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RESEARCH PAPER ON UNINTERRUPTED POWER SUPPLY (UPS) BY USING SOLAR

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ABSTRACT

This paper provides the exploration and development of a solar powered UPS to meet the alternate energy source conditions of homes and small services. It includes the design, analysis, exploration methodology used and the findings of the request study during the exploration. The design of the solar UPS includes an especially designed inverter circuit and a solar panel. The inverter circuit has been designed according to the conditions and specifications of solar panel. numerous sample circuits have been studied to optimize the being circuit. backing has also been taken from design masterminds of being UPSs in the request to see possible druthers in case of any factors' failure or attainability. The paper provides study of possibilities of design and functionality of a solar powered UPS. It suggests that solar UPS can be a largely effective and successful volition to electrical UPSs in the request. There are two main factors in the design an out-of-door solar panel comprising of solar cells, which will convert solar energy into electrical energy and inverter circuit that will convert that energy into interspersing current to be used for home appliances.

Keywords: UPS Request, Renewable Energy, Inverter Circuit, Etc.

I. INTRODUCTION

Solar power charge regulator is applicable in numerous sectors similar as solar home system, mongrel systems, solar water pump system etc. solar panel converts sun light energy into electrical energy through an electrochemical process also known as photovoltaic process. Energy stored in the battery with the help of charging circuit through a diode and a fuse. This energy will be used in case of main power failure. In the battery chemical energy is converted into electrical energy which in turn illuminates electrical appliances or helps in pumping water from the ground. thus, we need to cover battery from over charge, deep discharging mode while DC loads are used or in under voltage as it's the main element in a solar power charge regulator. Solar panel produce direct currents (DC) to convert into AC affair at a certain needed voltage position and frequence connect these panels to the electricity grid. The conversion from DC to AC is basically fulfilled by means of DC- AC inverter, which is major element in the system. Yet the affair of the solar panels isn't continuously constant and is related to the immediate sun light intensity and ambient temperature. unforeseen change in voltage may beget damage for the functioning of charge critical electrical loads. To avoid these damages and to give a steady inflow of power to these electrical loads we're using uninterruptible power force (UPS). It provides instanraious result to these power quality problems. It includes the design, analysis exploration methodology used and the findings the request study during the exploration. In the design of solar UPS there are substantially two corridor they're solar panel and especially designed inverter circuit. The inverter circuit has been designed on the base of solar panel. The paper provides study of possibilities of design and functionality of a solar powered UPS. Main purpose of using solar UPS is having high effectiveness and also a successful alternate to electrical UPSs in the request. There are two main factors in the design an out-of-door solar panel comprising of solar cells. Which will convert solar energy into electrical energy and inverter that will convert that energy into interspersing current to be used for home appliances, solar power and uninterruptible power force (UPS) are two technologies that are growing fleetly.

II. PROPOSED SYSTEM

Here we proposed a solar powered uninterrupted power supply project that uses the solar energy to charge the 12v battery and after that this DC battery is used to power the AC load by using an inverter. Solar panel constantly charge the 12v Dc battery. Two main components of our system are outdoor solar panel to be made

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up of solar cells which converts solar energy into electrical energy and an inverter circuit that will convert this energy in alternating current used for the home appliances.

III. WORKING

Solar bowl circuit that's used to charge Lead Acid battery using the solar energy power. The circuit crops solar energy to charge a12 volt4.5 Ah rechargeable battery for colorful operations. The bowl has voltage and current regulation and over voltage cut-off installations. The circuit uses a 12- volt solar panel and a variable voltage controller IC LM 317. The solar panel consists of solar cells each rated at1.2 volts. 12- volt DC is available from the panel to charge the battery. Charging current passes through D1 to the voltage controller IC LM 317. By conforming its Acclimate leg, affair voltage and current can be regulated. VR is placed between the acclimate leg and ground to give an affair voltage of 9 volts to the battery. Resistor R3 circumscribe the charging current and diode D2 prevents discharge of current from the battery. Transistor T1 and Zener diode ZD act as a cut- off switch when the battery is full. typically, T1 is out and battery gets charging current. When the terminal voltage of the battery rises above12.7 volts, Zener conducts and provides base current to T1. It also turns on resting the affair of LM317 to stop charging. DC to AC inverter that provides 140VAC when a 12VDC power source is handed. It can be used to power veritably light loads like night lights and cordless telephones, but can be modified into a important inverter by adding further MOSFETs. It uses 2 power IRFZ44 MOSFETs for driving the affair power and the 4047 IC as an astable multivibrator operating at a frequence of around 50 Hz. The 10 and 11 leg labors of the IC directly drive power MOSFETs that are used in drive- pull configuration. The affair motor has a 12V-0-12V, 3Amps on the secondary and 230V on the primary. Use suitable heat- cesspools for MOSFETs. Flash back that this isn't a sine- surge inverter, not indeed a modified one. It's just a square- surge one so you can power only light bulbs, and small power tools that don't bear a frequence with a sinusoidal surge form.

