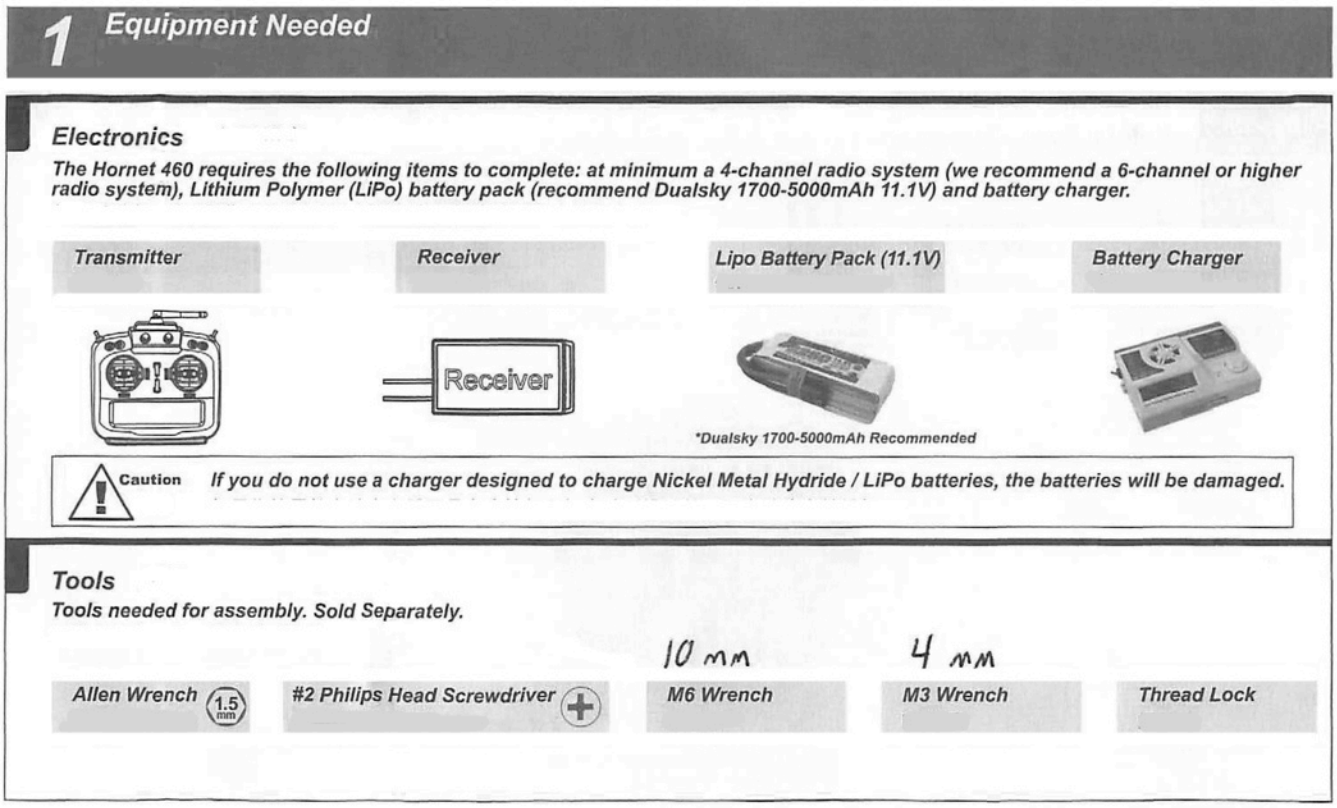
DualSky Hornet Manual Hints and Tips - www.droneflyers.com



Notes on Equipment Needed

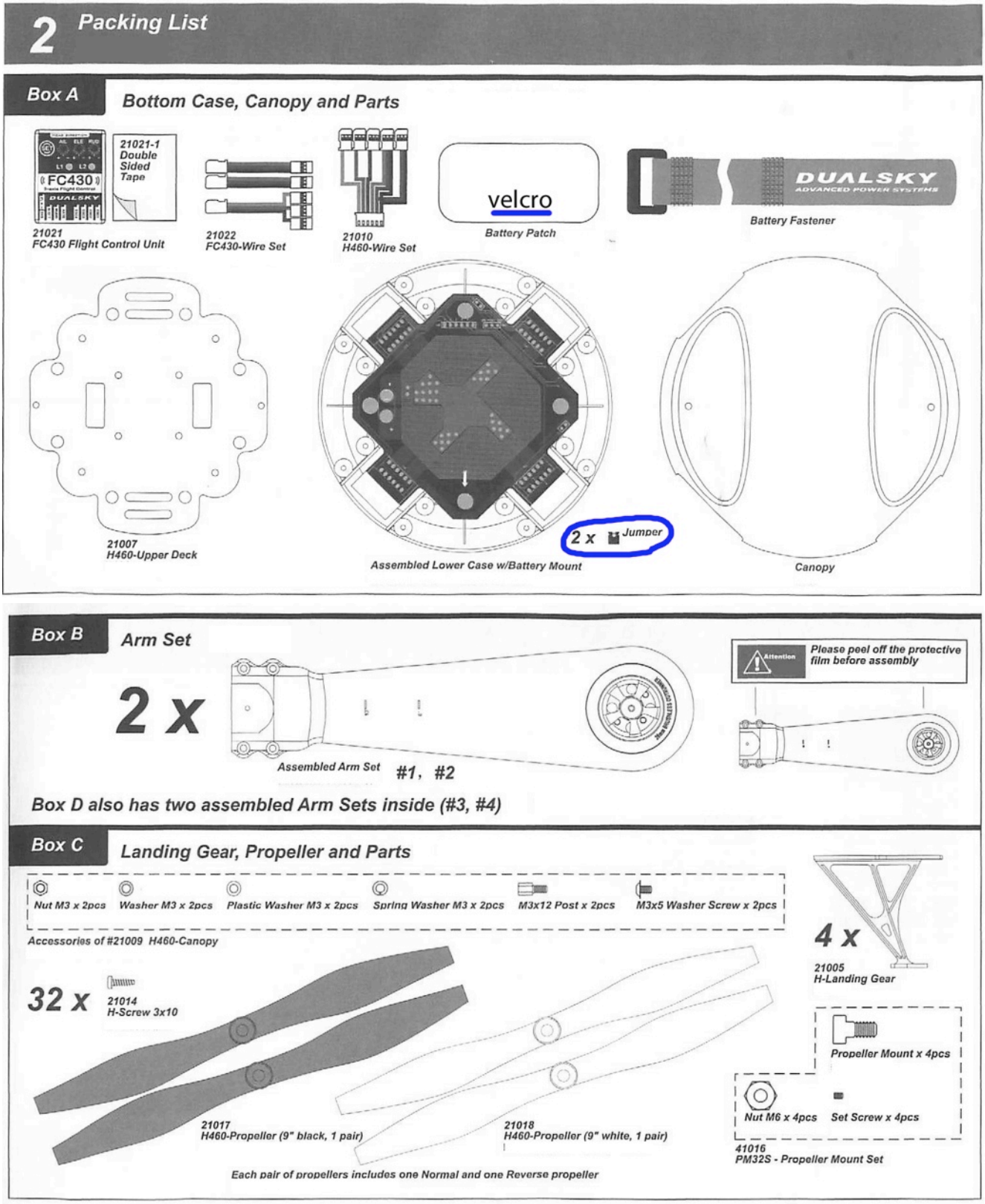
The Dualsky Hornet is sold ARF - which stands for "almost ready to fly". Make certain that you have all the additional items before you start assembly of your new quadcopter.

