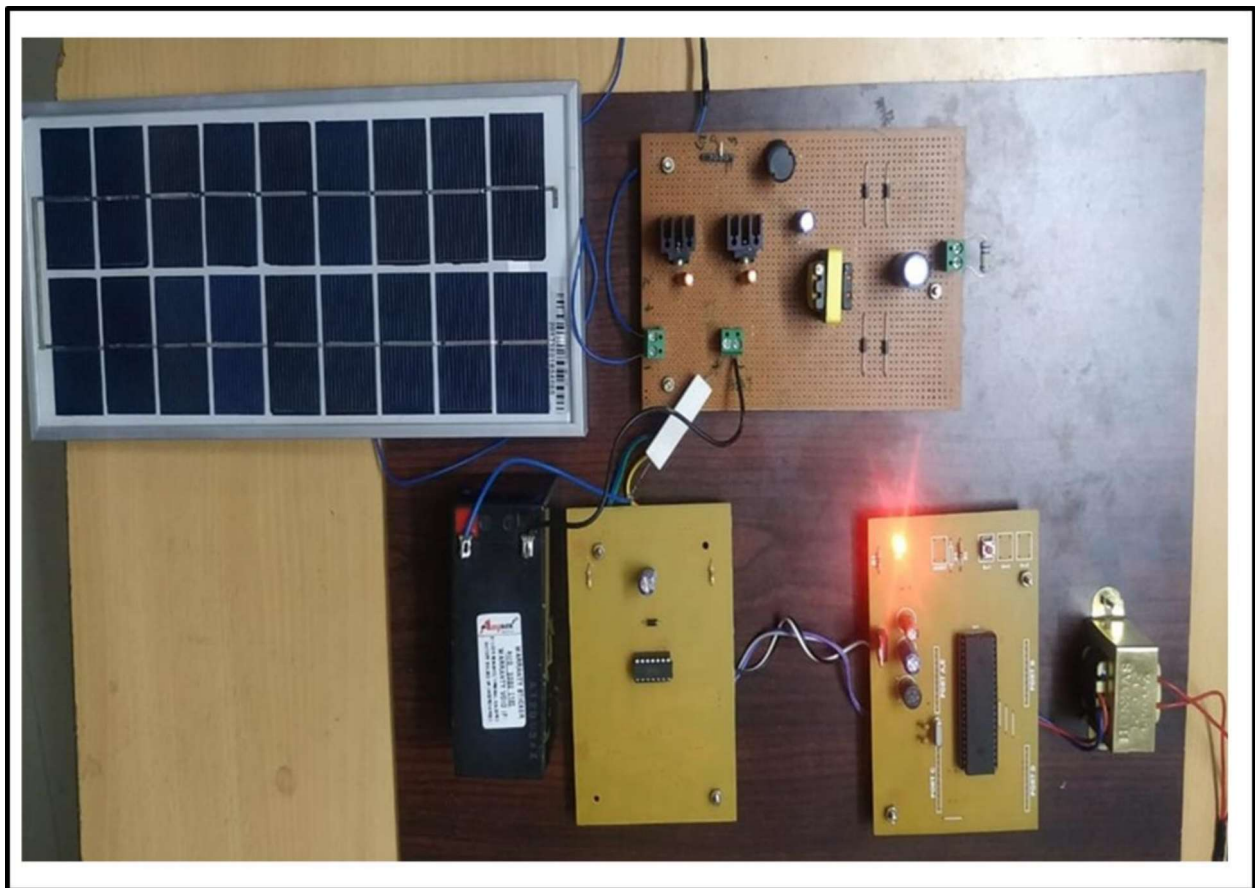


Fig 4.2 hardware setup

This setup shows the Hardware setup of our project. The hardware components are explained in below chapters .The working of this hardware is explained in hardware explanation part.