IV. BLOCK DIAGRAM

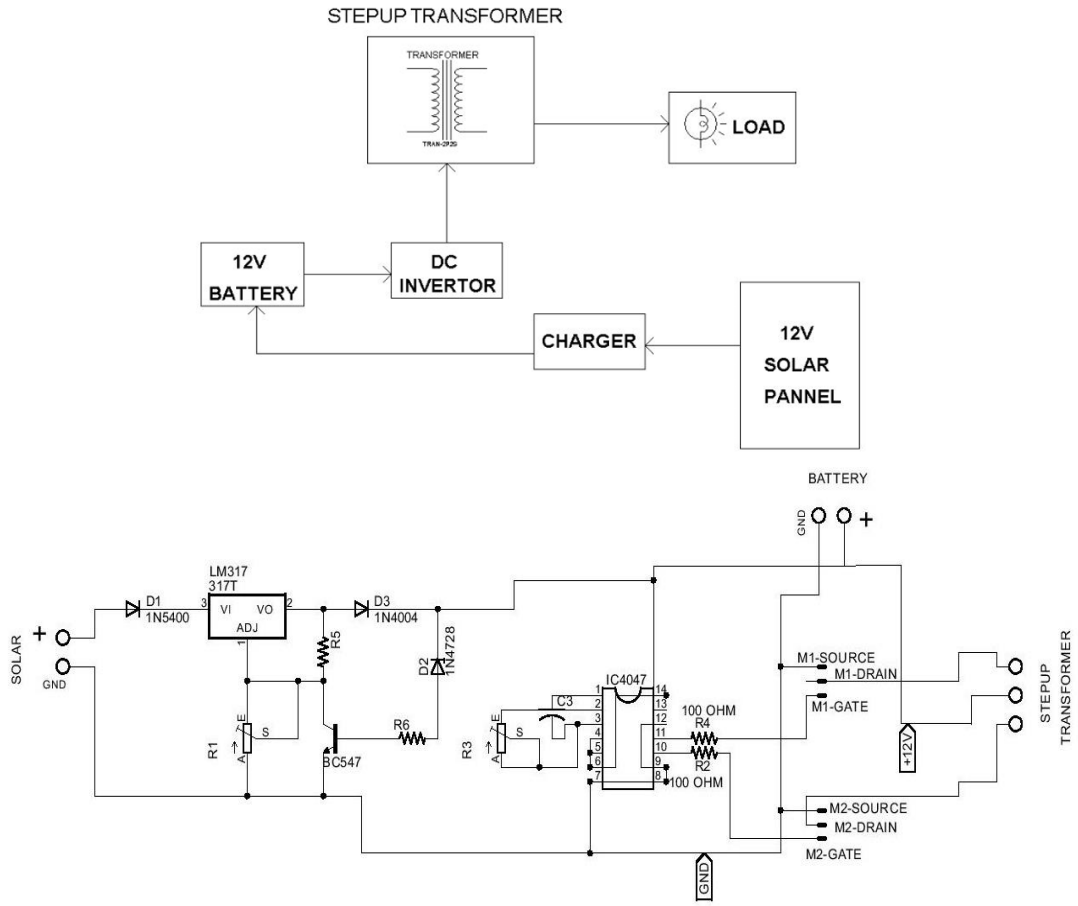

Fig 1. PCB Layout

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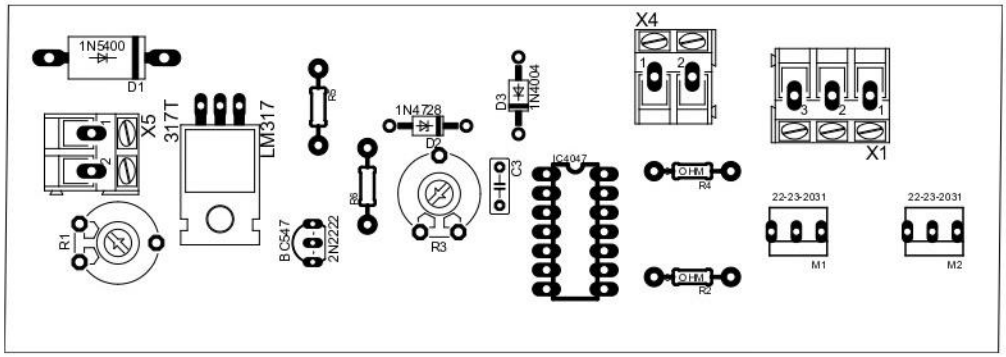
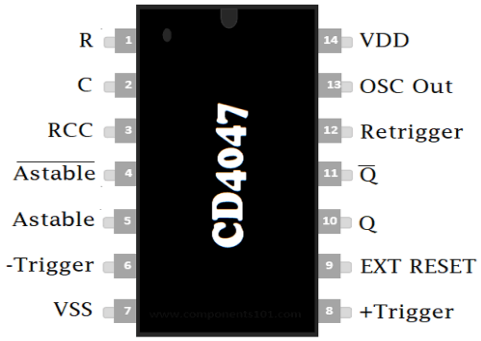


Fig 2. PCB Schematic

V. SYSTEM COMPONENTS

IC 4047



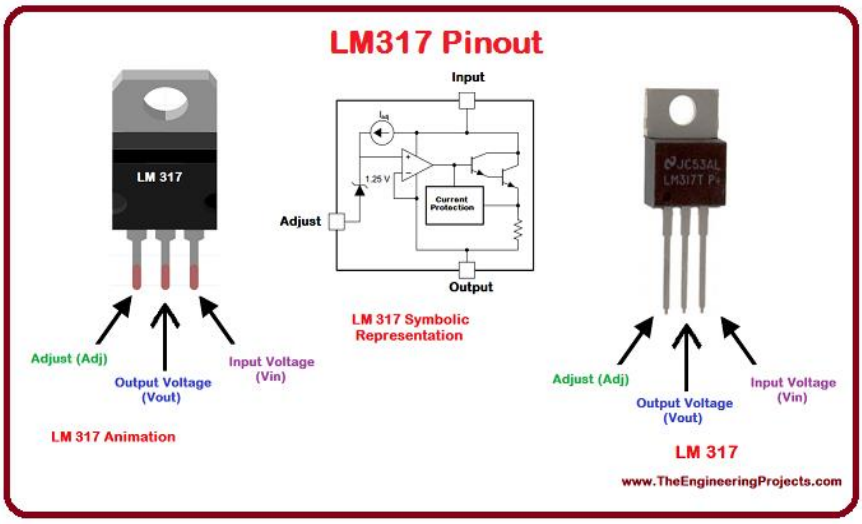
IC 4047 is an astable and monostable IC. The main function of IC 4047 is to produce clockwise signals, such as sine signals, square signals and many mores. IC 4047 is 14 pin IC. Each pin having different work.

Features of IC 4047

1. Less power utilization.
2. It operates in monostable and a stable mode.
3. Consistent and symmetrical O/P characteristics.
4. Parametric ratings are 5v,10v, and 15v.

LM 317 Regulator

The LM 317 regulator is a device which having three terminals. It is the regulator capable pf supplying more than 1.5A over an output voltage range of 1.25v to 37v. It requires only two external registers to set the output voltage.



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Voltage transformer

In our project, this step-up transformer increases the input voltage and delivers it to the load. It steps up the 12v AC to 200 to 230v.

