

POWER BANK OF USING SOLAR LIGHT

Abdullah¹, Annisa Sakinah², Isminarti³, Muhammad Akil⁴
Mechatronics Diploma Degree, Polytechnic of Bosowa, Makassar, Indonesia
E-mail : abdullahaku@yahoo.co.id / annisasakinah294@gmail.com

ABSTRACT - Power bank can allow users to charge the phone. However, the power of banks still need to charge the battery. If the power of banks that use run out of power while surrounding locations there is no power source to recharge. The difficulty is making researchers took the initiative to design a power bank with another alternative source is sunlight. Activation using sunlight done with solar cell panels. The use of the sun's light can make it easier to perform charging anywhere. The results showed that the ideal conditions to do that during the charging light that can generate a voltage of 5.2 Volts.

Keywords : Power bank, solar, battery, IC 7805, mobile

I. Introduction

In this time where every human activity is already familiar with the tools of communication that have been advanced. For example mobile phones, gadgets and so forth. But sometimes there is a constraint in which the battery cell phone or gadget can not last long, so it should always recharge the phone battery. We can not refill or recharge the phone as much as possible when traveled, because of the time and venue are less efficient to just look for the source of electric current. Currently it has found a way to do that is charging the phone using the power of banks, the use of this tool is very practical. Widespread use of the power of the current bank is the answer to mobile users who are super busy and long day outside, so that if the battery is empty, charging can be performed with this device. However, what if the bank used the power running out of power, while the location around there is no electrical source to recharge. Such difficulty makes the author took the initiative to design a power system of the bank with other alternative sources, namely solar light.

II. Basic Theory

a. Power Bank

Power bank is a device used to input electrical energy in the battery can be recharged without having to connect the device to an electrical outlet. This is called a portable battery charger because it is different from the battery charger must be connected to an electrical outlet, portable charger can be used without having to connect to the electrical device. However, the bank has a power capacity of electrical energy so that when the power has been used up, electrical energy must come back recharged by connecting the cable to

the outlet listrik. This portable battery charger not only able to recharge the phone battery, but also can recharge the battery in other devices such as iPod, iPad, mp3 player, tablet, and other devices. How to use the power bank is to connect the device connector cable with portable battery charger. Cable connector that connects the device to a portable battery charger on the one end of the cable as the connecting a portable battery charger plugged into the the usb power bank and the other end is shaped in accordance with a customized filler device [6].

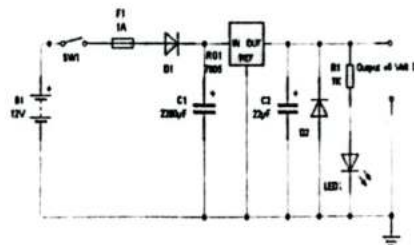


Figure 1. The circuit of power bank

b. Solar cells

Solar cells are also often call photovoltaic or are devices capable of converting sunlight directly into electricity. Solar cells can called as the lead in order to maximize the enormous potential energy of sunlight that reaches the earth, in addition to be used to generate electricity, solar energy can also maximized heat through solar thermal system. Solar cells can be analogous to a device with two terminals or connections, where the dark area or not enough light this tool serves as a diode, and when irradiated with sunlight, it can generate a voltage. When it gets sunlight is generally a commercial solar cell to produce a dc voltage of 0.5 to 1 Volt, and short-circuit currents in the milli ampere scale per cm². Large voltages and currents is not sufficient for many applications, so it is generally a number of solar cells arranged in series to form a solar module. One solar module typically consists of 28-36 solar cells, and total produce a dc voltage of 12 V in standard lighting conditions (Air Mass 1.5). The solar modules can be coupled in parallel or in series to increase the total output voltage and current in accordance with the power needed for a particular application [5].

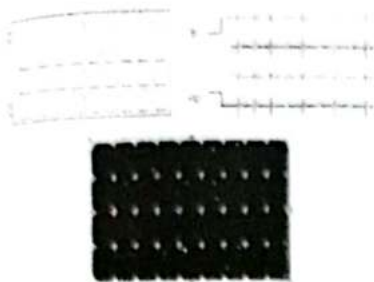


Figure 2. Solar cell modules, usually consist of 28-36 solar cells are strung together series to increase the total power output.