Step 1 calls for a Transmitter (TX) and Receiver (RX) as the first additional items you will need. Those who are already experienced in R/C may already posses these, but for many this will be the first larger quad so they need to buy these items. Transmitters are often sold without a matching receiver module, so make certain your purchase includes both! The TX is what you use to control the quadcopter from the ground, while the RX is a small and lightweight modules which wires into the quadcopter on-board controls and flies along with your Hornet. This communicates - or BINDS - with your TX.

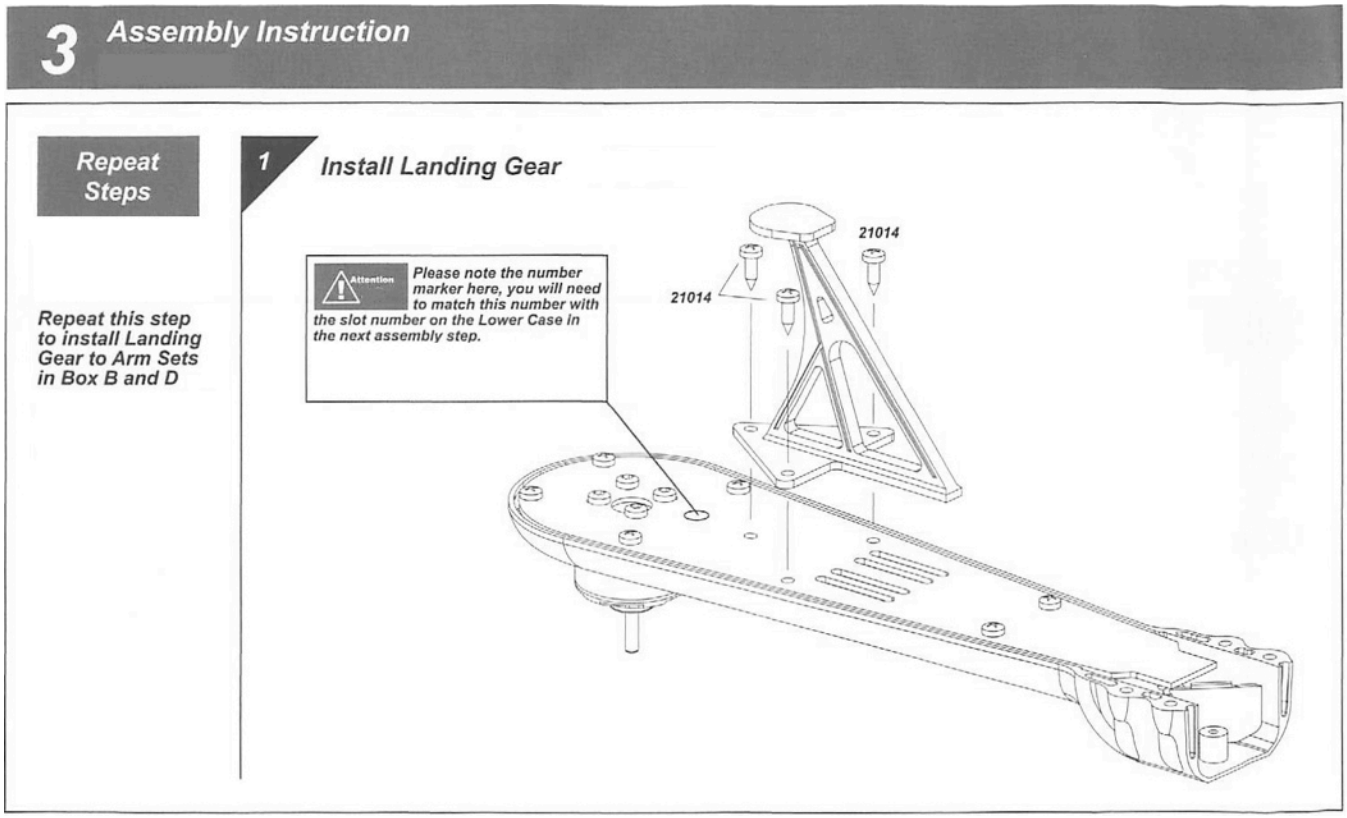
A low price "value" TX/RX combo is the HobbyKing Turnigy 9X, which is approx. $80 including shipping to the USA. An order for this TX/RX combo in Jan. of 2013 shows the following model number and description:
Item# 2006070034 - 1x #TX-9X-M2/8992 Turnigy 9X 9Ch
Note that you will be able to use the same radio on many R/C items - some which you may already have, others which you may buy in the future.

You will also need to buy a couple LiPo batteries as well as a battery charger. These are 3-cell 11.1V batteries - for most newbies, batteries of 2200 mAh should do the trick. Special balancing battery chargers are available - you will need one before charging or flying.
Other notes on this step - you will need to posses or buy the tools and supplies listed at the page bottom. We recommend against using power screwdrivers, as you need to be able to feel the amount of torque applied. Also, note that the M6 Wrench will likely say 10mm on the tool, as that is the OD of a M6 nut. The M4 (4mm OD) wrench is probably not needed - you can use a small adjustable wrench - as the torque of that part is not critical. Do not skimp on the M6 (10mm) wrench or the 1.5mm Allen Wrench as they are on the propeller shaft and under a lot of stress at high RPMs. While at the hardware store, pick up a couple ss M6 (1.0) nuts as replacements (prop nuts).

Packing List Pages (2)



Notes - these pages are accurate - please take note of those tiny electrical jumpers in Box A and consider putting all small parts into a small container (can lid, etc.) so they don't roll away, etc.



Notes: This step is quite easy - use the small black screws and install the plastic landing gear on all four of the Hornet arms as shown. As mentioned before, the use of hand tools (no power screwdrivers or drills) is suggested. Snug them down, but no need to make them too tight.

The “Attention” box is calling out to you to recognize that each arm has a # associated with it, and it is important for you to look at these as you assemble your new Hornet. The number is expressed as a group of black dots. The picture below is arm #2, as indicated by two dots. If you want to save yourself some later trouble, put a post-it note or small piece of adhesive tape on the top side of each arm and write down the arm number. This will allow you to always know, from the topside, what each arm # is.

