

Make Your Own Li-Ion Battery Packs

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This tutorial goes over recycling a generic battery pack into a usable Li-Ion pack for your robot. I used batteries from a cable modem that supported telephone over cable. You can also buy raw Li-Ion cells from a place like battery junction <http://www.batteryjunction.com/lg-18650-2600.html>. If you do buy raw cells, I suggest getting ones with tabs. You will also need a Li-ion protection board, be sure to get one for the voltage you want. This will work for most battery pack you find in obsolete equipment around the house, but may be different looking then what you will see here. Use your head, if you can't apply this tutorial to what you have, it may not be wise to follow as:

DISCLAIMER!!!

Li-Ion batteries could be very dangerous if used incorrectly or mistreated. The author of this tutorial takes no responsibility for any damage caused to person or property.

Tools and Parts

An unused Li-ion battery pack (or raw cells)

Hammer

Side snips

Soldering iron

Solder

Some scrap wire

A new Li-ion protection board like <http://www.batteryjunction.com/pcb-14v-6a-leads.html>

In the correct voltage configuration you want.

A battery connector

Foam tape

Li-ion battery charger

Step 1 – Remove cells from old battery pack



The batteries I used were in a plastic case. I removed all the stickers, and somewhat gently hit the case along the seam with a hammer. If done just right, the shell will fall apart, (I didn't even need the screw driver) and you get some yummy cells.

Step 2 – removing the old protection board



Here we see a before and after. Use side snips to cut the wires at the board, as you are going to want all the length on them later. You can also see the new protection boards on the left. BE CAREFULL TO NOT LET ANY BATTERY ENDS / WIRES TOUCH EACH OTHER!!!

Step 3- cutting cells

These packs were wired as 2 sets of 2 cells in series, wired in parallel. This gave 8 Volts at 4.4Ah. I reconfigured them to be 4 cells in series; 14V at 2.2Ah. To do this, I had to cut the cells apart; but I only cut the center of the pack apart, and left the ends (in red circles above) attached, as it will reduce the work needed later when you solder the new pack together.



This is the pack, folded in half in the middle. I cut the tabs in such a way to leave each battery enough tab to fold back over itself. This is important, because you cannot solder directly to a cell end, but you can solder to the tab attached to it.

Step 4 – Reassembling the battery pack

After you cut the cells apart in the middle, you get two sets of 2 cells, in series. Bend them over so they are in line with each other, and tape them together like so.

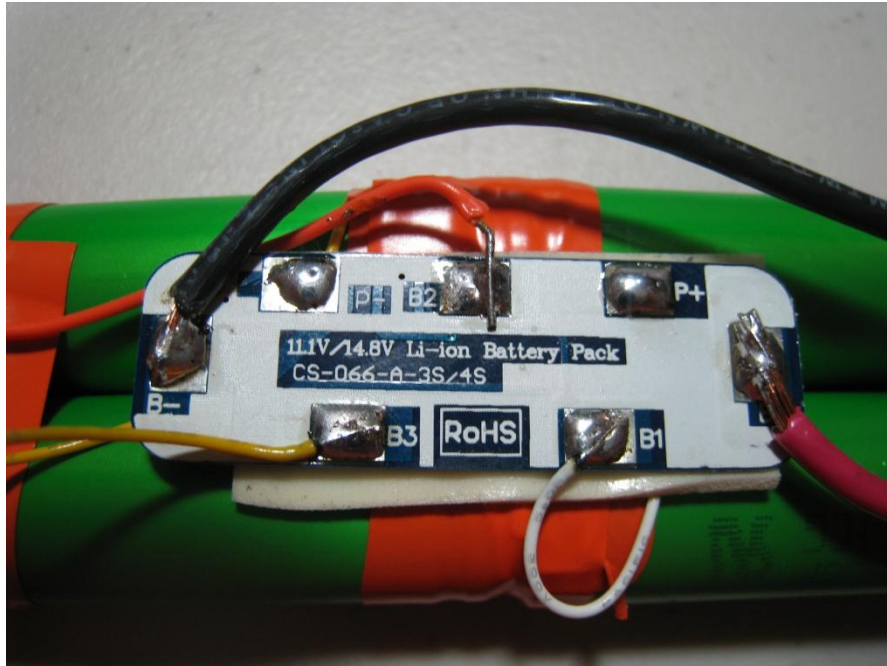


Then tape both rows together in such a way where you can solder one end together, to complete the connection of 4 cells in series. You will need to also add a piece of wire to that junction for later connecting to the protection board. On the other end, solder some heavier gauge wire to the positive and negative terminal, for later connection to the protection board. You can tell which end is positive, as it will have an indented ring around it.



Step 5 – Attaching the new protection board.

As you can see in the last picture, I prepped the board by adding a good amount of solder to each pad, and covered the wires in solder. I eyeballed a place on the battery where all the wires would reach the board, and attached it with foam tape. Each connection in-between the cells needs to be brought to the board, this is how it balances load across cells.



Step 6 – Finishing up

Finish up the wiring by soldering on a battery connector, and seal up the battery in some electrical tape.



And you are finished. You can but a Li-Ion battery charger at the correct voltage for your pack, and you have yourself a nice Li-Ion battery as a reduced cost!