Journal

Materials:

For this build you will need several things, a computer with internet access is a must. We ordered an all-inclusive kit from amazon similar to the one [here](https://www.amazon.ca/SunFounder-Quadcopter-Controller-Hobbywing-Propellers/dp/B01JGAS4HA/ref%3Dsr_1_1?s=toys&ie=UTF8&qid=1512409433&sr=1-1&keywords=drone+kit) although it should be noted that we paid significantly less that the one in the link and this could be done for under $200 if you are willing to shop around and order these parts individually.

Here is what comes in the kit:

* 1 x Upper Board
* 1 x Bottom Board
* 1 x Board for Fixing the Camera
* 1 x PR301 Li-ion Polymer Balance Charger
* 1 x HobbyWing 5V 3A UBEC
* 1 x BB Bong 1-8S Battery Indicator
* 1 x 12V 1.5A Power Adapter
* 4 x HobbyWing XRotor 15A Brushless ESC
* 1 x 3S 11.1V 1300mAH T-Plug Li-Po Battery
* 1 x CC3D Flight Controller
* 1 x Male T-Plug Adapter Cable (100mm)
* 1 x USB cable (black)
* 1 x Heat Shrink Tubing (black 100CM)
* 5 x Double-Sided Foam Tape(25mm\*40mm)
* 20x Nylon Zip Ties( white 150mm\*2mm)
* 4 x Skid Landing Damping Sponge Tube
* 12x Banana Plug Female Bullet Connector (2mm)
* 12x Banana Plug Male Bullet Connector (2mm)
* 16x Screw
* 1 x Allen Wrench (K2.0)
* 1 x Strap for Binding the Battery (black 2\*20cm)
* Velcro Tape(10\*2.5cm) x1(pair)
* Quadcopter Arm (red x2 & white x2)
* 6040 CW/CCW Propeller (greenx2 & yellowx2)
* EMAX CW/CCM Motor(black bullet x2 & white bullet x2)

In addition to these parts we also bought:

* FrSky i6 controller
* 2.4Ghz FPV camera
* FPV monitor

The software program that we are using is called OpenPilot and can be downloaded for free [here](http://opwiki.readthedocs.io/en/latest/user_manual/gcs_install_op.html).

Step 1:

Once everything comes in you can begin the assembly. Start by assembling the frame; the frame consists of 2 fibreglass plates and 4 arms that are sandwiched between them. First take an arm, orient it correctly and screw it to either of the plates, depending on the orientation that you’ve chosen. Repeat this 4 times and once you are done take the FPV camera mounting plate and set it in the grooves; then screw the top plate to the arms.

Next we will attach the motors; it doesn’t matter which order you put them in but for the purpose of this build the clockwise motors (Silver cap on Emax motors) will be the top left one if the quad is facing away from you and the bottom right. The CC ones (Black cap on Emax motors) will be the top right and bottom left when the quad is facing away from you. It’s important to pay close Attention to which motor is where because once we start the configuration process the board is calibrated based on motor position and will send power to the ESC’s (Electronic speed controller) which will deliver the power to the opposite wire and can short your motors or the ESC.

Step 2:

Now we will attach the ESC’s to the frame; we will do this using zip ties. First, place an ESC on the arm of your choice, inserting it into the slot and make sure the orientation is correct; it should look like this (insert photo). Attach it with the provided zip tie and repeat this for the remaining 3 arms. Once this is done we are now ready to connect them to the board. On the CC3D Revo (the board included in the above kit) they are located on the side of the board and numbered 1 through 8; we will only use the first 4 for now. Take the 3 pin connector cable from the ESC in the top left corner of the frame if the camera holder is facing away from you and plug it into the first 3 pin set. Note the colour of the wires (Red for positive, black for negative and white for control) and line them up with the markings on the board. (+, - or GND, etc…) Now we are ready to connect the board to the computer and begin calibrating and programming it.

Where we are as of December 6, 2017.