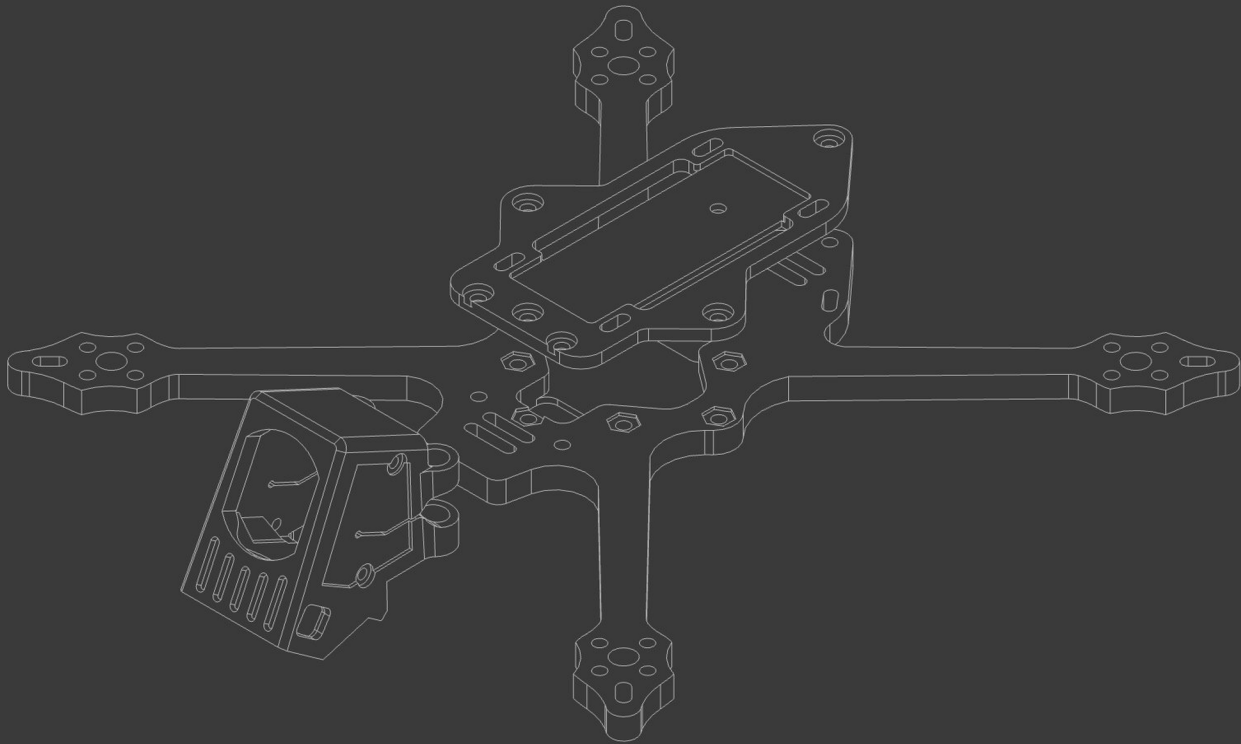


WRAITH

PORTO FPV

Assembly Guide & Product Description



3" TRUE X / SQUASHED X · 4mm / 2.5mm CARBON FIBER · 2S-4S · DIGITAL / ANALOG

ASSEMBLY GUIDE

What Is It?

The Wraith is a unibody 3" frame — one piece of carbon, no joints, no slop. Stiffer than a multi-plate build, lighter too, and there's nothing to come loose mid-flight. Get it in the air and it flies like a toothpick: snappy, immediate, with that low-inertia feel that makes tight gaps feel easy. Small enough to rip urban environments, capable enough to run digital without compromise.

SPECS

SPEC	DETAIL
Wheelbase	137mm motor-to-motor diagonal
Configuration	True X / Squashed X
Bottom Plate	4mm carbon fiber — Standard or Donut
Top Plate	2.5mm carbon fiber — Diamond or Standard
FC Mount	20×20mm
VTX Mount	25×25mm (fits DJI O4 Air Unit + 20×20 stacks)
Motor Class	1303 / 1304 / 1404 / 1207
Motor Mount	9×9mm M2 — Ø2.20mm holes, Ø4.20mm shaft clearance
Prop Size	3" / 76mm
Power System	2S / 3S / 4S LiPo
Video Systems	Digital / Analog