4.3.1 Hardware Circuit

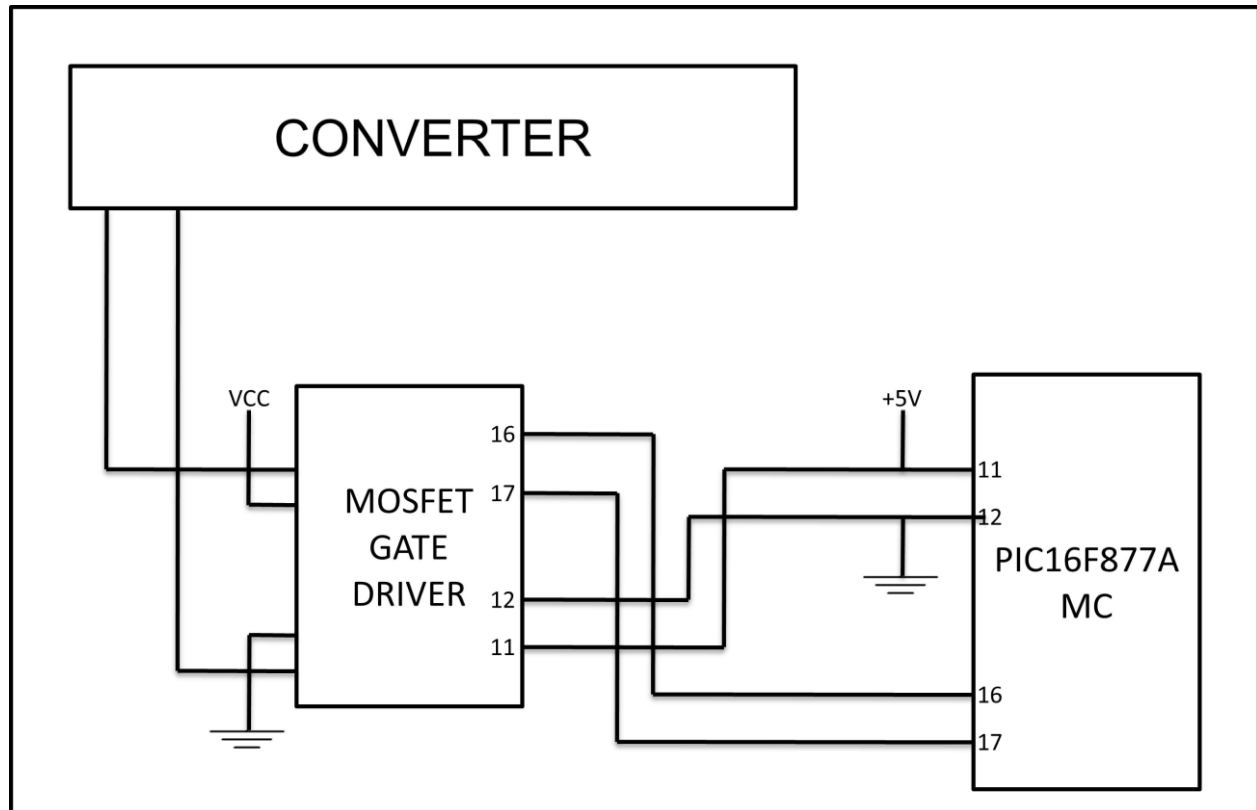


Fig 4.3 Hardware circuit diagram

This is circuit connection of hardware part. From the converter Two switches are connected to 1st and 8th pin of MOSFET gate driver, 3rd pin of MOSFET is connected Vcc. 11th pin of MOSFET is connected to 11th Pin of PIC Mc, 12th pin of MOSFET is connected to 12th Pin of PIC Mc, along with 5v led supply is given. 14th pin of MOSFET is connected to 17th Pin of PIC Mc, 15th pin of MOSFET is connected to 16th Pin of PIC Mc.

4.4 HARDWARE COMPONENTS

4.4.1 Solar Panel

4.4.1.1 Introduction

A PV module is an assembly of photo-voltaic cells mounted in an exceedingly framework for installation. Photo-voltaic cells use daylight as a supply of energy and generate electrical energy electricity. A set of PV modules is termed a PV Panel, and a system of Panels is an Array. Arrays of an electrical phenomenon system offer solar electricity to electrical instrumentation. Electrical phenomenon modules use lightweight energy (photons) from the Sun to come up with electricity through the electrical phenomenon result. Most modules use wafer-based crystalline element cells or thin-film cells. The structural (load carrying) member of a module will be either the highest layer or the rear layer.

Cells should be protected against mechanical harm and wetness. Most modules square measure rigid, however semi-flexible ones supported thin-film cells are on the market. The cells square measure connected electrically asynchronous, one to a different to the specified voltage, and so in parallel to extend electrical phenomenon. The electrical power of the module is that the product of the voltage and therefore the electrical phenomenon of the module.

The manufacture specifications on Solar panels square measure obtained below customary condition that isn't the \$64000 operative condition the Solar panels square measure exposed to on the installation web site. A PV junction box is hooked up to the rear of the solar array and functions as its output interface. External connections for many electrical phenomenon modules use MC4 connectors to facilitate simple weather proof connections to the remainder of the system. A USB power interface can even be used.

4.4.1.2 Working of Solar Panel

A cell is essentially associate in nursing device that uses electrical phenomenon impact to convert daylight energy into electricity. The development impacts are often outlined as a phenomenon that generates voltage or current with the exposure of sunshine in a very material. On absorption of daylight the electrons, that's a part of valence band gets

enough energy to leap into the conductivity band and thereby becomes free. These electrons that have, extremely excited electrons, diffuse and on reaching the junction, they're carried onto another material with the assistance of inbuilt potential. This movement generates emf (emf) that converts a definite quantity of sunshine energy to electrical energy. This can be the straightforward understanding with cell and electrical phenomenon impact.

4.4.1.3 Types of Solar Panel

Solar Panels play a significant role for the economical utilization of inexperienced energy. These Solar panels area unit thought-about to be associate environmentalist's dream since they'll turn out limitless electricity from the sun with no pollution or greenhouse gas emissions. To extend the dependence on solar power, differing kinds of Solar panels area unit currently created on the market within the market everywhere the planet. There are 3 types they're Polycrystalline solar Panels (also called Multi-Crystalline), Monocrystalline and Thin-film

Table 4.1: Advantages and Disadvantages

Solar panel type	Advantages	Disadvantages
Monocrystalline	- High efficiency/performance - Aesthetics	Higher costs
Polycrystalline	Low cost	Lower efficiency/performance

Thin-film	· Portable and flexible	· Lowest efficiency/performance
	· Lightweight	
	· Aesthetics	

4.4.1.4 Thin film

In rigid thin-film modules, the cell and also the module square measure factory-made within the same assembly line. The cell is formed on a glass substrate or superstrate, and also the electrical connections square measure created in place, a supposed "monolithic integration". The substrate or superstrate is laminated with associate degree encapsulant to a front or back sheet, sometimes another sheet of glass. the most cell technologies during this class square measure Cd Te, or a-Si, or a-Si+uc-Si bicycle, or CIGS (or variant). Amorphous atomic number 14 incorporates a daylight conversion rate of 6–12%. Versatile skinny film cells and modules square measure created on identical assembly line by depositing the photoactive layer and different necessary layers on a versatile substrate. If the substrate is associate degree stuff (e.g. polyester or polyimide film) then monolithic integration is often used. If it's a conductor then another technique for electrical affiliation should be used.

4.4.1.5 Maintenance

There are activity hazards with solar battery installation and maintenance. Birds' nests and alternative junk that may get lodged below the Solar panels, which may cause disruptions within the system, result in hearth if there are any loose connections, or simply cause the system to degrade over time.

4.4.1.6 Recycling

Silicon primarily based modules: metallic element frames and junction boxes square measure demolished manually at the Solar of the method. The module is then crushed in a very mill and also the totally different fractions square measure separated - glass, plastics and metals. It's potential to recover quite eightieth of the incoming weight. This method are often performed by flat glass recyclers since morphology and composition of a PV module is analogous to those flat glasses employed in the building and automotive business. The recovered glass, as an example, is instantly accepted by the glass foam and glass insulation business.

This utilization method is meant to recover up to ninetieth of the glass and ninety fifth of the semiconductor materials contained. Some commercial-scale utilization facilities are created in recent years by personal firms. For metallic element flat plate reflector: the trendiness of the reflectors has been named by fabricating them employing a skinny layer (around zero.016 metric linear unit to zero.024 mm) of metallic element coating gift within the non-recycled plastic food packages.

4.4.1.7 Applications

Photovoltaic power stations

- Rooftop Solar PV systems
- Standalone PV systems
- Solar hybrid power systems
- Concentrated photo voltaics
- Solar planes
- Solar-powered water purification
- Solar-pumped lasers
- Solar vehicles

4.4.1.8 Applications of Solar Energy

Residential and industrial sectors are unit the most users of alternative energy. In residential sectors, alternative energy may be used for generating electricity mistreatment the solar electrical phenomenon technology. Within the variety of solar water heaters, water heating is additionally doable. For cookery applications, today the solar cookers are unit gaining additional quality. In industrial sectors, Sun's thermal energy may be wont to offer power. Today, alternative energy is sweet to power radio and television stations, beacon and warning lights for craft. Solar cars, remote areas and even swimming pools will use the solar electrical phenomenon technology. Agriculture and every one gardening sectors will use the alternative energy for the economical productivity. Last however not the smallest amount, alternative energy have endless applications within the world and within the close to future we will expect several new advancements within the Solar technology.

