

FPV Drone Making Guide

Project Title: DIY FPV (First Person View) Drone

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1. Introduction

FPV (First Person View) drones provide real-time video feedback to the pilot, allowing immersive flight using goggles or a screen. This guide details building a basic FPV drone using standard components with both analog and digital options.

2. Required Components

Category	Component	Description
Frame	220mm Quadcopter Frame	Lightweight, carbon fiber or plastic
Motors	2204/2205 2300KV Brushless Motors	4x motors for quad configuration
ESCs	20A–30A BLHeli ESCs	One for each motor
Flight Controller	F4 / F7 Flight Controller	Supports Betaflight / INAV
Propellers	5045 3-blade or 2-blade props	5-inch standard for 220mm frames
Battery	3S or 4S LiPo (1300–1500 mAh)	High C rating ($\geq 75C$)
FPV Camera	RunCam Nano / Caddx Ant	Analog mini camera
VTX (Video TX)	5.8GHz Transmitter (25–800mW)	With adjustable power output
Antenna	Pagoda / Cloverleaf / Dipole	Circular polarized recommended
FPV Goggles	Eachine / FatShark / Skyzone	With 5.8GHz receiver
RC Transmitter	FlySky i6 / FrSky X9D / Radiomaster	With matching receiver
Miscellaneous	Zip ties, heatshrink, XT60s, soldering kit	Wiring and mounting accessories

3. Assembly Instructions

3.1 Frame Setup

- Mount arms to the base plate with screws.
- Attach motor mounts securely.
- Route ESC wires through the arms.

3.2 Motor & ESC Wiring

- Solder 3 wires from each motor to its ESC.
- Connect ESC signal wire (white/yellow) to flight controller's motor output pads.
- Power ESCs from the battery rail (PDB or 4-in-1 ESC stack).

3.3 Flight Controller

- Mount FC on rubber vibration dampeners.
- Connect:
 - ESC signal pads (M1–M4)
 - RX (Receiver) via UART (SBUS/IBUS)
 - FPV Camera (CAM pad or video in)
 - VTX (VTX pad or video out)
- Configure in **Betaflight Configurator** on PC:
 - Enable serial RX
 - Map channels
 - Calibrate accelerometer & set PID loop

3.4 FPV System

- Mount FPV camera at 20–30° angle in the frame.
- Connect camera power and video out to FC/VTX.
- Connect VTX output to antenna.
- Ensure proper 5V or 9V supply to FPV camera and VTX.

3.5 Receiver Binding

- Connect receiver (IBUS/SBUS/DSM2) to FC UART.
- Bind transmitter with receiver (consult manual).
- Verify channel mapping in Betaflight.

3.6 Propeller Mounting

- Ensure correct motor direction:
 - CW: Front-right & rear-left
 - CCW: Front-left & rear-right
 - Use lock nuts or thread-locking for safety.
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4. Power Setup

- Use a 3S or 4S LiPo battery via XT60 connector.
 - Connect battery through PDB (or integrated stack).
 - Ensure VTX and Camera voltage compatibility (5V or 9V)
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5. Testing and Safety

Pre-Flight Checklist

- Check motor direction in Betaflight (motor tab)
- Ensure propellers are OFF during initial tests
- Calibrate accelerometer
- Check VTX channel and goggles frequency

Maiden Flight

- Perform test flight without FPV goggles
 - Use low rates and altitude hold for stability
 - Switch to FPV only after control is verified
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6. Tips and Enhancements

- Use buzzer + lost model alarm
 - Add OSD (On-Screen Display) via Betaflight
 - Upgrade to digital FPV (DJI HD or Walksnail)
 - Add GPS for rescue mode / return-to-home
 - Install current sensor for battery monitoring
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7. Resources

- [Betaflight Configurator \(Chrome\)](#)
 - [OscarLiang FPV Blog](#)
 - [RotorBuilds](#)
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Support & Credits

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Fly safe, build smart, and enjoy the FPV experience!  