

FPV Racing Micro Quad Build Instructions



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CHAPTER 1| KEY INFORMATION

This section of the build instructions will highlight key parts of information that will be helpful to build your FPV racer.

SECTION 1.1| COMPONENT CHECK



4 Motors (2 CW/2 CCW)



1 Receiver Board



1 Transmitter



1 Onboard Lipo Battery



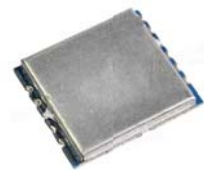
1 Onboard Lipo Charger



1 5" Monitor



1 5.8ghz FPV Receiver



1 5.8ghz FPV Video Transmitter



1 600TVL Micro Camera



1 Pack of Assorted Wires



1 Coaxial Cable



4 Propellers (2 CW/2 CCW)



1 11.1v Lipo Battery

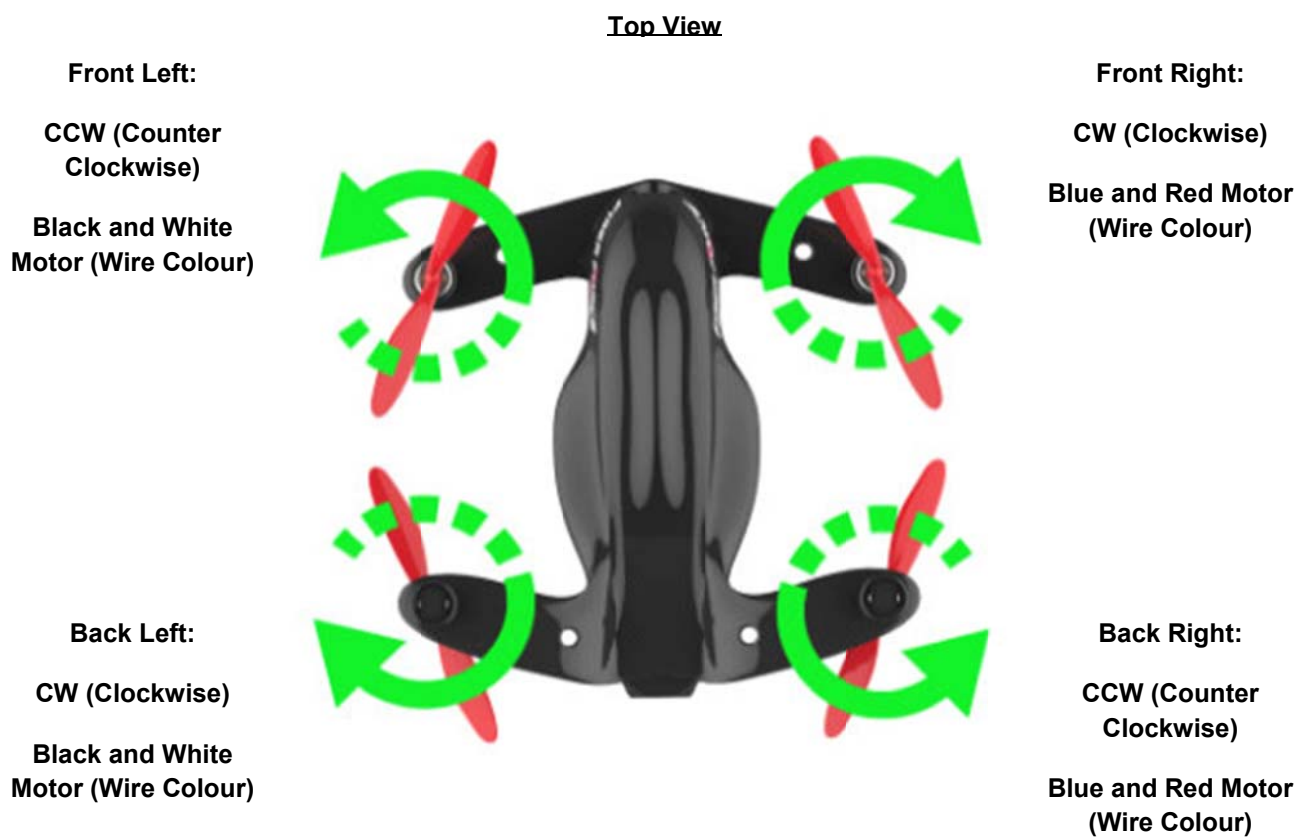


1 Large Lipo Charger

SECTION 1.2| FUNDAMENTALS

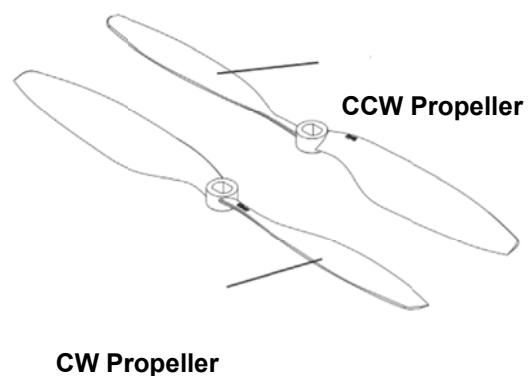
Motor Direction:

Having the motors spinning the correct way is crucial for the quad to function. See the image bellow for the correct rotation direction for each motor.



