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

TO BE DONE

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

Function	ESP32Copter Part	ESP Drone Part	Ideal Part	Source
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
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	
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	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

Function	State	ESP Drone Ref.	Part	Specs.	Package	Note
Ferrite Bead, 330 Ohm @ 100MHz						
To be done						
LDO 2.8V, fixed, for camera	Chinese brand, not available	U2	ME6211C28M5G-N			
MOUSER SEARCH						

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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