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SOLAR BATTERY CHARGER

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Abstract -*Mobile and other smart devices are always up and running and are draining the battery.*

It takes some time and a suitable place to charge the mobile phone. Uncharged mobile phones are suddenly disconnected, creating a major embargo for people rushing to work, markets, schools, colleges, offices, train stations, bus stops, and more.

It would be great if we could provide these people with the ability to instantly charge their smart devices with renewable energy that is available on the go whenever they need it.

So far, some research has been done to solve this problem of providing mobile charging capabilities to smart devices.

Some of these developments are portable, while others are stable large charging stations, but a common feature of these systems is that the power generation of these systems is entirely on one or more renewable energy sources. Or it is partly based. B. Hand crank generators powered by the sun, wind, and physical movements.

Key Words: *Charging, Solar, Battery, Renewable Energy, Portable.*

1.INTRODUCTION

Gadgets such as phones, iPods and smart watches have become an important part of our lives. They all face a problem, which is that they need to be charged after normal use. One of the best solutions is to rely on renewable energy sources. There are different types of renewable energy sources such as wind, tides and sunlight.

This project uses solar energy sources to charge mobile phones . Solar energy is a clean energy source, and it is time to understand its importance and use it in our daily lives. Solar cells are the heart of every circuit. In the circuit of this project, a solar panel was used as a power source and supplied to a voltage regulator for constant voltage charging of the battery. Batteries are the simplest way to store energy. Therefore, the solar charging circuit is intended to charge the battery, not drive the components. It is also very important to stop charging when the battery is fully charged. This is achieved using a Zener diode that is turned on at the cutoff voltage and shunts the current through the transistor. Therefore, the battery is charged at a constant voltage and a desired rate, depending on the amount of current supplied. Solar energy is the most common, but the least used source of energy. But it's a solution to most of our problems. The biggest challenges we face in the conversion to solar energy are expensive technology, limited space and limited energy.

2. PROPOSED SOLUTION

The energy provided by the sun every hour exceeds human needs for a year. Diesel, and all of the fossil fuels are none other than the solar energy stored over the years. This makes it very efficient in terms of energy per unit of fuel. Solar energy is not new. Lliteratures in India even state the use of flying machines which were powered using the sun.

Solar panels are simply solar cells lined up together in series and parallel so as get sufficient voltage and are pn junction semiconductor devices with pure silicon wafer doped with `n` type phosphorous on the top and `p` type boron on the base. If the PV cell is placed in the sun, photons of light strike the electrons in the pn junction and energize them, knocking them free of their atoms. The need for renewable energy resource has never bigger than today and so is a lot of research going to match this high energy demand. An efficient and more feasible alternative option is solar energy. Solar is more practical energy source.

3. METHODOLOGY

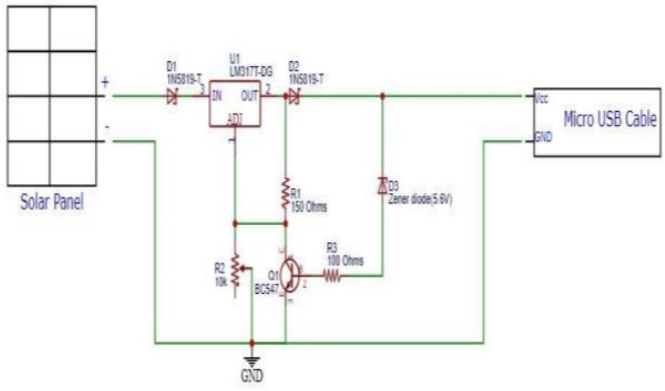
First, place the entire assembly where you can receive the maximum amount of sunlight. To get the desired output voltage from the circuit, adjust the potentiometer (use a multi meter to measure the output voltage from the circuit). Once you have the required voltage (you can charge your phone with 5V), connect the Micro USB to your phone.

The phone will be charged if the proper solar radiation is available on the solar panel. Speaking of overcharge protection, if the user sets the desired output voltage to 5V (by changing the potentiometer) and selects a Zener diode with VZ = 5V, the circuit will run until the battery is below 5V. .. charging. As soon as the battery voltage exceeds 5V at the end of charging, the Zener diode begins to conduct with reverse bias (because the Zener voltage is 5V).

This causes transistor BC547 to operate in forward bias mode, cutting the R2 resistor from the circuit and leaving the output voltage from the circuit at 1.25 volts (maintaining R2 = 0 from the LM317 equation). This voltage is not enough to charge the battery. In this way, when the required voltage is reached and the battery is protected from overcharging current voltage, the circuit will not charge the battery. 5V is enough to charge a cell phone, but today's cell phones are known to be able to use more voltage for charging, so the

can increase the voltage. Then, when the proper solar radiation becomes available on the solar panel, you can get the desired voltage , so you can charge your cell phone. Currently there is only one problem that overcharge can occur and this problem can be solved with the help of a 5V Zener diode.

However, as soon as the voltage exceeds 5V, the Zener diode begins to conduct with reverse bias. This causes the transistor to operate with a forward bias, disconnecting the R2 resistor from the circuit and disconnecting the output.



4. ADVANTAGES

- It uses clean and renewable energy source.
- It is an available alternative energy source.
- Solar cell charger is most effective under bright and sunny days.
- The solar cell charger has an internal battery that can store energy.
- If you need to recharge the electronic device, you will use sunlight to collect energy, and storage energy will be used in the battery to recharge this device.
- This charger has an AC outlet that can charge your cell phone battery.
- Solar Charger is portable and can be easily carried anywhere to charge the device's battery.
- The main advantage of using this charger is that it does not require an external power source to charge the device. Very convenient for outdoor activities.

5. DISADVANTAGES

- The power generation capacity of a small charger is very small. If you want to load faster and more efficiently, you need a larger model. Most are usually foldable, but still take up space in your backpack.
- Only available in sunlight (lithium batteries can be used to overcome this)
- Heating issues
- Climate: Solar chargers are entirely dependent on solar energy. Sure, it works on cloudy days, but it's much less efficient.

6. FUTURE SCOPE

Solar energy can only be used when it is sunny during the day. To overcome this, solar panels can be combined with a backup power source that can be used to store the surplus power generated during the day and power the system in the absence of sunlight.

The lead-acid batteries used in the design are large and heavy, which makes the device stand out.

Not portable. Therefore, you can design a pocket-sized battery of optimal weight to make your device portable. The size of the solar panel makes the device bulky and unportable. Solar panels should be created to cover the entire device. This allows you to effectively reduce the size.

7. CONCLUSIONS

• Solar panels are as good as power supplies, averaging 12V in bright sunlight. The only problem is the unadjusted voltage due to fluctuations in light intensity.

• The ICLM317 solves the problem by adjusting the output voltage, but it also consumes 2V, which reduces the efficiency of the system.

• The solar charging circuit requires a voltage regulator to charge the battery at a constant voltage. • The battery should stop charging as soon as it is fully charged. This is guaranteed by a Zener that initiates conduction at the cutoff voltage.

• The charger circuit is a simple plug-and-play lead-acid battery charger, the perfect way to harness solar energy on the go.

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