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Wireless Solar Power Bank

Dr. P. Gayathri
M.tech, Ph.D.
Associate Professor
Dept of Electronic & Communication Engineering
TKR College of Engineering and Technology, Meerpet

ChallaAnil
Cholleti Bhishma KaranDande Harsha

ABSTRACT:

Power banks are one of the need to have product these days. But even power banks need charging. For that, one needs to get the power bank charged in a power plug. This is not always possible when travelling, so here we design a solar powered power bank. The solar power bank integrates solar charging with efficient battery support and wireless charging to provide a multi-functional unique power bank product. The device is able to self-charge anywhere during day time so that the user never runs out of power.

The solar power bank integrates lithium battery pack with solar panels battery protection and wireless charging coils using dc power boosters and charge controllers to provide for a feature packed power bank. This solar panels are used with charge controllers to charge the battery pack using charging circuitry. The power bank makes use of LED for indication of current battery capacity. An Adapter can also be used to directly charge the power bank using AC power if needed. The battery pack power is used to power the induction coil that is mounted on the top of the power bank. When mobile phone is placed over the top of the power bank an electromagnetic induction effect induces electric current in the coil mounted in the phone back. This is used to charge the phone wirelessly.

Key words: Solar panels, LED, Li-ion battery, wireless charging

INTRODUCTION:

Wireless charging is emerging technology now days. Wireless charging is also known as a wireless power transfer; here the power is transferring to the load without interconnecting cords. The wireless solar power bank integrates solar charging with efficient battery support and wireless charging to provide a unique power bank product. The device is able to self-charge anywhere during day time so that the user never runs out of power. Wireless charging

is also called as inductive charging. Wireless charging eliminates the cable required for charging. It reduces the wear and tear of hardware ports.

Solar energy is radiant light and heat from the Sun which harnessed using range of technologies such as solar heating, solar thermal energy, solar architecture and photosynthesis. It is an important source of renewable energy and the technologies are broadly characterized as passive solar and active solar depending on way they capture and distribute solar energy. Active solar include use of photo-voltaic systems, concentrated solar power and solar water heating to harness the energy. Passive solar include orienting building to Sun, selecting materials with favorable thermal mass, and designing spaces that naturally circulate Solar power banks are small external batteries that can be charged with solar energy and allow you to recharge without having to connect them to an outlet. Note that you can charge them by plugging them into a power outlet as well as with solar energy. They are normal power banks with solar panels. They are usually portable enough to be carried about for use when the need arises, but some are big and so need to be stationed at a spot. Solar power banks come in various capacities (usually between 1000 – 50,000 mAh) and have designs to suit individual preferences.

The major feature of the solar power bank that makes it unique is that as long as there is sunlight, even just a little bit, your solar power bank will draw power. The power stored during the presence of daylight is then saved for use later. Some small solar power banks allow you to charge the power bank with both the sun or regular electricity.

Existing System:

Power Banks without wireless charging. These power banks can only be charged and discharged through acable. The batteries cannot be charged in remote areas where there is no electricity. Traveler's or Hiker's cannot be able to use their power banks, when they run out of power to charge their devices as there is no source to charge the power banks in Hills and Mountains.

Solar inverters with Ac output for Houses. These are generally huge devices, they should be fixed and mounted in houses and cannot be moved or changed. These devices cannot be easily charged and carried.
They need a solar power bank with voltage greater than 150V to charge the invertor batteries.

Proposed System:

A Simple and Portable Solar power bank with wireless charging to charge the devices wirelessly and the device can be charged via Solar energy (Sun light) or Cable. The power bank is designed in a way to charge the Electronic gadgets anywhere as it is compact and handy. The solar charging in the device is helpful in charging the power banks in remote areas like hills or mountains and Places where there is no electricity. The Device is light weight and Easy to carry anywhere. It can charge the devices with an output voltage of 5V.

