



3DR ArduCopter Hexa-B

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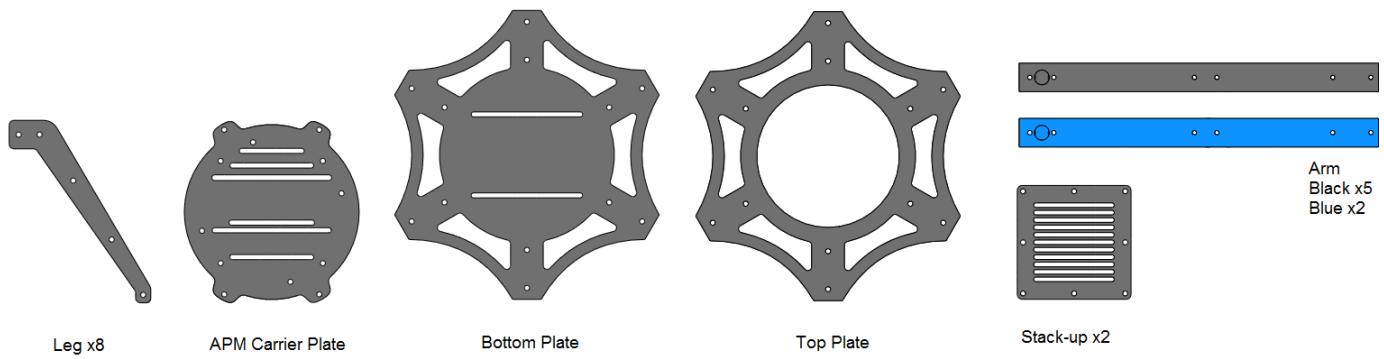
Thank you for purchasing an 3DR ArduCopter Hexa kit. The 3DR ArduCopter Hexa is a stable and supported multi-rotor frame in the ongoing development of the ArduCopter codebase on DIYDrones. It features a very durable Aluminum and G10 FR4 frame that can withstand hard impacts. The wide legged stand allows for more stable takeoffs and landings and provides an unobstructed view for a bottom mounted camera. The 3DR ArduCopter Hexa is designed by 3D Robotics in San Diego, California and manufactured by 3D Robotics in Tijuana, Baja California.

Rewards to frame:

Revision B - Shorter arms. Motor mounting is no longer done with a bolt through the entire arm, but now the motor just mounts to a single face of the arm. Previous mounting method caused the arm to sink in. Center plates design changed to accommodate the shorter arms. Added blue arms. Reduced frame weight.

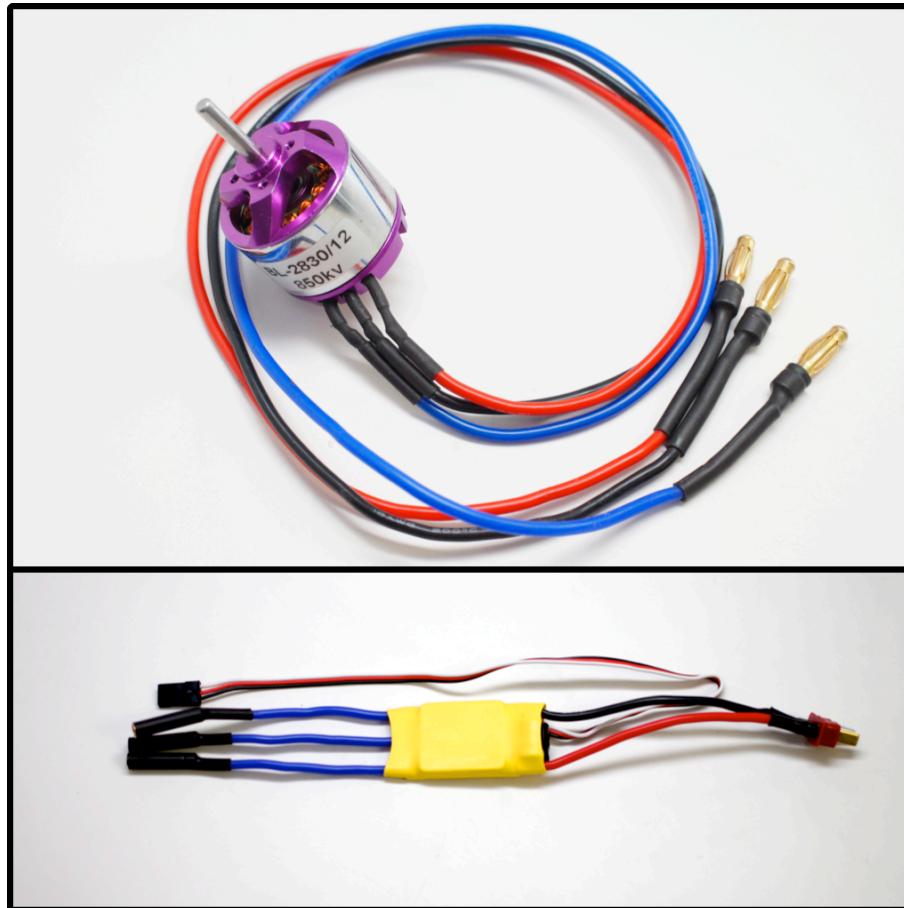
3DR ArduCopter Hexa-B Hardware

M3 Rubber Washer	
M3 Lock Washer	
M3 Metal Nut	
M3 Thumb Nut	
M3x5mm Plastic Screw	
M3x5mm SS316 Screw	
M3x25mm SS316 Screw	
M2x35mm SS316 Screw	
M3x18mm Spacer	
M3x30mm Spacer	



Assembly Guide

Solder Motor and ESC Connectors



Note: You may choose to solder the ESCs directly to the PDB. This will save time on this build and not require you to solder connectors to both the ESCs and the PDB. Soldering connectors however will allow you to easily remove components in the future.