Fig 3. Transformer

Circuitry Diagram

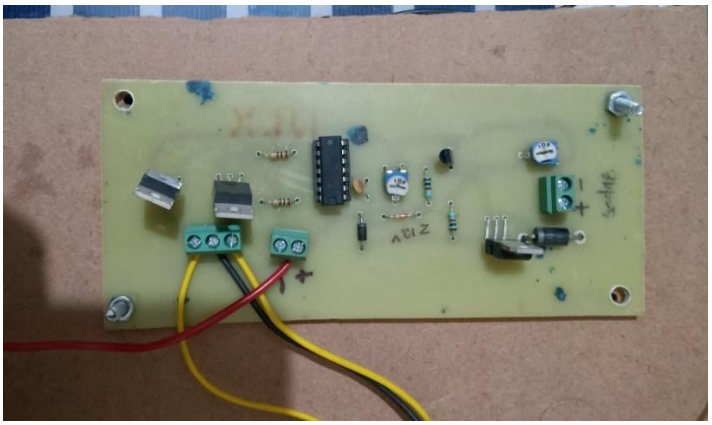

Fig 4. PCB Layout

Battery

As compared to the newer technology, the batteries are inexpensive. Battery stores the electricity through the electrochemical process. Generally, lead acid batteries are widely use for the process. In this system sunrays hits the solar panel and the energy is converted into DC electricity and this DC electricity is stored by the battery.

Fig 5. 12v Battery

Specification

Lead acid battery

Rechargeable battery

Stand by use: 12.60v-12.80v

Max current use: 2.80A

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Capacitor

A capacitor is a device use for storing charge. It is a passive electronic component consists of a pair of conductors separated by a dielectric. The capacitor on power circuit board has two main functions, first one is they store electric charge and allows alternating current to flow while holding direct current.

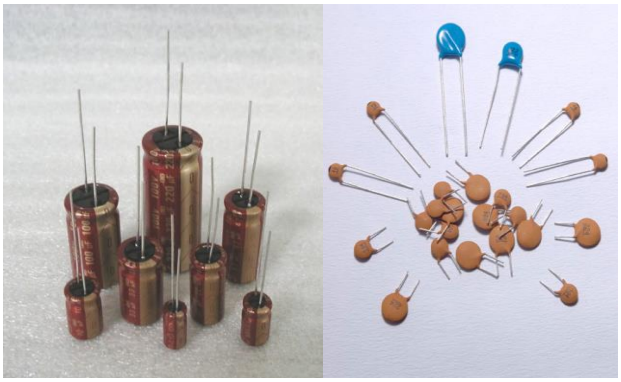

Fig 6. Capacitors

Register

A resister is a two terminal electronic component which is use to oppose the flow of electric current. i.e., in accordance with the ohms law.

$$V=IR$$

Register are the most common components which integrated into hybrid and printed circuits.

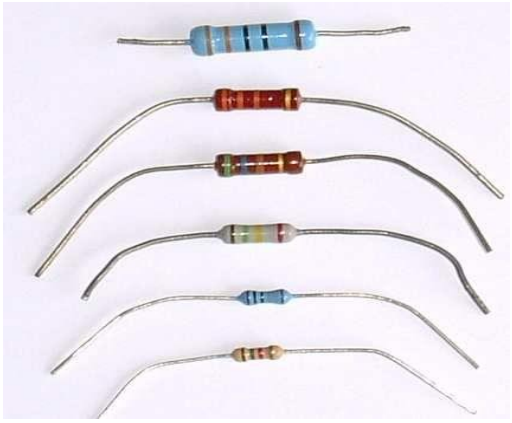

Fig 7. Resister

Solar Panel

Fig 8. 12v Solar Panel

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Specifications

Array size: 67×60cm

Maximum Power: 50W

Maximum Voltage: 12V

Maximum Current: 2.9A

No of modules: 1

Type: Polycrystalline

VI. APPLICATIONS

1. This is now provided to the AC load.
2. Thus, our system successfully powers AC load using a solar panel and battery.
3. The system can be used as a UPS in case of emergency power cuts or outage and has the capacity to work as a standalone system without the need of any external electricity supply.

VII. CONCLUSION

As we know that the solar energy is renewable energy which is environment friendly. In this project we used solar power to provide the emergency supply in case of grid failure. It provides instant power supply to the various electrical appliances. As we concluded, the project is very effective and useful in case of emergency power is required.

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