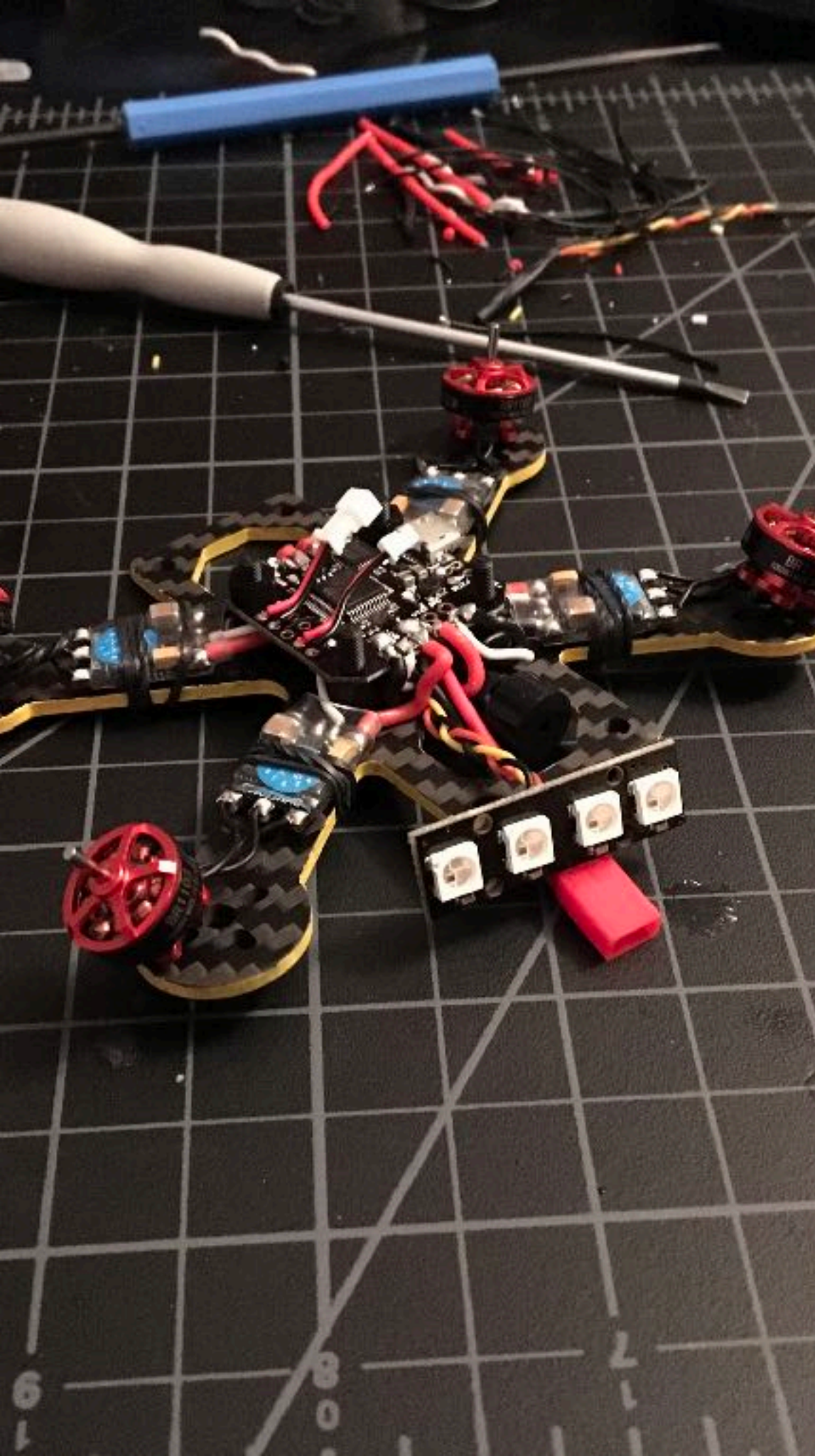INTRO TO PARTS AND TOOLS REQUIRED
TO BUILD AN FPV DRONE

FPV DRONE BUILD

AGENDA

Tiny Whoop vs. 5" Racer

Basic Equipment

Required Tools

How to Build

Equipment Selection

Programming

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