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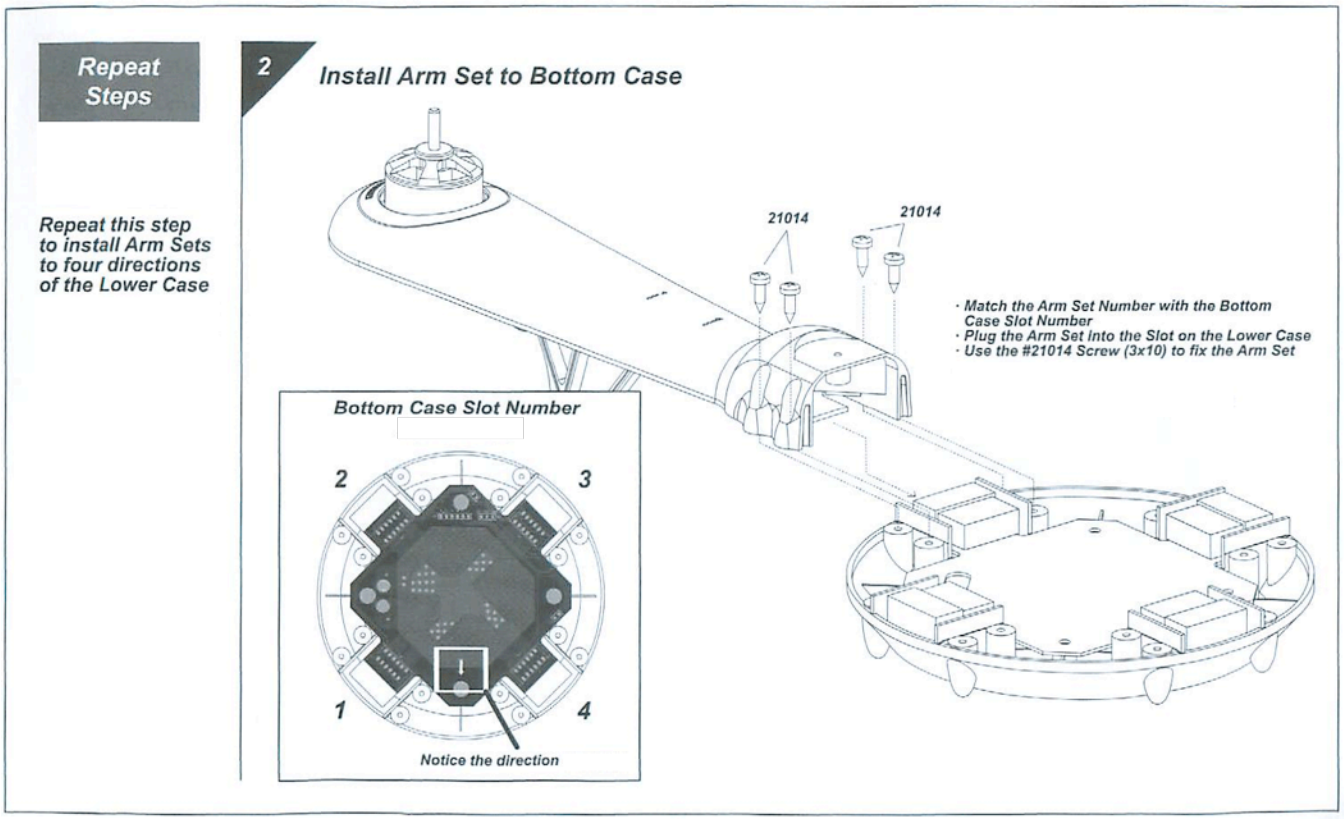
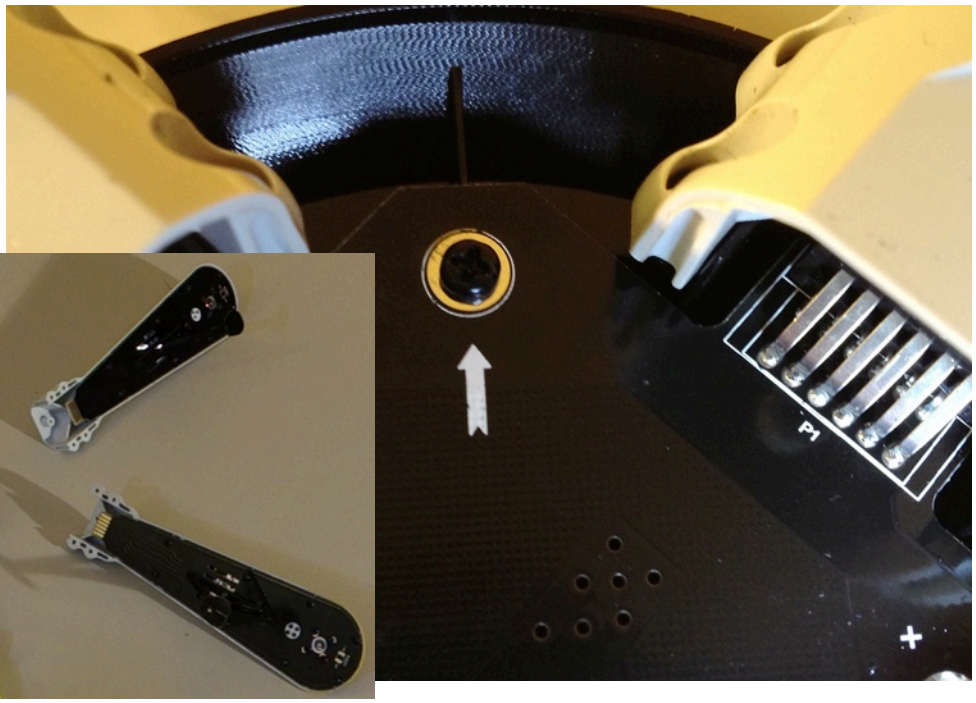
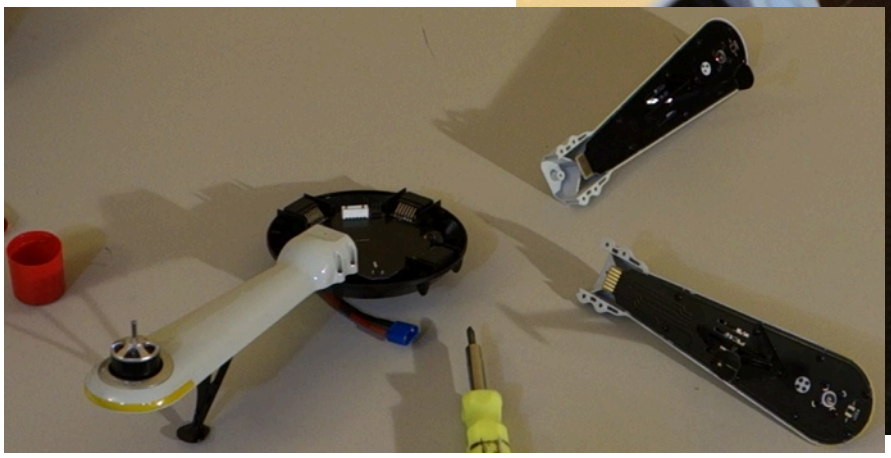
Install Arms to Bottom Case (Quadcopter Hub)



Notes:

Each arm slides into the Bottom case and is held with 4 of the same black screws used for the landing gear. This step will be easier if you transferred the arm numbers to the top or if you lay out the arms on the table in the proper order. Note that each leg MUST go into the proper slot, running clockwise from the small arrow on the circuit board as shown above. It's a good idea to also put a small piece of colored tape on the base where the arrow is located so, as you build your Hornet, you will always know which way is forward. The circuit board (Bottom Case) also has small numbered markings for each arm labeled P1, P2, P3, P4.





