Stinger Tri-Copter

from Radical RC

Build Notes
for
Beta Tri Kit

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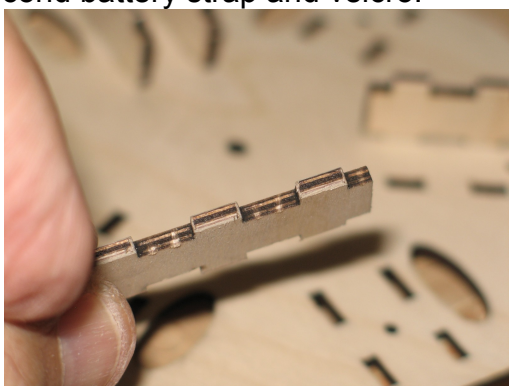
14-May-11

When I first got the kit, I thought “How did they fit a Tri-copter kit in such a small bag?!” I'm used to building monster Tri's for heavy lifting.
Well, once I started reading the instructions (always a good thing to do!), I was amazed at both the simplicity and sophistication of the design. Once I understood how everything went together, and that spare parts were included in the sheets, I started the build.

The laser cutting is extremely precise. My personal preference is to lightly sand the parts before I break them out of the sheet, just to clean up the normal laser smudging.

First thing I did was build the center section. I opted to add the accessory boom mount with the battery straps as well, as it gave a place to mount a second battery strap and velcro.

Just a quick note: I found it to make assembly quite a bit easier if you *lightly* sanded the corners of the tabs to relieve the sharp edge. This also eliminated any tear out on the back side of the slot, due to the necessarily tight fit.



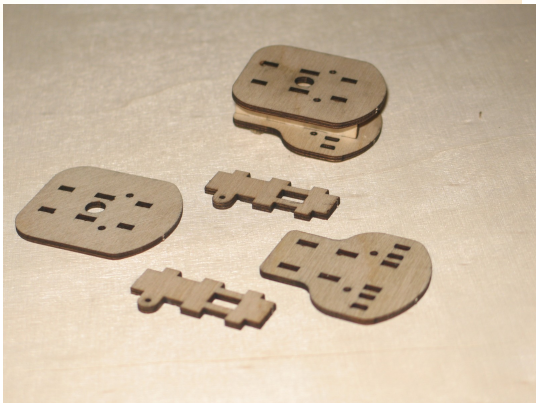
As you can see in the picture, I used a small "persuader" to tap the pieces together. This made for a very nice tight and square fit.

Final step in preparing the center section in my version was to mount the accessory boom mount cap with the battery tie strap slots.

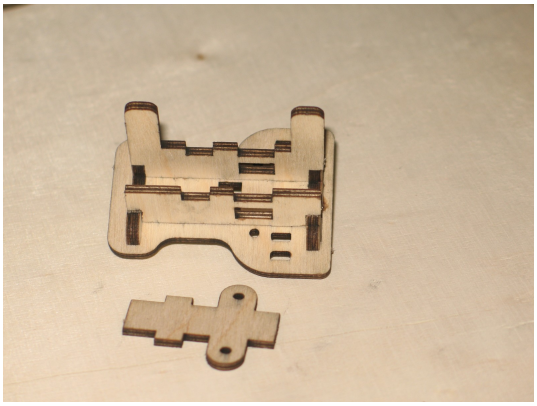
It's amazing how strong this piece is when glued together with thin CA.

Next was the two forward arm motor mounts. These went together quickly as well.