Propeller Orientation:

Like the motor direction propeller orientation is also vital for the quadcopter to function. On this model it is important to remember that the furthest away (from the model) raised edge of the propeller should be facing outside away from the quad.



SECTION 1.3| TRANSMITTER SETTINGS

Introduction

It should be remembered that before flying your micro quad you should place it on a flat level surface. You must turn on your transmitter first before connecting your battery to the quadcopter. The Led's on the quadcopter will begin to flash before they turn solid to indicate that it has successfully bound to the transmitter. If the transmitter and quadcopter do not bind then turn off the transmitter and quadcopter and repeat the process.

Understanding the Controls

This model uses a Mode 2 format controller that means the Elevator or 'Throttle' is on the left side.

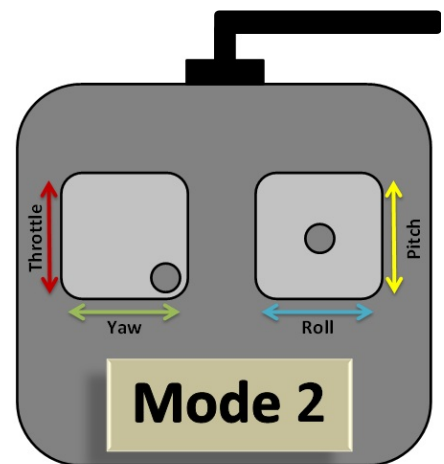
Control Explanation:

Throttle/Elevator – This will make the quadcopter rise/gain altitude.

Pitch – This will tilt your quadcopter forwards or backwards making it move forwards or backwards.

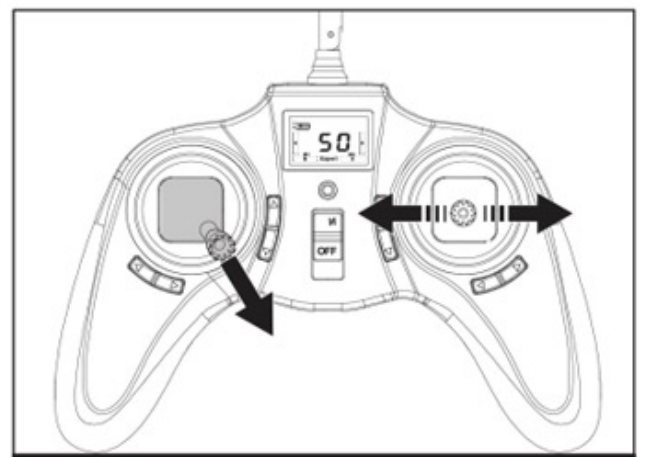
Yaw – This will make your quadcopter turn left or right on the spot.

Roll – This will tilt your quadcopter left or right making it move left or right.



Calibrate Quadcopter

It is important to calibrate the sensors on the quadcopter to ensure a smooth flight. This can easily be done from the transmitter once bound to the quadcopter. Simply move the elevator stick on the transmitter to the bottom right and move the right stick side to side and continue to do so until you see the Led's "blink" on the quadcopter to show a successful calibration.



CHAPTER 2| ASSEMBLY

The section will cover the steps to construct your own FPV Micro Racing Quadcopter.

SECTION 2.1| TOOLS REQUIRED

To construct your Micro quad you will need access to the following tools:



Soldering Iron and Solder



Wire Cutters/Strippers



Caliper Gauge



Crocodile Clip Stand (Optional)

SECTION 2.2| EXTEND MOTOR WIRES

Firstly you will need to extend the motor wires on all 4 motors.

You will need:

Hardware:

- All 4 Motors
- Assorted Wire
- Heat Shrink

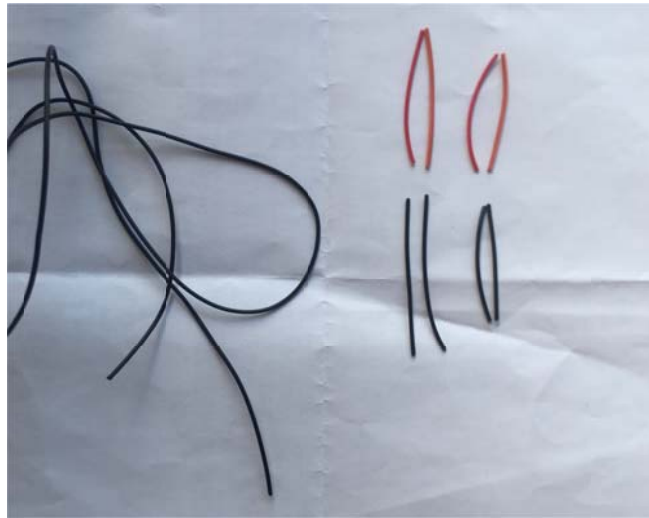
Tools:

- Soldering Iron
- Wire Cutters
- Crocodile Clip Stand (Optional)

Step 1: Cutting the wire

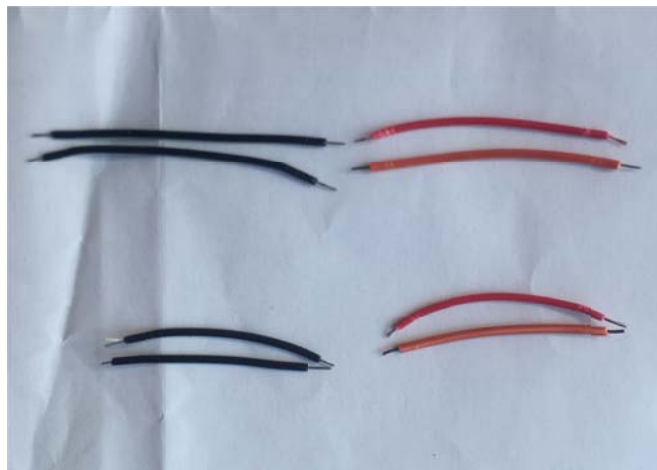
Cut 4 lengths of black wire – 2 lengths at approximately 30mm and 2 lengths at approximately 45mm.