4.4.1.9 3W Solar Panel

Solar panel: 3.0 Watt, 9 Volt.

Weight : 0.79 kg (1.74 lb)

Dimensions: 14.2 cm H x 24.1 cm W (5.6 x 9.5 inches)

Technical Data			CE
MODWLE	TYPE:MP-3WP		
Peak Power	(Pmax)	(w)3	
Max Mum Power Current	(Imp)	(A) 0.34	
Max Mun Power Voltage	(Vmp)	(v)9	
Short Circuit Current	(Isc)	(A)0.41	
Open Circuit Voltage	(Voc)	(V) 11.25	

Fig 4.4 Technical data

4.4.2 BATTERY



Fig 4.5 Battery

4.4.2.1 Product Description

With enriched industrial expertise of this trade, we have a tendency to be giving a wonderful quality of 12v-1.3 Ah reversible Batteries. This battery is intended by utilizing world category basic material at vendor's well equipped operating unit keeping in mind the set customary. This battery is well tested on many parameters so as to confirm its unflawed performance. Shoppers will avail this battery from United States at nominal costs in numerous sizes & models. For example, a twelve V battery with a capability of five hundred Ah battery permits energy storage of roughly a hundred Ah x twelve V = one,200 Wh or one.2 KWh.

Features are-

- Hassle free performance
- Low pollution
- High potency

4.4.2.2 Application

- Emergency Light, Solar Lighting, Telecom, Electronic Weighting Scales etc..

4.4.3 MOSFET Gate Driver-IR2110

4.4.3.1 Basic MOSFET Introduction

MOSFET's operate the same as JFET's but have a gate terminal that is electrically isolated from the semiconducting channel. As well as a result of the Junction Field impact semiconductor unit (JFET), there is Associate in nursing other kind of Field impact semiconductor unit on the market whose Gate input is electrically insulated from the foremost current carrying channel and is thus referred to as an Insulated Gate Field impact semiconductor unit. The foremost common kind of insulated gate semiconductor device that's used in many various sorts of electronic circuits is termed the Metal compound Semiconductor Field impact semiconductor unit or MOSFET for temporary.

The IGFET or MOSFET is also a voltage-controlled field impact semiconductor unit that differs from a JFET in that it is a "Metal Oxide" Gate conductor that's electrically insulated from the foremost semiconductor n-channel or p-channel by a awfully skinny layer of artifact generally chemical compound, typically known as glass. This ultra-thin insulated metal gate conductor is going to be thought of united plate of a condenser. The isolation of the dominant Gate makes the input resistance of the MOSFET very high so much at intervals the Mega-ohms ($M\Omega$) region thereby making it just about infinite.



Fig4.6 IR2110 MOSFET Driver

4.4.3.2 Types of MOSFET

- Depletion sort – the semiconductor device needs the Gate-Source voltage, (VGS) to modify the device “OFF”.
- Enhancement sort – the semiconductor device needs a Gate-Source voltage, (VGS) to modify the device “ON”. The improvement mode MOSFET is comparable to a “Normally Open” switch.

Table 4.2: Pin Expansion

Pin No.	Pin Name	Description
1	LO	Low side gate drive output
2	COM	Low side return
3	VCC	Low side supply
5	VS	High side floating supply return
6	VB	High side floating supply
7	HO	High side gate drive output
9	VDD	Logic supply
10	HIN	Input for High side-in phase
11	SD	Logic input for shutdown
12	LIN	Input for Low side-in phase
13	VSS	Logic ground

4.4.3.3 Features

- Output Current: 2.5A
- Supply Voltage Range: 10V to 20V
- Maximum Turn-On Delay Time: 120 ns

- Maximum Turn-Off Delay Time: 94 ns
- Operating Supply Current: 340 μ A
- Rise Time: 35 ns
- Fall Time: 25 ns
- Package: PDIP and SOIC

4.4.3.4 Application

- DC motor driver
- AC Motor Speed control
- Half, full and three-phase bridge
- Pure sine wave inverter
- Soft starter for three-phase induction motor

4.4.4 ISOLATED REASONANCE CONVERTER

4.4.4.1 Introduction

LLC resonant bridge converters square measure wide employed in shopper natural philosophy, like powering the board of alphanumeric display TV. However, the operational principles of a LLC resonant bridge device square measure aloof from apparent and intuitive. This application note focuses on the intuitive and abstract understanding of a LLC resonant device. Some basic mathematical equations also are shown during this application note for elementary quantitative understanding of LLC resonant bridge converters. Many key topics, as well as evolution of LLC resonant bridge device, basic analyzing methodology, DC characteristics, and options of typical shift waveforms, soft-switching feature, and CCM/DCM options square measure coated during this application note. For hands-on understanding of the LLC resonant bridge device analysis board provided by ON Semiconductor, spice simulation circuits square measure provided for transient simulation and DC simulation.

4.4.4.2 Types

There are multiple kinds of resonant converter:

- Series Resonant device
- Parallel Resonant device
- Class E Resonant device
- Class E Resonant Rectifier
- Zero Voltage amendment resonant devices
- Zero Current amendment resonant devices
- Two Quadrant ZVS Resonant device
- Resonant dc-link converter

4.4.4.3 Zero Voltage Switching

Zero Voltage amendment suggests that the flexibility to the load (heater or cooler or completely different device) is switched on or off on condition that the output voltage is zero volts. Zero Voltage amendment can extend the time period of a controller and of the load being controlled.

4.4.4.4 Operation

This section offers associate degree outline of the LLC device operation and waveforms at intervals the completely different modes. Figure shows a Full-Bridge LLC device with Full-Bridge rectifier. In associate degree extremely simplistic discussion, the amendment bridge generates a sq. undulation to excite the LLC resonant tank, which might output a resonant flexuous current that gets scaled and corrected by the device and rectifier circuit, the output device filters the corrected ac current and outputs a DC voltage.

