

Building the Portable Power Supply for Kinect V2 Camera

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Executive Summary

This paper is aim to introduce how to customize a portable power source for the Xbox one Kinect camera sensor. The first part of the paper will introduce the parts and their work theory to help the read had a better understanding. The following part will mainly explain how to connect and build the power source.

Keywords

NiMH battery, DC Regulated Power Supply Voltage Converter Module, Kinect V2

Introduction

Portable power source plays critical roles on any kind of wireless devices. It will be a disaster if using cell phones, cameras and so on that all must be connected to the electrical outlet. To make sure those devices working, the portable power sources which mainly are batteries, always can last much longer than the device required usage.

For the team project, the camera requires power and a computer to relay information. Therefore, the robot must be able to support the weight of both the camera and the computer without losing its ability to move around an environment. So, the battery should be a light weight with high capacity and as cheaper as possible.

Objective

The objective of this application note is to guide to build a stable and portable power source for the Kinect camera step by step. This including the detailed parts models and function which can be ready to order and easily purchased at the market. The potential purpose of this notes is to provide the idea of building the reliable power supply with portable purpose for some other similar electronic devises which are originally powered by wall wart plugs.

Parts List

- **Required**

1. Duratrax NiMH Onyx 7.2V 5000mAh Stick Standard Plug (Figure 1)

NimH battery is one type of the rechargedable battery which is high used on mobile phone, digital cameras, loptops and majority of other electrionic prodcuts. The advantages of this battery is higher energy capacity per kilogram compared with NiCd one and it's more safty and the output is more stable (M.A. Fetcenko, 2006). NiMH bettery can efficiely

support the Kinect camera working at least half an hour with a relatively light weight and cheaper price.



Figure 1. Battery model

2. RioRand Adjustable Boost 3~35V to 3.5~35V 5/12V DC Regulated Power Supply Voltage Converter Module with Digital Voltmeter (Figure 2)

Due to the battery is not able output the exactly 12V all the time, a boost DC power is necessary to apply as the connection between the battery and the Kinect camera (Boost Converters, n.d.). There is an adjustable resistor which can help to adjust any output voltage at least slightly higher than input. Due to the required 12V inputs of Kinect and the ideal 7.2V output of the battery, this convertor fits the requirement.

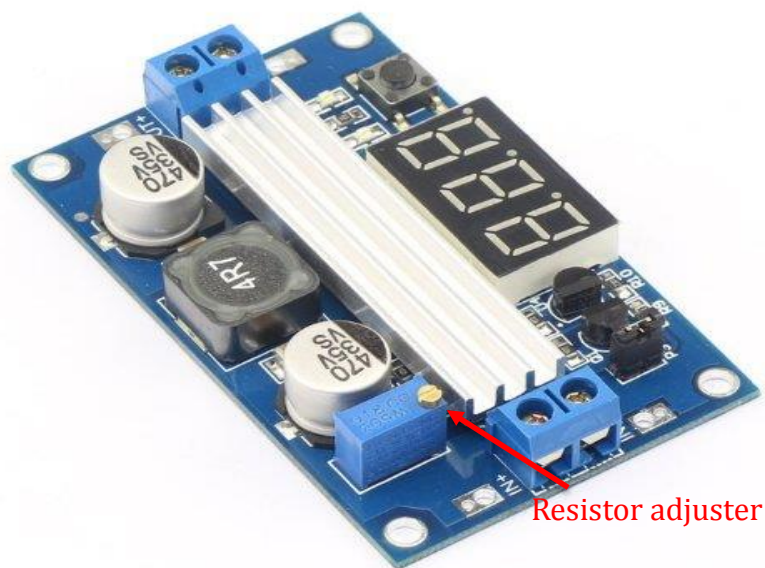


Figure 2. Converter Module

3. Tamiya Male and Female Plug Set M/F

This will be the connection cable between the battery and the boost convert module. In addition, it really depends on the model of the battery used.

4. Tenenergy Universal Smart Charger for NiMH/NiCd Battery Packs (6V - 12V)

● **Optional**

1. Two plugs and a connect of DC Barrel Power Jack

Due to Microsoft's special standard, the DC power male plug for Kinect is not sold on the market. It will be cut off and connect to the portable power. In aim to avoid waste of original wall wart charge, two DC barrel power jack plugs can be ended at on it and the portable power module. The female connect will be connected at another end of the DC power male plug for Kinect. So the Kinect can be power supplied on either way.