Cut 4 lengths of red wire – 2 lengths at approximately 30mm and 2 lengths at approximately 45mm.



Step 2: Strip the ends

After you have cut all of the wires you will need to strip both ends of the wire cut in the previous step – Strip approximately 6mm of the outer sheath.



Step 3: Connect the wires

Once all of the wires have been stripped you will now need to attach them to the relevant motor wires.

Motor wire polarity

CCW Motor (Front left and Rear left):

Black = Negative

White = Positive

CW Motor (Front right and Rear right):

Blue = Negative

Red = Positive

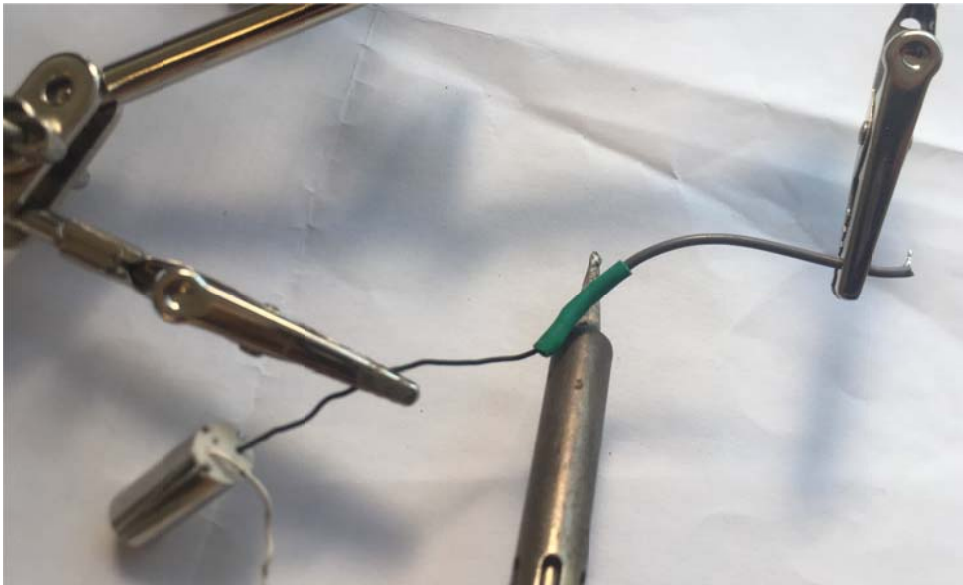
The smaller wire's (30mm) cut should be used to extend the front motor wires while the longer wires (45mm) should be used to extend the rear motor wires.

It is advised to attach the black wires to negative connections and red wires to positive connections to make it easier to understand.



Step 4: Protect the connections

Once all of the motors have been extended you should cover all of the joins with Heat Shrink to protect the connections and to stop them shorting together. Simply slide a small piece of heat shrink over the join and rub gently with the soldering iron to shrink it - a heat gun can also be used.



SECTION 2.3| INSTALL MOTORS

Now that the motor wires have been extended they can be installed into the 3D Printed chassis.

You will need:

Hardware:

- All 4 extended Motors
- 3D Printed Quadcopter Chassis

Step 1: Push the motors in

Push the motors into the motor stations on the quadcopter chassis – Be careful not to damage the chassis when pushing the motors in, as they require a friction fit.

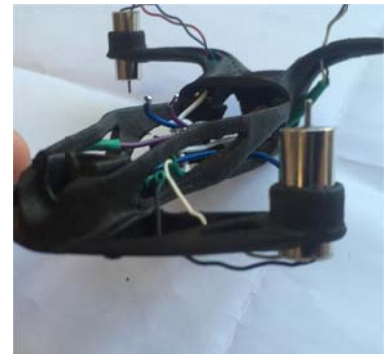
Remember to install the correct motor in the correct place see the “Motor Direction” section on page 3 of this instruction manual for help.

Also remember this quadcopter has the rear two propellers inverted/upside down.



Step 2: Guide the Wires

After fitting the motors you should guide the motor wires into the chassis through the guide holes and chassis openings – See bellow:



SECTION 2.4| FPV ASSEMBLY

This section of the build will be split into two parts for two different circuits:

- Onboard (FPV circuit on the quadcopter)
- Off-Board (FPV circuit not on the quadcopter)

Onboard

You will need:

Hardware:

- Camera
- Video Transmitter
- Assorted Wire
- Coaxial Cable
- 3-Way Dipole Switch

Tools:

- Soldering Iron
- Wire Cutters
- Crocodile Clip Stand (Optional)
- Caliper Gauge

Step 1: Cut camera wires

First you will need to cut off the white connector block on the end of the camera wires. You will then need to cut the camera wires down to approximately 8cm. Then you will need to strip approximately 4mm of the outer sheath. You can remove the white wire completely.



