

OI Portable Power Supply

Team 358



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A portable power supply for the Operator Interface controls gives you the freedom to operate your FIRST robot anywhere far from an outlet to plug in your AC adaptor. Demonstrations at local schools, parades, fundraisers, sponsors, etc. are possible with the flick of a switch rather than being restricted to an area close to a power outlet.

The power requirements supplied by the FIRST power adaptor to the OI are:

- ❖ 9 volts DC
- ❖ Center of the connector is positive
- ❖ 1.5 amps maximum

The OI can be powered by a portable power pack of regular alkaline 9v batteries or by 9v's worth of rechargeable batteries. Standard RC rechargeable batteries can easily be used with a simple \$6 homemade adaptor that connects a standard 9.6v RC battery connector (230-0445 @ Radio Shack) with a 5.5x2.1mm Inline Plug DC Power Connector (274-1569 @ Radio Shack).

One alkaline 9v battery is sufficient for a short period of time, and connecting several 9v batteries in parallel will provide power for several hours of non-stop use.

The following is one of the power supplies Team 358 has built. The number of batteries used is entirely optional. We choose to use four batteries because that's a common retail multi-pack size and it lasts many hours. Many of the parts listed below are also optional. A bare-bones version requires only a power connector, a 9v battery connector, and a battery. You can turn it off by simply unplugging it rather than use a switch. All parts are freely available from Radio Shack or other retail electronics stores.

Parts:

1. (4) 9v batteries ~ \$3.29 each



2. (4) Heavy-Duty 9V Snap Connectors \$2.59



3. (4) 9v battery holder \$.99



4. (1) toggle switch \$2.59

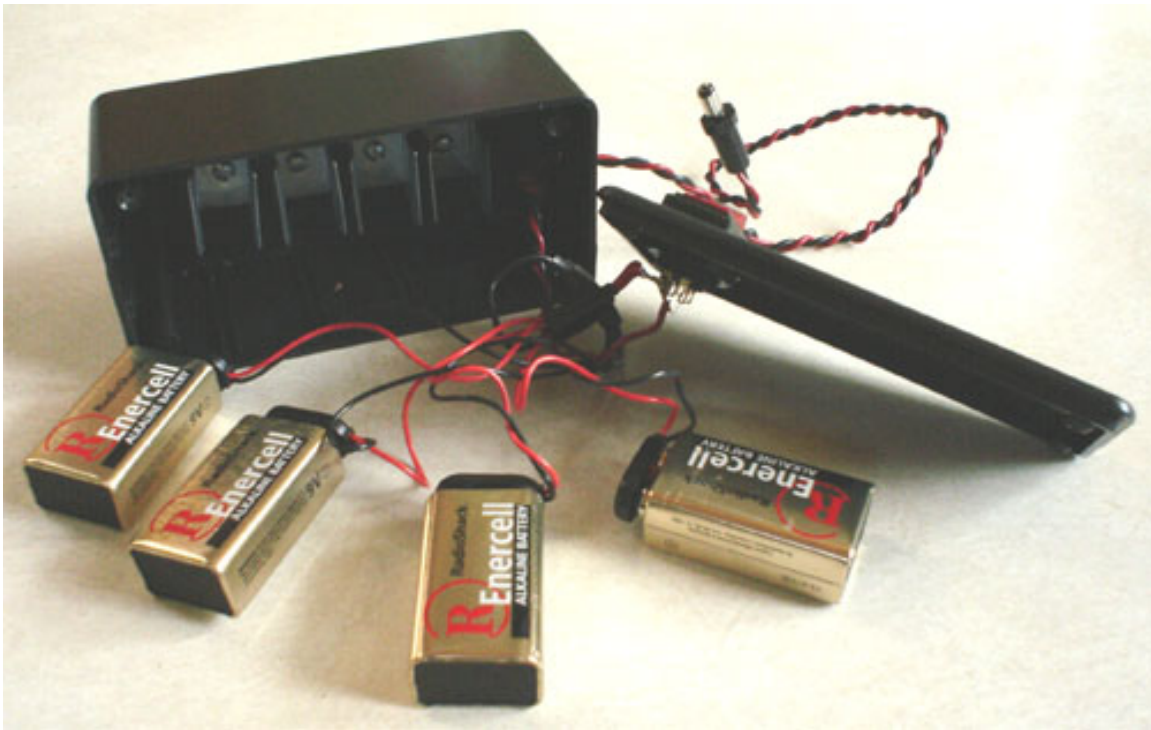
5. (1) 5.5x2.1mm Inline Plug DC Power Connector \$2.59



6. (1) Project box sized to fit the # of batteries you choose \$3.69
 7. ~60" of 16 or 18 awg wire
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Assembly:

1. Drill/cut holes in the project box for:
 - a. 9v battery clips
 - b. power cable running to the OI
 - c. on/off switch
2. Mount the 9v battery clips to the project box, leaving enough "finger" space to actually get the batteries in and out.
3. Join the 9v connector leads together (circuit in parallel) and solder
4. Connect the on/off switch in series with the 9v connector leads and the OI connector line that will exit the project box. Remember to add heat shrink before attaching the wires if that's what you are using to
5. Insulate the wire connections with wire nuts, heat shrink, or electrical tape.
6. Install switch, wires, connectors in the project box
7. Knot or use some type of strain release where the OI connector leads exit the project box. We like to twist our wires to keep pairs together.
8. Wire in the OI power connector very carefully. The center of the connector MUST be positive. If you reverse the polarity you can damage the OI.
9. The DC Power Connector that Radio Shack sells is a little long for the OI plug, but doesn't have to fit in all the way. We added a small rubber spacer on the plug itself, but it isn't necessary.
10. Verify correct voltage and polarity with a multi-meter before connecting it to your OI.



Alternative Simple Battery Adaptors



For standard RC rechargeable battery



Single 9v alkaline or rechargeable