1. Solder all bullet connectors to the motors and ESC. Male connectors go on the motors and female on the ESC. Make sure to heat up both the cable and the connector to avoid a cold solder joint. *For a short video demonstrating how to solder bullet connectors follow this link: <https://www.youtube.com/watch?v=aEK2e0xUi5s>*

2. Slide a piece of shrink tubing over the bullet connectors and apply heat to shrink. Heat can be applied with a soldering iron or a [heat gun](#). *Note: Female connectors should be fully covered by shrink tubing to avoid shorts.*
3. Slide two pieces of shrink tubing on the red & black wires on the ESC.
4. Solder male Deans or your preferred connector to the red & black wires on the ESC. *Note: Make sure the black wire is soldered to the negative (-) terminal of the connector and the red to the positive (+).*
5. Pull the shrink tubing over the exposed connector leads and shrink it.

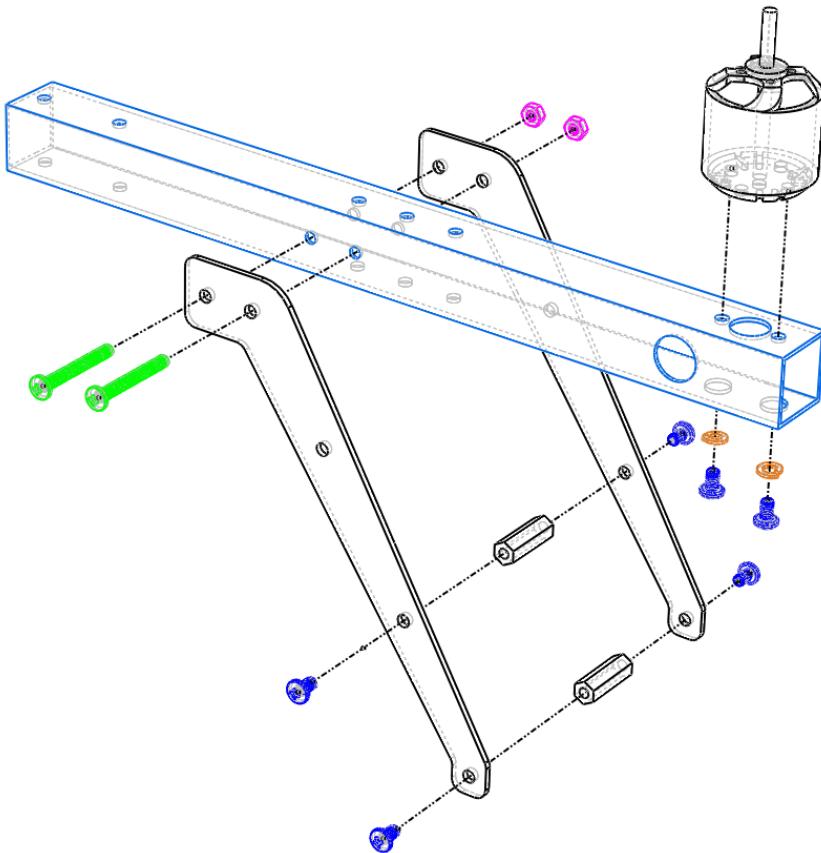


Choosing + or x



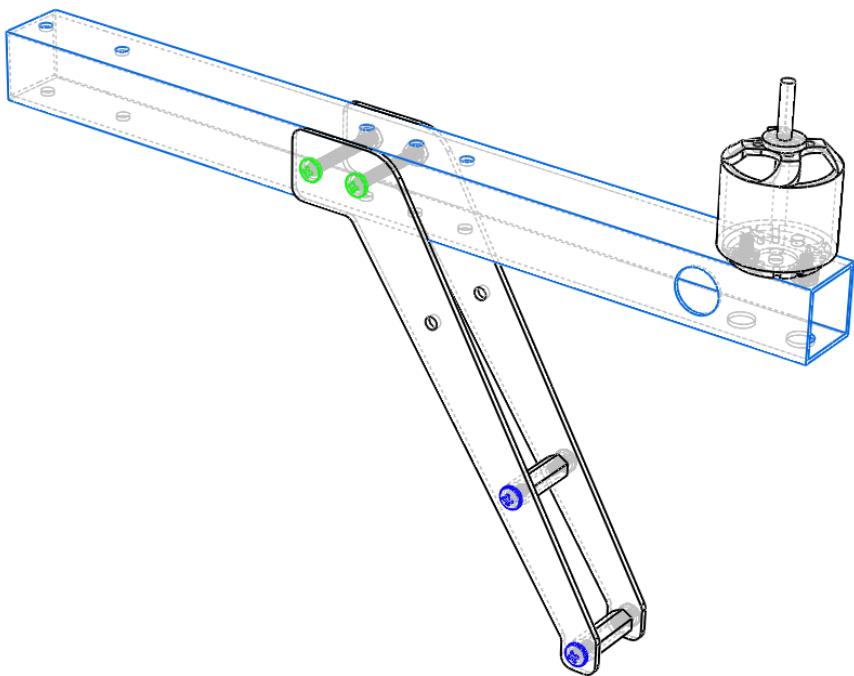
Something to keep in mind during this build is which configuration your vehicle will be flown in. This is later chosen when setting up your APM in the Mission Planner. There is no effect on performance it is just a matter of personal preference. Both the + (Top) and X (Bottom) configurations are pictured above. The blue arms indicate the front of the vehicle. **This manual will continue building the vehicle in X configuration. Please adjust accordingly.** *Note: Notice which color arms have legs mounted on them for each configuration.*

