HYPERION HK LTD – How We Assemble A123 Battery Packs

NOTE! This document is intended only to show how we assemble A123 battery packs for models we test at Hyperion HK Ltd. Because no cell manufacturer will recommend soldering cells in this manner, Hyperion HK Ltd. also cannot recommend it on a legal basis. Therefore anyone who chooses to follow this document as a guide to assembly of their own battery packs does so 100% at their own risk and Hyperion HK Ltd. Accepts no liability under any circumstances due to injuries or losses which may occur as a result.

Having said all that, we may note that this method of pack assembly has a long history in the R/C field, and that when done correctly has been shown by others to provide mechanically sound, low-resistance, high-performance battery packs. **The key to success in soldering cells is to MINIMIZE soldering TIME**, and therefore minimize heat transfer to the cells. When tinning cells or applying bars between cells, your solder iron should be applied for NO MORE than three seconds. DO NOT use an underpowered solder iron!! Although it sounds counter-intuitive, it is vitally important that you use an 80W to 100W soldering iron with large tip, so that the solder can be melted almost instantly without transferring much heat into the cell itself. See diagrams at end this document for series wiring of cells and balance connectors.

CRITICAL NOTES:

***The "button" end of A123 2300mAh cells are NEGATIVE polarity! Pay attention to cell markings!**

*Do not use a Soldering "GUN". Use a soldering IRON similar to the one shown.