Procedure

1. Connect the battery with the Boost DC Regulated Power Supply Voltage Converter Module.

- 1) Pick up the Tamiya Female cable and insert with the output of the NiMh battery.
- 2) Find out the input terminals on the converter module and then insert the red wire into the hole with '+' sign and the black to another. Use the screwdriver to fix the cables. Now, there should be some value displayed on the digital screen
- 3) Rotator the resistor adjuster shown on the Figure 2 until the value on the screen matched with the required Kinect input voltage which is 12V.
- 4) Wiring two cables from the output side to a voltmeter to test the exactly output voltage. If the value is not 12V, adjust the resistor again. This is step is very important to protect the Kinect in feature use.



Figure 3. The battery power module

2. Create the DC power male plug for Kinect

- 1) Cut the off the plug from originally power cable. Inside the cable is shown as the Figure 4. The positive was separated by a plastic layers and wrapped inside; the ground wires are distributed outside the layer.
- 2) Splitter the cooper wires as positive and negative side like Figure 5.



Figure 4. The Power Cable Cut

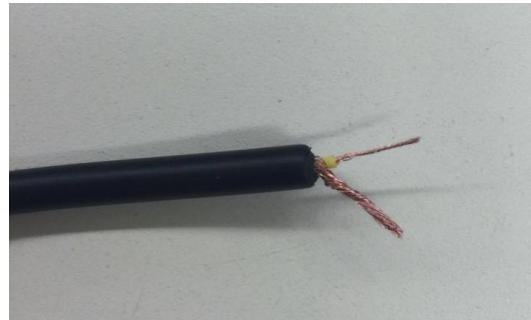


Figure 5. The Spitted Power cable

3. Connect the Plug with the battery module

- a) Using the two male plugs and a female connector of DC barrel power jacks.
 - 1) Solder the female connect at the end of the DC power male plug just build.
 - 2) Solder one of the male plugs at the cutoff point of the wall wart charger.
 - 3) Solder another plug with two wires and insert them into the output side

of the convert module. Use the screwdriver to fix it.
The final built is indicated as Figure 6. The Kinect can be powered either the battery or the wall wart.

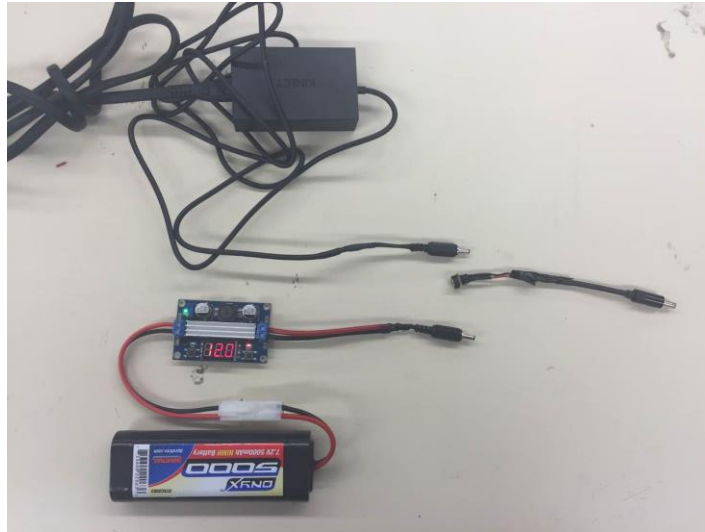


Figure 6. Complete product

b) Connect the plug directly to the module and fix it.

Conclusion

This application note detailed explained building the portable power source for the Kinect camera from the reason of picking every parts to how to wire and combine them together. Even if the person was out of any electrical knowledge, it's still able to achieve the goal. In addition, it can provide the reference to someone who is aim to build similar system to supply to electronic devices.

References

- Boost Converters.* (n.d.). Retrieved from learnabout-electronics.org:
<http://www.learnabout-electronics.org/PSU/psu32.php>
- M.A. Fetcenko, S. O. (2006). Recent advances in NiMH battery technology. *Journal of Power Sources.*