Arm Assembly x6

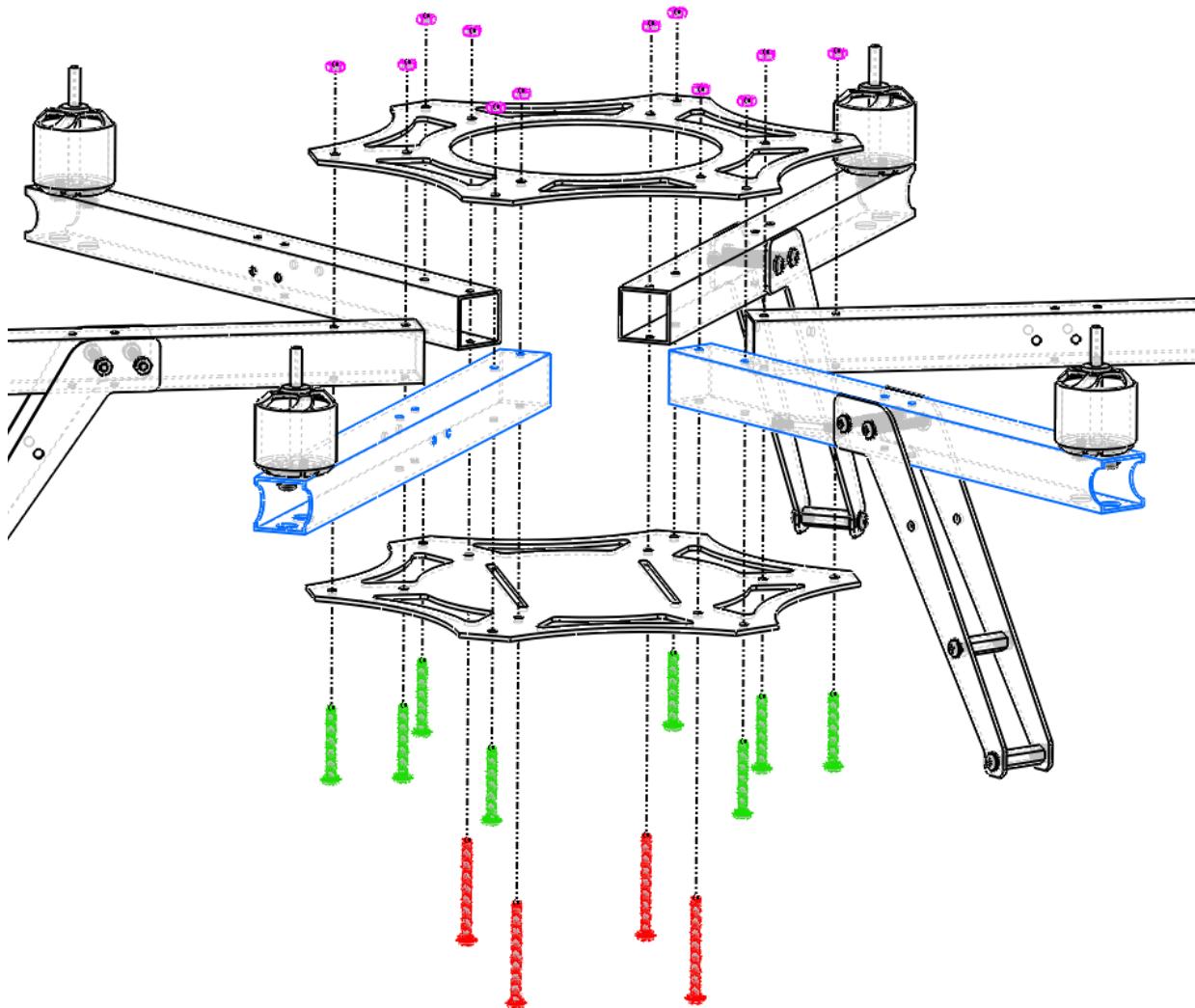


Note: If assembling a hexa kit prior to Revision-B and installing 880kv (orange) motors the centered hole on the arm that allows room for the shaft to poke through needs to be drilled out to 10mm.

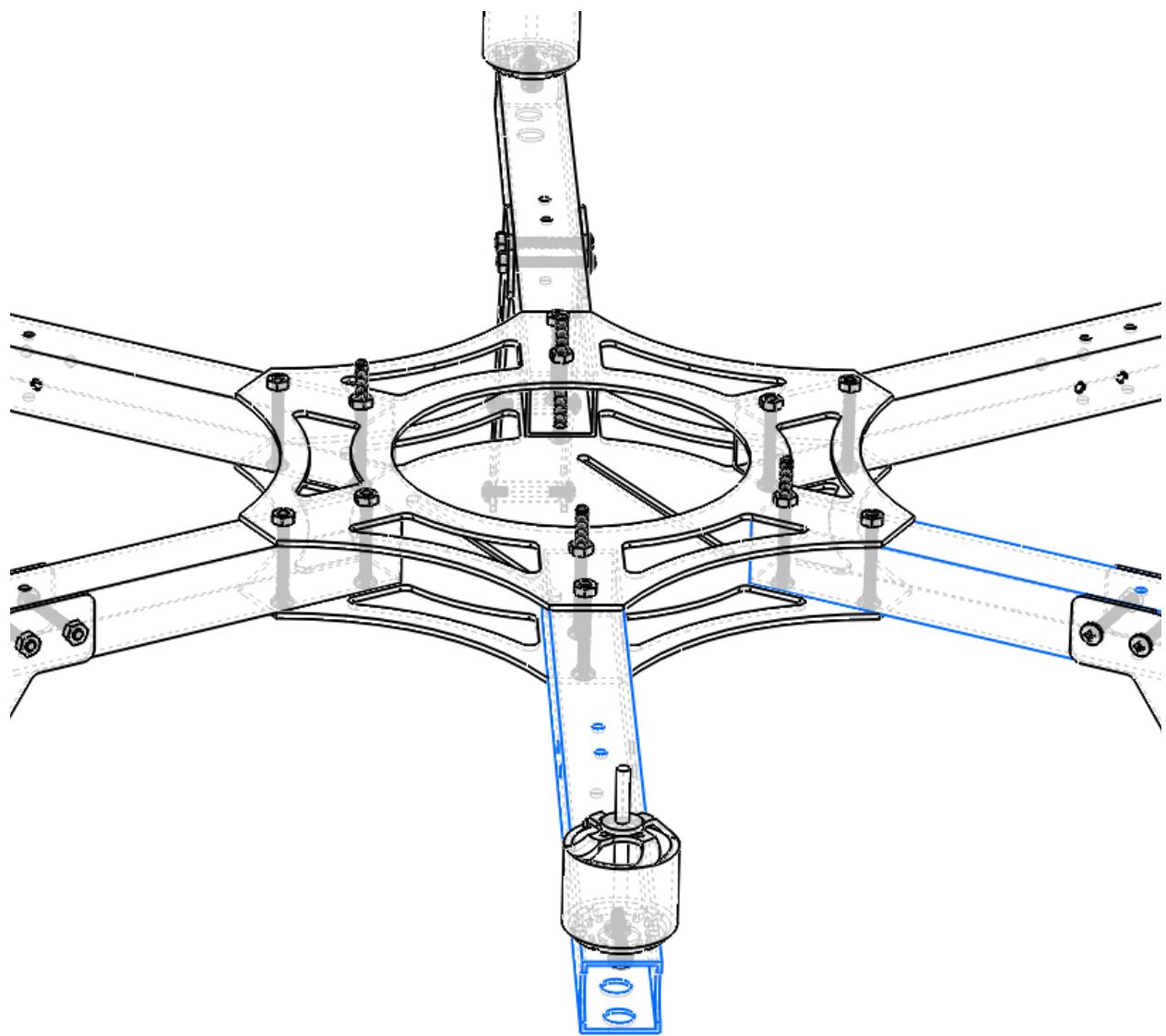
1. Attach the motor to the arm using two M3x5mm screws (Blue) and two M3 lock washers (Orange) making sure the screws go into the threaded holes in the motor and not the ventilation holes. (If the motor is screwed using the ventilation holes, it will not spin freely) Route the motor cables through the hole on the side of the arm.
2. Use two M3x25mm screws (Green) and two M3 metal nuts (Pink) to fasten the legs to the arm using the indicated holes. To provide rigidity to the legs attach two M3x18mm spacers in between the legs and secure with four M3x5mm metal screws (Blue).
3. Repeat for all 6 arms. *Note: Only 3 will have legs on them. Refer to the pictures on the previous page to select which color arms will have legs on them.*