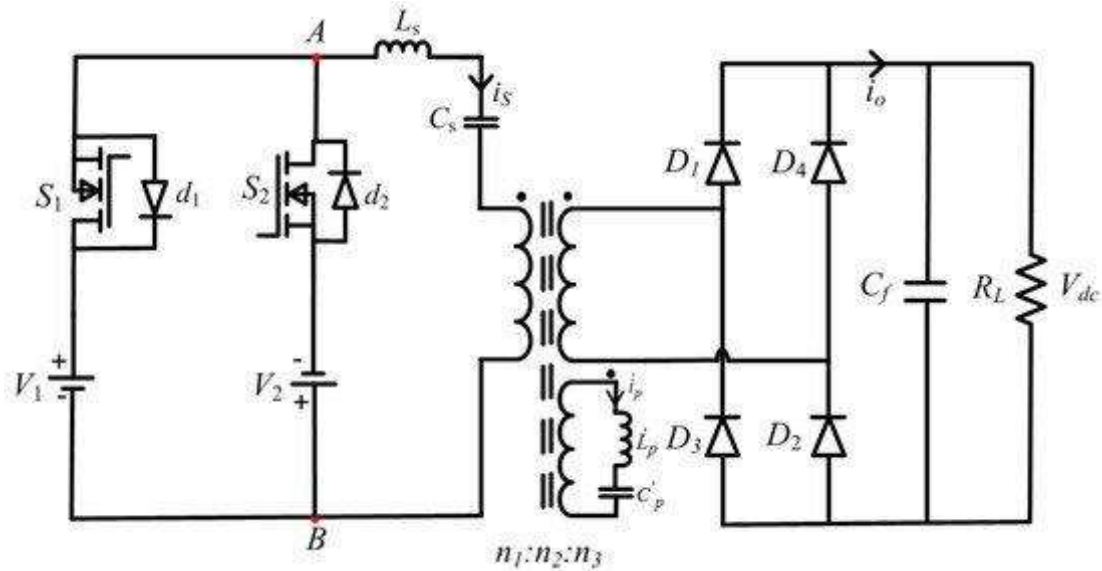


Fig 4.7 Isolated Resonance Converters

4.4.5 PIC16f877A –Micro controller

4.4.5.1 Introduction

PIC (usually pronounced as "pick") could be a family of microcontrollers created by chip Technology, derived from the PIC1650 originally developed by General Instrument's electronics Division.

Programmable Intelligent laptop (PIC) These devices feature a 12-bit wide code memory, a 32-byte register file, and a little two-level deep decision stack. They're delineating by the PIC10 series, still as by some PIC12 and PIC16 devices. Baseline devices square measure obtainable in 6-pin to 40-pin packages. Generally, the primary seven to nine bytes of the register file square measure special-purpose registers, and also the remaining bytes square measure general purpose RAM.

4.4.5.2 Pic 16f877A Architecture Diagram

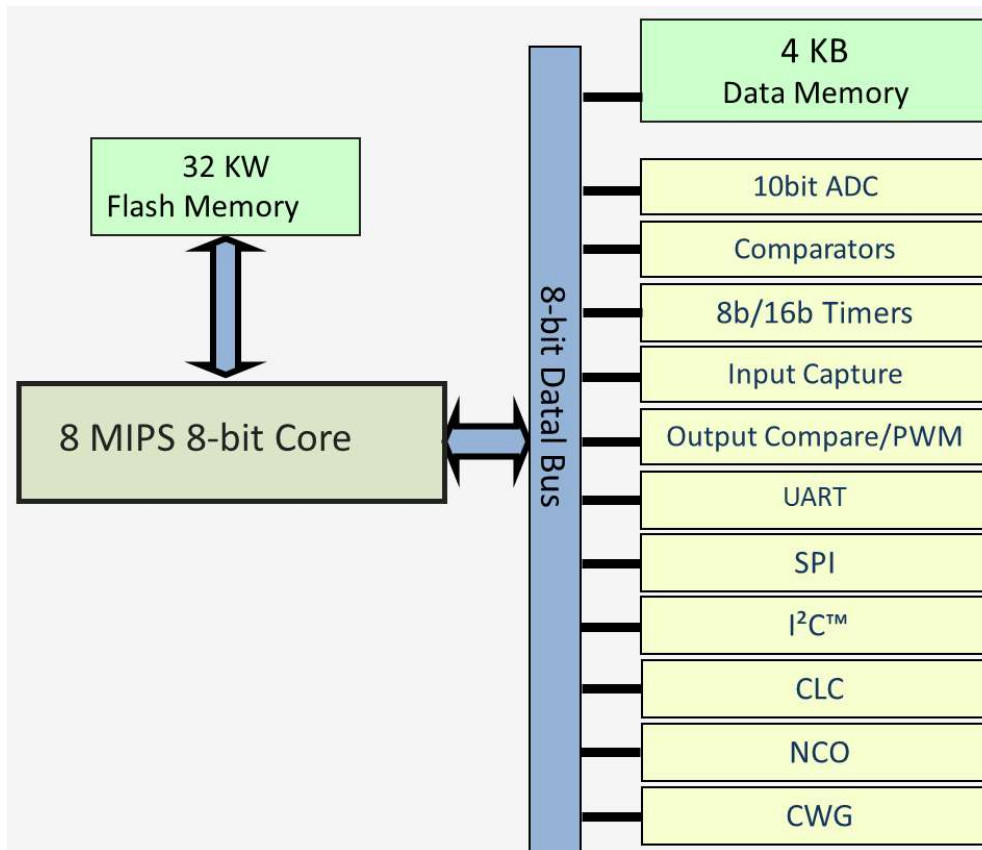


Fig 4.8 Architecture of PIC

4.4.6 Power Supply-center approach step down electrical device

4.4.6.1 Introduction

12-0-12 500mA Center approach Step Down electrical device could be an all-purpose chassis mounting mains electrical device. Electrical device has 230V primary coil and center approach secondary. The electrical device has flying coloured insulated connecting leads approx. one hundred metric linear units long. The electrical device act as step down electrical device reducing AC - 230V to AC - 12V. The electrical device provides outputs of 12V, 12V and 0V.

A variable current within the primary coil creates a variable magnetic flux within the transformer's core and so a variable magnetic flux through the secondary. This variable magnetic flux induces a variable emf (E.M.F) or voltage within the secondary. The electrical device has cores product of high porosity semiconductor steel. The steel features a porosity persistently that of free area and also the core so serves to greatly scale back the magnetizing current and confine the flux to a path that closely couples the winding.

