

Connecting DC-DC Converter to Computer.

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Abstract:

This Application note is to provide user an idea of how to connect DC-DC converter to Computer. This will include the use of right plug for computer and how to adjust the voltage of the DC-DC converter. Users also need to understand safety issue of this DC-DC converter.

Key word:

DC-DC Boost Converter, Computer, Plug.

Table of Contents

Material	3
Introduction	3
Component information and instruction	4
Power Transformer Information	4
DC-DC Converter	5
Plug	6
Conclusion	7

Material:

- DC-DC Boost Converter
- Computer Charging Plug
- Fuses

Introduction:

A **boost converter** (or Step up converter) can have output voltage greater than its input voltage. For this design, batteries will be put in parallel that can provide 12 volts with high current. However laptop computers generally require more than 12V depends on the brand and computer model. To meet the charging requirement of computer, a boost converter is needed. In this design, adjustable boost converter will be used.

Fuses are needed to protect computer. Fuse will disconnect the circuit when the current is drawing over its limits. This will open the circuit and not allow voltage to apply to computer.

This Application note will provide user the information of the DC-DC converter, some safety issue of connecting DC-DC converter and also a way to identify Computer Charging Plugs.

Component information and instruction:

A. Power transformer information -

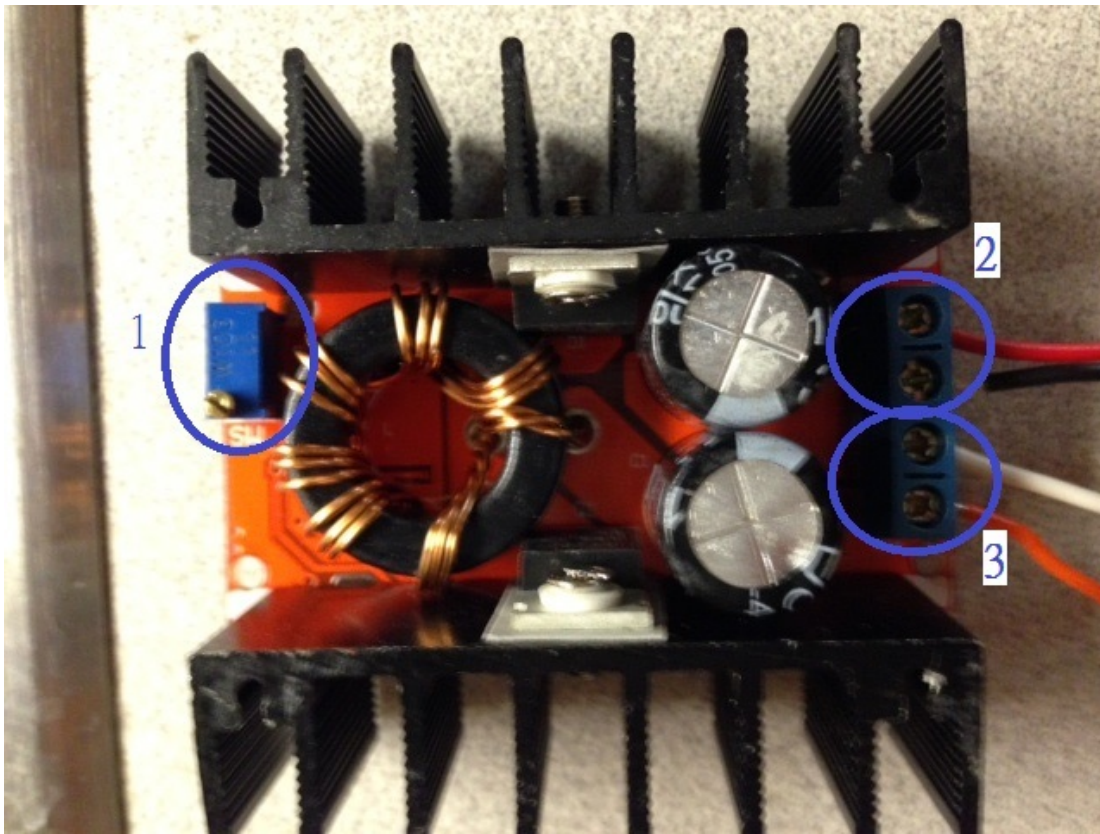
To understand how much of Voltage you need and what is the limitation of fuse you should use, a power transformer that came with the computer should be able to provide this information.

For example:



From the Transformer on the Left side, it states that the output will provide 19.5V and around 3.33A.

For this particular computer, it is suggested to have 4A of Fuse at the input of DC-DC converter and 19.5 voltage source from DC-DC Converter.