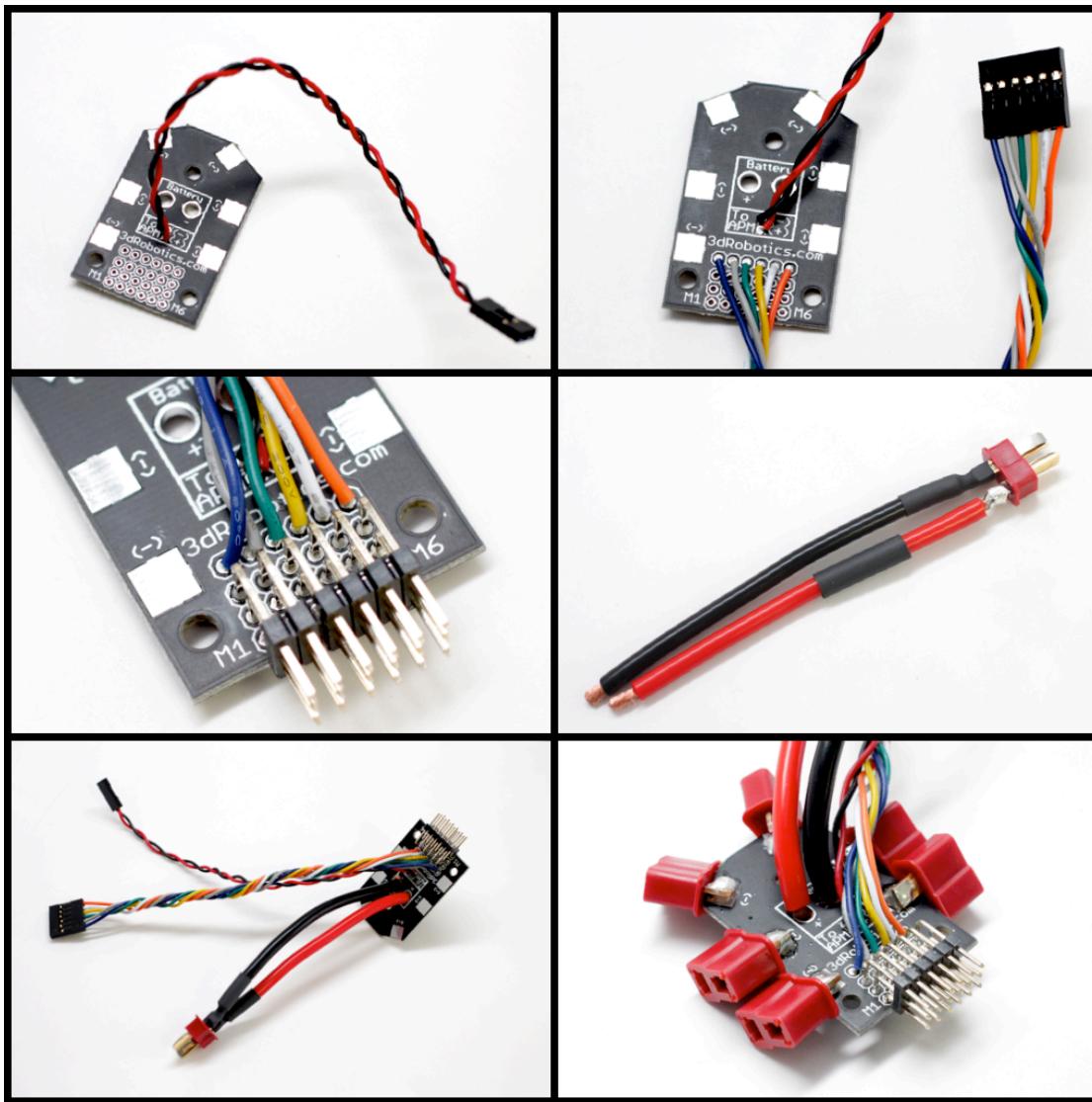
Main Frame Assembly



1. Attach the bottom and top plates to one of the black arm assemblies using two M3x25mm screws (Green) and secure with two M3 metal nuts (Pink).
2. Attach a black arm in the same manner directly opposite to this one.
3. Attach the remaining four arms using an M3x25mm screw (Green) and an M3x35mm screw (Red), secure with two M3 metal nuts (Pink). *Note: screw closer to the center of the vehicle is longer. You will end up with four longer screws that will be used to attach the PDB cap.*
4. Slide the two velcro straps through the slots on the bottom plate. The velcro straps will be used to fasten the flight battery under the vehicle.



