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Application Based Solar Street Light by Using DC-DC Converter

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ABSTRACT: This paper present the application of solar street light by using DC-DC converter. A DC-DC converter is an electronic circuit that convert source of DC from one voltage level to another. Power level range from very low to very high .DC to DC converter developed to maximize the energy harvest for photo voltaic system .It is cheaper and more efficient .The input voltage for VSC is kept constant and output voltage is independent load.IOT is important to sense and collect data from connected devices, and then share that data across the internet where it can be processed and utilized for various purpose and decisions ,IOT allows real time information that we have never had before .Thus DC-DC converter used to increasing the voltage and current.

KEYWORDS: - Street light, LDR sensor, microcontroller, energy saving circuit and DC-DC Converter

I. INTRODUCTION

In this modern world, Electricity is also added to the most basic needs in everyone's life. The graph of energy consumption is getting increased day by day where as the energy resources are diminishing parallel. In order of balanced to scarcity for electricity, to various sources are used to generate electricity. For generation of electricity is are two ways 1.one of the conventional method and 2.other one is non-conventional methods. Some of the energy carriers like fossil fuels and nuclear fuels are also used, but they are not renewable resources (i.e., they are not 'refilled' by nature) and it is said to be non-conventional. In its broadest sense, sustainable power source can be achieved by using the solar power as source. Solar energy has the wide availability throughout the world. Even The sun has produced energy for billions of years. The sun's rays may can as an important source for the generation of electricity by converting it into a electric power. Such application is called as solar thermal energy, which is conventional. Even through the various sustainable sources are available to such as a wind, rain, tides and geothermal, natural based bio fuels and conventional biomass, solar power have huge benefits.

II. SOLAR PANEL

The photovoltaic solar panel has protection energy from electricity. The energy of photo voltaic cell has assembly by a 10*10 solar panel. Sun has energy protection from a photo voltaic effect. maximum model of using from solar panel water based on crystalline silicon cell(or)thin -film cells .The load crying member of model can be either top layer to back layer. Cells also protected from mechanical damage and moisture. . Most modules rigid semi flexible once based thin -film cells are also available. A PV junction box are attached the back of the solar panel and its output interface is externally and most photovoltaic modules used connected type to facilitate easy weather proof connections are rest of the system. USB interface can be used in a electrical connection are series to achieve desired output voltage or in parallel to provide the current capacity. The photovoltaic effect is the electrical potential developed between two dissimilar mate Serials when their common junction is illuminated with radiations of photons. The conducting wires are take the current off modules contain silver, copper,(or)other Non magnetic conducting transient metal.



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Fig: 1(Solar panel)

SILICON PANEL:

The silicon cell found use in a computer chip. It's a common semiconductor in photo voltaic cell. The photons hit a silicon will be release the electrons. Currently over the solar panel producing the current level of 90%based on silicon. Instance of solar panel gallium one has less than electrons atom of silicon an arsenic atom of one electrons are more. The silicon atom order to improved silicon ability to capture of sun energy has improved the power of electricity. Back of days the silicon solar panels used to expensive for very high quality of silicon used to creating them. Procedure of purification of silicon interfering with gallium and arsenic atoms used to time-consuming and costly.

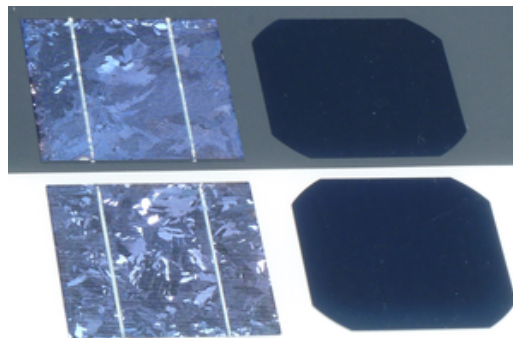


Fig: 2(Silicon metal)

Solar Street light:

Solar Street lights are raised lighting source of power with solar panel s generally mounted on a structure or integrated poles itself. The panel charging to battery is rechargeable which powers are used in LED lamps during the night.