4.4.6.2 Specifications

- Input Voltage: 230V AC
- Output Voltage: 12V, 12V or 0V
- Output Current: 500mA
- Mounting: Vertical mount kind

4.4.6.3 Features

- Soft Iron Core.
- 500mA Current Drain.

4.4.6.4 Applications

- DIY comes Requiring In-Application High current drain.
- On chassis AC/AC convertor.
- Designing a battery Charger.

4.4.7 Voltage Regulator

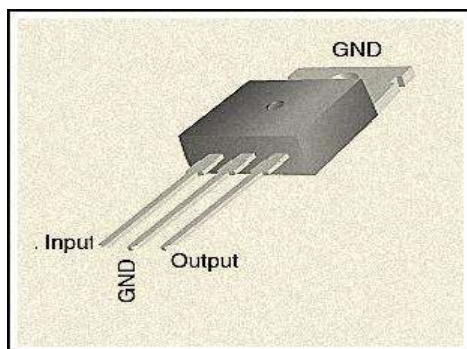


Fig4.9 Single transistor

Table 4.3:- Description of Pin

PIN NO	PIN	DESCRIPTION
1	INPUT	This capacitor is known as bypass capacitor and is employed to bypass extremely tiny duration spikes to the ground with no distress the other components.
2	GROUND	In this pin where the ground is given. This pin is common for the input and output.
3	OUTPUT	The output 5V is taken out from IC

4.4.8 Working of hardware

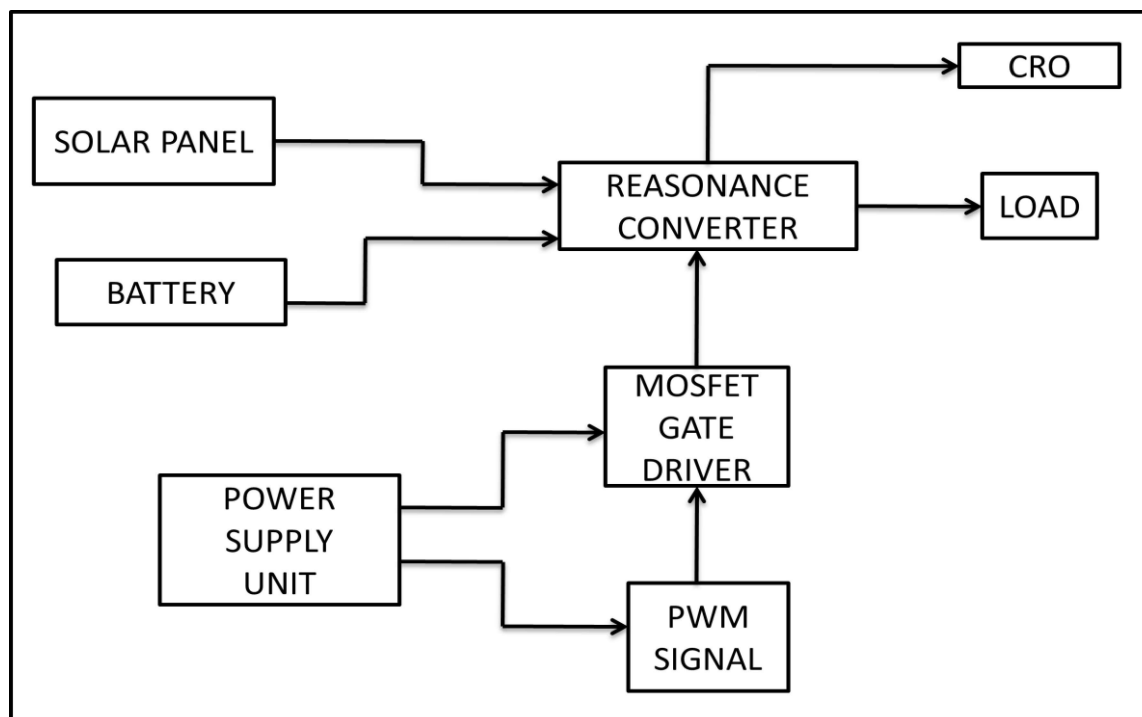


Fig4.10 Block Diagram of Hardware

In First we had shown the block diagram of Solar Panel and Wind But in simulation it is not coming and Cost is also increasing so we came up with this two dc source are Solar Panel and Battery, Here Battery acts like an input and also like storage device before giving the supply check the input sources of two input are connected properly in order to avoid short circuit. Now give the power supply, here we used 12-0-12 center tapped transformer hence we get 12 v dc supply and led turns on now the check the values of two dc sources by using Multi-Meter and note down the value. Now at off condition load will be zero voltage. Now Switch is oned then the boosting take place in converter and now check the value at load it will show some value which got increased when boosting. The process is when we give supply, we get dc and then through converter it converter to ac via scope in simulation near primary and secondary winding we can clearly see the Ac wave form. Now by four diodes its converter to dc and also it also boosts the load and get an dc output and now we apply Zero Voltage Switching, For Vds connect probes negative to Source and positive to Drive then we get some Triangle wave form we can see in CRO. Now again connect negative to Source and positive to Gate Now we see the output in CRO. When we connect two probes, we can see clearly the Vds and Vgs taken place, when VD's goes to zero then gate pulse is added and decreases the switching losses and harmonics some and we can get an efficient output.

CHAPTER 5

RESULT AND DISCUSSION AND PERFORMANCE ANALYSIS

5.1 SIMULATION

5.1.1 MATLAB Simulation

MATLAB (matrix laboratory) may well be a numerical computing atmosphere and fourth-generation artificial language. Though MATLAB is supposed primarily for numerical computing, Associate in nursing no mandatory tool chest uses the MUPAD symbolic engine, allowing access to symbolic computing capabilities. An extra package, SIMULINK, adds graphical multi-domain simulation and Model-Based vogue for dynamic and embedded systems.

5.1.2 SIMULINK

Simulink may well be a diagram atmosphere for multi-domain simulation and Model-Based vogue. It supports system-level vogue, simulation, automatic code generation, and continuous take a glance at and verification of embedded systems. Its integrated with MATLAB facilities, and incorporate MATLAB models and exports.

