J_Ray

Electric Longboard

Purpose:

The purpose of this project was to make my life at school much easier. Rushing between classes can be a great way to add stress there is just no need for in your everyday life. It also gives me the ability to travel a long distance in a short amount of time without being hot and sweaty which can be nice especially somewhere like Florida, were just the thought of walking can make you sweat.

Specifications:

- Needs to be able to go at least 5 miles on a single charge
- Must be faster than a light jog
- Must be lighter than 15 lbs
- Must be able to easily convert it back

Parts/tools:

- 30 X 18650s (I reclaimed mine from old laptop batteries)
- Santa Cruz Longboard
- Alien Power Systems Twin 150Amp 2-8S BEC ESC
- 2 X Maytech hub Motor
- Maytech truck
- Soldering iron/wire stripers
- Heat shrink
- Materials to make a container for the electronics

Changes I would make now:

Looking back now there is a high likelihood that I will change the battery configuration from 6s 5p (6 in series, 5 in parallel) to 8s 3p or 8s 4p. The range is nice to have but has proven itself unnecessary. Other changes I would make may include better wire management and possibly stacking the battery 2 high vs one high length wise. Having a few extra inches of clearance has come in handy a few times but having the pack all the way across has also caused problems on one or two occasions.

***This will not be a complete build as this was made before I started making reports for these, but I will do my best to lead you through it and feel free to ask me any questions about the project. ***

Build:

Building a battery (References only):

References I used and you should at the very least look at before attempting this project:

HBPowerwall: https://www.youtube.com/channel/UC0pBauLp63yzf6sVdEOIUbA

https://www.youtube.com/watch?v=v_4ggDN7290 (Good tutorial to follow along with for how to reclaim cells from old laptop batteries.) His whole channel

jehugarcia: https://www.youtube.com/results?search_query=jehugarcia

His whole channel

Both channels

Step 1:

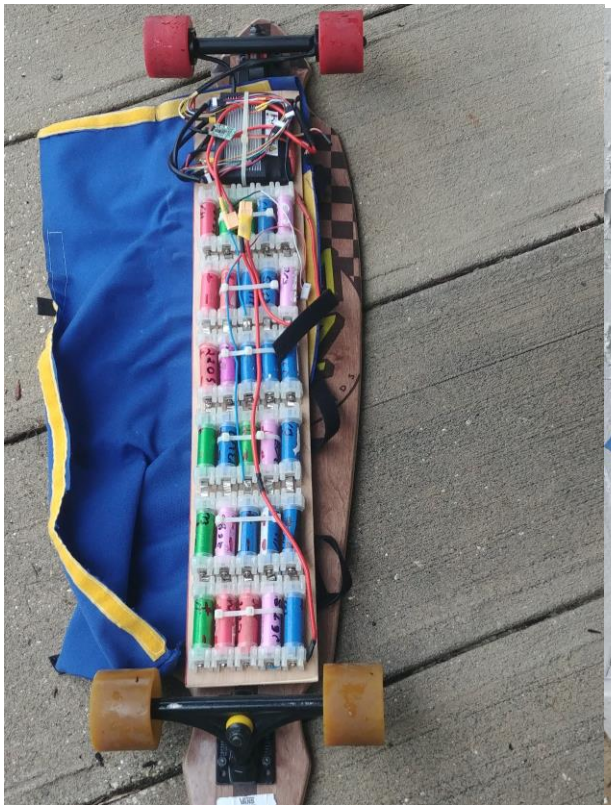
Buy a board and ride it for a while. I know it may not be quite the same but learning to kick and handle speed wobbles proves itself invaluable when you are about to be thrown off. Just the balance and the intuition you get from the riding on a nonmodified board is well worth the time spent. If you even buy the board and then order components you will have about a month to practice which may not be optimal, but it will allow you enough time to learn the basics. Some notes for those of you wondering what board to buy. I would say to go with a medium flex board as it still gives a very responsive ride while still holding the components tight without making different soldering joints be constantly strained because of the flex you are asking from the battery.

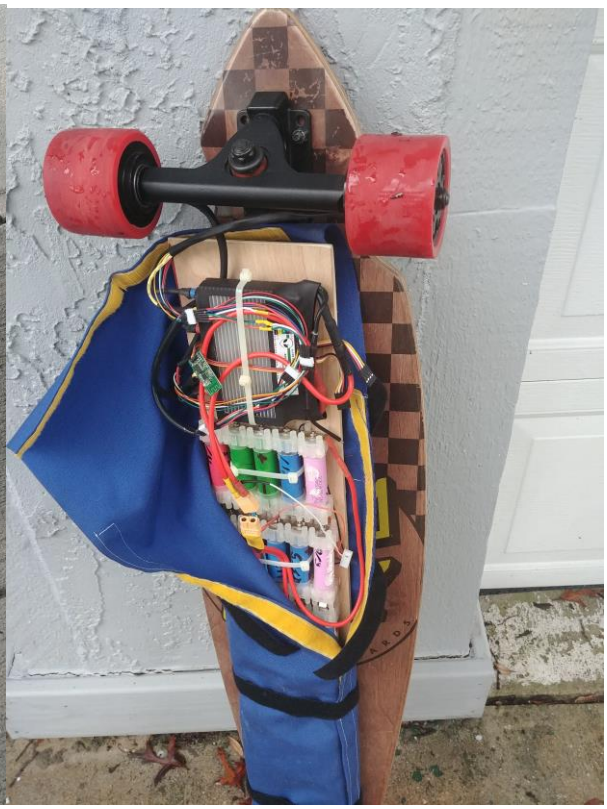
Step 2:

Now that you are starting to receive components in the mail begin to lay them out along your board. Decide whether you want a low profile and tight to the board construction like I did or if you are ok with having a little more around the trucks to free up the middle of the board. While deciding the placement begin to think about the enclosure you want. I decided on a canvas cover as it allows for me to easily detach the battery and esc from the board in about 15 seconds and then the only thing different from my board and the original board is just the front truck and wheel assembly which can be switched out easily. This has allowed me easy maintenance to all the components and also allowed me to use the board when I had a esc failure and was waiting over a month for a new esc.

Step 3:

When we have all our components, we should have already laid them out and know how we want them to fit on the board. With this being true, we can begin putting components together off the board to test as working in a more confided area, on the board, is just adding difficulty to the project.



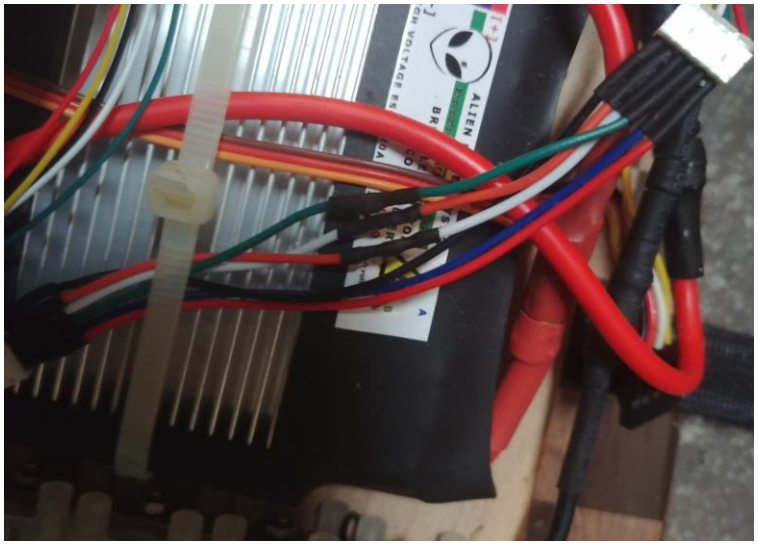


Step 4(Not always necessary):

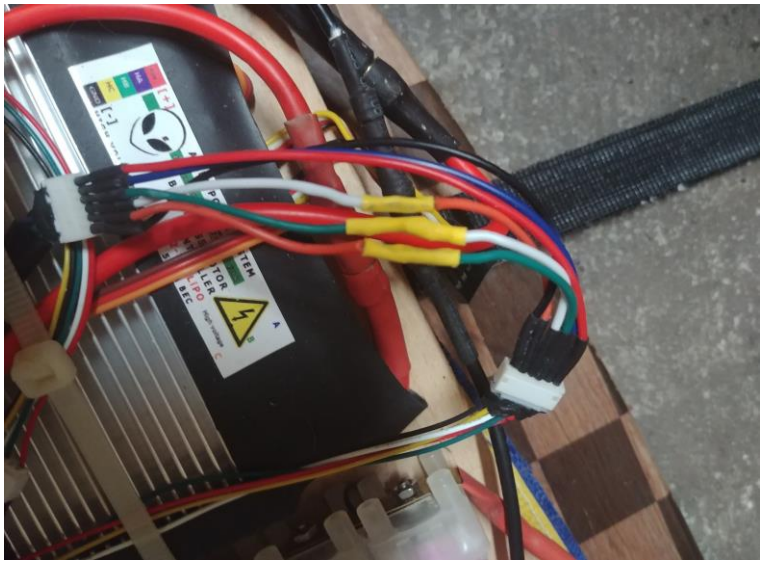
In this step we will be dealing with using my specific esc with the Maytech hub motors. The sensors wires do not match so it is not as simple as just plug and play but it is also very doable. First off, the correct pattern, for me at least, but it should be the same for anyone using the same components considering the same wiring patterns should continually be used on both.

(Board flipped with wheels above the board.)

Right Hub Motor Sensor wires:



Left Hub Motor Sensor wires:



Step 5:

Charge and connect the remote to make sure everything is working properly. Be sure to press on the throttle slowly to so you can make sure you wired the sensor wires correctly if they begin to spin up then stop let go of the throttle and check your wiring. You may have to solve the puzzle for yourself but hopefully my sensor wire set up works for you. If everything turns on and spins up, then we will move on to putting everything on the board. Remember to check that both motors are spinning in the same direction and that they will both propel you forward.

Step 6:

All that is left to do now is to set up your electrons and case/cover to your liking on the board and then test it out for yourself.

Conclusion:

This project is great for learning about building and using a battery pack and helps to understand why proper battery management systems are necessary. It also provides with a larger understanding of the whole system as well as a in depth look at each component as you trouble shoot the system. In the end you also get a great electric longboard to fly around campus or wherever with.