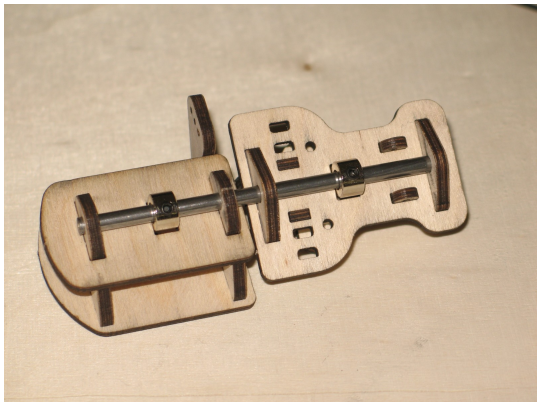
I modified the parts slightly to open up the motor shaft hole to allow clearance or the collar I run on all my motors. I'm also using a bit larger motor (Alpha 370) than would probably be necessary. I drilled two 1/8" holes for the 4-40 hardware I usually use to mount the motors. Plenty of room and a nice clean mount.



The Yaw control assembly for the rear arm is one of the best designs in ply I have seen to date! It's simple, works very well without any binding, and gives enough range of motion for good yaw control.



Using the two wheel collars to retain the pivot shaft in the cutouts was brilliant.



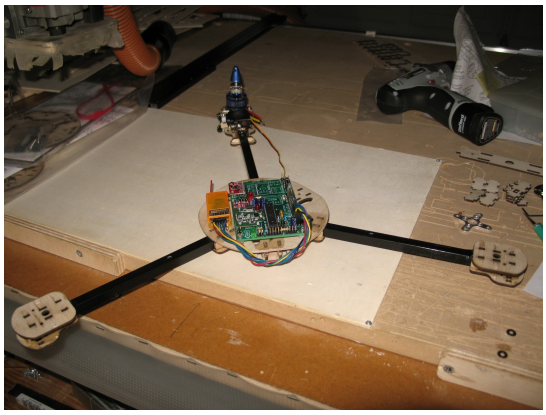
One mod I did to the top plate was to install 4-40 blind nuts to match the hole pattern of the stabilization board. I also soaked the ply around the tab/slots with thin CA and let everything dry thoroughly.

Once everything was dry, It was time for final assembly.

I mounted the rear motor and yaw servo, and installed the ball link. A bit longer arm than the stock one that comes with the HS-81 that I use would probably be better. In addition, I would also add a nylock nut between the ball and yaw plate control horn to reduce the angle of the link. This would give a bit more throw travel as well. It flies fine the way it is.

I mounted the motor plates and yaw assembly to the booms using a dab of household Goop. Works well, and will allow you to make repairs if necessary.
I used relatively short arms (about 7 3/4" for front arms, and about 6 1/2" for rear arm). This gave a nice size.

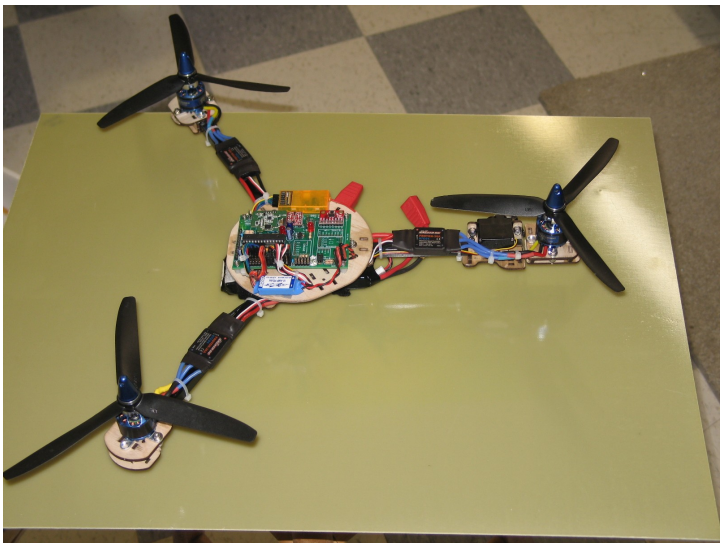
I've found that with the multi-wii control board, the length of the arms is not a critical factor at all.