IOT (INTERNET OF THINGS):

The street light working from internet application of development demand of very high. Iot is major technology which can be produce various use full internet of applications. Basically iot use a network which all physical objects and connected to the internet through networks devices (or) router and exchange data. then internets allows the objective to controlled remotely across to executing network are very good and intelligent technique of On and Off controls .Also has autonomous of control feature by which connecting any device can be controlled with a human interaction. The connectivity of various devices of different fields with internet and exchange data between then. Then connectivity of world through various existing technologies. The Things refer to Iot are sense in mixture of hardware, software, data and services. Iot which can be such as DNA analysis devices are monitoring from environments, Electric

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clamps in coastal waters, home automation and others. Then use of home automation machine and connecting from a Bluetooth for exchange data between various devices of home.

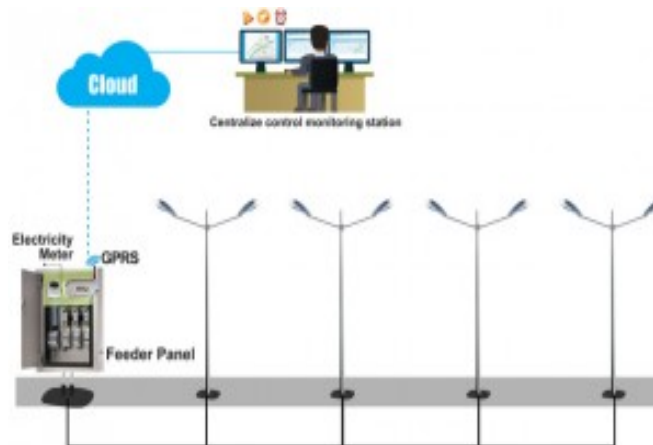


Fig: 3 (IOT)

III. BLOCK DIAGRAM

The street light control and monitoring system based ON/OFF controls. Then power convertor are using from DC-DC Converter .Converter are varying current and voltage levels are boosting from light. E.g. (5v-50v/3amps) the convertor are protecting from harmonics to solve by using filter. Then charging unit has detecting power rating of units and working performance time and a battery charging units to analysis the input, output flow charging rates are calculating from unit.

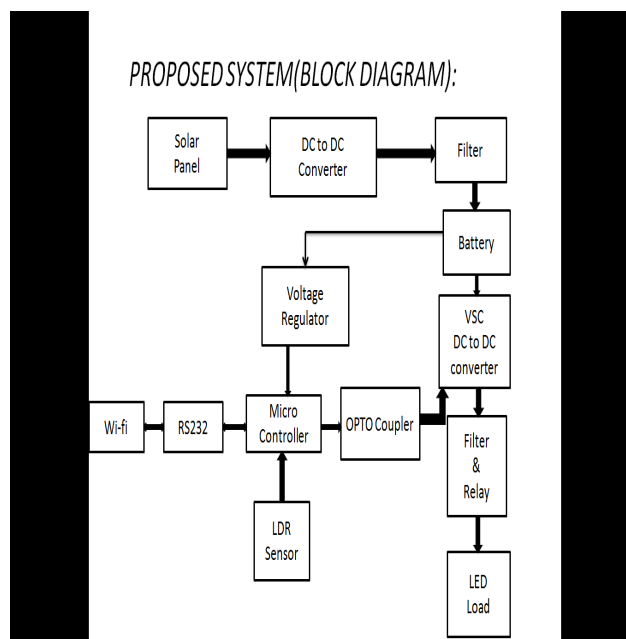


Fig: 4(Block diagram of solar street light)



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VOLTAGE REGULATOR:

Voltage regulator is using constant voltage to design automatically maintaining level. Regulator has used from simple feed forward design and to including the negative feedback. The regulator based on a one (or) more AC and DC voltages. Electronic regulates founds devices such as power supplies stabilizing Dc voltages used the processor of other elements.