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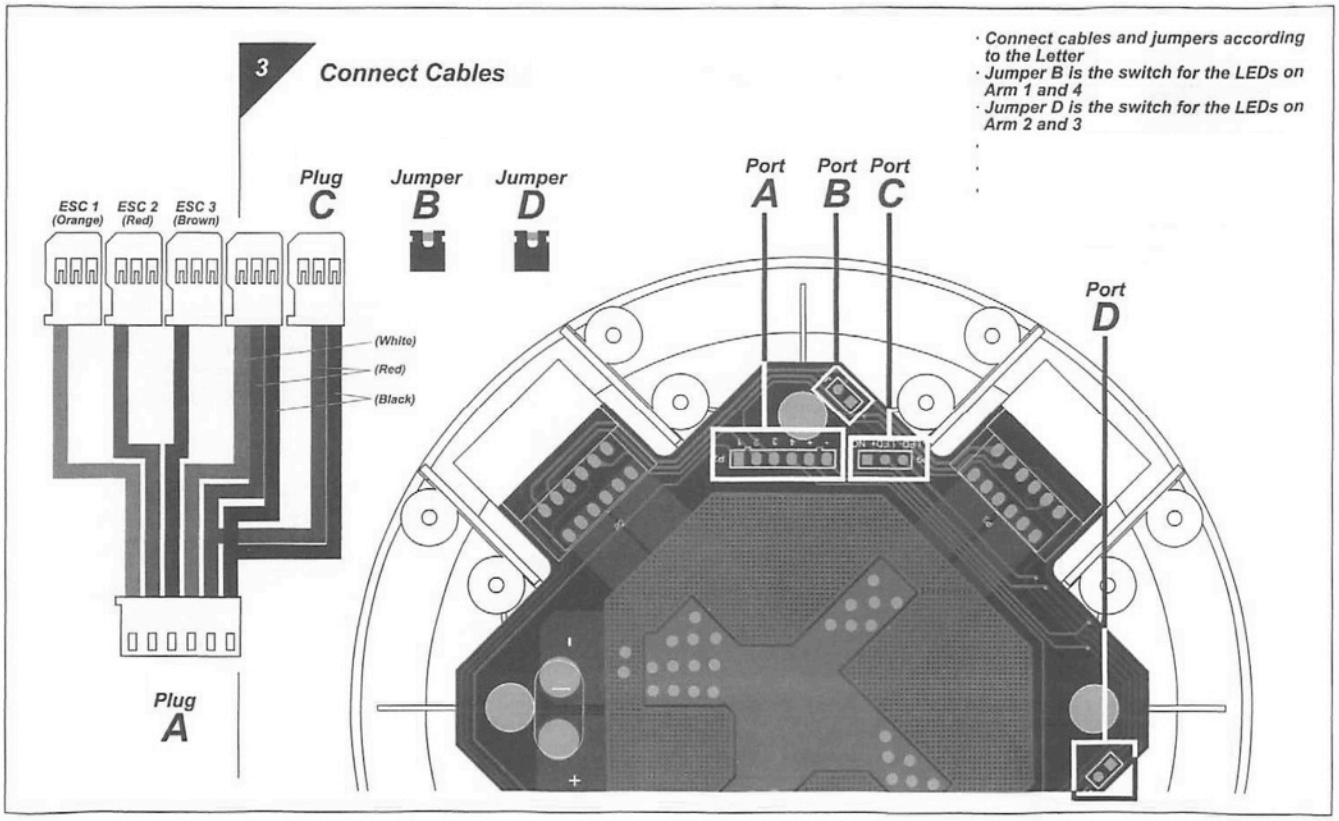
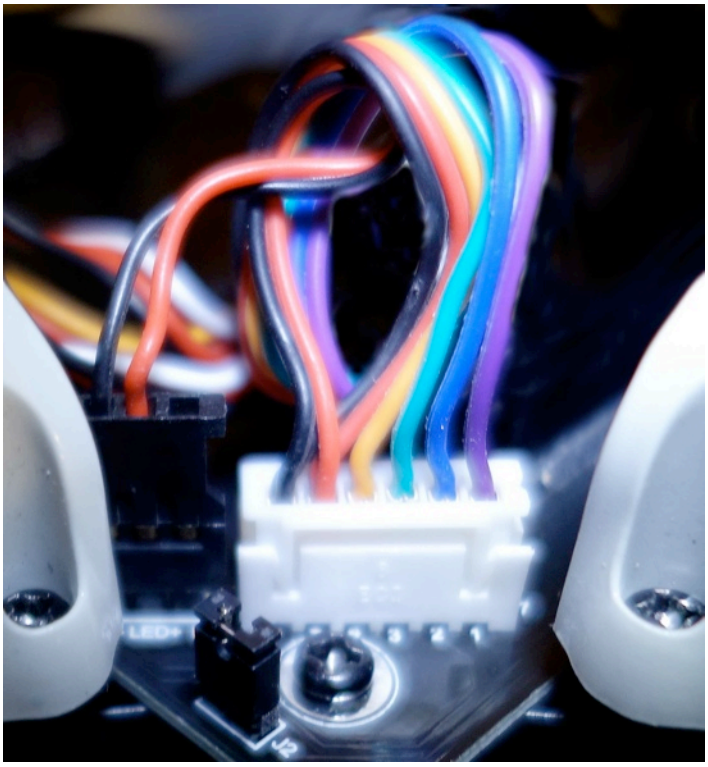


Connecting the Wiring Harnesses and Jumper Pins



I found a couple of discrepancies and shortcomings in this page of the assembly manual. They are detailed here.

1. Plug A on the main board connector does not match up with the colors of my actual cable. Notice that the drawing above shows, left to right, orange, red, brown, white, red, black red, black. My plug is shown (in reverse order) in the picture at right - as you can see it starts with purple, blue, green (aqua?). The key to installing this connector properly is to make sure the pins and slots on the right (marked 1,2,3 on circuit board) have only a single wire on them - and, to make certain that the white connector fits properly into the receiver (note the slots in the front). It is possible to install this connector backwards - there is really no fail-safe in this regard.
2. The connector from port A to port C can also easily be installed backwards - install it as in the picture with the empty slot closer to port A.

The two tiny jumpers mentioned in the packing list Box A fit over port B and D as shown - both are two pins so you cannot install those connectors backwards!