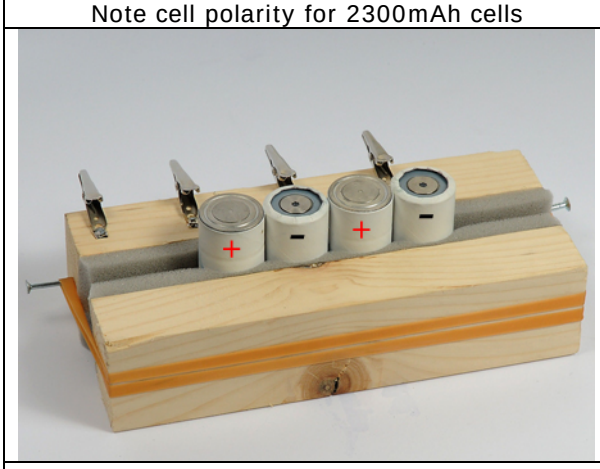
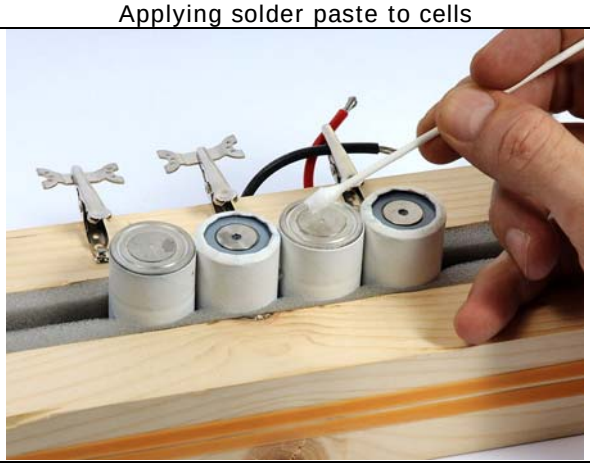
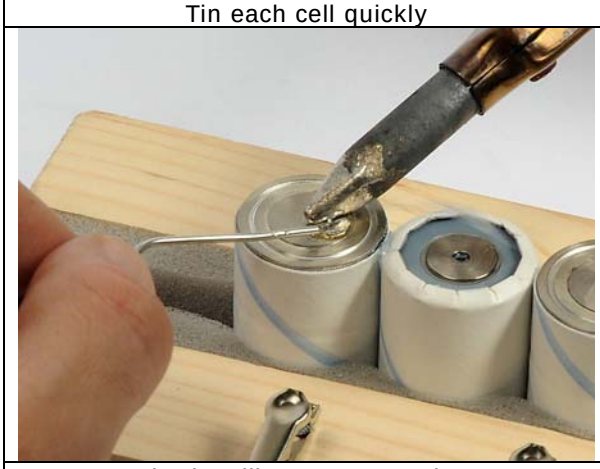
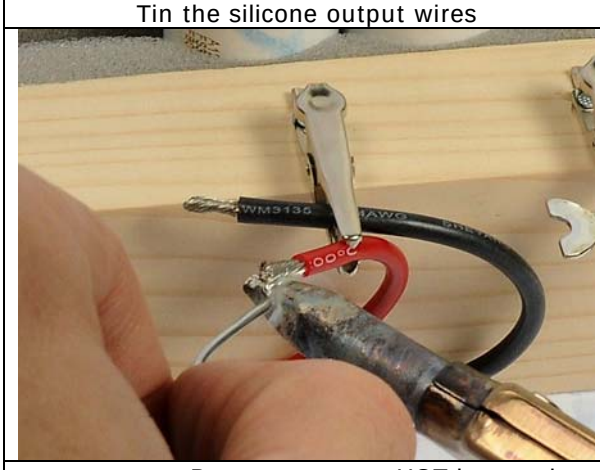
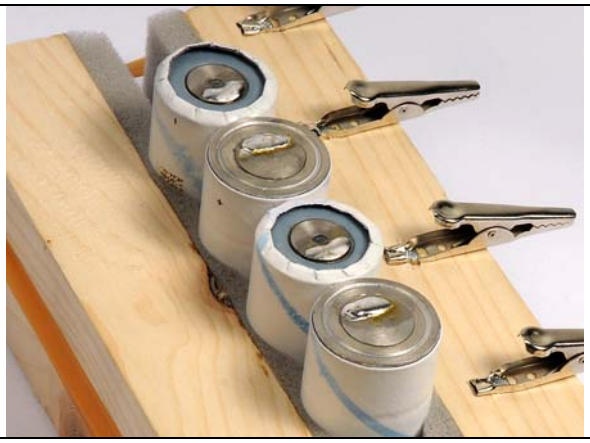
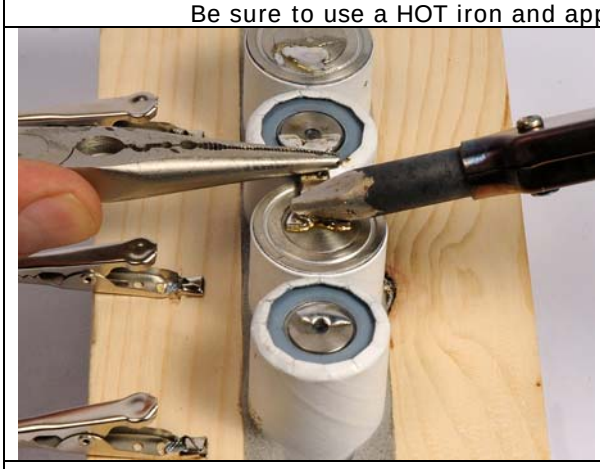
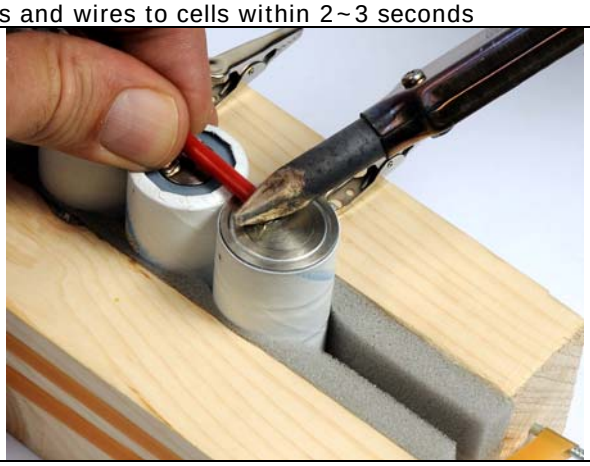
*A123 Packs should ALWAYS be Balance Charged. Hyperion type balance connector wiring information is provided at the end of this document. We show a 4S pack and 7-Pin connector in this example.