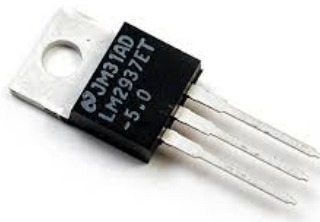


Fig: 5(Voltage regulator)

DC_DC CONVERTER:

DC-DC Converter is used efficiently produced the regulated voltage from source may (or) may not will be constant. DC-DC converter are high frequency and high power conversion circuits use of high frequency switching and inductor, transformers, and capacitors to smooth switching noise into regulating the DC voltage. The closed feedback loops maintain the constant output voltage even changing the input voltages and output currents. The efficiency of 90% to generally to use more efficient and smaller than linear regulators. Disadvantages of noise and complexity. Converters are non-isolated and isolated varieties to determine by whether or not input ground is connected to the output ground. The conventional of solar street light are utilize converter are charging process. Converter is two parts of charging in one of the battery and another one of LED Street light. two converters are do not work simultaneously, and can be integrated for cost of reduction .then LED supplying to arrangement of DC source of resistor in lighting for light emitting current driven of LED. Resistor should be account high value of led know voltages.

TYPES OF CONVERTORS:

- ❖ Buck convertor
- ❖ Boost convertor
- ❖ Buck-Boost convertor

BOOST CONVERTOR:

The using boost converter is step up voltage, producing a higher input voltage. A boost converter could be used to drive a string of LED from lithium cell to provide a 5 V USB output from a lithium cell.

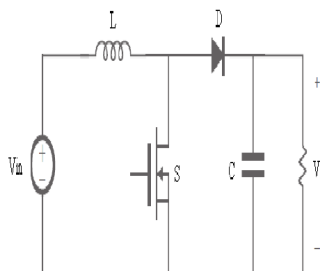


Fig: 6(Boost converter)

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- ❖ Without using boost converter
- ❖ Using boost converter

WITH-OUT USING BOOST CONVERTER:

The boost converter IV semiconductor switching device, linear regulated circuit access voltage from a unregulated input AC supply are due to the power loss. The power loss are proportional to a voltage drops in a switching devices.

USING BOOST CONVERTER:

A switching device its converters are converted to unregulated AC or DC input voltage to regulate the DC output voltage.

CONTINUOUS MODE:

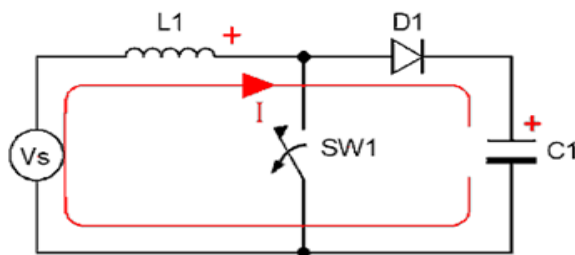


Fig: 7(Continuous mode)

The boost converter are continuous mode of switching is constructed with components are inductors, capacitors and input voltage source are connecting on a switching devices. Inductor acts as power storage elements. The boosting converter switch is a controlled by PWM (pulse width modulations). Switch on the energy are developed in a inductor are more energy is delivered to the output. It's possible to convert high voltage capacitors from a low voltage in a input source. An input voltage always greater then of a output voltages. In continuous mode and current is increased with respect to a output voltages.