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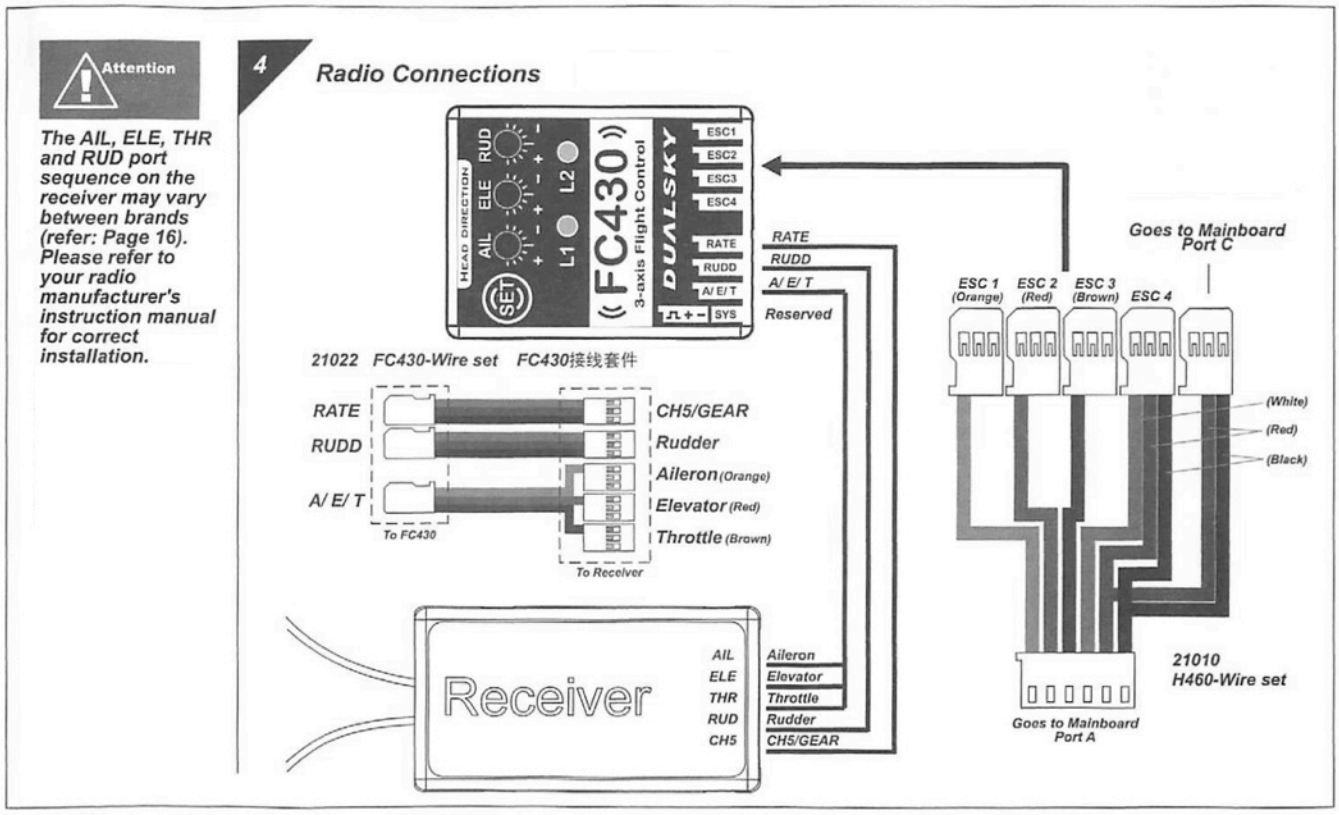
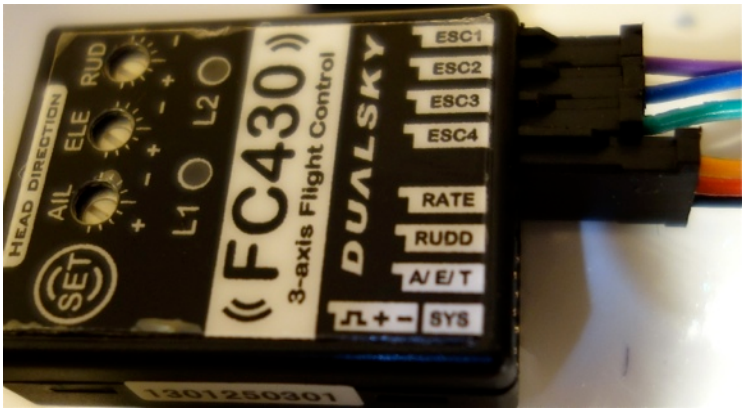


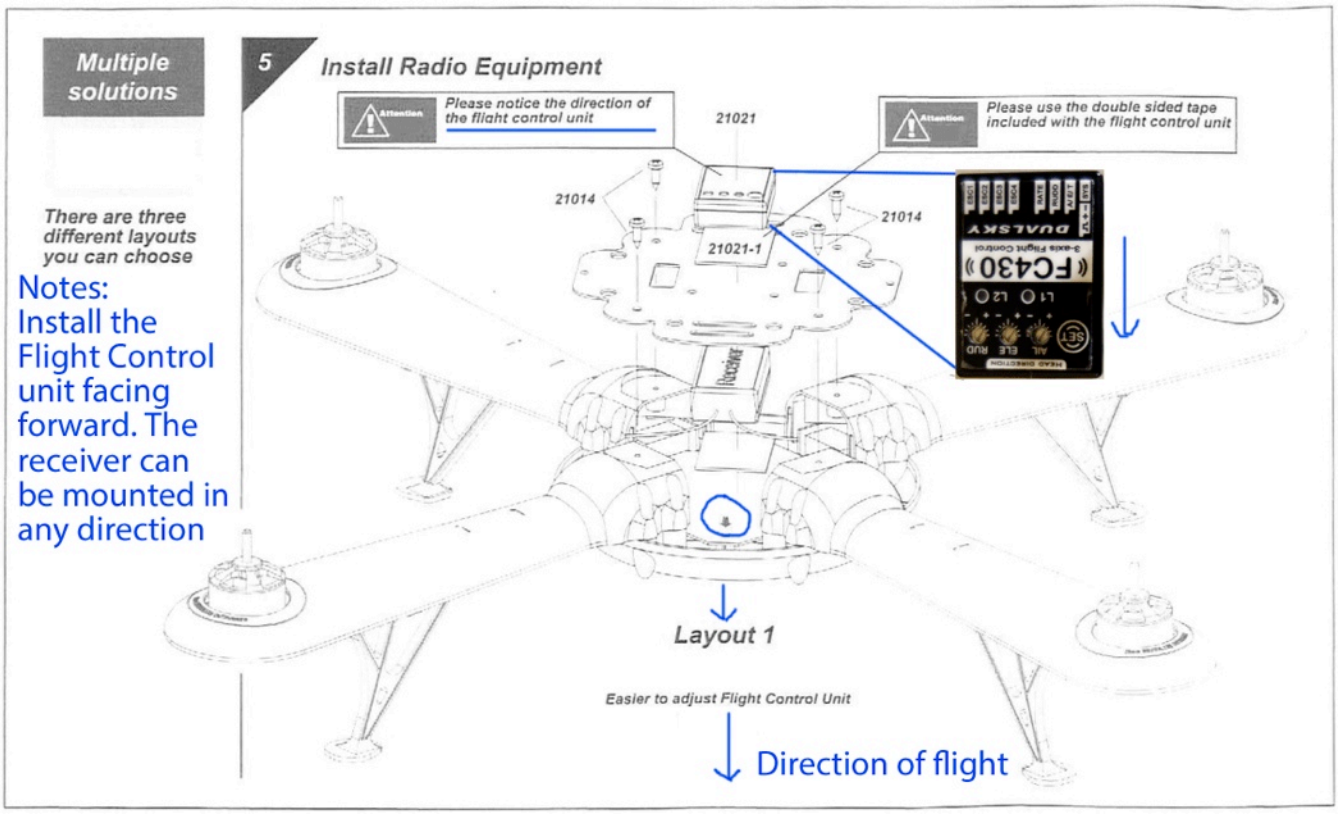
Receiver and Flight Control Wiring

There are two parts to this step - first is the plugging of the 5 plugs originating at Port A on the Main Board into the FC430 Flight controller. These are the four ESC wires, the first 3 having only one wire entering them and the 4th having 3 wires.
These are plugged into the matching ESC1,2,3,4 on the flight controller with the notched out side of the connectors up.