WHAT'S NEEDED TO BUILD

#	PART	NOTES
1	Bottom Plate	4mm CF — Standard or Donut
2	Top Plate	2.5mm CF — Diamond or Standard
3	Standoffs ×4	Height depends on stack
4	AIO Flight Controller	20×20mm spacing
5	Motors ×4	1303-1404 / 1207 — see motor section
6	Propellers ×4	3" T-mount, 2× CW / 2× CCW
7	Camera	14mm body — digital or analog
8	Camera Canopy	TPU — slides into standoffs
9	Battery	2S-4S — see battery section
10	Battery Strap	15mm width recommended
11	Battery Pad	Foam — sits recessed in top plate notch
12	Arm Tip Protection (optional)	TPU boots, socks, or claws
13	Screws & Hardware	M2 standoff screws, motor screws

HOW TO BUILD IT

STEP 1 — BOTTOM PLATE & STANDOFFS

Start with the 4mm bottom plate. The standoff holes have recessed notches cut into the carbon to accept a nut — thread one onto each stack screw before inserting so the screw has something solid to pull against. Nylon-insert lock nuts work well here to keep things from vibrating loose. Use whatever standoff height suits your stack and video system.

STEP 2 — FLIGHT CONTROLLER

Install your soft grommets into the FC mounting holes first, then slide it down onto the stack screws. Orient the USB port where you can reach it without pulling the frame apart. Solder your motor wires before the top plate goes on — much easier with clear access.

STEP 3 — MOTORS

Bolt all four motors to the arm tips. Direct solder the motor wires to the AIO — no connectors keeps the build compact and lowers resistance. Check motor spin directions against your Betaflight motor map before closing up.

STEP 4 — CAMERA CANOPY

Pick the TPU canopy for your camera and video system. Some canopies open like a jaw so you can seat the camera easily — do that first if yours has a split. Slide the standoffs into the canopy, then drop the bottom notch into the front of the bottom plate. It stays in place on its own, and once the top plate screws go on it's fully locked in — no zip ties needed.

STEP 5 — TOP PLATE

Drop your chosen plate onto the standoffs and secure with M2 screws. Tighten evenly. Route any antenna leads out through the rear and clear of the props.

STEP 6 — BATTERY PAD & STRAP

Press your foam battery pad into the recessed notch on the top plate — it sits flush and keeps the battery from shifting. Loop your strap through the plate notches and fit your pack.

STEP 7 — PROPS

Press your 3" props onto the motor shafts. Confirm CW and CCW orientation matches your motor layout before arming.

WHAT MAKES IT DIFFERENT

Unibody construction — One plate, no joints, no slop. A unibody frame is stiffer than any multi-plate build and there's nothing to rattle loose mid-flight. The tradeoff is honest — if you break it, you replace the whole plate. But that's the deal with any frame built to actually perform.

Carbon-integrated motor bumpers — Each arm tip has a built-in horn shaped to take the hit before your motor bell ever contacts the ground. Crashes land on the frame, not your motors.

TPU arm protection — Three options depending on how you want to run it. The boots slip over the outside of the arm tips for an extra layer of impact protection. The socks slip inside — keyed to the frame so they stay put through crashes but can still be pulled off when you need to. The claw variant adds grip and a more aggressive look. All are free to print and swap any time.

Golden nuts — The standoff holes have recessed notches cut into the carbon to seat a nut flush against the plate. No screwing into raw carbon, no loose hardware to manage underneath.

Two top plate options — Choose the Diamond plate for more protection around the stack, or the Standard plate to strip back every gram. Both share the same standoffs, foam notch, and strap routing.

Recessed battery pad — The top plate has a built-in notch sized for a foam battery pad — it sits flush with the plate surface instead of stacking on top. The battery sits lower, more centered, and doesn't shift on hard maneuvers.

Zip tie points throughout — Dedicated holes front and rear on both plates. Secure antennas, receivers, or whatever your build calls for.

25×25mm VTX mount — Fits the DJI O4 Air Unit and any 20×20 stack. Digital video is a first-class citizen on this frame, not an afterthought.

Two geometry variants — True X for sharp, symmetrical response. Squashed X for pilots who want the props pushed back and a

slightly more planted feel in forward flight. Same frame, different character.

Power-to-weight that doesn't make sense for the size — 78g dry on a 1303 digital build. 9:1 TWR on a 1304 at 4S. 14:1 on a 1207. At 137mm this thing has no business going this hard — and that's exactly the point.

Digital-first, analog welcome — Everything about this frame was designed around running a proper digital video system. Go analog and it just gets lighter and faster.

MOTOR RECOMMENDATIONS

The Wraith runs a standard 9×9mm M2 motor mount with a 1.5mm shaft. That covers a wide range of stators — from a lightweight 1303 up to a 1404 or 1207.

By Motor Size

1303 / 6000-8000KV — The lightest option. Best for 2S builds where you want to keep weight down and flight time up. A complete 1303 digital build comes in at 78g dry — around 105–110g all-up with a 2S 550mAh pack.