DISCONTINUOUS MODE:

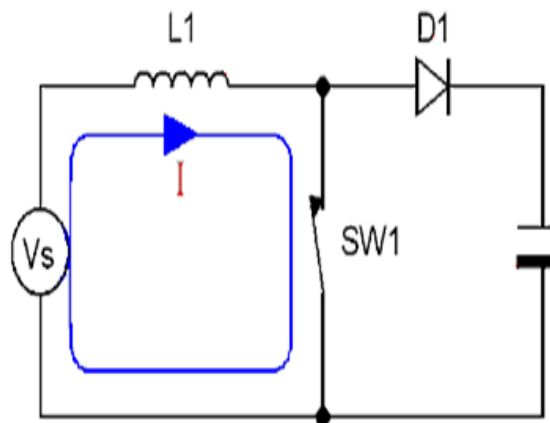


Fig: 8(Discontinuous mode)

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OPTOCOUPLER:

An opto-isolator is called as opt coupler or photo coupler or optical isolator is an electric component that transfers the electrical signals between the isolated the two circuits by using light. Opto-isolator prevents the high voltages from affect the system to receiving the signals. A common type of opto-isolator consists of an LED and a phototransistor in the same opaque package. Other types of source-sensor combinations include LED-photodiode, LED-LASCR, and lamp-photo resistor pairs.

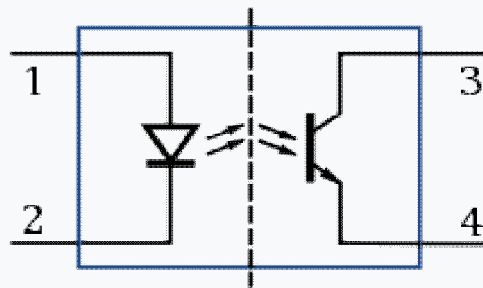


Fig: 9(Opto coupler)

RELAY:

Relay has electrical operating switch. Then relay has electromagnet to mechanical operate switch in other principle of principle of used in a solid-state relay. Then relays are used in necessary to control a circuit separate the low-power signals. The several circuits must be controlled the one signal. Types of relays can be handled in a high power required a directly to controlled in a electronic motors and other loads are called as contactor.

WORKING:

It activates the electromagnet to generating a magnetic field attracts connect and activating the second circuit. The power is switch off spring pulls the contact back up to the original position switching for the second circuit off. The example for normally open relay circuit. It is the contact for second circuit does not connected for default and switches on only current flow the magnet. The relay circuit is normally closed and switch off only the magnet activated pulling or pushing for contact. The normally open relays for most common the essentially for same thing to slightly different. On the left side to input circuit power switch or sensor the circuit is activated to feed the current in a electromagnet pulls on metal switches are closed in activated in a open circuit. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. The input circuit is switch off and no current flows through the until of a sometimes either a sensor or a switching are closing to turns it on a circuits that output circuit are open to also a switch off. When a small current flow in the input circuit, it activates in a electromagnet are which produces a magnetic field that all around it. The energized to a electromagnets pulls on a metal bar in a output circuits towards it. Closing the switch and allowing to much bigger than a current and to flow through the output circuit. The output circuits operate in a high-current appliance such as a lamp in a led.

FILTER:

In filter has signaled processing devices and process of unwanted components are removed in signals. Its removing the some frequencies (or) frequency bands. The field of a imaging processing many to other targets of filtering to exiting currently to removing the certain frequency of components and not others to without having to acts in a frequency domain.



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LDR (LIGHT DEPENDENT RESISTOR):

A LDR or photo resistor devices. Which resistivity for function is indicating in a electromagnetic radiation. They are sensitive devices in a lighting operation. It's also called as photo conductors and photo conductive cells and simply photocells. It made up of a semiconducting material having a high resistance. They are many different symbols are used indicating a LDR. Then one of most commonly used symbols are arrows to indicating lighting falls on it. Lighting falls through photons falls on a device. It electrons to valance band of a semiconductor materials are used to excited to a conduction materials.

