

Solar Mobile Phone Charging System

Abstract

Crisis of electricity is a major problem in the present era. This problem is even more critical for densely populated poverty stricken country like ours. Many of the people live here without the basic amenity of electricity. Day by Day crisis of electricity is increasing whereas no other solution has been left for us without using the solar power or wind turbine to generate electricity.

A solar panel was used to convert the solar energy into electric energy. The solar circuit consists of solar panel; composed of 2 solar cells, 2 ICs for controlling the voltage and rechargeable batteries for charging the devices in the absence of sunlight. Solar power is a renewable source of energy, which has become increasingly popular in modern times. It has obvious advantages over non-renewable energy sources, such as coal, oil and nuclear energy

Keywords: Solar panel, mobile charger

Introduction

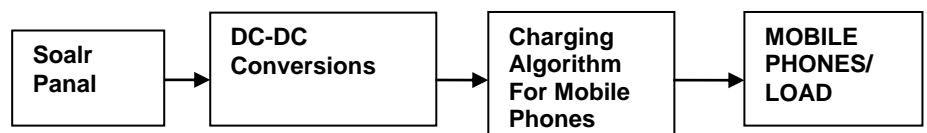
Mobile phone have become an extremely popular device in the entire world and it is easy to say they are part of our daily lives. In the year 2010 there was an estimate of over 4.6 billion Mobile phones worldwide and the number has been growing by more than a billion ever since; this translate to more than half's the world populations.

Solar power is a renewable source of energy, which has become increasingly popular in modern times. It has obvious advantages over non-renewable energy sources, such as coal, oil and nuclear energy. It is non-polluting, reliable and can produce energy in the presence of sun shine, so its resources are not going to run out. Solar power is generated using solar panel, which do not require any major mechanical parts, such as wind turbines. These mechanical parts can break down and cause maintenance issues and can also be quite noisy.

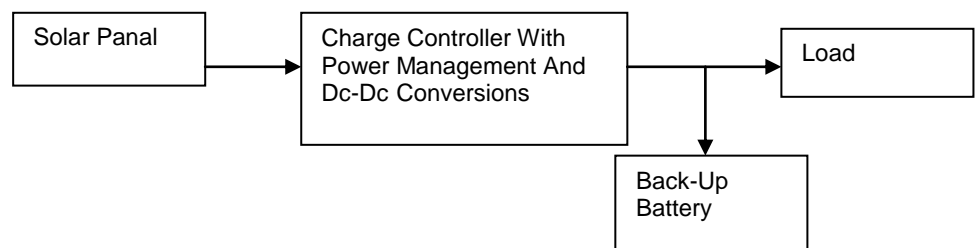
Design

The solar panels voltage would be controlled by a DC-DC converter, most likely a commercial one, and the main circuitry design would be in implementing the mobile phone charging algorithm to charge the mobile phones at the load. A commercial charge controller IC was sourced that met with specifications project.

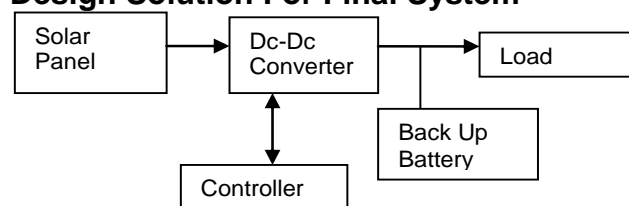
Design Solution For Charging Algorithm



Design Solution Including Backup Battery



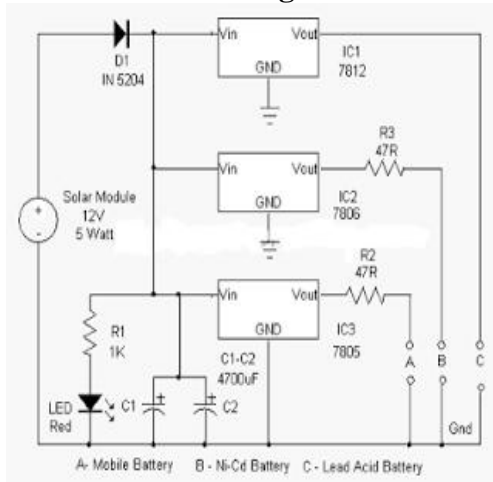
Design Solution For Final System



Subah Chawla

Electronics & Communication
Gyan Ganga College of
Technology
Jabalpur (M.P.)

Solar Mobile Phone Charger Circuit Diagram



This charger can charge almost all types of batteries such as mobile phone batteries. It uses a solar panel to convert light in to electric energy. A 12 volt and 5 watt solar panel is used as source of current. The cells in the panel are made up of semiconductor material which convert sun light energy in to electrical energy. When the sunlight is a peak means maximum, then solar panel can generate up to 16.5 volts with 400mA current. This current is able to phone battery. Diode D1 allow current to pass in to three regulator ICs to get regulated output. This output voltage is able to charge Lead Acid battery. The battery can be connected to point C and ground. IC2 gives regulated 6 volt to charge NiCd battery. IC3 provides regulated voltage to charge mobile charge all types of mobile phone batteries which is rated at 3.6 volt. Red led indicates its charging the battery.

