

ESP32Copter Design

Our design is named **ESP32Copter**. It is mainly inspired by **Espressif's ESP Drone** design. We change some parts and add others. The chip crisis is a big challenge! Many parts are not available.

-  [Espressif ESP Drone web site](#)
-  [Espressif ESP Drone git repo](#)

The Hardware Reference from Espressif

 **READ IT !!!**

- ESP32 Drone V1.2 [Hardware Ref. Website](#)
- ESP32 Drone V1.2 Mainboard [SCHEMATIC](#)
- ESP32 Drone V1.2 Mainboard [BOARD LAYOUT](#)

Espressif ESP Drone Bill of Material

https://docs.google.com/spreadsheets/d/e/2PACX-1vQztF2Uq3z238SJ_Da_DvWMfNcR-GU6IMJ-nDem6M420P7MagXZBUF-9-yg1RN9syfaSIDfnVDzqNFX/pub?gid=2030335610&single=true&output=csv

https://docs.google.com/spreadsheets/d/e/2PACX-1vRsZ43vISzzgWH8QIKqGolYrf693KWM7aZom1D5Sxj5FfWwabxHRpYM_2Eri5V2T2i9gndDd2dffjct/pub?gid=0&single=true&output=csv

CSV

https://docs.google.com/spreadsheets/d/e/2PACX-1vRsZ43vISzzgWH8QIKqGolYrf693KWM7aZom1D5Sxj5FfWwabxHRpYM_2Eri5V2T2i9gndDd2dffjct/pub?output=csv

https://docs.google.com/spreadsheets/d/e/2PACX-1vRsZ43vISzzgWH8QIKqGolYrf693KWM7aZom1D5Sxj5FfWwabxHRpYM_2Eri5V2T2i9gndDd2dffjct/pubhtml?gid=0&single=true

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Number	Name	Details
1	Power Man	Blue
2	Red Book	Yellow, but blue

ESP32Copter Bill of Material (BOM)

We are planning to use some other components. The column **Ideal Part** lists the components we would like to use but which are partly unavailable because of the chip crisis. The column **ESP Drone Part** is the ESP Drone reference design by Espressif, version 1.2. The column **ESP32Copter Part** shows the selection of our current design.

The original BOM (xlsx) can be found [here](#)



The following lists are not complete and still under construction!

Main Components: MCs and Sensors

Function	ESP32Copter Part	ESP Drone Part	Ideal Part	Source
main controller	ESP32 Wrover	ESP32 Wrover	ESP32 Wrover	https://www.reichelt.de/de/en/wifi-smd-module-esp32-d0wd-v3-16-mb-spi-8-mb-psram-18x31x3-3-esp32-wrover-ie-p300207.html
IMU, 6 DOF		MPU-6050		old design
IMU, 9 DOF			ICM-20948	not available
IMU, 9 DOF	MPU-9250			https://www.reichelt.de/de/en/arduino-grove-sensor-imu-10dof-v2-0-bmp280-mpu-9250-grv-imu-10dof-v2-p243392.html
compass	inside MPU-9250			https://www.reichelt.de/de/en/arduino-grove-sensor-imu-10dof-v2-0-bmp280-mpu-9250-grv-imu-10dof-v2-p243392.html
compass		HMC5883 (shield)		old design
barometric altitude sensor		MS5611 (shield)		old design
barometric altitude sensor	BMP280		BMP280	https://www.reichelt.de/de/en/arduino-grove-sensor-imu-10dof-v2-0-bmp280-mpu-9250-grv-imu-10dof-v2-p243392.html
optical flow sensor			PixArt PAA3905E1-Q with L242-ZSZ1 lens	
optical flow sensor		PMW3901 (shield PMW3901 + VL53L1X)		
TOF based altimeter		VL53L1X (shield PMW3901 + VL53L1X)		
TOF based altimeter	VL53L1X		VL53L1X (?)	

- ESP32-WROOM-32E
- ICM-20948
- CP2102N
- LP3961EMP-3.3V
- PAA3905E1-Q to be used with PixArt's L242-ZSZ1 lens
- BMP280
- VL53L1CB

Transistors, Regulators

Function	State	ESP Drone Ref.	Part	Specs.	Package	Note
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Function	State	ESP Drone Ref.	Part	Specs.	Package	Note
Power N-Fet for motors	not available	Q4,Q5,Q6,Q7	IRLML6344TRPBF	N-MOSFET 5.0A 29mOhm 30V 2.5V 1.3W drv capable	SOT-23-3	
 MOUSER SEARCH						
	option 1		SI2336DS-T1-BE3	N-MOSFET 5.2A 42mOhm 30V 1V 1.8W	SOT-23-3	20.427 in stock
	option 2		IRLML6244TRPBF	MOSFET MOSFT 20V 6.3A 21mOhm 2.5V cpbl	SOT-23-3	132.372 in stock
	option 3		RQ6E050AJTCR	MOSFET 30V N-CHANNEL 5A 35mOhm 1.25W	SOT-457-6 / SOT-23-6	5.235 in stock
	option 4		PMV15ENEAR	N-MOSFET 6.2A 20mOhm 30V 1.3W	SOT-23-3	4 in stock

Misc Information

- [Optical Motion Tracking Sensors](#) by PixArt
- <https://micro.ros.org/blog/2020/08/27/esp32/>
- Footprint / package size comparison by Onsemi, [6 leads](#)

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