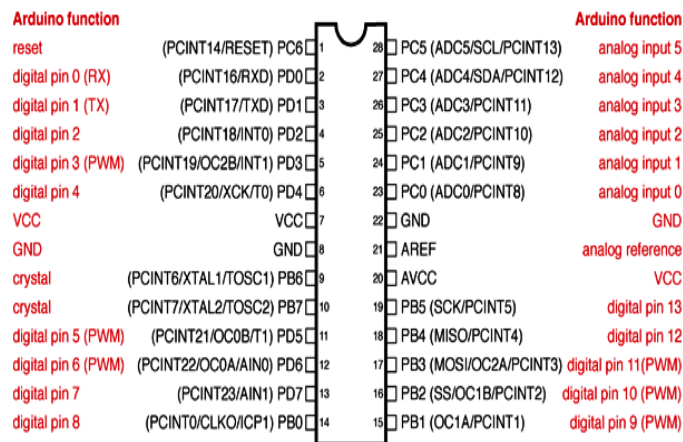


Fig: 10(Light dependent resister)

LED (LIGHT EMITTING DIODE):

The high power LED sources of in 0.5 watts in a single LED power are high. A manufacturer to using a low power led. But need of lot of a low power in a high power LED. The light emitting diode with a high rated current in a LED to generally to a 0.1 Watts. So trend to use of high lighting sources of led in a commercial lighting IN high power. The operating current is a 20 mA. Then high power LED has reached in 1 watt, 2 watts and evens tens of watts, to operating current range from to tens a mA.

MICROCONTROLLER BASED PIN DIAGRAM:



Digital Pins 11, 12 & 13 are used by the ICSP header for MISO,
MOSI, SCK connections (Atmega168 pins 17, 18 & 19). Avoid low-
impedance loads on these pins when using the ICSP header.

Fig: 11(Pin diagram of microcontroller)



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. Then very popular microcontroller chip it produced by Atmel 328. It is an 8-bit microcontroller that has 16 KB ISH of flash memory, and 1K of SRAM internal memory and 512K of EPROM an 8-channel and 10 bits and A/D converter and debug wires on a chips. The device supports a throughput of 20 MIPS at 20 MHz and operates between 2.7-5.5 volts. By executing powerful instructions of The ATMEL328 is one of the microcontroller chips that used to popular boards.

FEATURES:

- High-performance
- Low power
- 130 Powerful Instructions – Most Single-clock Cycle Execution
- 32 × 8 General Purpose Working Registers
- Fully Static Operation
- Up to 16MIPS Throughput at 16MHz
- On-chip 2-cycle Multiplier

Peripheral Features

- One 16-bit timer/counter with separate pre-scale, compare mode, and capture mode
- Real time counter with separate oscillator
- Six PWM channels
- 8-channel 10-bit ADC in TQFP and QFN/MLF package
- 6-channel 10-bit ADC in PDIP Package
- Programmable serial USART

Special Microcontroller Features:

- Power-on Reset and Programmable Brownout Detection
- Internal Calibrated RC Oscillator
- External and Internal Interrupt Sources
- Five Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, and Standby

IV. CONCLUSION

In this paper, integrating large scale of PV power plants in a power grid. It's via HVDC links are explored. Different benefits are gained using a integration methodology circuits to including eliminating are stability to issues the higher capacity, lower losses, better voltage profile and the better control abilities. It's also to utilizing bipolar-HVDC links to facilitate integrating different PV units and even with different frequency together. With different frequency of grid to the grid connections. In this investigation it has been accessed to various procedures are used to the tracing of solar panel. It can be manipulated anywhere such as house-hold activities in office even in industrial purposes. The costs of the implements are task to fluctuate by various methods. If the user's consideration is on cost, then the method of using a in the module can be a agreeable one. For this it is also a low power consuming project. Today world is confronting intense power emergency. We are required to better power system of given benefits to utilize the peoples are to live remote control areas. It also to efficient monitoring systems for acquiring to complete energy conversations. TO Under circumstance of various types projects to given a decent outcrosses vitality emergency to the most fundamental issue on a solar planets.

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