5.2 GRAPHS

5.2.1 Simulation

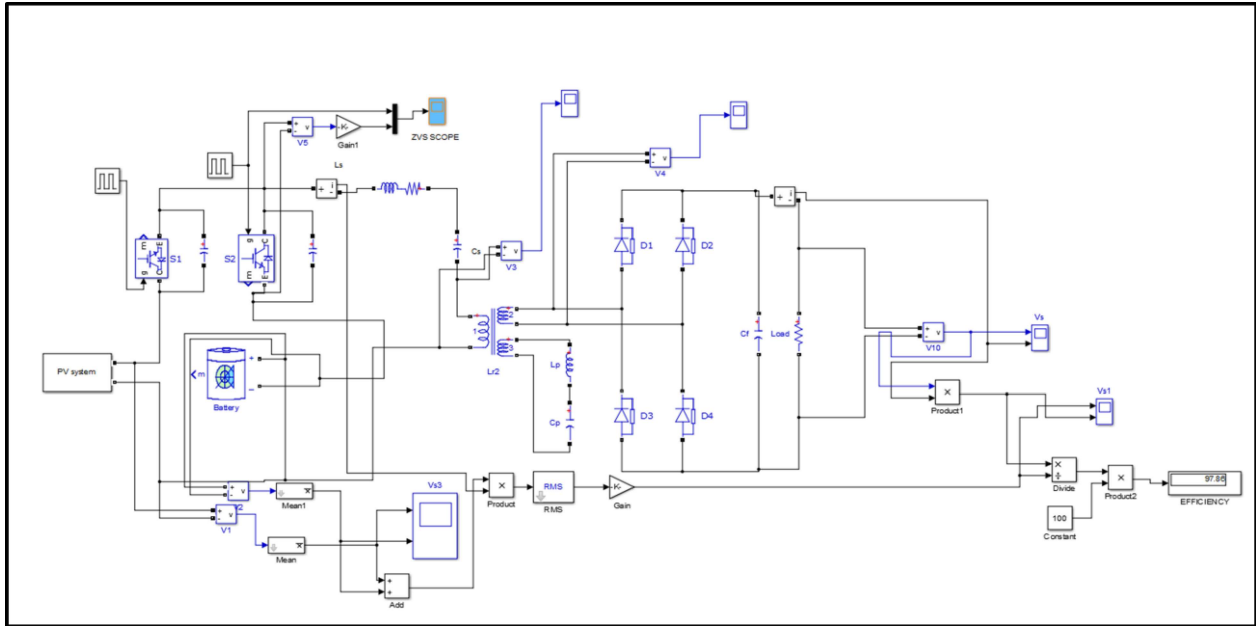


Fig 5.1 Simulation Diagram - This Represents the Simulation diagram of our Project