PDB Assembly

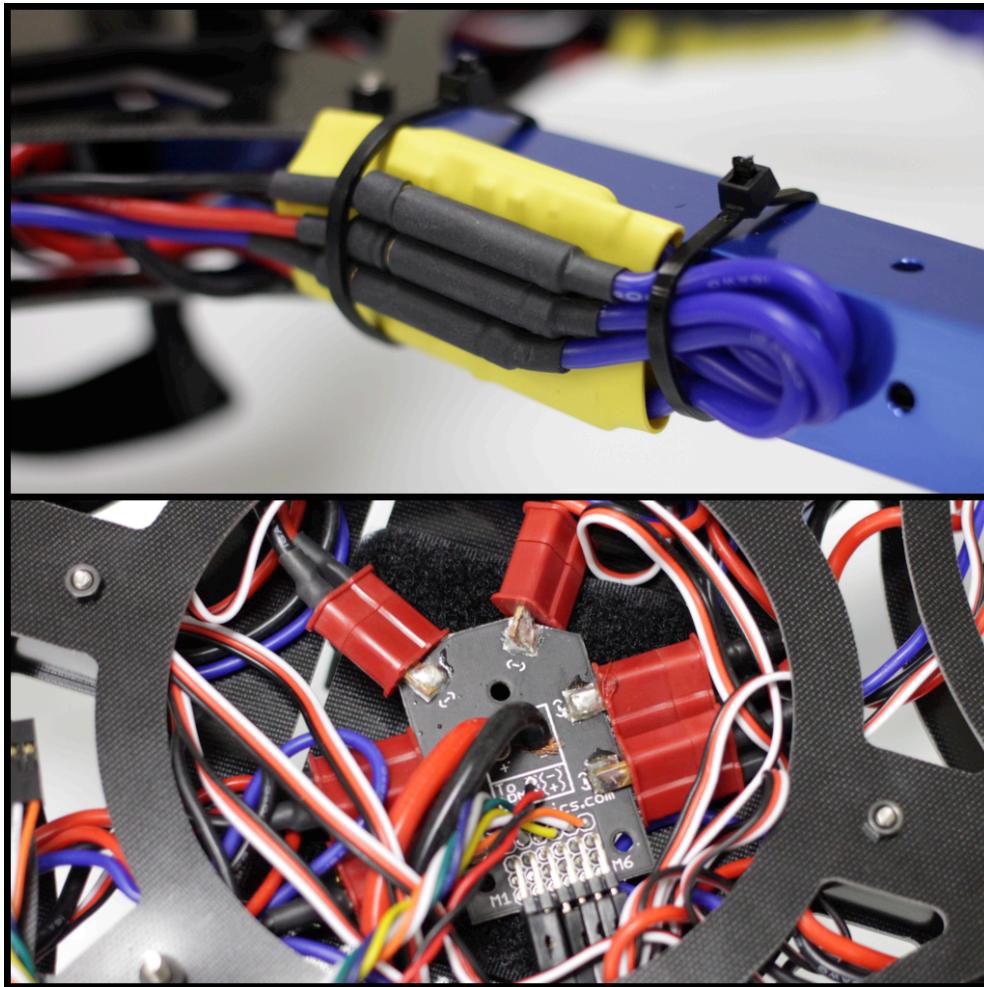


1. Solder the thin gauge red & black wire to the positive and negative leads labeled "To APM" in the center of the board.
2. Solder the six wire connector. Solder the blue wire on the edge of the connector to S1 on the PDB. Work your way down the connector soldering the wires in order. Gray to S2, Green to S3, Yellow to S4, White to S5 and Orange to S6. *Note: The 6 wires you just soldered are your motor signal wires. Colors are not important as long as they can be plugged in in numerical order into the APM. In this case blue is motor 1, gray is motor 2 and so on.*
3. Solder the 3x4 and 3x2 pin headers to the remaining holes at the edge of the board.

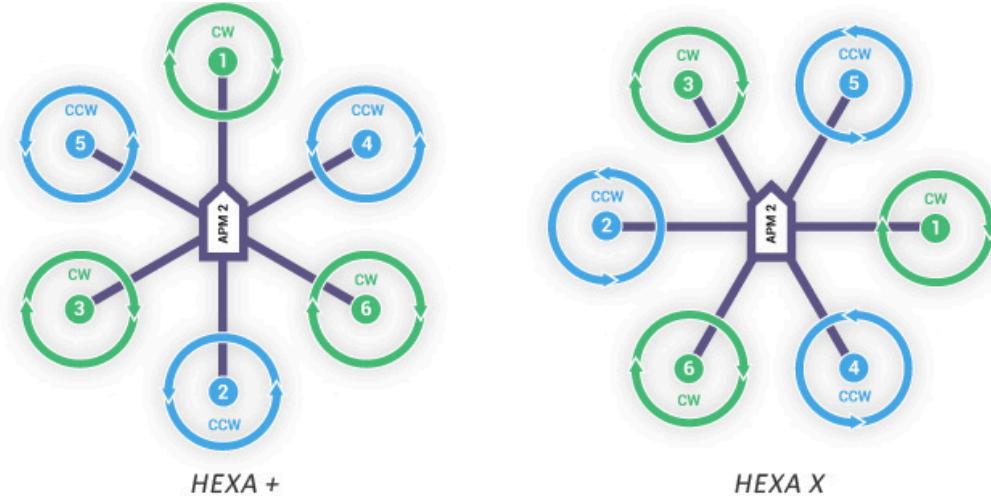
4. Strip both ends of the 10AWG wire about 0.2in/5mm.
5. Solder the wires to the positive and negative leads on a male Deans or your preferred connector. *Note: this will connect to your flight battery.*
6. Slide a piece of heat shrink over the exposed connector leads and shrink.
7. Solder the stripped ends of the 10AWG cable to the large holes in the center of the PDB labeled “Battery”. Black goes to “–” and red goes to “+”.
8. For this next step you have two choices:
 - a. Solder female Deans or your preferred connector to the +/- pads along the perimeter of the PDB. This is where the black and red wires of your ESC will plug in. *Note: Having a connector will allow you to quickly replace an ESC in the event of a failure. **The manual will continue with this method.***
 - b. Solder the black and red cables on your ESC directly to the PDB. *Note: This will save you a lot of time in this build by not soldering connectors to the PDB and ESCs but will make the build slightly more challenging because it will be harder to slide the ESCs +PDB through the center of the frame.*