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 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
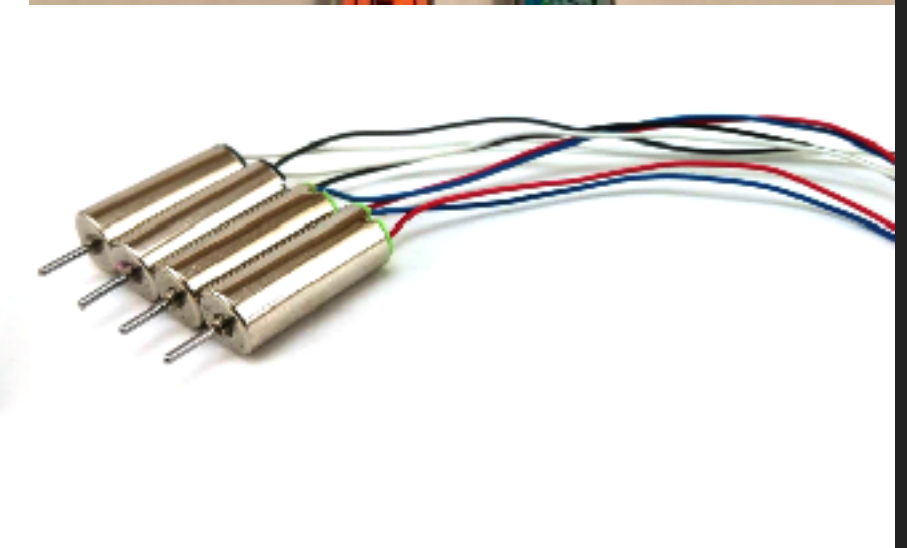
5" RACER PARTS

▸ 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
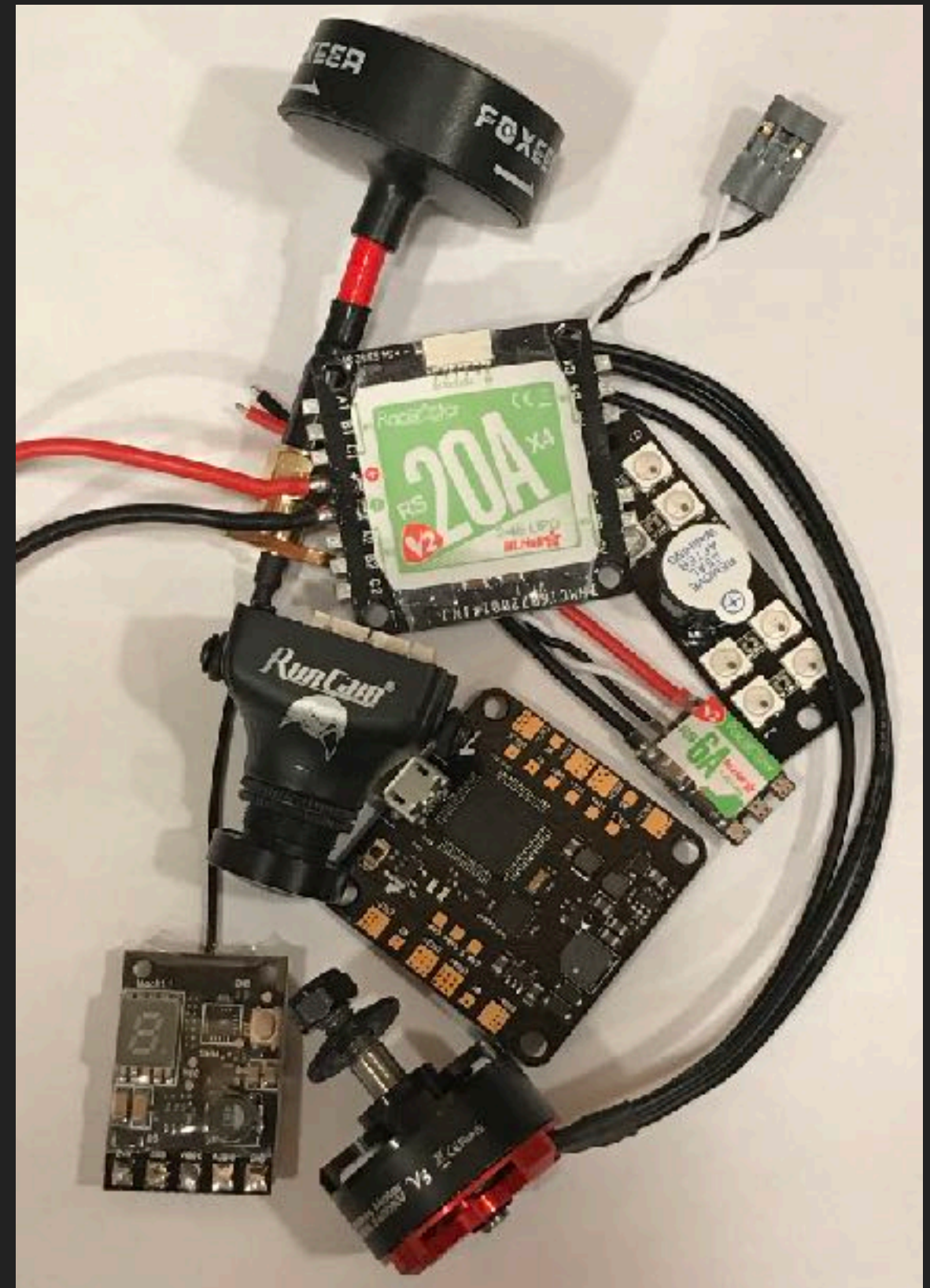
TOOLS AND BUILDING SUPPLIES