5.2.2 Primary Voltage

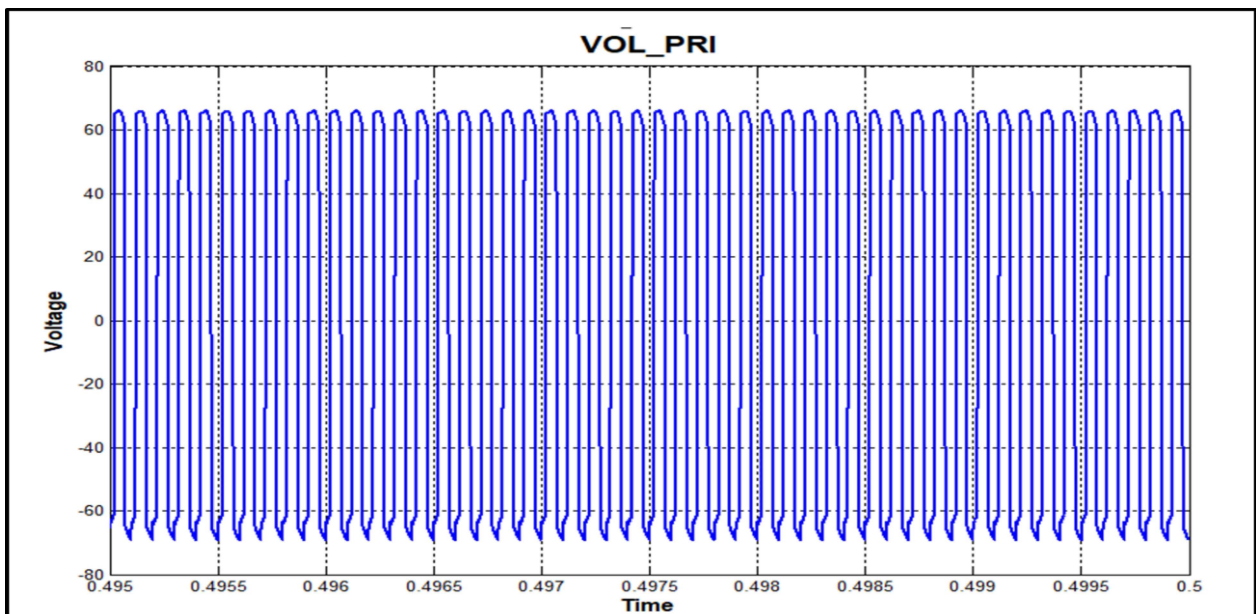


Fig 5.2 Primary Voltage – This Represents the Primary Voltage

5.2.3 Secondary Voltage

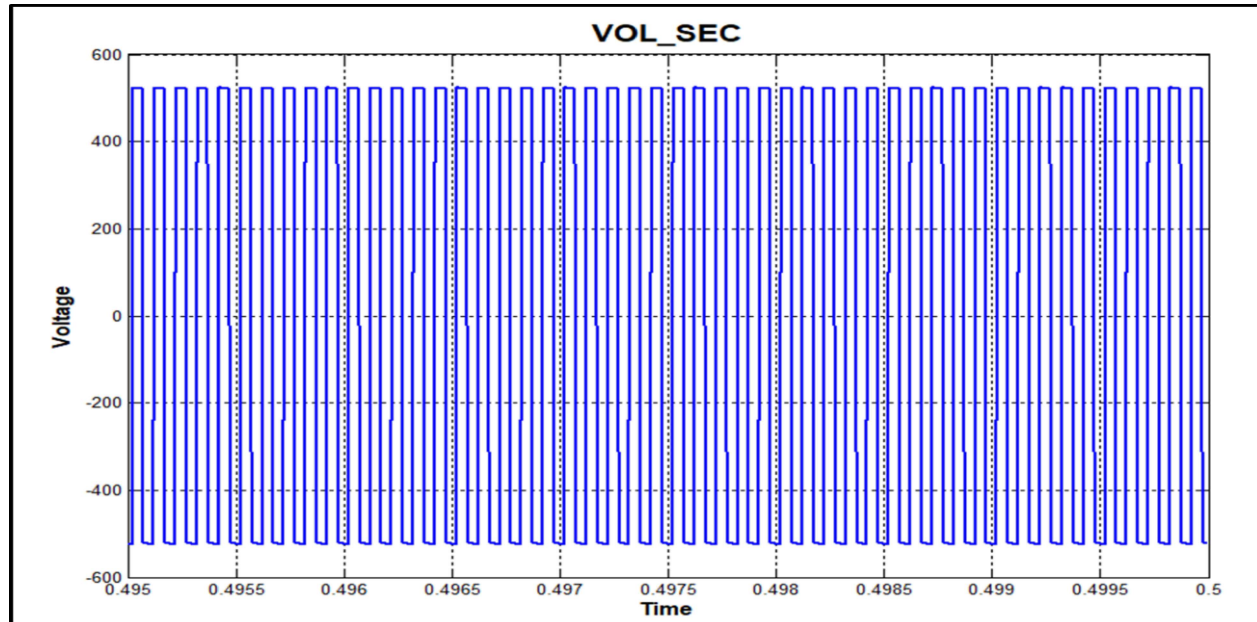


Fig 5.3 Secondary Voltage – This Represents the Secondary Voltage

5.2.4 Output Voltage and Current

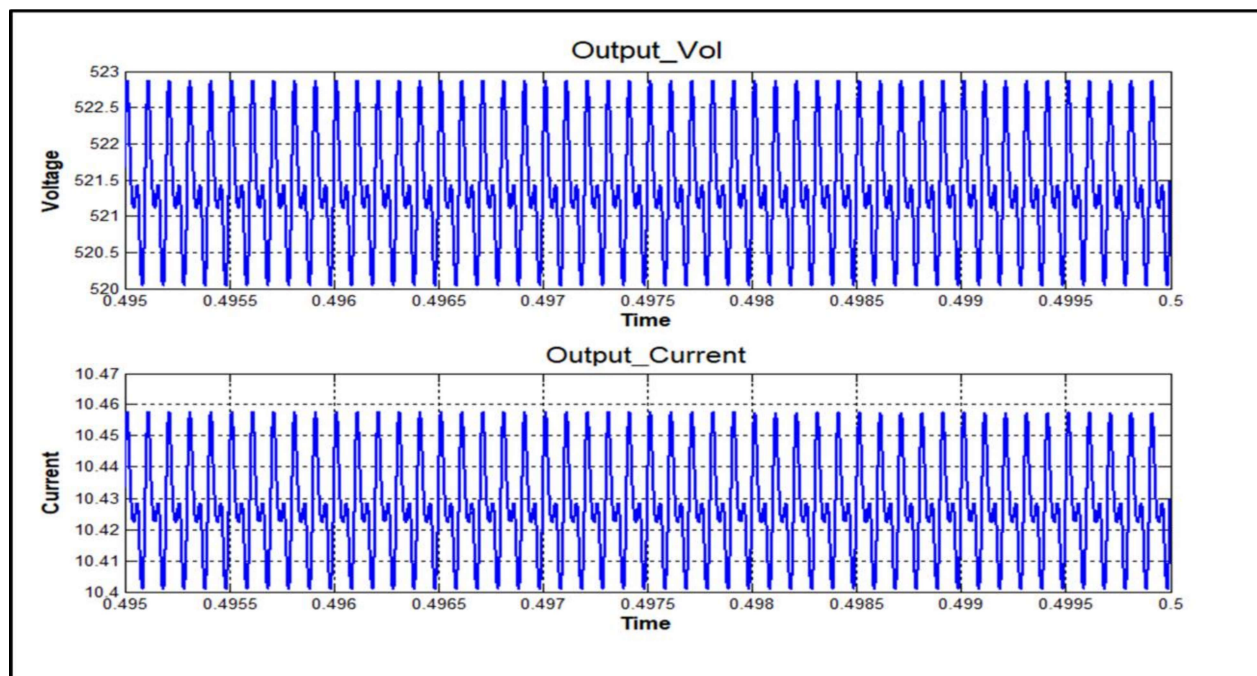


Fig 5.4 Output Voltage and Current – This Represents the *Output Voltage and Current*

5.2.5 Power Input and Output

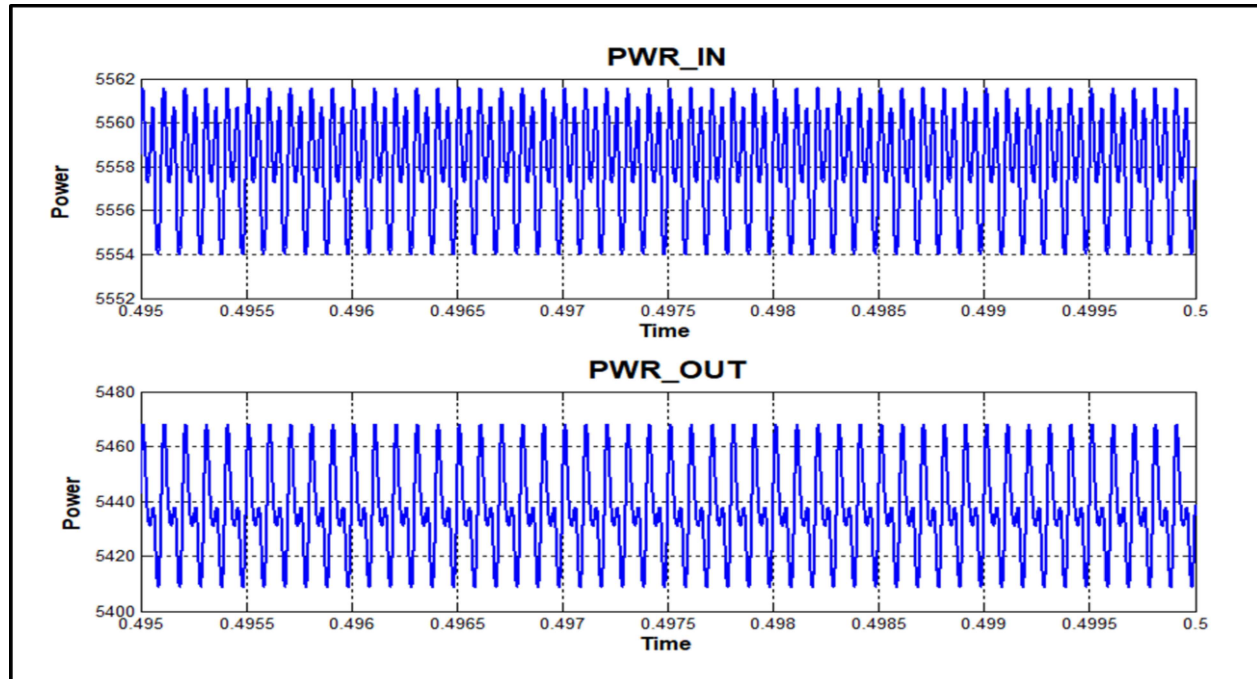


Fig 5.5 Power Input and Output – This Represents the Power Input and Output

5.2.6 Efficiency

Our Project Efficiency is 97.82%

5.3 TABULATION-Values

5.3.1- Simulation results

Table 5.1- Simulation Results

SI.NO	TERMS	Values
1	Input Voltage Solar Panel	100 V
2	Input Voltage Battery	200V

