



Goblin FPV Drone



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updated 29. 1. 2026 | published 29. 1. 2026

Summary

A fully 3D printed 3" drone that stands out in one way and one way only: **sexiness**

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Note: A larger version of this drone, able to fit a 20x20mm stack is available:

The Goblin FPV Drone

I worked hard on this little guy. Poured love into every edge and crevice. Spared no mechanical consideration. And what a beautiful little goblin he turned out to be.

Now to get a bit more technical. This is a 3 inch drone frame. Mine is printed using carbon fiber nylon for the body and translucent green PETG for the top. I'll list out the specific electronic and mechanical hardware that

I used below, I know this combo works and pretty damn well at that. If you don't wanna choose parts for yourself, follow this list.

The Electronics:

- **1x 16x16mm Flight controller / ESC stack**
 - What I used is out of production. Search for: Flywoo Goku GN405 Nano HD 35A
- **1x ELRS receiver**
 - The GN405 Nano has a built in receiver already
 - What I used: Happymodel EP1
- **4x 1106 brushless motor**
 - Higher KV motor if you want to fly on 2-3S. Lower KV motor if you want to run 4S
 - What I used: FlashHobby A1106 6500KV
- **1x Nano Analog VTX**
 - Designed to mount one specific VTX, the Zeus Nano
 - Other nano VTXs, like the TBS Unify Pro32 Nano can fit
 - What I used: Zeus Nano VTX
- **1x Analog FPV camera**
 - Design fits 14mm width camera
 - What I used: RunCam Nano 2
- **1x VTX antenna**
 - antenna stem thickness of 4mm
 - UFL/IPEX antenna connector type
 - Polarization of transmitter and receiver antennas must match
 - What I used: Rush Cherry 87mm UFL RHCP antenna
- **1x LiPo battery**
 - Select voltage based on motor KV rating
 - Look for capacity in range of 500-800 mAh
 - What I used: CODDAR 500mAh 3S 11.4V HV
- **1x ELRS Radio controller**
 - What I used: Radiomaster Pocket
 - A cheaper alternative is the Radiomaster T8L

The Hardware:

- **4x 3" / 2.5" propeller**
 - I recommend getting replacement extras though
 - What I used: Gemfan 3018 propeller
- **4x M2x14 low profile screw + M2 nut**
 - These are for the FC / ESC stack
 - Low profile in order to be flush with the drone's surface
- **8x M2x7 screw**
 - For securing the propellers
 - These are usually included with the motors

- **4x M2x6 screw**
 - These are for attaching the cover
- **18x M2x5 screw**
 - 16 of these are for the motors
 - The other 2 are for securing the VTX
- **2x M2x4 screw**
 - For attaching the camera
 - These are usually included with the camera
- **6x M2x4x3.2 insert nut**
 - These are for affixing the cover
- **1x 10x180mm velcro strap**
 - For strapping on the battery
 - Does not have to be this exact size

Weight & Cost Estimate:

- Drone ~ \$120
- Transmitter: \$40 - \$70
- Weight without battery: 90g

Assembly Guide:

(please have some prior drone experience, that said I'll be happy to help just leave a comment or something if you've got a question)

1. Go ahead and print off both pieces. I'll wait. Oh, I should mention - use the good settings, no supports needed.
2. Start with the motors, thread the wires through the drone's arms, then tighten the motors down with the M2x5 screws, be careful not to overtighten.
3. Solder up wires to the VTX, if it arrived unsoldered. If you're using the Zeus Nano as I did, you can snip off all but the closest mounting points, and mount to the built in holes of in the rear part of the drone. The screws go directly into the plastic. Make sure you mount with the antenna port facing up. If you are not using the Zeus Nano, you can edit the .step files to fit your VTX or just kinda mush it in there and hope for the best.
4. Suspend **only** the ESC part (there are two pieces in the stack) of the stack 2cm or so above its future spot in the drone using a soldering helping hand or some other method. **Make sure** the ESC module is facing forward (same for the flight controller when you install it later)
5. Cut the motor wires down a little, so that the ends of the wires overlap the solder pads **while** the ESC is elevated. This will give a bit of extra slack.
6. **Be careful soldering**, strip all the motor wires and (preferable) using a pair of tweezers, solder them to the ESC pads.

7. Thread an antenna through the hole in the back of the drone, and snap the connector into its place on the VTX. I purchased the Zeus Nano option that comes with a RUSH Cherry Antenna, it is the perfect size and its stem is exactly 4mm in diameter, and the drone was designed to accommodate it, but thinner antennas will fit through the hole as well.
8. Prepare the XT30 connector that came with ESC (or your preferred connector) and cut the wires down to 40mm each (or whatever you prefer bro), then thread through either the left or right slit in the rear of drone. It's up to you which you choose.
9. Solder the XT30 wire leads to the ESC, be careful to get the polarity right and not short out any component.
10. Now, lower the ESC module into place and thread through the four M2x14 screws, pop on the flight controller part of the stack too.
11. Using the tweezers, carefully solder the VTX wires to their proper spots on the flight controller. You'll need a wiring diagram to know what goes where, and any manufacturer who knows what they're doing will provide one to you.
12. Excellent! We've got the flight stack and the VTX installed and wired up.
13. Secure the camera to the frame. Whichever one you end up choosing, it must be 14mm wide and have M2 mounting holes. Honestly the RunCam Nano 2 is perfect, highly recommend.
14. Solder the camera wires to their correct spot on the flight controller.
15. Lastly, the receiver. If it came with wires soldered on already, great! If not, solder them on yourself. I believe all ELRS receivers use 4 wires. Once you've done that, solder the connections to the flight controller.
16. With that, you've completed all of the electrical connections. Congrats!
17. You can line up the cover and tighten it down.

Ok ok ok. I know. There's still a lot of configuration to do. I'm, not gonna go into detail about that here, but If you are new to this check out Joshua Bardwell on YT. As far as drones go, the guy's my lord and savior. He will teach you everything you need to know. I will say, if you find that your motors are spinning in the wrong direction, you can change that configuration. And with that I'll say, good luck, druz'ya moi.

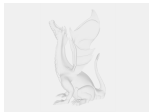
Model files



golbin-drone-body.stl



golbin-drone-lid.stl



goblin-drone-v3-extra-reinforced.step



goblin-drone-v2-reinforced.step



goblindrone.step

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