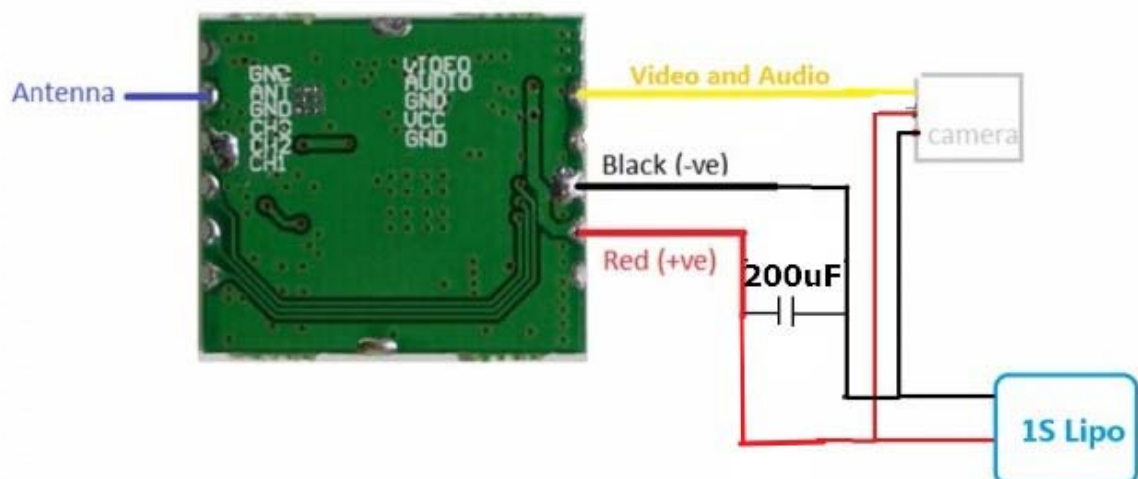
Step 2: Insert Camera to Chassis

Once the wires have been cut to size and stripped then you can insert the camera into the chassis being sure to run the wires through the guide loop in the camera housing and into the channel in the centre of the chassis.



Step 3: Connect camera to the Video Transmitter

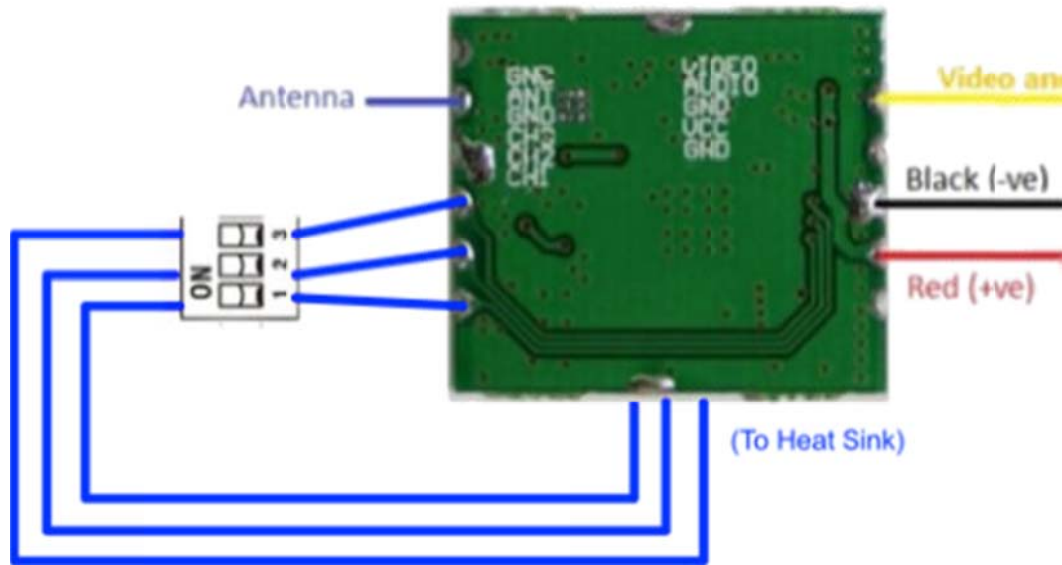
Next you will solder the camera wires to the video transmitter as per the wiring diagram below:



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Step 4: Connect the 3-way dipole switch to the video transmitter

Next you will connect the 3-way dipole switch to the transmitter. To do this you will need to trim 6 lengths of wire about 30mm. Follow the wiring diagram below:



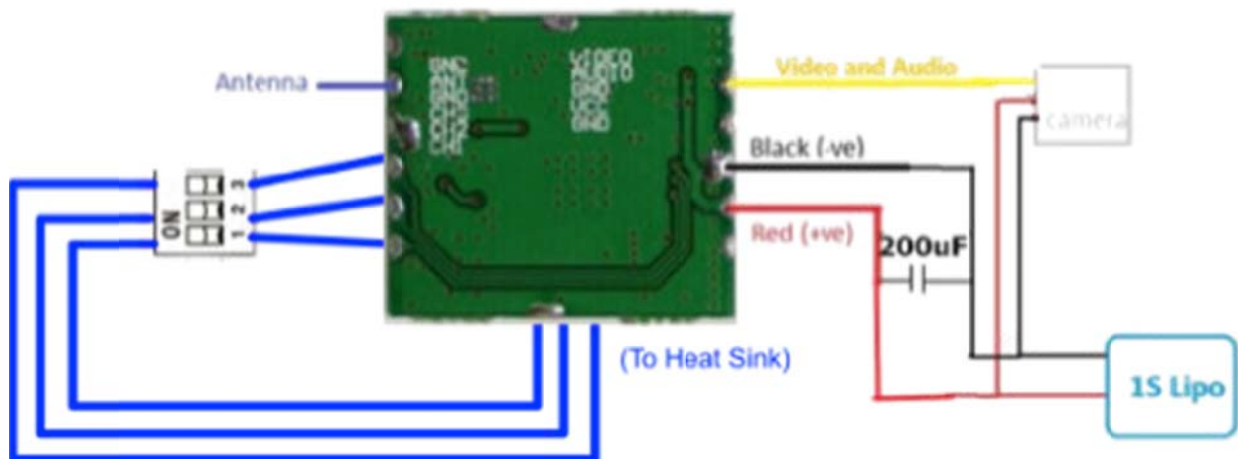
Step 5: Make the transmitter Antenna

To make the transmitter Antenna you will need a caliper gauge, coaxial cable and wire strippers. Cut approximately 8cm of coaxial cable from the length provided. Then carefully remove approximately 15mm of the outer sheath being sure not to damage the cable inside. Set your caliper gauge to 12.92mm. Place the caliper gauge next to the bare wire with it touching against the sheath and trim the excess bare wire – You should be left with 12.92mm of bare wire.



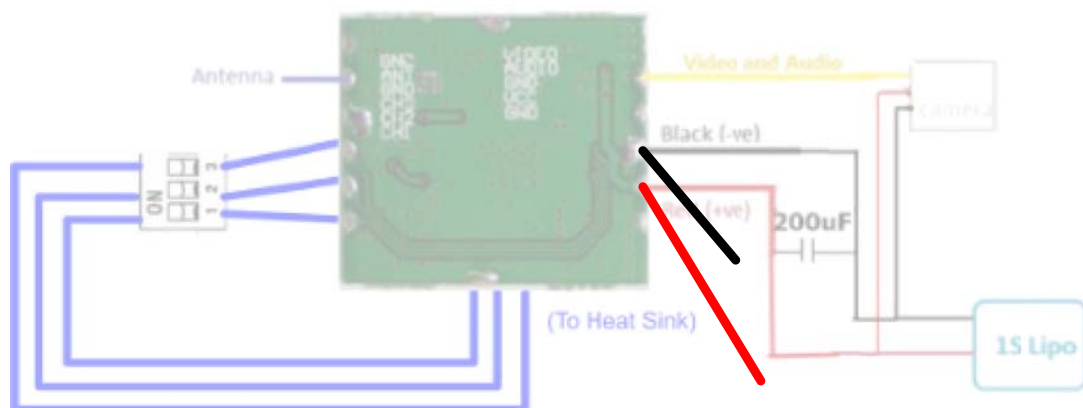
Step 6: Attach the Antenna to the transmitter

Before attaching the Antenna to the transmitter you will need to remove approximately 4mm of the outer sheath at the opposite end of the bare wire. Then you will need to solder the Antenna to the 'Antenna' connector on the transmitter – See the wiring diagram bellow for help:



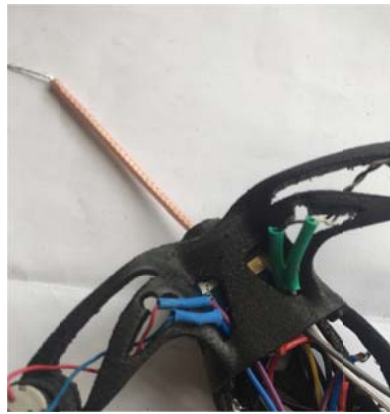
Step 7: Add power wires to FPV circuit

The FPV circuit will be powered in parallel to the receiver board. To achieve this you will need to cut two lengths of wire approximately 30mm long (Its best to use Red and Black to make it easier to recognise the polarity) You will then need to strip approximately 4mm off each end of the wire and solder both wires to the positive and negative connections on the video transmitter where the camera connects too. See the wiring diagram bellow for assistance:



Step 8: Install onboard FPV system to chassis

Now that the onboard FPV system is complete you can install it into the chassis. Be careful not to damage any connections – especially the Antenna. Start by threading the Antenna through the hole in the rear of the chassis.



Step 9: Protect the Antenna

To protect the Antenna you should fold over the bare wire to the sheath and then use some heat shrink to hold it in place. This will help prevent the wire breaking off – it's the 12.92mm bare wire that does the transmitting so its best to keep it protected.



