

TinyTank drone racing quadcopter - 4S 3" Micro cam & HDZero versions



Bacon2002

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Summary

"TinyTank" This is a prototype monocoque 4S 3 inch racing / freestyle quadcopter design with all the components (FC,...

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"TinyTank"

This is a prototype monocoque 4S 3 inch racing / freestyle quadcopter design with all the components (FC, VTX, wires, battery etc.) fitted internally.

Hardware - M2 countersunk bolts (x4) & M2 nylon nuts (x4)

The FC and VTX are mounted using four M2 countersunk bolts, I use M2x16mm steel bolts but anything from 16mm to 20mm would work as long as the bolts are countersunk otherwise the heads will interfere with the battery bay..

Other parts / specifications:

3 inch max prop diameter (3" Emax Avan props)

Flight controller - Flywoo F745 toothpick style 25.5 x 25.5

VTX - HDZero / SharkByte whoop board

VTX antenna - Lollipop 3

Camera - Runcam nano HD (SharkByte / HDZero) with Caddx lens upgrade

RX - ELRS PP (Happymodel)

Motors - iFlight Xing 1404 4600KV

Battery - 4S GNB 520 mah HV - https://www.banggood.com/Gaoneng-GNB-15_2V-520mAh-80C-4S-HV-4_35V-Lipo-Battery-for-Betafpv-Beta85X-Whoop-FPV-Drone-p-1512848.html?cur_warehouse=CN

Weight

Frame - 30g (ex cover)

Built (all except the battery) - 114g

Battery - 55g (4S GNB 520 mah HV - see above)

Total (built with battery) - 169g (this version was printed with carbon nylon), where possible the design has been optimised for resilience.

The build is probably about 12 -14g heavier than an equivalently equipped Tadpole 3". It's a little heavier however 4S and 1404 motors should deliver good performance and manoeuvrability.

Build - It's fiddly to route the cables and be gentle when removing internal supports especially from within the hollow arms so take your time, I use zigzag with conical supports within Cura.

Material - eSUN - PA-CF Upgraded Carbon Fiber Filled Nylon Filament 1.75mm

However I expect ABS would work, a better material would likely be either Nylon-X or eSun PA6-CF both of which are stronger nylon carbon material.

The FC has gummies plus rubber o-rings to provide shock absorption and also to support it off the base and to separate the VTX.

Motor wires are threaded through the inside of the arms and routed up through a guide to the bottom left and right of the FC mounting board. This helps to avoid the wires from interfering with the battery bay. The

motor wires come out under the the FC and continue under the FC to front and back of the FC and are then routed over the FC.

Also the motor wires will need to be left quite long to accommodate routing them through the chassis, I would guess at least 6 inches before being cut to length. If you have cut your existing motor wires shorter then they will need extending. Ideally extending the wires so that the solder joint is somewhere within the arm cavity when pulled through the arm so as to ensure that the joint does not cause a jam or require any force to correctly route the wires.

Once build it flies great, the dimensions are similar (the same) as a 3 inch Tadpole.

Betaflight CLI dump - Betaflight 4.2.9 first tune and setup included within the download area.

BF needs the FC to be shown as rotated by 45 degrees - Config tab and as per the CLI dump.

NEW HDZero version - in development.

19mm camera mount to fit HDZero micro camera

Larger camera mounts and changes to the body.

The first attempt removed - needs to be updated to reposition the HDZ camera position, reduce the camera housing height and resize the lower opening to allow for camera fitting. - update to follow.

Future changes:

- Re-work the cover - currently this relies on some flex in the body to fit it in place however I printed a body in ABS and found there was almost zero flex in the body so I will re-work a cover that is easier to lock in place. Probably with clips at the bottom where the locating pins slot into the main body.
- Improvements arm design to add additional strength
- Small modification to the main body to reduce weight

Category: R/C Vehicles

Model files



tinytanktopcoverv1.stl

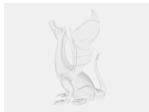


tinytankbatterycoverv1.stl



tinytankbodyv1.stl

Other files



btfl_cli_mohichan_20211009_124345.txt

[Find source .stl files on Thingiverse.com](#)

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