B. DC-DC Converter -

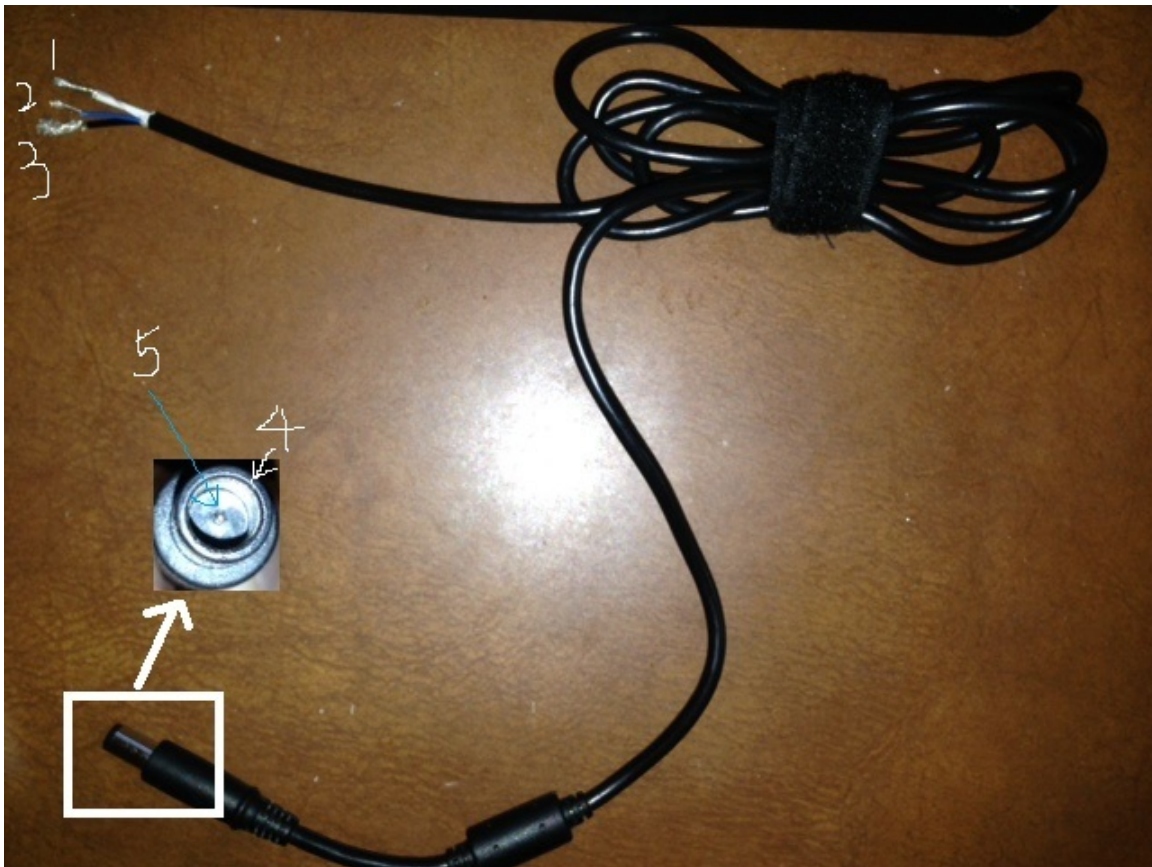
This DC-DC converter can have input from 11V ~ 35V, and output of 11V~35V with maximum of 5A Current. The operating temperature is from -40°C to 85°C. This is the perfect Boost converter for this project. It has good output voltage range and good current output.

1. Potentiometer (Pot) –
By rotating the knob on the Pot, it will adjust the output voltage of the DC-DC Converter. However, it needs to be rotated **slowly** because it is sensitive. Remember, a boost converter will not output voltage lower than input voltage.
2. Output Pins –
The output has two pins, one positive and one negative. To insert wires for those two pins, loosen and screw and put wire then tighten the screw to make sure the wire will not move or fall off easily. (To know what Voltage you will need, refer to power transformer of computer)
3. Input Pins –
Input also has two pins; follow the instruction from output pin to insert wires. Make sure the battery is not connected to wire while inserting. It is also very important to add fuse at the input. (To know what fuse you should use, refer to Power Transformer.

C. Plug -

Before apply the voltage to the computer, the computer plug is needed because the most of computer plug are complicated, they are not just positive and negative pins at the connection. Two options that can help you to get computer plug, the first one is to purchase one, the other option is the take apart the plug connecting to transformer. However, purchase one is suggested because it is cheap and the power plug from original computer will be fully functional if it is needed.

The following example will give you some idea of how to identify what wires correspond to.



For this particular plug, the outside of plug (No. 4 in graph) is the ground pin, and the center pin is positive side. But how to identify what wire (1,2,3) is ground and what is Positive. It's very simple. Use Fluke multi-meter (or similar) and measure the resistance across the wire and pin (No.1 and No.5 or No.1 and No.4), if the multi-meter has a reading, it means that they are corresponding to each other.

After identifying the Ground wire and positive wire, attach the DC-DC converter output to correspond wires. With the correct input voltage, plug into computer to charge the computer.

Conclusion –

The Safety is the most concern thing for this section, applying the correct fuse should be able to disconnect the converter to battery when the current is drawing too much. The next thing is to understand the Voltage and power computer required, this information could be found from the power transformer. The last thing is to know the plug, make sure to understand the pin and wire connection and connect the DC-DC converter to plug correctly. By doing all three, the Computer should be charged.