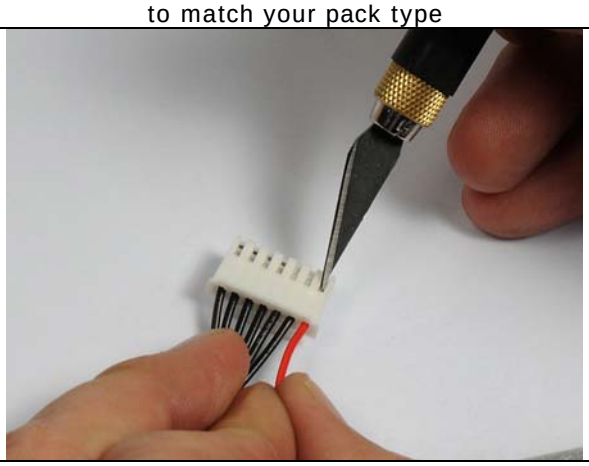
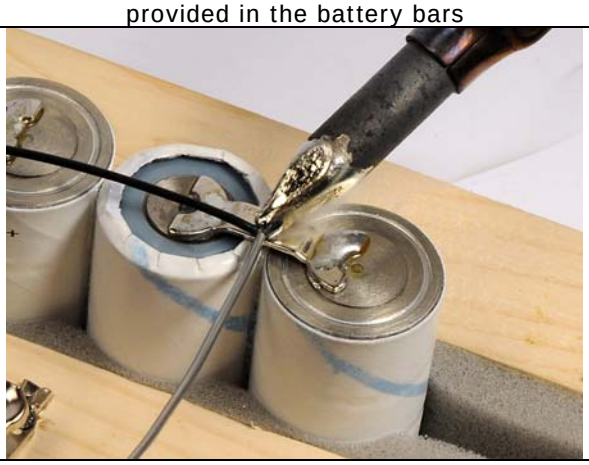
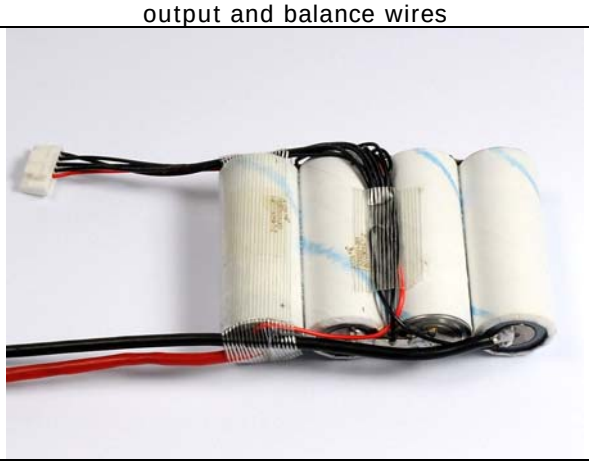
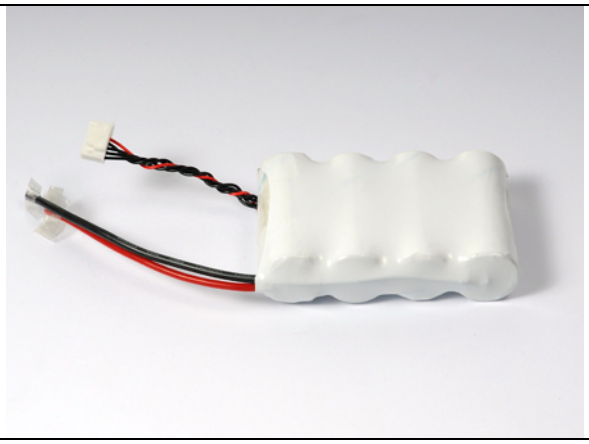
*** PLEASE SEE THE VIDEO AND READ THE ENTIRE DOCUMENT BEFORE BEGINNING!!!!**