Wiring



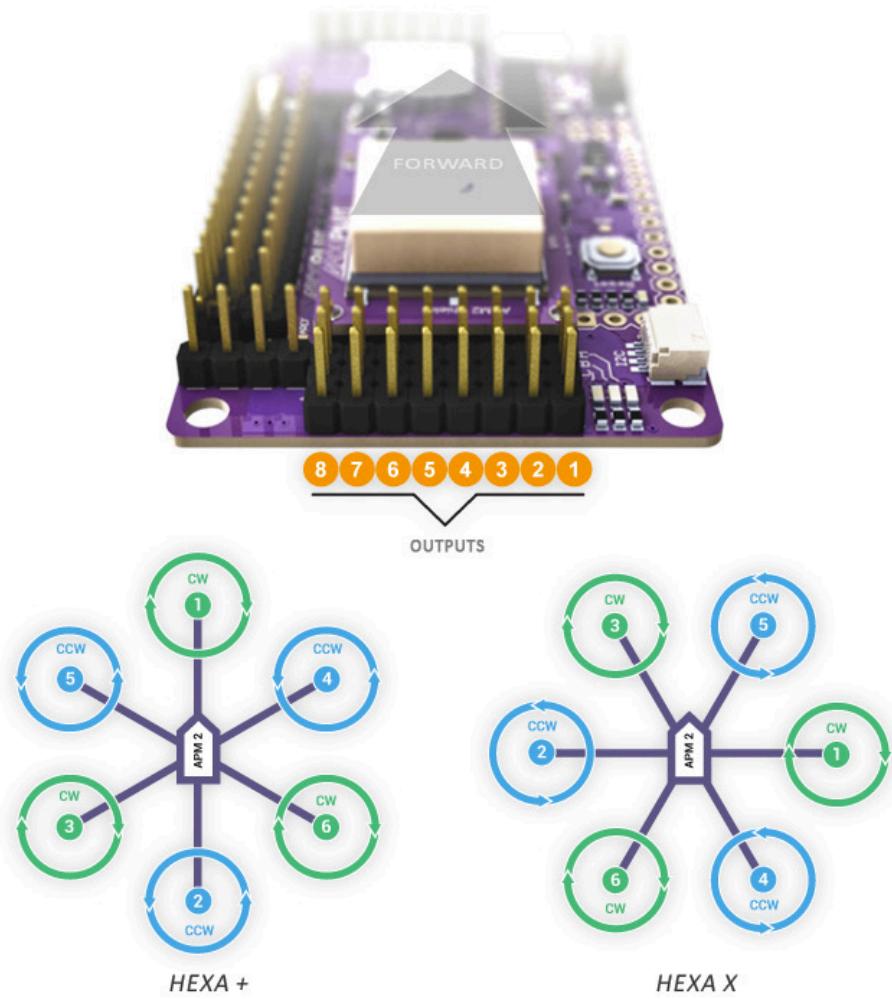
1. Connect the three male bullets from the motors to the three bullet connectors on the ESCs.
2. Repeat for all 6 motors.
3. Place the PDB in the center hole of the vehicle as shown in the picture above. *Note: Although orientation does not matter, some orientations might allow you to route wires more neatly. It is recommended that the PDB pins face the same direction as your APM output pins to minimize the distance between them.*
4. Connect the Deans plugs on the ESCs to the PDB. *Note: the order does not matter, this is just so the motors can get power from the battery.*



5. Label the arms of the vehicle to correspond with the image above. Note: *Keep in mind your chosen vehicle flying orientation.*
6. Finally connect the 3 wire cables from the ESCs to their respective spots on the PDB signal pins. Match the arm number (labeled in step 5) to the respective signal number ("S#") on the PDB. Remember ground is down

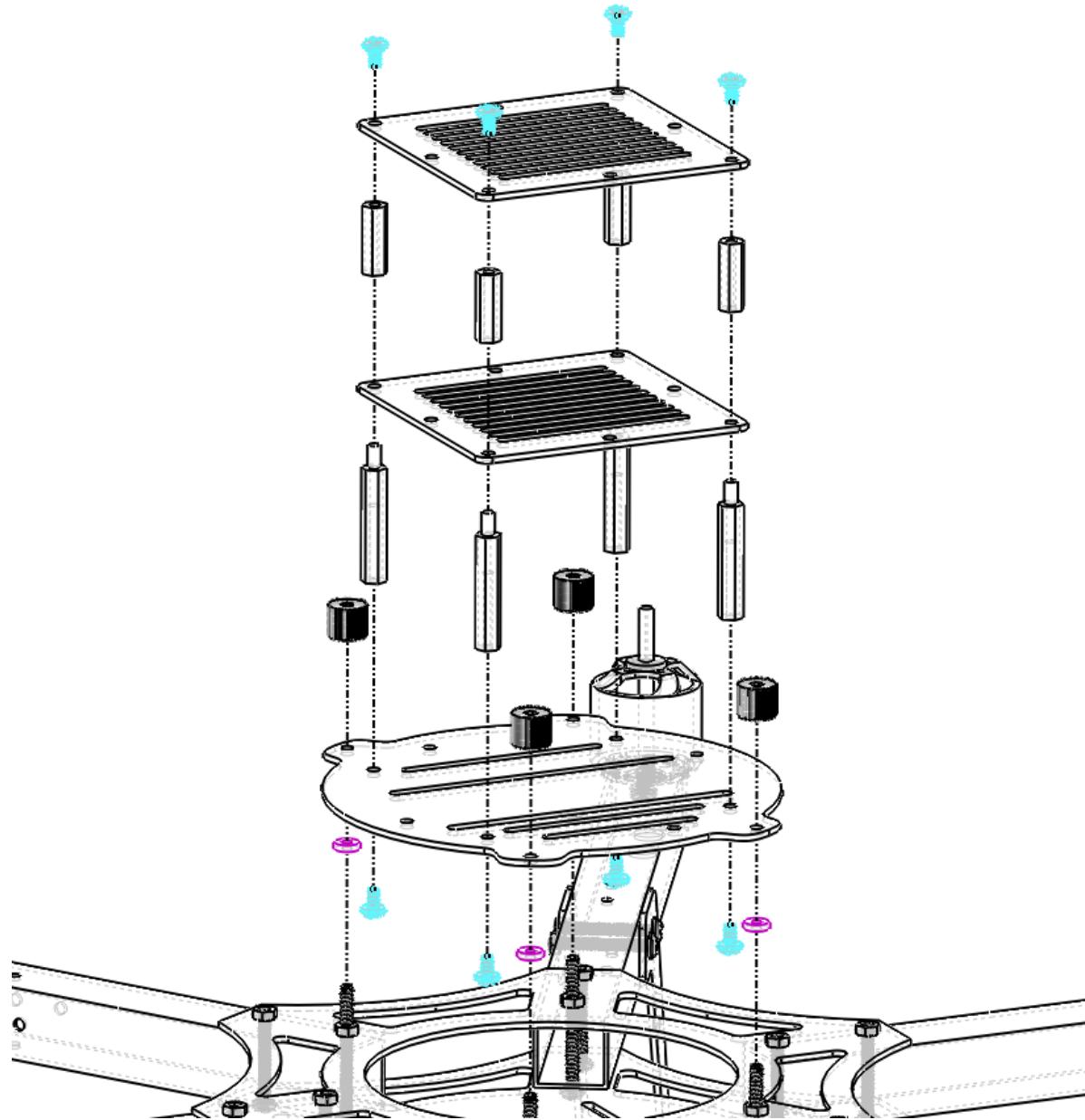
Note: The ESCs are currently left dangling and unattached to the frame. This is because later on we will start up the vehicle and verify the motors rotate in the correct direction. To reverse motor spin direction, swap any two of the three wires connecting the motor to the ESC. Once all the motors spin in the correct direction use the zip ties included to mount the ESCs to the vehicle's arms.