▸ 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.
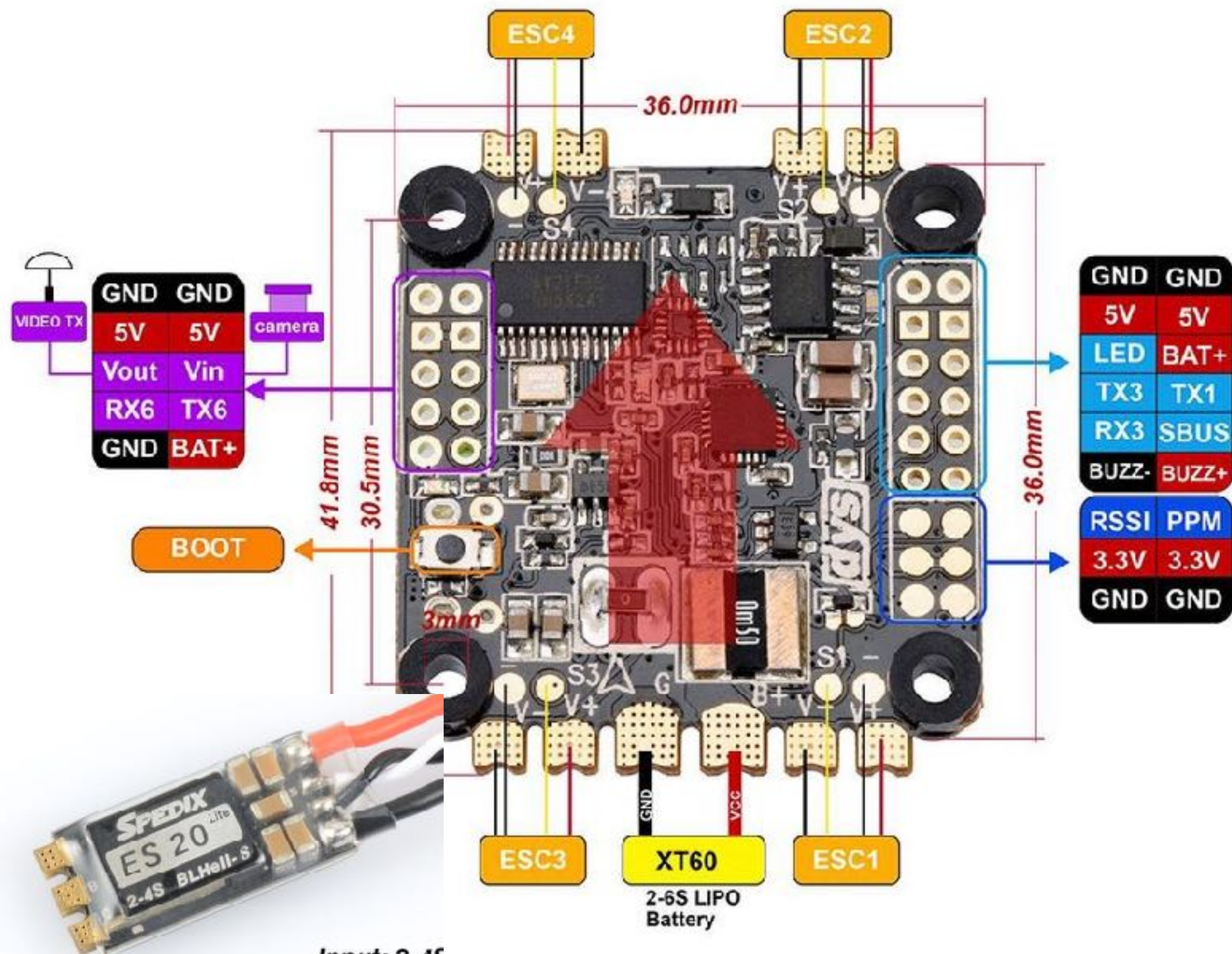
MOCK UP TO VERIFY COMPONENT LOCATION AND WIRE LENGTHS