CLICK HERE TO SEE A VIDEO OF IMPORTANT ASSEMBLY STEPS (9.5Mb, *wmv format)

Items Needed		
A123 Battery Cells	ScotchBrite Pad (or 180g sandpaper)	Balance Connector (#HP-EOSLBA-MC-Pxx)
Battery Bars (#HP-LAxxxxBAR)	Thin CA Glue	Packing Tape
Low-Acid Solder Paste	CA Accelerator	Heat Shrink Tubing (#HP-LASHR-xxxx)
Rosin Core Solder (60/40)	Cotton Swab ("Q Tip")	Heat Gun
80~100W Soldering IRON	Silicon Output Wires	Work Stand (user made)

See list of items needed above and picture below	Prepping the cell surfaces for soldering, using a ScotchBrite (3M) pad
	
Glue the cells together in pack shape	Applying accelerator to solidify the CA Glue
	

Note cell polarity for 2300mAh cells	Applying solder paste to cells
	
Tin each cell quickly	Tin each battery bar
	
Tin the silicone output wires	Looks like this....
	
Be sure to use a HOT iron and apply bars and wires to cells within 2~3 seconds	
	

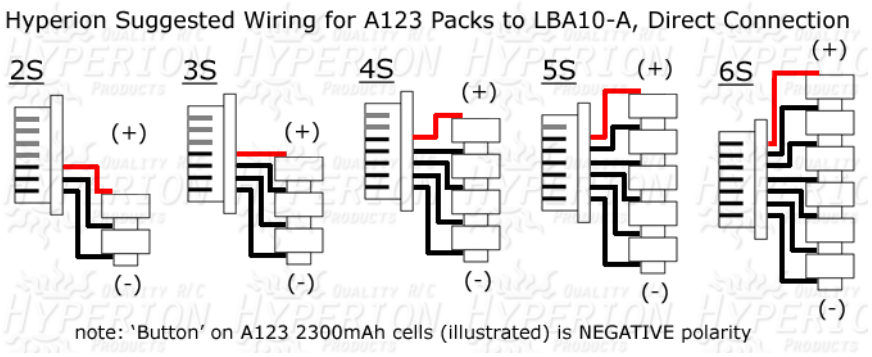
Remove/Reinsert wires in Balance Connector to match your pack type	This example shows a 7-Pin (#HP-EOSLBA-MC-P6L) connector to a 4S pack
	
Solder balance connector wires to the holes provided in the battery bars	Tape the pack to provide strain relief to the main output and balance wires
	
Heat-Shrink the pack	DONE!!
	

