INTRO TO PARTS AND TOOLS REQUIRED TO BUILD AN FPV DRONE

FPV DRONE BUILD
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 AIO 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

DIY Kit from TinyWhoop.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
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Price</th>
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<tbody>
<tr>
<td>Mach 1 Stretch X Frame by RDQ 5” MultiGP Spec Class Racer - Normal (14mm Wide) / Micro Camera</td>
<td>1</td>
<td>$49.99</td>
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<td>Runcam Micro Swift 2 Camera 2.1mm or 2.3mm Lens</td>
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<td>CNHL 1300mAh 100C 4S G+ Plus Battery</td>
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<td>DYS AIO F4 Flight Controller V2 FC</td>
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<td>Spedix 20a ESC 8.99 x 4 600 BLHeli S</td>
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<td>RaceDayQuads 2205 2450kv BadAss Racing Motor by BrotherHobby</td>
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<td>Eachine ATX 03 Video Transmitter 25/50/200mw (VTX03 with Audio)</td>
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Discount (Build night)                                                                                                   -$24.65

Subtotal                                                                                                                   $221.93

**TOTAL**                                                                                                                  $221.93

Based in Orlando
Fast and Free Shipping
Great Customer Support

RaceDayQuads.com
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
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.
Welcome to Betaflight - Configurator, a utility designed to simplify updating, configuring and tuning of your flight controller.

**Hardware**
The application supports all hardware that can run Betaflight. Check flash tab for full list of hardware.

**Contributing**
If you would like to help make Betaflight even better you can help in many ways, including:

- Answering other users questions on the forums and IRC.

Welcome to BLHeli - Configurator, a utility designed to simplify updating and configuring of your ESCs.

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

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