▸ 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.

TINY WHOOP

DIY Kit from TinyWhoop.com

Optimized for Performance

Total $99 – charger not included

BNF from Horizon Hobby

Total $99 – charger included

Mach 1 Stretch X Frame by RDQ 5" MultiGP Spec Class Racer - Normal (14mm Wide) / Micro Cameras	49.99 × 1 ~~50.00~~	$49.99
Runcam Micro Swift 2 Camera 2.1mm or 2.3mm Lens 2.1mm	× 1	$34.99
CNHL 1300mAh 100C 4S G+ Plus Battery	× 1	$18.49
DYS AIO F4 Flight Controller V2 FC	× 1	$38.20
Spedix 20a ESC Lite DShot 600 BLHeli_S	8.99 × 4	$35.96
RaceDayQuads 2205 2450kv BadAss Racing Motor by BrotherHobby	13.49 × 4	$53.96
Eachine ATX 03 Video Transmitter 25/50/200mw (VTX03 with Audio)	× 1	$14.99
Discount (Build night)		-$24.65
Subtotal		$221.93
TOTAL		**$221.93**

RACEDAYQUADS
5" RACER

Based in Orlando
Fast and Free Shipping
Great Customer Support
RaceDayQuads.com

Total $221.93

RunCam Micro Swift 2 600TVL 2.1mm/2.3mm FOV 160/145 Degree 1/3" CCD FPV Camera with Built-in OSD (1179743)
Size: 2.1mm
Mode: NTSC
× Remove   ♥ Add to Wishlist
US$34.99

5V 12V Adjustable Voltage Dual BEC Output Board Only 1g (1031884)
× Remove   ♥ Add to Wishlist
US$2.55

Racerstar 2205 BR2205 2600KV 2-4S Motor + RS30A V2 30A Blheli_S ESC Dshot600 + 5042 3 Blade Prop (1118868)
US$76.49

Eachine VTX03 Super Mini 5.8G 72CH 0/25mW/50mw/200mW Switchable FPV Transmitter (1114206)
× Remove   ♥ Add to Wishlist
US$10.55
US$16.99
US$-6.44

Martian II 220 220mm 4mm Arm Thickness Carbon Fiber Frame Kit w/ PDB For FPV Racing (1064065)
× Remove   ♥ Add to Wishlist
US$26.10

F3 Flight Controller Acro 6 DOF/Deluxe 10 DOF for Multirotor Racing (1010232)
Model: Acro
US$21.99

Infinity 4S 14.8V 1300mAh 70C Graphene LiPo Battery XT60 SY60 Support 15C Boosting Charge (1062565)
US$21.99
US$25.99
US$-4.00

BANGGOOD 5" RACER

Cheaper
Free shipping from China
Slow Customer Support
Banggood.com

Total $179.93

BETAFLIGHT
CONFIGURATOR 3.1.1

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

Show Log

Welcome

Documentation & Support

Firmware Flasher

Changelog

BETAFLIGHT

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.

Download Betaflight Blackbox

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.

Open Source / Donation Notice

This utility is fully **open source** and is available free of charge to all **Betaflight** users.

BLHELI
CONFIGURATOR

2017-09-08 @ 12:03:01 -- Reading setup finished

Show Log

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

Changelog

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** and is available free of charge to

QUESTIONS?