Solar Mobile Chargers



Mini Solar mobile charger SMC -1 Product Description

World's smallest solar mobile phone charger.

Benefits

Solar power charging green, environmental friendly, safe and economic, Light in weight, long life, high efficiency.

Specifications

Battery: 600mAh Li-ion Polymer
Solar Panel: Multi-Crystalline 5.0V, 25mA
Net Weight: 26g
Output: DC 5.5V / 300-500 mAh



India's cheapest solar mobile charger SMC-1.5 Product Description

Perfect solar charger for use in INDIA. Can charge almost all types of phones. Connectors of various phones as shown in figure. Solar panel can generate power for upto 10-15 years!! Extremely simple and usable!! BEST PRICE GUARANTEE!!

Benefits

Can charge a mobile phone in 2-3 hrs only!! Extremely fast charging speed compared to other solar mobile chargers.

Specifications

Output Voltage: 5V DC
Maximum Power Pm [Wp]=1.5W
Maximum Power Voltage Vm= 6.5V
Weight: 560 gm



Solar smart mobile phone charger SMC-3 Product Description

Solar Mobile Battery Bank Charger 2000 mAh
Inbuilt Battery charging by Solar and Laptop/PC

Benefits

Battery Status Indicator Emergency LED
Flashlight Connectors : Mini Nokia Pin, Micro USB, Mini USB Ideal for Mobile, iPhone, iPod, Mp3 Player, Portable players
Small in Size and Lightweight

Specifications

Eco-friendly
Emergency back-up of 2000mAh
No problem on power cuts
Worldwide use
Universal USB Port



High capacity-10000mAh solar mobile charger SMC-5 Product Description

Solar Charge is designed as a backup power supply to power virtually any portable devices like Cell Phones, Smart Phones, Cameras, MP4/MP3 Players GPS and more.

Benefits

This product is a multi-function solar emergency charger.

With a power button & four battery level indicator LED's.

Specifications

Solar panel: 0.7W
Built-in Battery Capacity: 10000mAh
Input: DC 5V 1.0A (max)
Output USB1: DC 5.0V / 2100mA
Output USB2: DC 5.0V / 1000mA



Solar bag with mobile charger 5w SMC-8 Product Description

Solar laptop bag combines the functionality and comfort of a premium level lightweight backpack with an in-built solar power charging system to give you power on-the-move.

Benefits

Light weight and hence easy to carry

Lets you charge your phone and other devices anywhere. Poly-Crystalline solar panel which works well also in robust environment.

Specifications

Solar panel (poly –crystalline): 5W
Li-ion battery: 3.7V 2000mAh
Item Height: 43.2 Centimeters
Item Length: 33 Centimeters
Item Width: 15.2 Centimeters



Solar mobile charger with free lamp SMC-9 Product Description

Presenting new low cost mobile charger with lighting gadget, the Solar Mobile Charger With Lantern is powered from innovative solar technology and is the ultimate cost saving solution designed specially to give bright light for long hours

Benefits

Battery Charging: charged between 6 to 8 hours on sunlight. Mobile charging function with various connectors. Light output: Bright light for 8-9 hours in single day

Specifications

Solar panel (poly –crystalline): 5W No. of LEDs in lantern: 30 Lantern color: White Dimensions[in cm] (Height x Width x Depth): 28 x 7 x 10 Weight: 500gms.

Advantages of solar battery chargers

Some of the key advantages of Solar battery chargers are

- These chargers are robust & sturdy. They do not possess any complicated circuits & have an operational life of 20 to 25 years. They require very little maintenance due to their simple design.
- The chargers are portable and lightweight. They come in handy while travelling as they operate at any location with the help of available sunlight.
- Solar battery chargers are universal. They can charge any type of rechargeable battery provided the capacity of the charger is larger than the capacity of the battery. Thus the same charger can be used to charge mobile phones, cameras & small lights

Limitations of Solar battery chargers

The current constraint with solar battery chargers are its initial costs compared to conventional battery chargers. Hence solar battery chargers are currently limited to off-grid markets where grid charging is not available.

Charging devices via solar battery chargers are time consuming. It takes at least 3-4 hours of direct sunlight to charge any device completely which is impractical in some cases. These chargers rely on sunlight.

Charging of any device is a challenge during cloudy weather and times of rainfall as the charger can provide only limited amount of power to the batteries resulting in incomplete charging.

Conclusion

A solar power generation has emerged as one of the most rapidly growing renewable sources of

electricity. The Sunlight is free, abundant and widely distributed, available to every country and person in the world. The trend is to integrate the solar power in small form that enhance the battery life and acts as an additional source of energy to supplement the battery power from other sources. Solar charging is slow and this presents another challenge of keeping the device under sunlight. This may not be always practical and hence there is a need to have battery backup solutions.

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