Off-Board

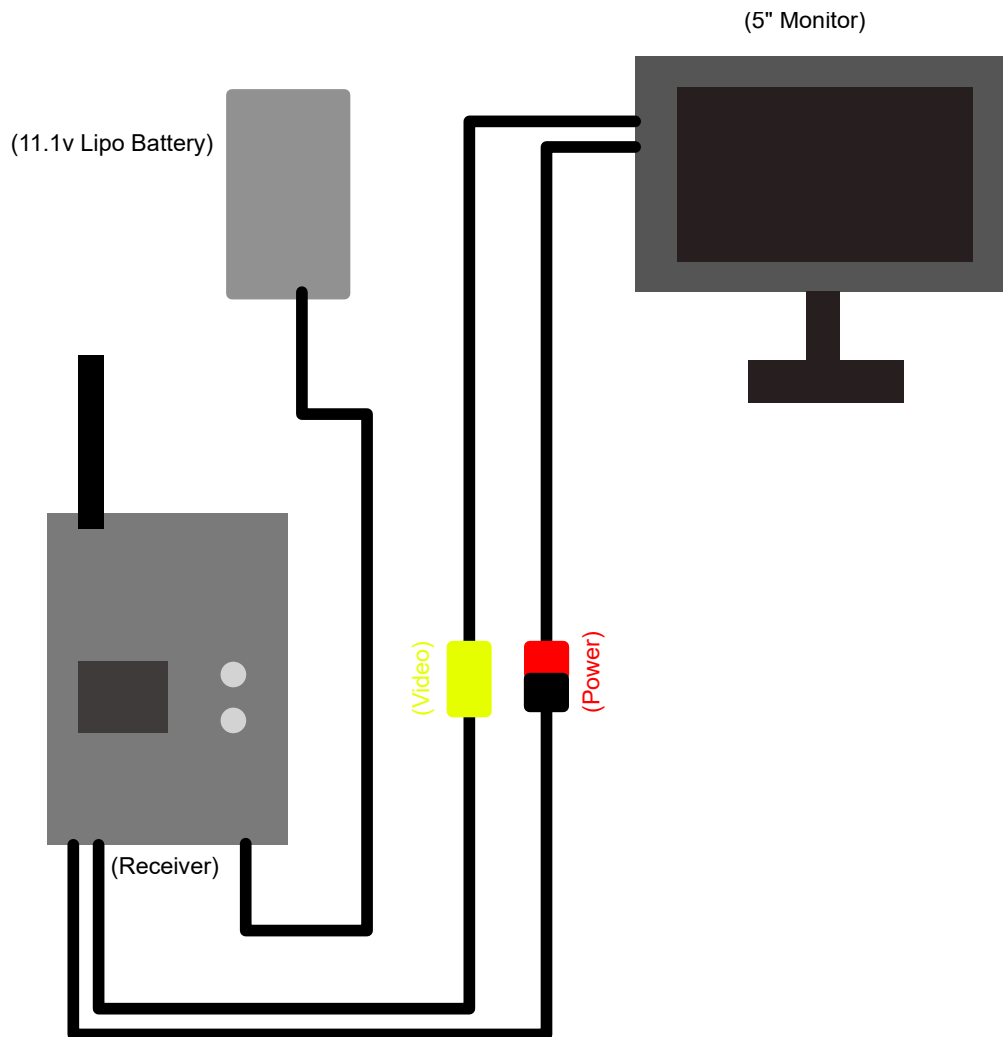
You will need:

Hardware:

- 5" Monitor
- 5.8ghz FPV Receiver

Step 1: Connect the Off-Board FPV circuit

Simply connect the components together following the diagram bellow:



SECTION 2.5| INSTALL RECEIVER

The final stage of the build is to install the receiver board to the quadcopter.

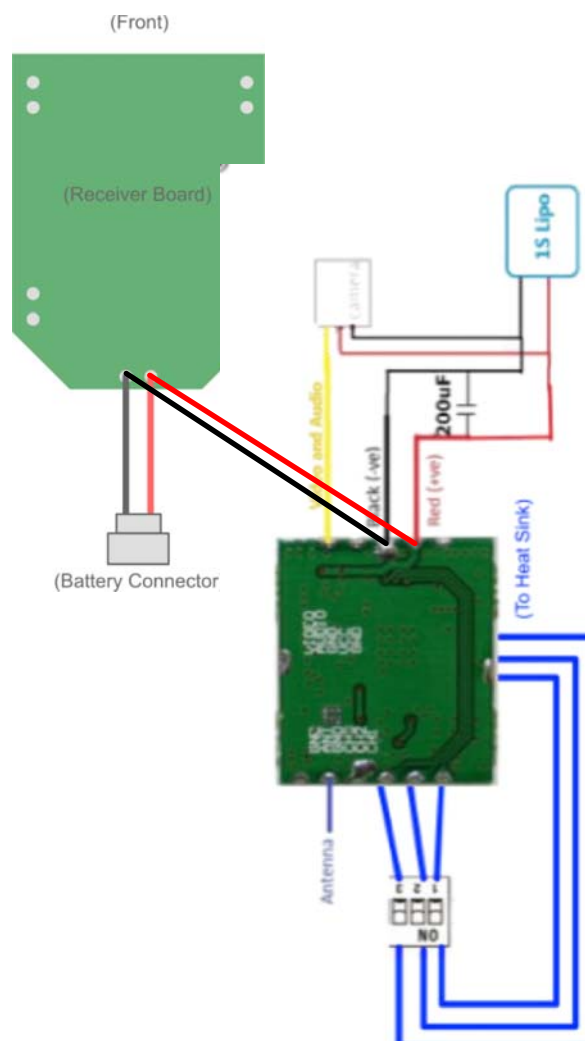
You will need:

Tools:

- Soldering Iron
- Crocodile Clip Stand (Optional)

Step 1: Connect FPV Power Wires

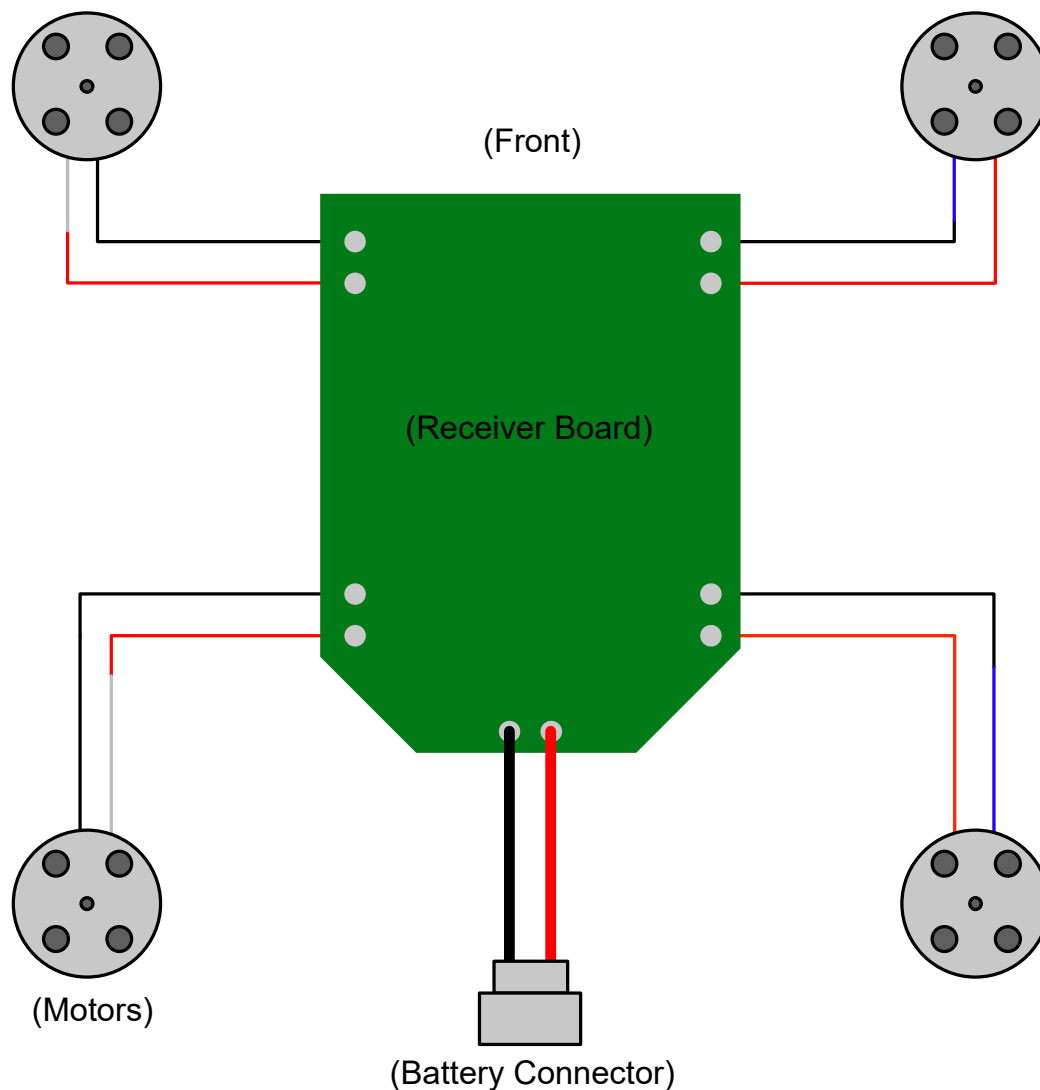
To install the receiver the first step is to solder on the FPV power wires to the battery connector connections on the back of the receiver board.



Step 2: Connect Motor Wires

Once the power wires have been connected you will need to connect the motors. Start by soldering the back motors first. Be sure to solder on the connections the correct way (Positive wire to Positive connection/Negative Wire to Negative connection) or the motor will spin the opposite way.

Motor Wiring Top View



Step 3: Secure the Receiver board

To secure the receiver board simply presses it into place between the two clips on the 3D Printed chassis – The two clips should clip into place roughly half way either side on the receiver board.



SECTION 2.6| INSTALL THE PROPS

Step 1: Fit Front props

Ensuring to fit the correct to the correct front motor simply press the two front props onto the motor shafts.

Remember that the raised edge should be the leading edge in the way that the motor rotates. See pictures bellow for guidance.



Step 2: Prepare Rear Props

As the rear motors are inverted and the props fitment hole does not pass all the way through the material you will have to trim off a small amount to expose the whole to allow you to fit the propeller. See pictures below for guidance.



Step 3: Fit rear Props

Now that there is a hole all the way through the prop you can fit the rear props the same way you did the front ensuring to get them the correct way around.