III. Methodology

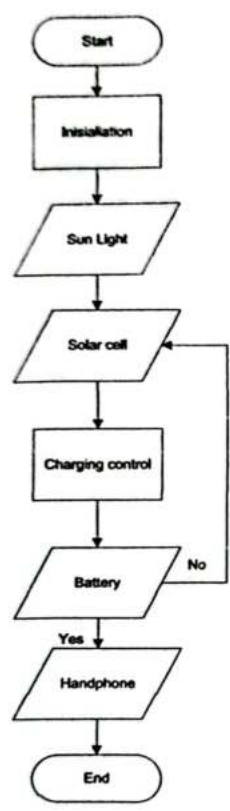


Figure 3. Design Flowchart

The input voltage (solar cell) having outputs 5-6 Volt circuit coursing through the diode 1N4007 (left image), please note that the input voltage must be greater than a minimum of 3 volts of batteries will be charged voltage. Batteries are needed to have a voltage of 3.7 volts. Voltage will be regulated by the regulator LM317 chip is first set According to the voltage of the battery via potentiometer 1K. Thus Spake the output voltage on the chip LM317 would be well-regulated. The output voltage at the LM317 chip set with a voltage of 6

volts. The voltage will charge the battery fully. When a full charge, the battery will drain current and voltage that exceeds its capacity. If this is allowed then the battery will be quickly intervening damaged by heat. To limit the voltage spikes when the battery is fully charged then it should automatically switch roomates circuit will cut the output voltage of the LM317 chip. The output voltage to the battery will rise from 6 Volts to 7 Volts. Before reaching 7 Volt is at a voltage of 6.8 volts of voltage will be disconnected by the transistor (with short circuit).

IV. Result

a. Observation Data

Table 1. Observation Data

No	Date	Time	Hour (Wita)	Weather	Voltage (Volt)
1	Jan, 27 2015	Daylight	12.00 - 12.30	Bright	5,2 Volt
2	Jan, 28 2015	Morning	08.00 - 08.30	Cloudy	2,2 Volt
3	Jan, 28 2015	Afternoon	16.55 - 17.30	Heavy Rain	0,8 Volt

In the table it can be seen that at any time during the day with sunlight heat can produce a voltage of 5.2 volts. While in the morning with cloudy weather can produce a voltage of 2.2 volt, lower during hot weather. In the afternoon the weather conditions of light rain can only generate a voltage of 0.8 volts. It can we know that its use for charging the battery is influenced by the weather got sunny weather, it can produce a voltage value big.

b. Discussion

How to convert sunlight into electricity source is to use solar cells. Solar cells that we often see is a bunch of photovoltaic cell module (photo = light, voltaic = electricity) are arranged in such a way and packed in a frame. The photovoltaic cells which will transform solar energy directly into electricity. The photovoltaic cells made of special material which is the type semiconductor n and p type. N-type semiconductor is a semiconductor that has an excess of electrons, so that the excess of negative charge, (n =negative). While the p-type semiconductor has excess holes, so called by p (p = positive) due to excess positive charge. How, by adding another element into semiconductor, then we can control the type of semiconductor.

As for how to design power bank which use sunlight is by using solar cell panels. Where sunlight as further input currents huge market to be stored in the battery. In the circuit fitted battery that serves as the LM317 voltage regulator so generated voltage by the solar cell to be regulated. Additionally install other components to form the circuit in a battery charger. After the battery is full, the transistor will break voltage, so that the battery remains safe. When the battery is mounted on a series of power bank then current will flow into the next connected with the USB connection to charge your phone on the phone. When the LED lights up it indicates that the battery has been in and ready to perform charging on the phone, while the phone is mark with the existing indicators on the phone.

V. Conclusions

1. Solar cells are devices capable of converting sunlight into electricity. The value of the voltage generated by the solar cell bergantung in bright

sunlight. The brighter the sunlight, the greater the voltage generated by the power bank.

2. To save the current on the battery should use the battery charger circuit use LM317 IC.

REFERENCES

- [1] Brian, Yulianto. 2011. Solar Cell Sumber Energi Terbarukan Masa Depan. Berita Artikel Solar Cell, (online). <http://www.esdm.go.id>, October 2014).
- [2] Natsir, Mariana. 2014. Analisa Power bank. Draft, (online). (<http://www.academia.edu>)
- [3] Rsulastama. 2011. Solar Panel Installation. Learning Community, (online). (<http://kagamavirtual.com> October 2014).
- [4] Sugeng, Mas. 2014. Apa Itu Power bank Charge. Ilmu Komputer, (online). (<http://www.iptekinfo.com>, October 2014).
- [5] Wilman, Septiana. 2014. Prinsip Kerja Sel Surya. Dasar Teknologi Sel Surya, (online). (<http://teknologisurya.wordpress.com>, October 2014).
- [6] Encyclopedia free, (online). (<http://id.wikipedia.org> . Accessed October 2014).
- [7] www.linksukses.com. Accessed October 2014.