Mounting your APM



APM can be mounted using double sided tape (3M Scotch Exterior Mounting Tape is recommended) or it can be bolted to the carrier plate. The series of slots on the carrier plate allow your APM to be bolted in both + and X configurations. Note: In + mode the front of the APM should face arm 1. In X mode the front should be between arms 3 and 5.

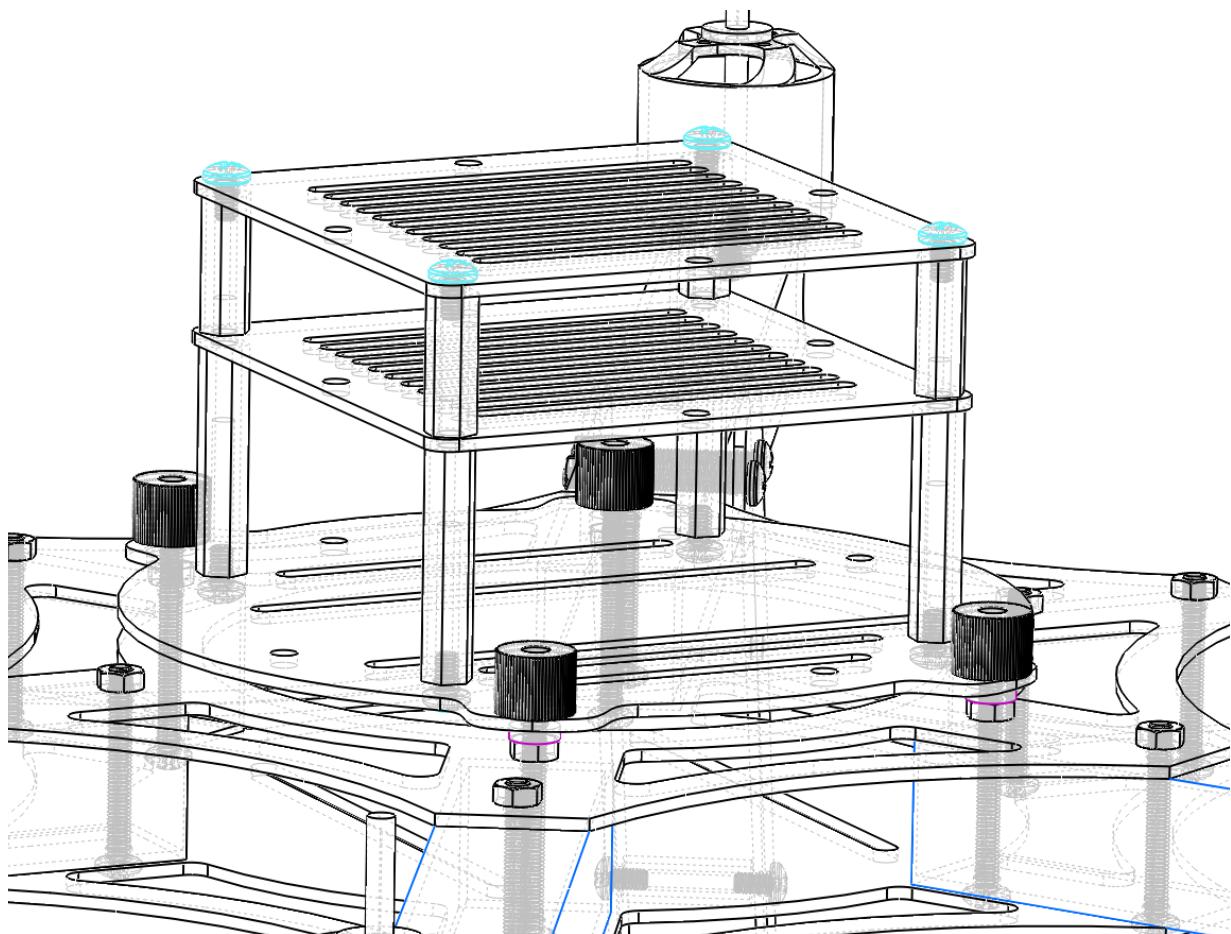
Assembling the stack-up



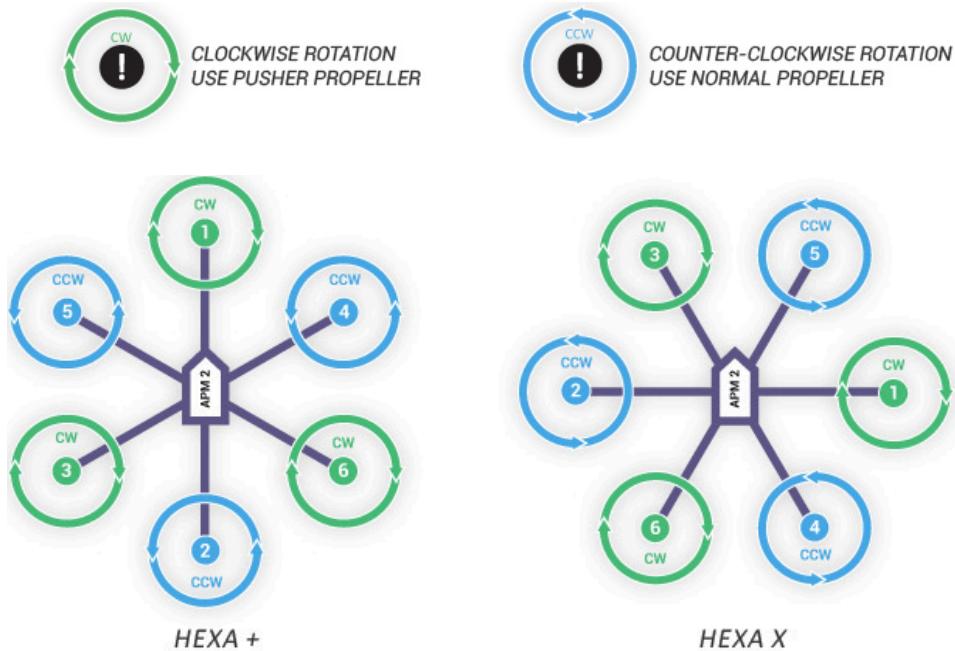
1. Starting from the top of the diagram above, use four plastic M3x5mm (Light Blue) screws to mount four M3x18mm spacers on one of the stack-up plates.
2. Mount the second stack-up plate to the bottom of the previous assembly using four M3x30mm spacers (longest).
3. Attach the stack-up assembly put together in steps 1 & 2 to the carrier plate where your APM is mounted using four plastic M3x5mm screws (Light Blue) from the

bottom. Note: The above diagram illustrates the X configuration. For + you will have to shift the stack-up assembly 60° to provide clearance for the APM.

4. Slide four rubber washers (Pink) onto the four screws sticking out of the Main Frame Assembly.