CHAPTER 3| PRE-FLIGHT CHECKS

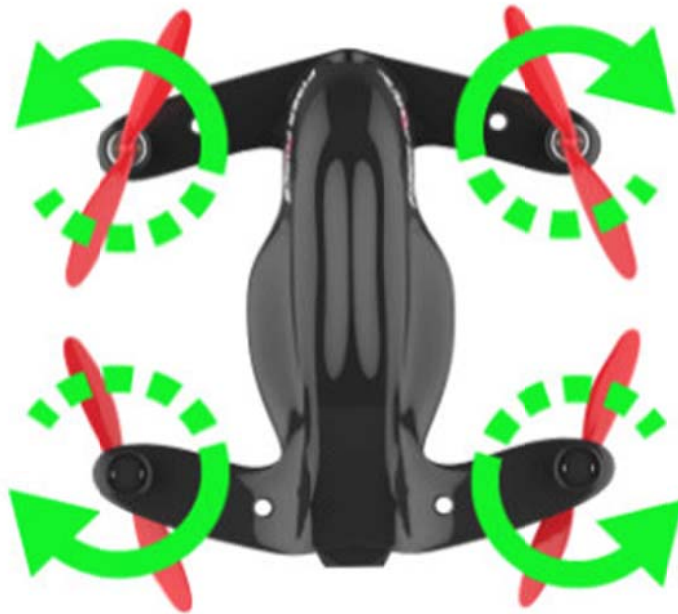
Before committing to your first flight take a quick read of this pre-flight checks section.

SECTION 3.1| MOTOR DIRECTION

Your quadcopter will not take off or be easily controllable if your motors are spinning the in correct way.

To test that they are spinning the correct way, turn on your transmitter and plug in your battery. Then gently apply the Elevator/Throttle so the motors spin and check which way they are spinning – It may be easier to “blip” the throttle so the propellers spin slower as they are stopping.

The propellers should be spinning in the following directions:



If any of the motors are not spinning in the correct direction then simply reverse the polarity of the motor wiring to (Positive to Negative/Negative to Positive).

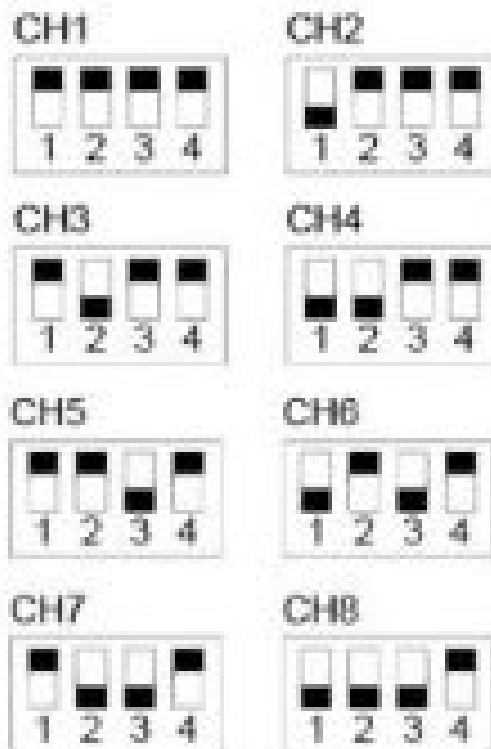
SECTION 3.2| FPV SYSTEM

To check if the FPV system is working then you need to plug in the battery to the quadcopter and the battery to the FPV receiver. Ensure that the quadcopter and receiver are both on the same channel.

The receiver channel is displayed on the screen on the front.

The quadcopter channel is determined by the position of the 3-way switch. See the table bellow to see the switch configurations for each channel.

Frequency Selection

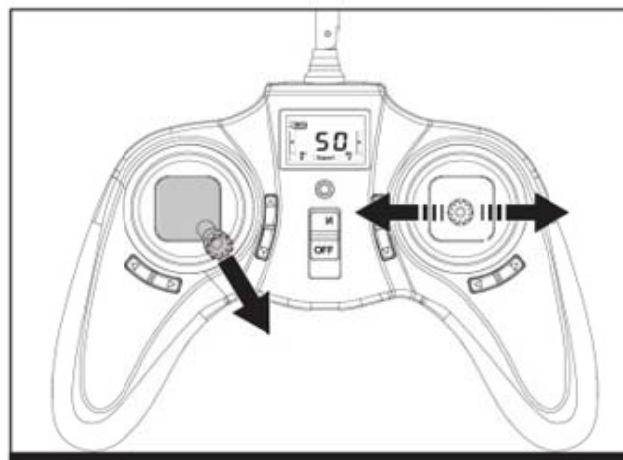


The FPV system will work if the receiver and the quadcopter are on the same channel. To see if the system is working the 5" monitor will display an image from the camera. If the system is not working check all connections with the wiring diagrams.

SECTION 3.3| CALIBRATION

Quadcopter Calibration

It is important to calibrate the sensors on the quadcopter to ensure a smooth flight. This can easily be done from the transmitter once bound to the quadcopter. Simply move the elevator stick on the transmitter to the bottom right and move the right stick side to side and continue to do so until you see the Led's "blink" on the quadcopter to show a successful calibration.



SECTION 3.4| EXPERT MODE

The quadcopter has an 'expert' mode which makes the aircraft much more responsive to stick movements. It is advised that users get to grips with the standard mode before making the transition to expert mode.

To swap between expert mode and standard mode simply click the right stick in. You will then see "Expert" displayed on the controller LCD screen.