IMPORTANT NOTES ON WIRING AND BALANCE CONNECTORS

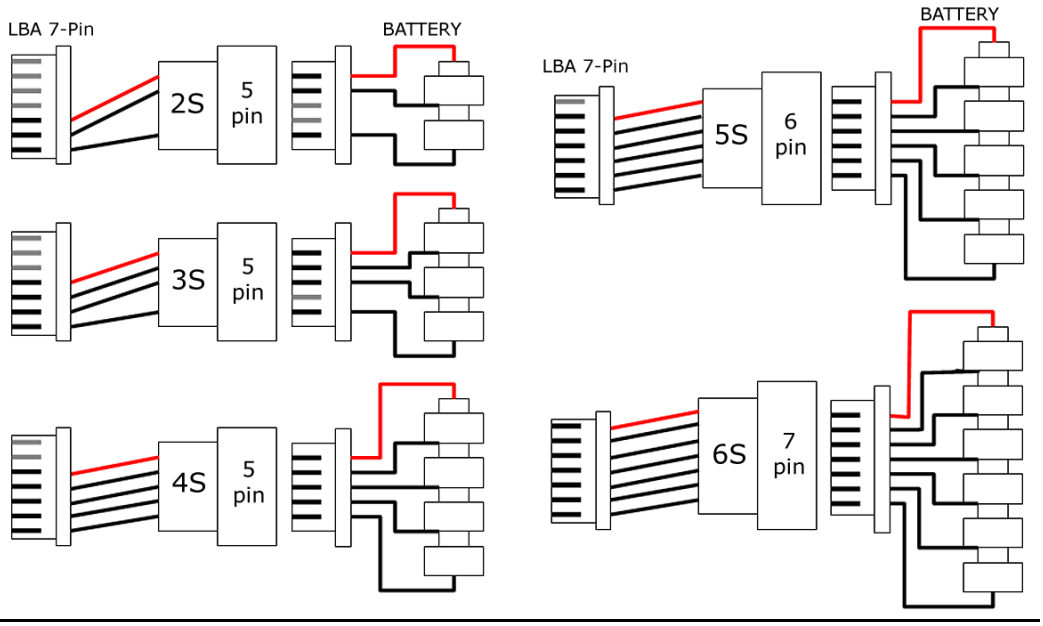
On the next page you will find two diagrams for balance connectors. The first diagram shows how we wire our A123 cylindrical-cell packs at Hyperion, using the same 7-pin (6S type) connector for all packs 2S to 6S. The second diagram shows the connectors which are standard on Hyperion Lithium Polymer packs. We prefer the first method for our A123 packs as the single connector type simplifies things. For small lithium polymer, the 7-pin connector is bigger and heavier than optimal, but since A123 (in 1100 and 2300mAh versions as of this writing) are fairly large, we find the 7-pin to work well and make things easier…

Important! The extension wires on the balance connector should all the the SAME LENGTH. This is important, as unequal wires will have unequal resistance, and reduce the accuracy of the voltage reading at each cell. Therefore you should measure the distance to the farthest cell, and cut all wires to that length. Tuck excess wire between cells and tape them down before heat shrinking the pack.

Below is the method we prefer for our own test packs at Hyperion, for A123 cells. 2S to 6S all use the same connector, HP-EOSLBA-MC-P6L, and have the wires in different positions depending on the pack. As noted, the 2300mAh "button" end is NEGATIVE polarity. The A123 1100mAh cells have the more conventional arrangement, where the raised button is POSITIVE. Pay attention to the cell markings!!



Below is the standard wiring system for Hyperion Lithium Polymer (LiPo) packs. You may choose either method. Note that the 2S to 4S packs all use the same 5-pin connector (#HP-EOSLBA-MC-P4) and have the wires in different positions depending on the pack. 5S use # HP-EOSLBA-MC-P5, and 6S use HP-EOSLBA-MC-P6 (or P6L which has longer extension leads). Note that the Polarity of BUTTON END shown in this diagram follows standard conventions, so is the opposite of the actual polarity at button of A123 cylindrical 2300mAh cells!



Last Notes….

The button end (negative side) of A123 2300mAh cells should not be rotated, so it is best to solder down the battery bar to the positive side first, and then do the negative side.

The 2300mAh brick pack shown here needs shrink about 100mm wide. Same for 1100mAh Brick style. 50mm wide shrink works for 1100mAh straight packs (end-end soldering). 80mm wide shrink works for 1100mAh 3S triangle and 4S Block packs, or 2-cell 2300mAh Rx packs.

1100mAh cells take end-end soldering well, but 2300mAh dissipate heat too quickly at the positive end, so we don't recommend trying end-end soldering with the 2300mAh.

Be careful, don't rush, and be safe! We hope you enjoy the process, and have hundreds of happy flights!

CLICK HERE FOR GENERAL INFO AND APPLICATIONS ON HYPERION A123 PRODUCTS