5. Place the stack-up assembly through the four M3x35mm screws. Make sure the motor signal cables from the PDB are out and have enough room to reach the APM outputs.
6. Secure the stack-up assembly using four M3 thumbnuts.

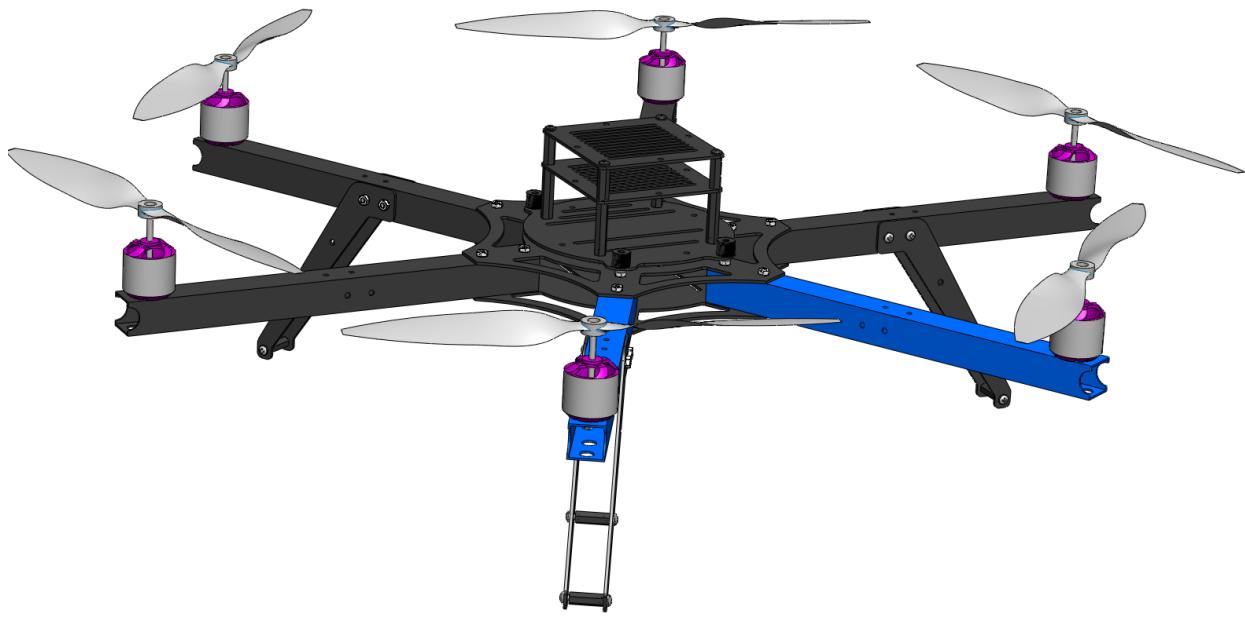


Attaching Propellers



To attach the propellers use the collets included. Cut the plastic ring included with the propellers that fits snug around the threaded collet and insert it into the slot in the back of the propeller. Place the collet on the motor shaft and tighten to keep the propeller in place. Make sure the writing on the propeller is facing up. Refer to the diagram above for correct prop rotation direction. *Note: It is recommended that you balance your propellers prior to installing.*





We hope you enjoy your 3DR ArduCopter Hexa. If you have any questions or concerns
please feel free to contact us via email at :

help@3drobotics.com

For additional information on how to set up your 3DR ArduCopter Hexa and more
information on the ArduCopter codebase please visit the ArduCopter wiki at:

<http://code.google.com/p/arducopter>

and

www.diydrones.com

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