1304 / 5000-6000KV (3S) / 4000-5000KV (4S) — A step up in stator with more punch. The sweet spot for 4S — hits close to 9:1 TWR without the heat or current draw of a 1207.

1404 / 3500-4000KV — More stator, more grunt. The right call for digital builds on 3S or 4S where you need extra headroom for video system draw.

1207 / 5000KV — 4S only. Published thrust data puts this at ~503g per motor — around 14:1 TWR on a light build. If you want to know what this frame is actually capable of, this is how you find out.

Thrust-to-Weight Reference

MOTOR	VOLTAGE	BATTERY	AUW	THRUST/MOTOR	TWR
1303 ~8000KV	2S	Tattu 550mAh HV	~105–110g	TBC	TBC
EX1404 3500KV	2S	Ovonic 450mAh	117g	~220g	~7.5:1
EX1404 3500KV	3S	Coddar 500mAh	144g	~300g	~8.3:1
1404 ~4000KV	4S	450mAh	160g	~474g	~11.8:1
1404 ~3500KV	4S	450mAh	170g	~400g	~9.4:1
1207 5000KV	4S	—	~140g	~503g	~14:1

1303 2S thrust data pending real-world testing. 1404 4S figures from AOS and T-Hobby spec charts respectively.

PROP RECOMMENDATIONS

All props below are 3" T-mount with a 1.5mm shaft.

Gemfan

3016 tri-blade — The community standard for 3" toothpick builds. Planted, snappy, good grip. Default recommendation for most setups.

3020-3 tri-blade — More pitch, more top-end. Better suited to heavier builds or 4S setups where you want to load the motors harder.

3018 bi-blade — Lowest load, most efficient, longest flight time. Floatier feel — worth trying if you're chasing pack time over punch.

HQ Prop

T3×2×3 — Solid all-rounder with a slightly softer feel than Gemfan. Good alternative if the 3016 feels too aggressive for your tune.

By Motor Pairing

1303 / 1304 on 2S–3S → Gemfan 3016

1404 on 3S–4S → Gemfan 3016 or 3020-3

1207 on 4S → Gemfan 3016 or 3020-3 — watch temps

BATTERY RECOMMENDATIONS

2S

450mAh — Light and nimble. Best for analog builds on 1303/1304 where you want the quad to feel like a toothpick.

550mAh — A bit more runtime without killing the feel. Good middle ground on 2S. The HDZero AIO15 digital build runs this pack at ~105-110g all-up.

3S

450mAh — The sweet spot for most builds. Enough capacity for digital systems, keeps AUW in check.

500-550mAh — More runtime for outdoor flying. Worth the slight weight penalty if you're ripping open spaces.

4S

450mAh — Fast and violent. Packs burn quick on 4S, especially with a 1207. Best for short, hard sessions.

550-600mAh — Extends your sessions without adding too much mass. Good for 1304 and 1404 builds where you want the power but not the anxiety.

For connectors, BT3 on 2S — low resistance, clean current delivery. Step up to XT30 on 3S and 4S.

FLIGHT CONTROLLER RECOMMENDATIONS

Digital — 2S/3S (slammed builds)

HDZero AIO15 — FC, ESC, VTX, and ELRS receiver all on one 7.2g board. 2S/3S only, 15A per motor. The reason a complete digital build can come in at 78g dry.

Digital — 3S/4S

JHEMCU GHF405HD AIO 40A — F405, ICM42688P, 40A ESC, 2S-6S, 7.1g. Solid all-around board for digital builds with headroom for 4S.

GEPRC Taker F411 35A — F411, ELRS, UFL antenna. Clean option for 3S/4S digital builds.

Analog — 3S/4S

JHEMCU GHF435 AIO — Lighter analog option. Good fit for pilots who want to keep weight down and don't need digital.

PolyAIO — BMI270 gyro — needs a different filtering strategy than ICM-based boards, more filtering required. Worth it for the weight savings.

FREE TPU FILES

All printed parts are free to download at printables.com. Print in TPU.

PART	VARIANTS
Camera Canopy	Flywoo O4 Air Unit (standard, chin, ND, chin + ND), HDZero Lux 25° (standard, 8mm standoff), DJI O4 Air Unit, Baby Ratel*, Foxeer Toothless 2*
Arm Boots	Standard, Zip tie, Claw, Claw + Zip tie
Arm Socks	Claw
Canopy Adapter	Bottom extension for popular clip-on canopy systems
XT30 Antenna Holder	Inline mount

*Converted from compatible clip-on canopy system — instructions included.