This is what it looks like all together. Again, the motors I used were probably overkill, as well as the speed controls I usually use (30A). You certainly could save some weight by using smaller motors and 10-18A ESC's.

I test flew this as it sits (yes, I know, no landing gear) as I couldn't wait. I hovered it in my garage with the basic PID settings (4-4-8) with an RC Rate of 50 and Expo of 65.

I have a 2600 3S pack, and it lifts off quickly and hovers at about 1/3 throttle.

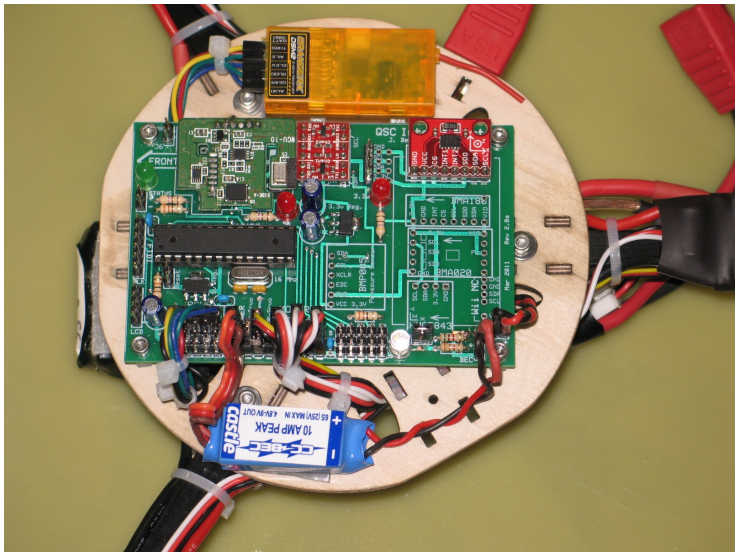


This is a closer shot of the electronics setup.

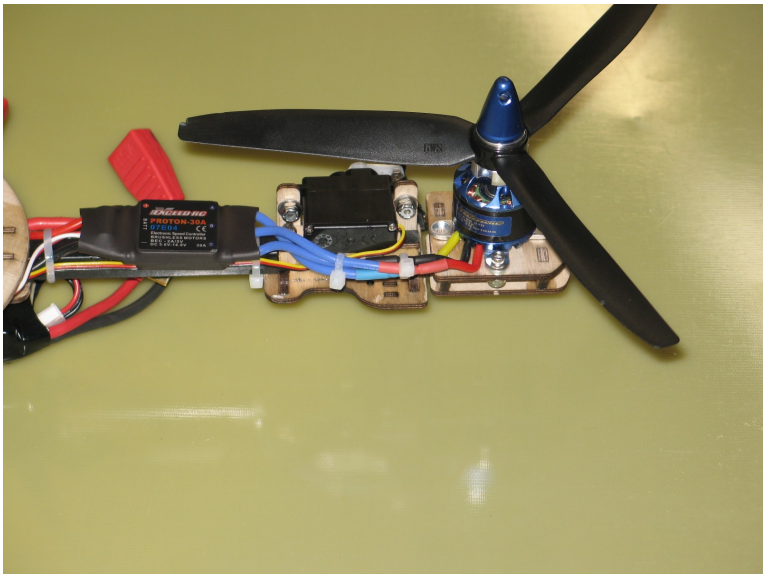
A UBEC is used to power up the electronics and be able to set up and change settings without having the motors live.

A "shorting plug" in the top right enables power to the three ESC's.

In this specific board, I'm using a Wii Motion Plus for the gyros, and an ADXL345 for the accelerometers. A Wii Nunchuck works just as well.



Here is a close-up of the yaw mechanism. It looks a bit busy back there, but it works like a charm!



This is a super kit that allows the builder the option of constructing a Tri-copter tailored to the way they want to fly, from mild to wild!

Finally, I put the legs on it. Super-simple, and the wire gives it a bit of suspension for those less than gentle landings.