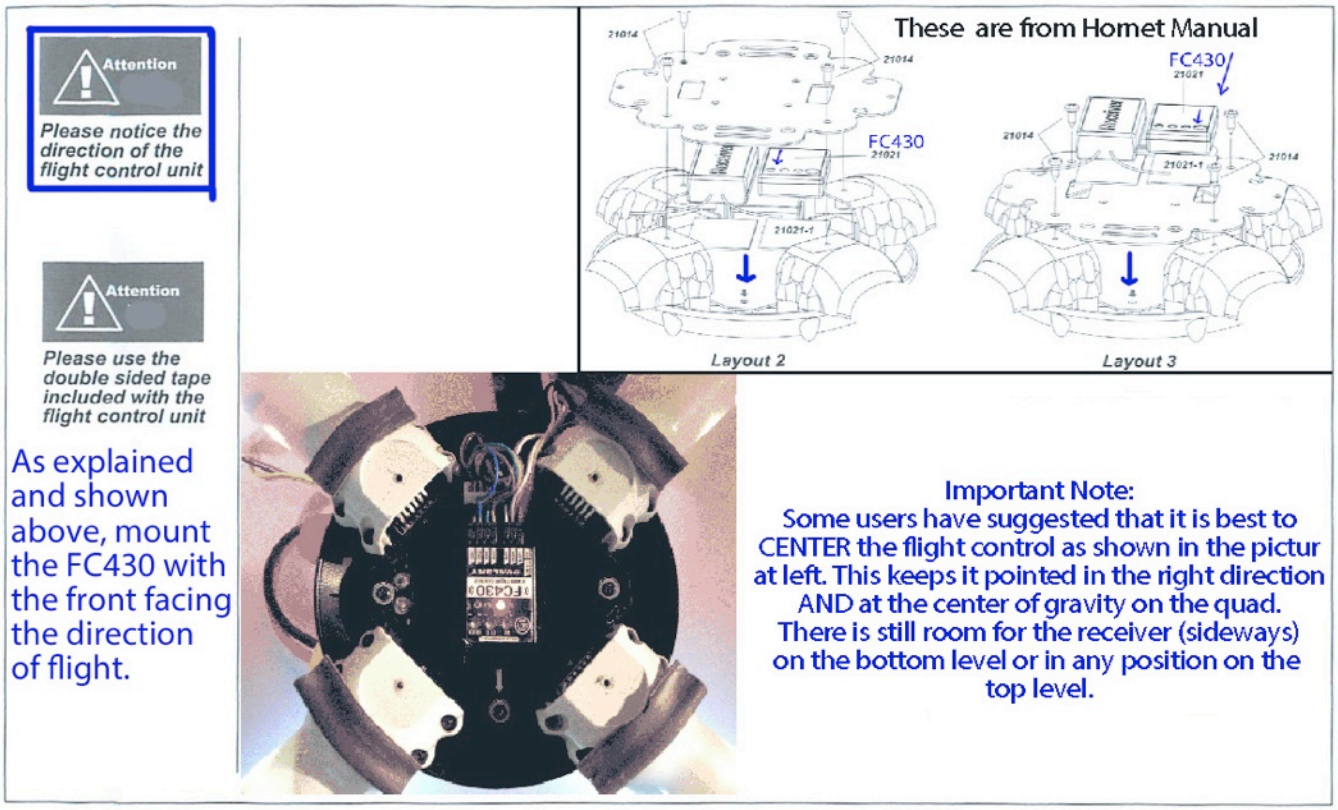


The next step is to connect the wiring from the FC430 to the receiver which YOU provide. These receivers can differ, but all of them should have at least 5 channels marked as shown on the line drawing above. On this Hornet, a Turnigy 9x vs Transmitter and matching receiver were used. Pictures are shown below. Due to the manufacturing of the receiver, it WAS possible to plug the wires in upside down - so watch for this! In the case of this receiver, the proper way is shown - that is, the single wires for the ESC 1,2 and 3 are at the top of the connector/receiver.

See www.droneflyers.com for hints on battery charging, use and many other tips for beginners!



Fasten the Flight Control Unit (FC430) and the receiver to one of the two boards.
IMPORTANT - Align the “head direction” of the FC430 pointing the same direction as the original arrow on your main circuit board. This direction is 1/2 way between arm #1 and arm #4. The FC430 does not have to be centered on the board(s), just as long as the direction of it is proper**.**



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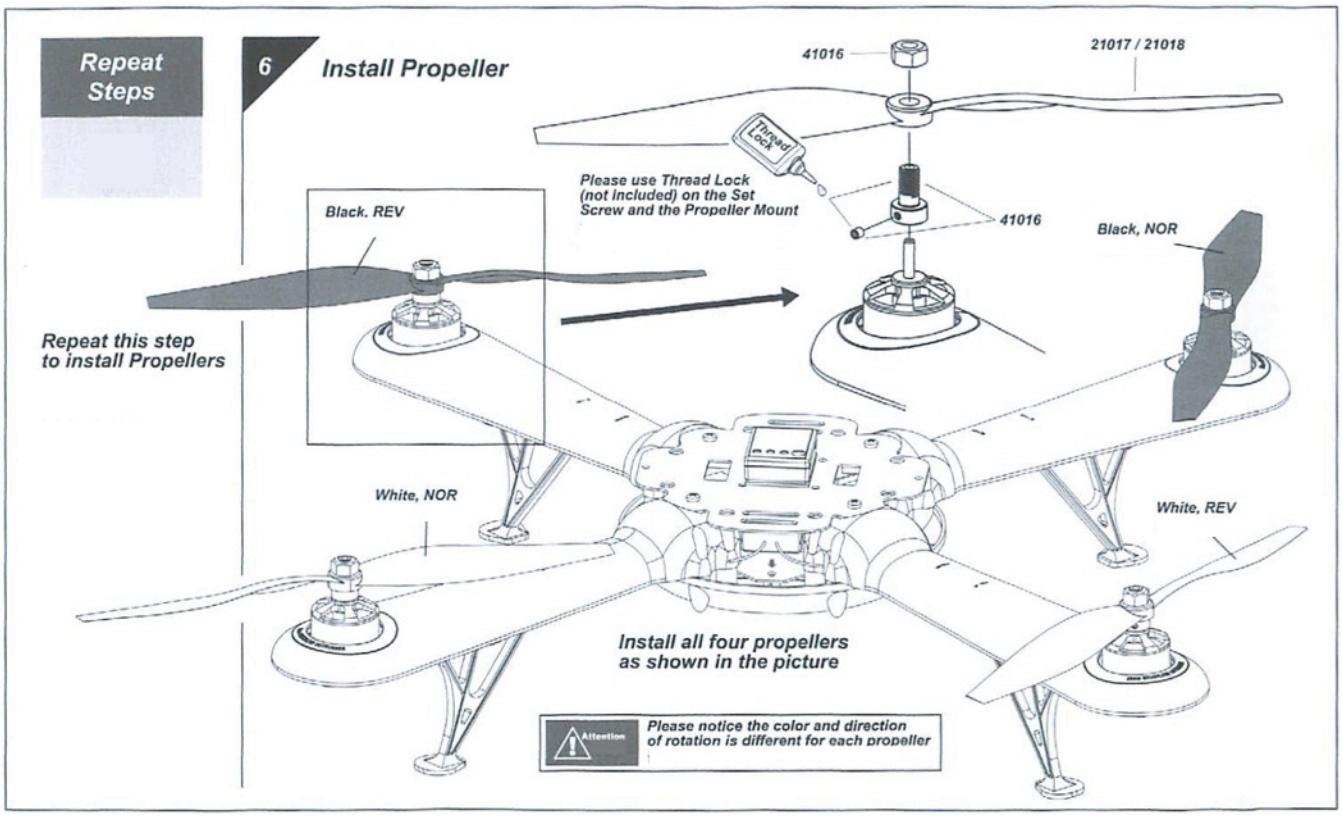
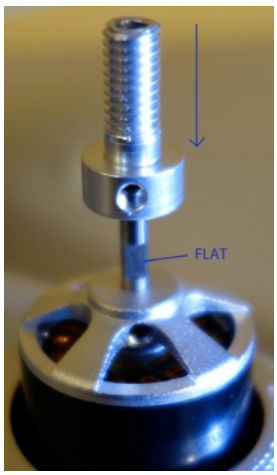


