FPV DRONE BUILD

INTRO TO PARTS AND TOOLS REQUIRED TO BUILD AN FPV DRONE



AGENDA

Basic Equipment Tiny Whoop vs. 5" Racer **Equipment Selection Required Tools** How to Build Programming

FPV DRONE EQUIPMENT

Frame

- Motors
- Electronic Speed Control (ESC)
- Flight Controller Betaflight, RaceFlight, or KISS
- FPV Camera
- Video Transmitter (VTX) 5.8ghz
- Control Transmitter (TX) and Receiver (RX) 2.4ghz
- Battery
- FPV Monitor or Goggles

Tiny Whoop

6x15mm Brushed Motors 31mm Props 205-250mah 1s Battery 25mw AlO Camera Perfect for Indoor (slight to no wind) Great for Learning Quadcopter Controls

5" Racer

22xx or 23xx Brushless Motors 20-40A ESCs 1300-1500mah 4s Battery Separate Camera and Video Transmitter Outdoor or Large Facility Required Easily reach speeds of 70+mph





TINY WHOOP PARTS

- Flight controller, receiver, and ESC combo board
- Frame either plastic, aluminum, or carbon fiber
- 615 Coreless Brushed Motors -17,500kv rated
- 205-250mah 1s Battery
- AIO Camera/VTX Combo







TINY WHOOP.com

Optimized for Performance

Total \$99 - charger not included

BNF from Horizon Hobby Total \$99 – charger included

5" RACER PARTS

- Frame Carbon Fiber
- Brushless Motors 2205, 2206, or
 2306 with 2300-2600kv rating
- ESC minimum 20A rating, depends on motor and prop selection
- Flight Controller minimum F3, F4 is preferred with built-in PDB.
- Camera CCD 600tvl
- VTX adjustable 25-200mw 5.8ghz
- RC Receiver







RunCam Micro Swift 2 600TVL 2.1mm/2.3mm FOV 160/145 Degree 1/3" CCD FPV Camera with Built-in OSD (1179743)

US\$34.99

US\$2.55

US\$76.49

US\$10.55

US\$16.99

US\$-6.44

US\$26.10

US\$21.99

US\$21.99

US\$25.99

US\$-4.00

Size: 2.1mm Mode: NTSC

× Remove • Add to Wishlist



5V 12V Adjustable Voltage Dual BEC Output Board Only 1g (1031884)



Racerst RS30A Blade F

Racerstar 2205 BR2205 2600KV 2-4S Motor + RS30A V2 30A Blheli_S ESC Dshot600 + 5042 3 Blade Prop (1118868)

Eachine VTX03 Super Mini 5.8G 72CH 0/25mW/50mw/200mW Switchable FPV Transmitter (1114206)

× Remove VAdd to Wishlist



Martian II 220 220mm 4mm Arm Thickness Carbon Fiber Frame Kit w/ PDB For FPV Racing (1064065) × Remove ♥ Add to Wishlist <u>F3 Flight Controller Acro 6 DOF/Deluxe 10 DOF for</u> <u>Multirotor Racing (1010232)</u>



Infinity 4S 14.8V 1300mAh 70C Graphene LiPo Battery XT60 SY60 Support 15C Boosting Charge (1062565)

BANGGOOD 5" RACER

Cheaper Free shipping from China Slow Customer Support Banggood.com

Total \$179.93



TOOLS AND BUILDING SUPPLIES

- Soldering iron and solder.
- Hex drivers 1.5, 2, 2.5, and 3mm
- Small Screwdriver
- Wire cutters
- Multimeter
- Heat shrink tubing
- Electrical Tape
- Zip Ties
- Smoke Stopper



CHECK PARTS BEFORE BUILDING

- Verify flight controller works by connecting it to Betaflight and installing the latest firmware.
- Check continuity of motor leads to verify there are no open circuits.
- Bind the RC receiver to the transmitter before connecting it to the flight controller.
- Verify motors spin by hand without too much effort or binding up.
- Verify edges of the carbon fiber frame where the battery strap touches is not sharp, sand or file as necessary.

HOW TO WIRE UP THE FLIGHT CONTROLLER



MOCK UP TO VERIFY COMPONENT LOCATION AND WIRE LENGTHS

- Build frame with motors and flight controller mounted.
- Lay ESCs on the arms and trim ESC wires to the FC to the correct length.
- Place camera, vtx, and rx on frame and trim wires to correct length. Plan on running the wires to the bottom of the FC. This keeps the wires tucked in and makes for a clean build.
- Trim battery cable lead to proper length and solder to the FC.
 - Verify no electrical shorts at the battery lead solder joint.
 - Plug battery into the battery lead using the Smoke Stopper. The light will not turn on unless there is a short.

BEGIN CONNECTING COMPONENTS TO THE FLIGHT CONTROLLER

- Remove FC from the frame to begin soldering the following:
 - Buzzer
 - > VTX and Camera use common ground for best video
 - RC Receiver
 - LEDs (optional)
- Pre-tin the wires, insert them from the bottom of the FC through the correct hole and solder into place.

CONNECT ESCS TO FLIGHT CONTROLLER

- Install flight controller into frame.
- Pre-tin the solder pads for all the ESC wires.
- Pre-tin the ESC wires.
- Solder the ESC wires to the correct pads.
 - Power wires are thicker and connect to the bigger pads.
 - Signal wires are smaller and connect to the small pads.

CONNECT MOTORS TO ESCS

- Ensure ESCs are electrically isolated from the carbon fiber frame. Use either heat shrink tubing over the arm or a piece of foam tape on the arm, if needed.
- Pre-tin the ESC motor pads.
- Cut motor wires to proper length and pre-tin wires.
- Solder motor wires to ESC motor pads.
- Secure ESCs to arms using electrical tape or heat shrink tubing.





2017-09-18 @ 17:53:14 -- Serial port successfully closed

ev/tty.Bluetooth-Incoming-Port	\$
5200	¢

Auto-Connect

(†) *°

Connect



Disclaimer

The application supports ESCs running BLHeli for Atmel, BLHeli for SiLabs and BLHeli_S. **BLHeli FC passthrough** is the only interface currently Contributing

If you would like to help make BLHeli Configurator even better you can help in many ways, including:

Open Source / Donation Notice

This utility is fully **open source**

QUESTIONS?