

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 |
|----------|-------|----------------|------|--------|---------|------|
|----------|-------|----------------|------|--------|---------|------|

| 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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