Install Propeller Hubs and Propellers

(note - you may want to read the next couple of pages (test your setup) before completing this step)



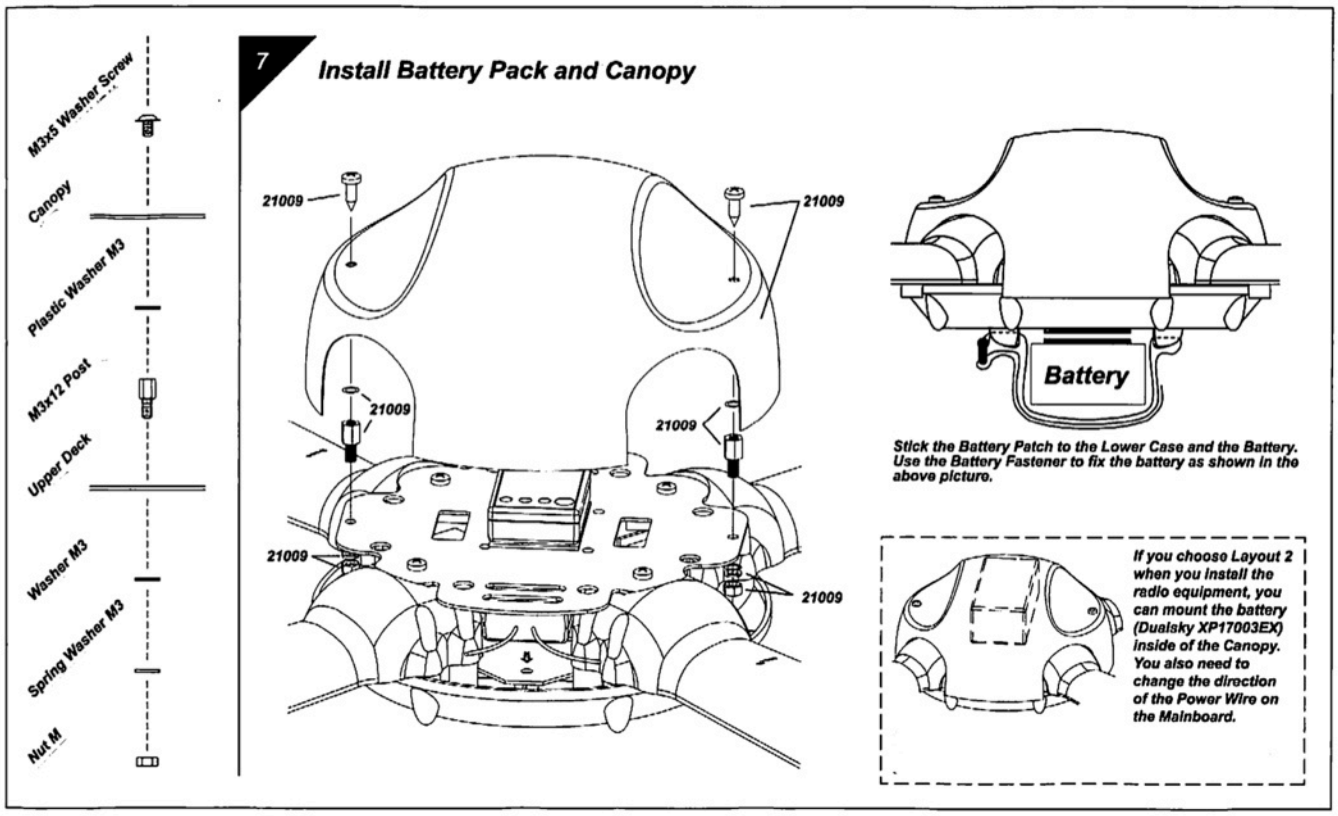
The propeller hubs now must be installed on each of the 4 motor shafts. Place the hubs over the shaft as shown with the set screw threaded hole lined up with the flat machined area on the shaft. Push down and seat hub against top of motor. Place a drop of thread sealant in the hole and insert and tighten the set screw using a 1.5mm hex key (not included).

Propellers are installed by placing them on the hubs as detailed in the drawing above and tightening the included nuts down onto the propeller center hub. A drop of thread sealant is suggested by the manufacturer, however be careful not to use excess so the props can be easily removed and replaced.

Some users suggested that the stock and nuts are in need of a plastic washer to properly seat against the propellers. As you see in the below photo, it's possible the downward pressure of the nut puts excess pressure on the propeller hub. Most of the replacement propellers come with a selection of washers included.

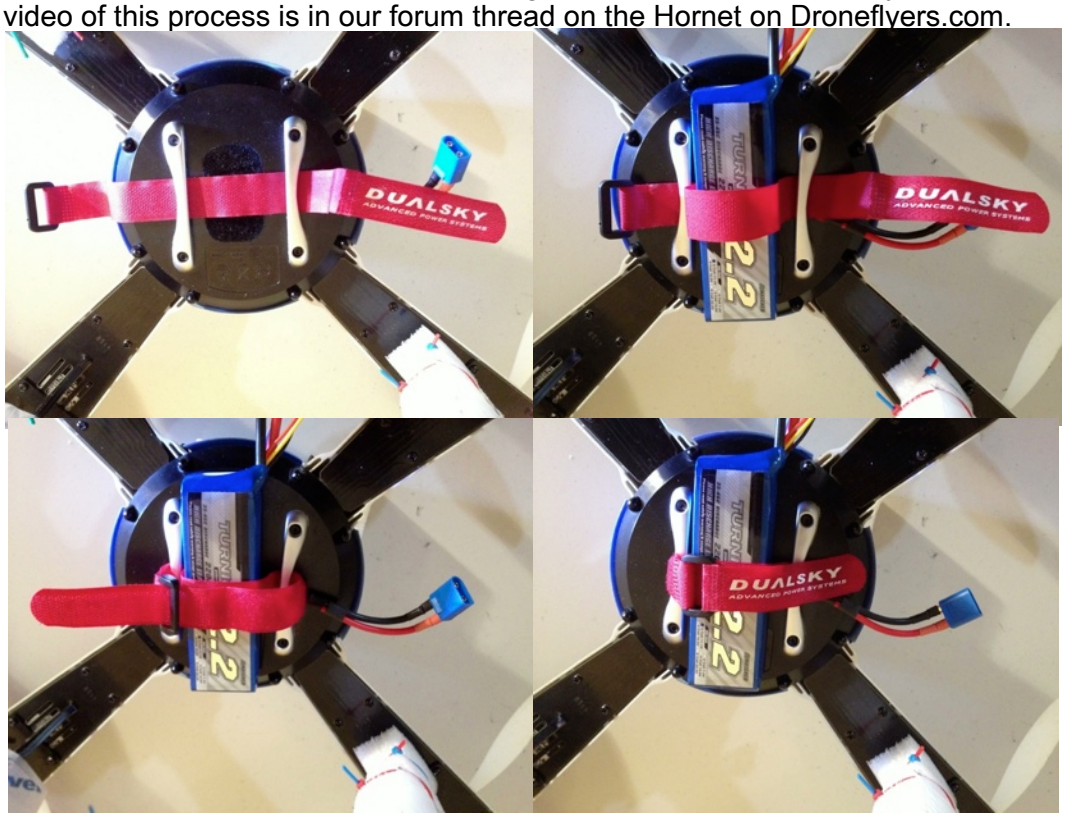
Note: before the propellers are installed and fully tightened, it may be a good time to test your transmitter and maker certain that the quad boots up and the the rotation of all the motors is correct. All propellers should spin in the direction where the leading edge of the prop is the higher one - that is, what the props do is push air DOWN. If you assembled your Hornet according to the manual, this will be the case.

