Multi-Use Wireless Charger

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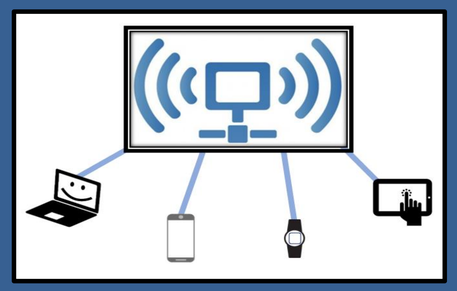
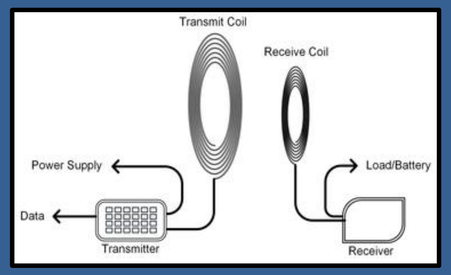
ABSTRACT

The objective of this project is to create a prototype multi-use wireless charger using wireless induction that can be used for charging various devices such as iPads, tablets, laptops, or cellphones.



BACKGROUND

Wireless charging has been mostly available for small electronic devices such as mobile phones. However, the wireless technology for larger devices such as iPad, tablets, and laptops has not been available in recent years and its development would be useful for many consumers.



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METHODS AND MATERIALS

The wireless design incorporates two wireless transmitting and receiving coils connected in series. Our design will have two supplementary USB ports for extra charging capabilities. The prototype includes a rechargeable battery with an additional backup battery. The charging module is a DC remote module, and the circuit is simple and practical.

- 12V/3W x2 Solar Panels
- 12V/3A x2 Receivers/Transmitters
- Six 3.7V, 1400mAh lithium-ion batteries
- 3.7V, 10,000mAh lithium ion back-up battery
- 3D Printed Solar Tracker
- Energy Meter

Our design is using a dual axis solar tracker. The tracker is an active tracker which is controlled by a computer program (via an Arduino). Sensors are always seeking to find the brightest source of light. The computer program changes the angle of the panel based on the time of day and physical location.

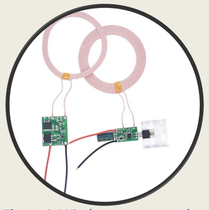

Figure 1. Wireless power supply.

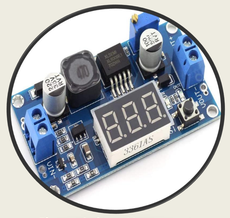

Figure 4. Step-Up converter

Figure 3. 10,000mAh Lit-ion batt.

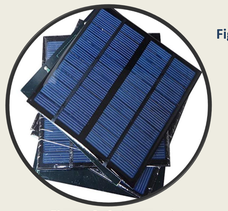

Figure 2. Solar panels.

Figure 5. 3.7V 1400mAh Lit-ion batt.

REFERENCES

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2. World Without Wires. Communications of the ACM, 57(3), 15–17. https://doi.org/10.1145/2567650
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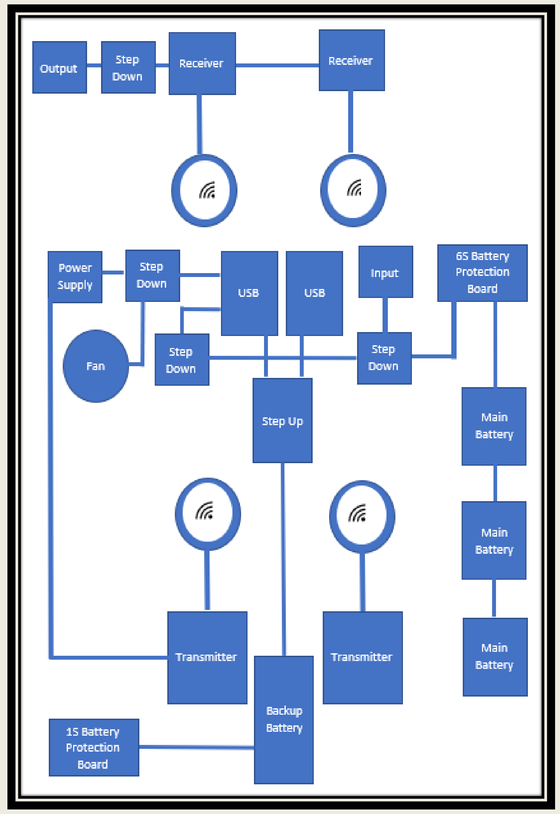
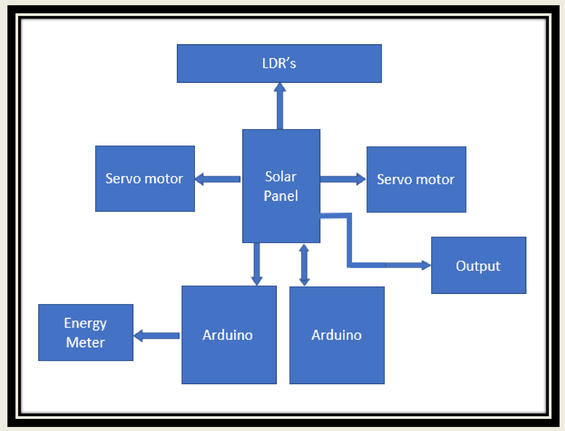
4. https://www.zdnet.com/article/untethered-wireless-power-transmission-will-make-robots-hard-to-stop/

SYSTEM BLOCK DIAGRAM



SOLAR TACKER BLOCK DIAGRAM



RESULTS

The prototype produced 18.5V, 3A to power and charge a laptop. It provides additional power via two lithium-ion batteries. Two supplemental USB ports are provided and produce 5V, 1.3A. Batteries are charged by an external enclosed solar tracker with two solar panels. An energy power meter displays the Volts, Amps, Watts, and kWatts/hour.

The system was designed to be used by:

- Students
- On-the-go workers
- Recreational Vehicles (RV's)
- Compatible with laptops, cellular devices, tablets
- Provides sustainable energy without the need of power outlets

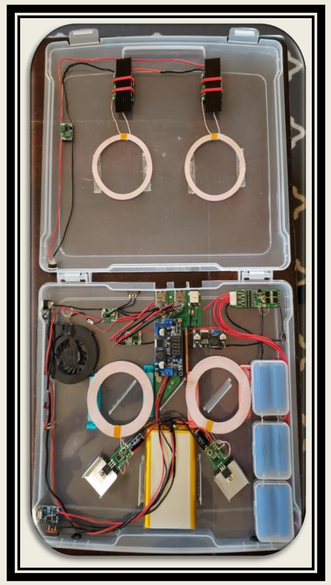


Figure 6. Main system enclosure.

Figure 5. Solar tracker with solar panels.

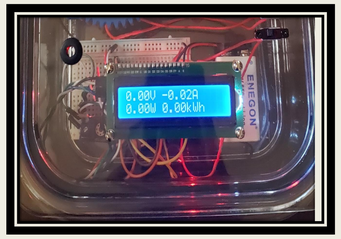


Figure 7. Energy meter.

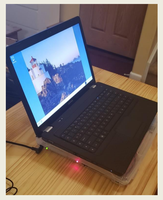


Figure 8. PC Wireless charging.

CONCLUSION

The Multi-Use Wireless charger prototype works as designed. It provides power from three different sources. The system may be used by anyone who may need power on-the-go without the need of additional wires or cables. Further research and development is needed to upgrade many of the components. The footprint may be reduced, and the efficiency of the components may feasibly be enhanced.

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