3	Input Power	5200V
4	Primary Voltage	62V
5	Secondary Voltage	500V
6	Output Current	10A
7	Output Voltage	520V
8	Output Power	5200V

This Table represents the Simulation Graphs Values, the values are taken under input and output voltages of Solar Panel, Battery and current.

5.3.2 Hardware Values

Table 5.2 Hardware Values

SI.NO	TERMS	Values
1	Input Voltage Solar Panel	10.96 V
2	Input Voltage Battery	10.97V
3	Load (Switch is off)	0 V
	Switch is on	
4	Output Soar Panel	9.97V
5	Output Battery Voltage	10.9V
6	Load	90V

This Table represents Hardware Values taken during the process

5.3.3 Specification

Table 5.3 Specification of Hardware Components

<i>PARTS</i>	<i>TERMS</i>	<i>RANGE</i>
<i>Solar panel</i>	<i>Peak Power</i>	<i>3WP</i>
	<i>Max Power Current</i>	<i>0.3A</i>
	<i>Max Power Voltage</i>	
<i>Battery</i>	<i>Cycle Use</i>	<i>12V</i>
	<i>Stand by Use</i>	<i>14.4V-15.0V</i>
	<i>Initial Current</i>	<i><0.39A</i>
<i>MC</i>	<i>PIC16f877a</i>	
<i>Power Supply</i>	<i>Center tapped step down transformer</i>	<i>12-0-12</i> <i>500Ma</i>

This Table represents the Speciation of Hardware components. This is very important point in any process. In order to deal with any component we have to knows its limits and demerts then only we can deal with the components in any easy manner .When we are doing Big projects the speciation of parts are import to deal with their limits and range then only we can do any kind of project in success manner without any short-circuit and in precaution manner.

5.4 OUTPUT GRAPH

5.4.1 Input Solar Voltage



Fig 5.6 Input Solar Voltage

This Represents the Input Voltage of Solar panel taken before the boosting

5.4.2 Input Battery Voltage



Fig 5.7 Input Battery Voltage

This Represents the Input Value of battery Voltage taken before the boosting

5.4.3 Switch is off Load is Zero



Fig 5.8 Switch in off Condition

During in off condition the load is zero

5.4.4 Switch is on Boosting taking place



Fig5.9 Switch in On Condition

During in ON condition the boosting takes place now load values changes to Zero to 90V

5.4.5 Output Solar Voltage



Fig5.10 Output Solar Voltage

This Represents the Output Value of Solar panel voltage taken be after the boosting

5.4.6 Output Battery Voltage



Fig5.11 Output Battery Voltage

This Represents the Output Value of battery Voltage taken after the boosting

5.4.7 Zero Voltage Switching

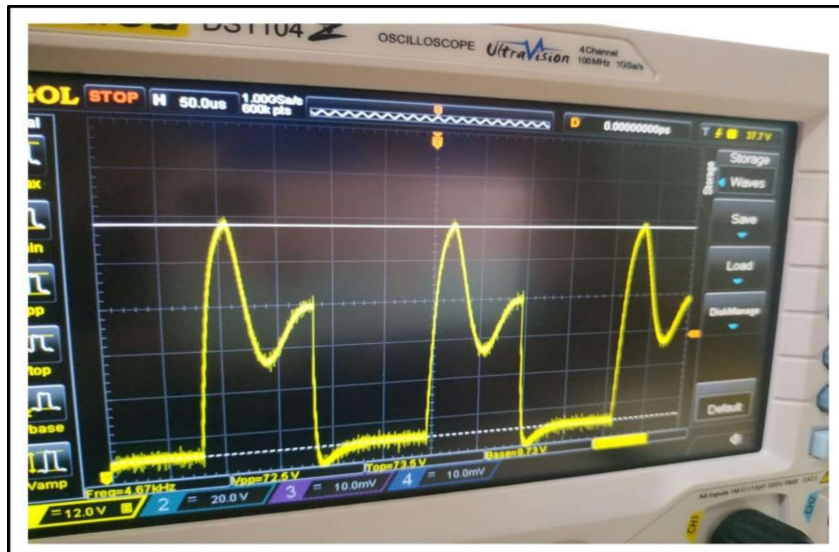


Fig 5.12 at V_{ds} Condition

This Represent the Zero Voltage Switching at V_{ds} Condition



Fig 5.13 at V_{gs} Condition

This Represent the Zero Voltage Switching at V_{gs} Condition

CHAPTER 6

SUMMARY AND CONCLUSION

6.1 SUMMARY

In this Project we came up with a collaboration of two Inputs dc sources with an isolated converter along with Zero Voltage Switching to get an efficient output. In Existing System, we taken some converters like Luo, Buck-Boost converter to make it possible but we didn't get efficient output so by analyzing some base paper, and along with the Guide support we did with the Isolated Resonance Converter. Where Two dc sources are connected to an isolated converter by applying the Zero voltage switching it has been done. In Simulating we got some nice graphs and in hardware we also got efficient output and by Applying Zero voltage Switching the switching losses has been reduced and got the load.

6.2 CONCLUSION

In Existing World we have many techniques which can solve many problems, all we need is simply output with more efficiency like wise we came up with Multi Input with a converter to get an one output. The proposed converters simple in structure and also employs an effective technique to integrate two voltage sources with a smaller number of switches. Converter performance is experimentally verified at varied load conditions in terms of ZVS and voltage regulation. Even at Unequal voltages this switches helps to maintain Constant Voltage and process take place. The maximum efficiency is 97.86%

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