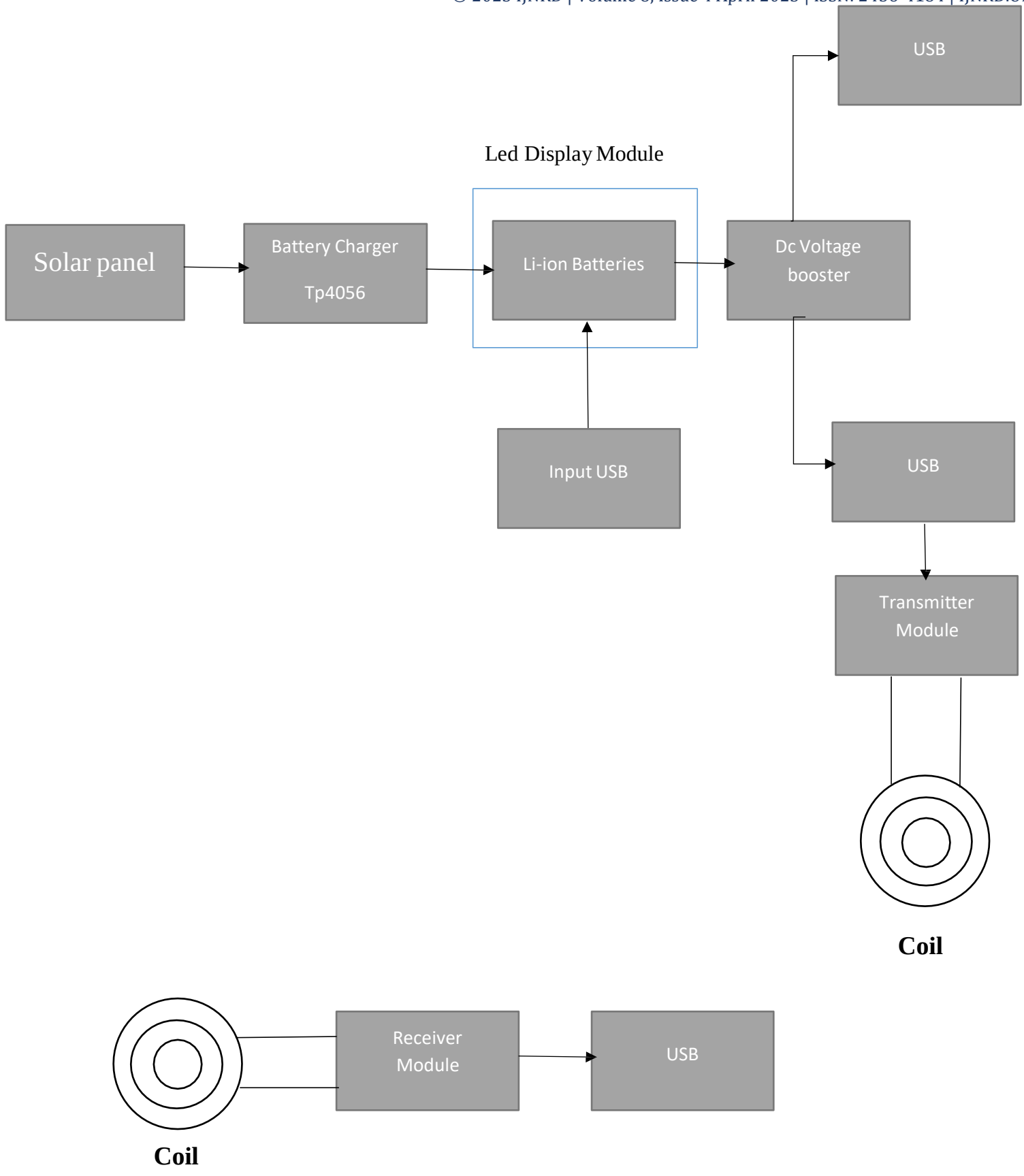

Fig: BLOCK DIAGRAM

Working:

Solar panel: Solar panel explains the process by which light energy in photons is converted into electric current when the photons strike a suitable semiconductor devices.

Battery Charger Tp4056: The TP4056 is a complete constant-current/constant-voltage linear charger for single cell lithium-ion batteries. Its SOP package and low external component count make the TP4056 ideally suited for portable applications.

Li-ion batteries: A lithium-ion or Li-ion battery is a type of rechargeable battery which uses the reversible reduction of lithium ions to store energy. The anode (negative electrode) of a conventional lithium-ion cell is typically graphite made from carbon. The cathode (positive electrode) is typically a metal oxide.**5V DC booster:** 5V Step-Up Power Module, it gives a constant output voltage of 5V and 1A current for given inputs 3.7~5.5V.It is used to increase or to step up the voltage from batteries.

Wireless Charging Module: Inductive charging pad for a smartphone as an example of near-field wireless transfer. When the phone is set on the pad, a coil in the pad creates a magnetic field which induces a current in another coil, in the phone, charging its battery.

CONCLUSION:

Wireless charging technology gradually eliminates the use of wired cords. It is more convenient and easy method. This technique eliminates the wear and tear of the hardware ports. This technology mainly provides portability to the user. Wireless charging seems a good idea and has been introduced to many mobiles iPhone 7(Apple), galaxy S5 (Samsung), Lumia 930(Microsoft), and Xperia z3 (Sony). These mobiles are built on the concept of inductive charging. Solar charging eliminates the need of charging through Charging cables and can easily the Li-ion batteries with the help of Solar energy (Sun light). The Device is portable and handy, thus it can be carried and used anywhere.

REFERENCES:

1Solar: photovoltaic: Lighting Up The World retrieved 19 May 2009 Archived 13 August 2010 at the Way back Machine

2 19"Renewable Power Generation Costs in 2021". irena.orgRetrieved 4 November 2022

3Solar Cells and their Applications Second Edition, Lewis Fraas, Larry Partain, Wiley, 2010, ISBN 978-0470-44633-1, Section10.2

4 "Wireless charging technology: what you need to know". Android Authority. 16 January 2017.

5Chen, Brian X. (3 October 2018). "Wireless Charging Is Here. So What Is It Good For?". The New York Times. Retrieved 2018-10-04

[6] Electromagnetic fields in daily life | RIVM". www.rivm.nl. Retrieved 6 February 2022

7Concentrating Solar Power Projects - Atacama-1". National Renewable Energy Laboratory. 1 July 2015. Retrieved 10 September 2016.

8Rechargeable Li-Ion OEM Battery Products". Panasonic.com. Archived from the original on 13 April 2010. Retrieved 23 April 2010

9"Battery Pack Prices Fall to an Average of $132/kWh, But Rising Commodity Prices Start to Bite". Bloomberg New Energy Finance. 30 November 2021. Retrieved 6 January 2022.

10 Panasonic. Archived from the original (PDF) on 17 August 2018. Retrieved 7 October 2016.

11 https://en.m.wikipedia.org/wiki/Solar_panel

12 https://en.m.wikipedia.org/wiki/Lithium-ion_battery

13 https://en.m.wikipedia.org/wiki/Inductive_charging

14 https://en.m.wikipedia.org/wiki/Solar_power

15https://www.ign.com/articles/2009/04/28/energizer-induction-charger-for-wii-preview[16] Solar-Power Research and Dryden". NASA. Retrieved 30 April 2008