Note 2: The propeller shaft nuts appear to be ss M6 regular pitch (1.0) - pick up a couple spares when you are at the hardware store.



Battery Straps and Canopy

Step 7 in the manual details the fastening of the hood and the battery. Better pics are shown below. A video of this process is in our forum thread on the Hornet on Droneflyers.com.



Although the last two pages show propeller, canopy and battery installations, it may be best to just start these steps and test your setup before finishing them up. This will be detailed on the following pages.

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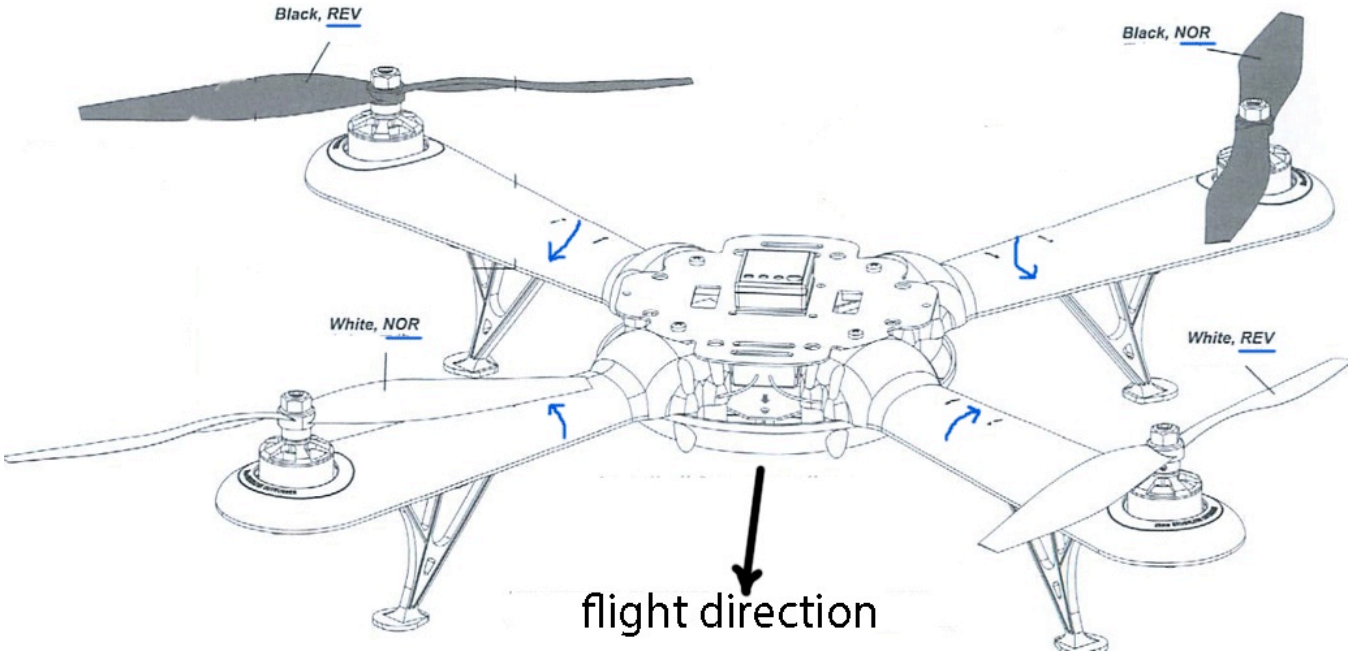

Understanding Propeller Types and Rotation Direction

Each of the 4 propellers included with your Hornet are different - there are two black and two white, but within each color you will note that the propellers differ in the way the angle of the blades are set. These are known as normal and reverse, notated in the drawing above as NOR and REV. It is very important that propellers be installed correctly - or the quad simply will not fly. I find the easiest way to understand prop direction is that higher edge of the propeller should be leading....or first hitting the air! That way, it pushes air down, which makes the quad fly. The blue arrows above show the proper rotation. The left front (white REV) turns clockwise, while the left rear (black REV) does the same. The other two turn counterclockwise. It may help to make small arrows from tape or with a marker on the top of the legs so you will get it right when replacing your broken props with new ones!

When you purchase replacement propellers, they usually come in packs of two of the same rotation direction, so you will have to buy, for instance, two pairs of white (one normal and one reverse) to have what you need for replacement props.

Preparing your Transmitter and testing your Hornet

Before you take your quad outside or to the park, you'll want to get your transmitters (TX) bound correctly to it and make sure all your settings are correct. The Hornet needs at least a 4 channel TX - most are 6-9 channels, so you should have plenty. Different brands include Turnigy, Futaba, Spectrum, JR and Devo. If you are not familiar with R/C transmitters, you'll want to get some basic instructions from your vendor or another experienced user. The instructions provided here are for the Turnigy 9x, a popular "value" radio, but most of the steps will also apply to other models and brands.

1. Install the battery (do not hook up!) and set your Hornet on the floor with plenty of clearance around it - so the propellers can spin up. If you are the paranoid type, you may want to weigh your Hornet down to the floor by attaching something heavy (small pipe wrench, etc.) to the battery strap with a wire or string. This will assure that if you accidentally hit the throttle, it is unlike to take off!

2. Create a new model in the 9x radio - use "acro" as the type, mode 2 as the stick set and set all channels to normal (not reversed). The 5th channel should be assigned to GEAR in the AUX channel setting screen. Make sure you name the model "hornet" or something similar so you are sure that it is selected when you return to the main screen.

3. Follow these steps to test the booting of your quad.

a. Turn the TX off, move the throttle stick to full, and turn it back on.
b. Plug in the battery to the Hornet - in a few seconds, it should make a long beep.
c. move the throttle stick all the way down - the Hornet should make a shorter beep.
d. Unplug the battery, wait a few seconds and plug it back in.

Your Hornet is now set and ready for you to unlock and test it further.

Unlocking the Hornet

The Hornet has a safety mechanism built in which does not allow the props to spin until you unlock them using a certain movement of BOTH sticks. This assures that the quad will not fly off or hurt someone if the throttle is accidentally turned up. To unlock, you must hold both sticks to the lower outside for a few seconds as shown in the picture below. If everything is working, the propellers will spin up for a few seconds and then stop. After this, your throttle WILL work normally, however the Hornet will go back into lock mode if you leave the throttle at zero for about 10 seconds or longer. To fly, simply pull both sticks to the outside bottom again.