

## ES32-POE2

# User Manual

## olimex.com

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# Introduction to ESP32-POE2

[ESP32-POE2](#) is upgraded version of the popular [ESP32-PoE](#) and is an IoT based on ESP32-WROOM-32E WIFI/BLE/Ethernet development board with Power-Over-Ethernet feature. The [ESP32-POE2](#) allow 25W power negotiation and can supply 24V/12V/5V to additional equipment connected to it

The PoE in [ESP32-POE2](#) is handled by TPS2378 chip that is IEEE 802.3af-compliant, including pre-standard (legacy) PoE support.

The PoE powering requires at least 37V DC to operate successfully. The board takes power from the Ethernet cable and can be expanded with sensors and actuators. Perfect solution for Internet-of-Things projects.



**Important notice:** [ESP32-POE2](#) has **no galvano isolation** from Ethernet's power supply, when you program the board via the micro USB connector the Ethernet cable should be disconnected (if you have power over the Ethernet cable)! Consider using Olimex [USB-ISO](#) to protect your computer and board from accidental short circuit.

## ESP32-POE2 features

- ESP32-WROOM-32 - WiFi and bluetooth module
- CE-RED and LVD certification
- Original design by OLIMEX Ltd
- Low power design - 200uA consumption in deep sleep
- Ethernet 100Mb interface with IEEE 802.3 PoE support
- USB-C connector for ESP32 programming
- MicroSD card working in 1 bit mode (3 more GPIOs)
- LiPo battery charger with LiPo battery connector
- Battery level monitor pin on ADC
- External power supply detection pin on ADC
- Provides 24V/0.75A or 12V/1.5A to external circuit
- Provides 5V/ 1.5A to external circuit
- [UEXT](#) connector
- EXT1 connector
- User button
- Reset button
- PCB dimensions: 59x90 mm

## PoE standard

[ESP32-POE2](#) follow the original IEEE 802.3af PoE standard and provides up to 25 W of DC power (minimum 44 V DC and 350 mA). Only 23 W is assured to be available at the powered device as some power dissipates in the cables.

## The difference between ESP32-POE2 and ESP32-POE-ISO:

[ESP32-POE2](#) is not galvanic isolated which means that it's not safe to connect it to other devices which use non isolated power supply.



this means YOU SHOULD NOT CONNECT [ESP32-POE2](#) to computer USB port while it's connected to Ethernet POE!!! If you connect USB while [ESP32-POE2](#) is powered by Ethernet you will damage the board or your computer or both. This also will void the warranty!!!

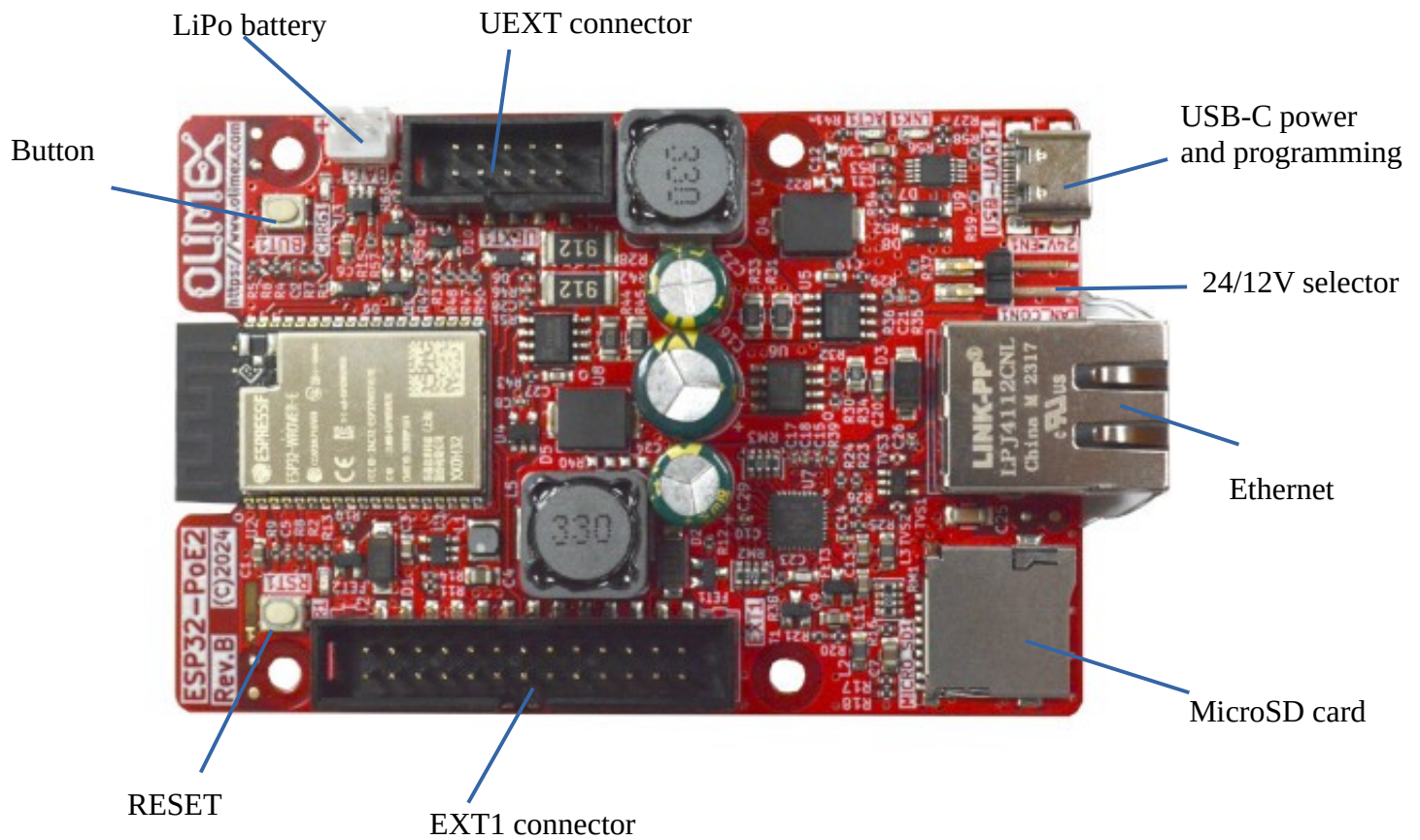
## Order codes for ESP32-POE2 and accessories:

<a href="#">ESP32-POE2</a>	commercial grade 0-70C board with internal antenna
<a href="#">USB-CABLE-A-TO-C-1M</a>	1 meter USB-A to USB-C cable for ESP32-POE2 power and programming
<a href="#">Ethernet-CABLE-1M</a>	1 meter Cat 5e Gigabit Ethernet cable with not shielded RJ45 connectors
Box-ESP32-POE2-F	Plastic box for ESP32-POE2
<a href="#">BATTERY-LIPO1400mAh</a>	- Lipo battery 3.7V 1400mAh – note these batteries can be shipped only by ground so we can deliver only to EU destinations.
<a href="#">UEXT modules</a>	- different sensors, relays, LCDs, RTC, GSM, GPS etc accessories which can be connected to UEXT connector

# HARDWARE

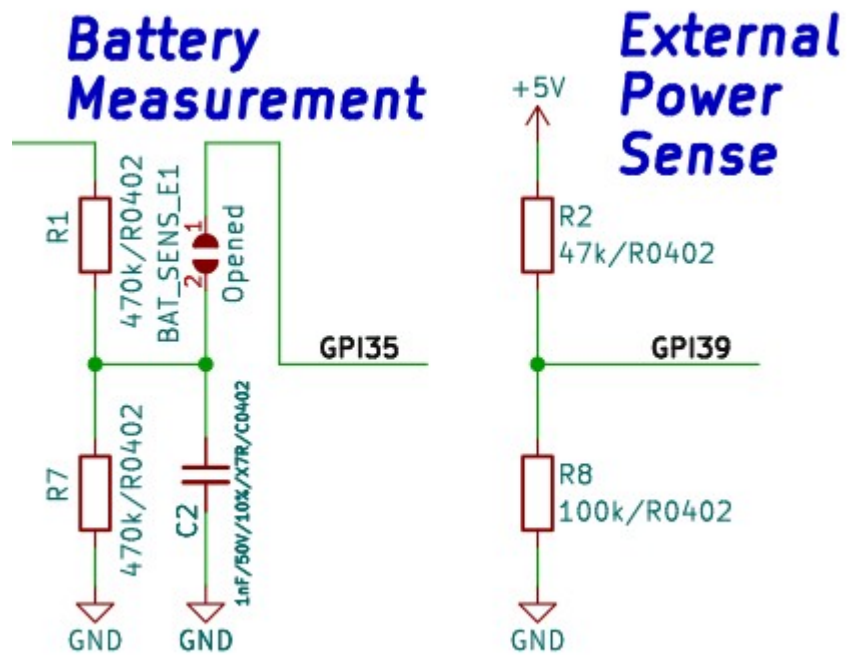


## ESP32-POE2 layout:



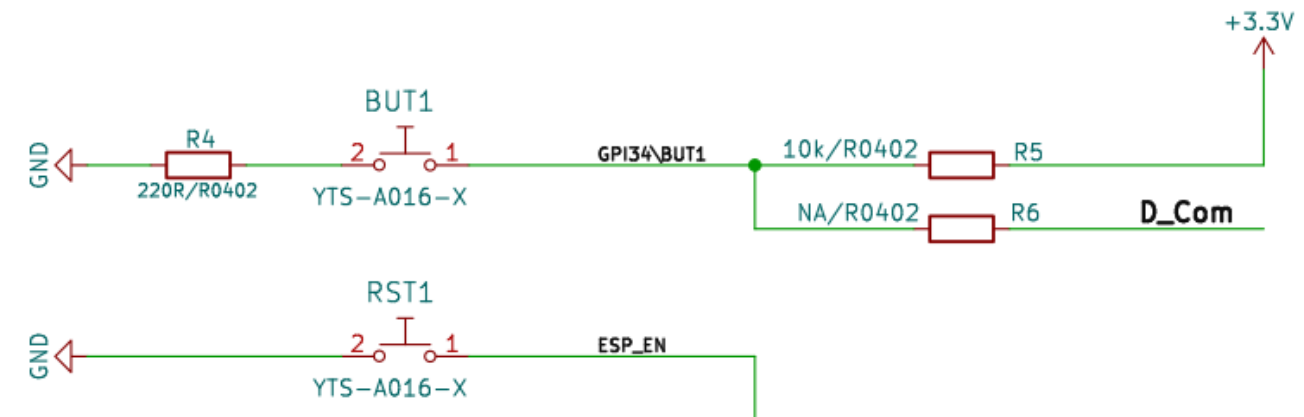
## ESP32-POE2 GPIOs:

Power sense and battery level measurement:



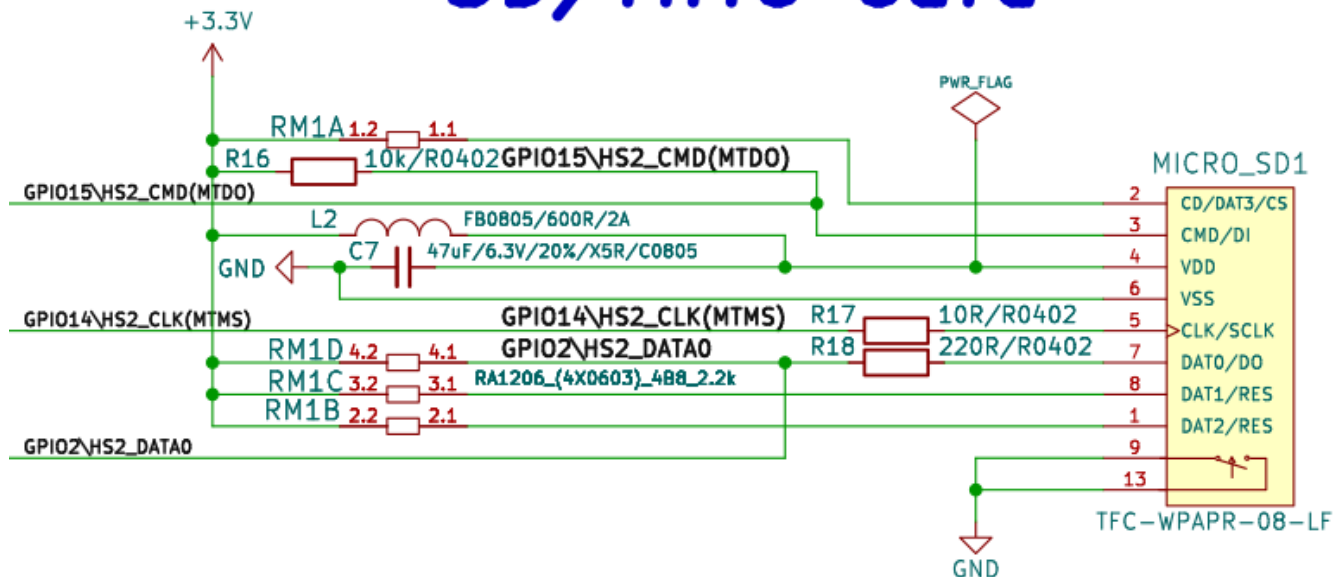
## GPIO Buttons:

# Buttons

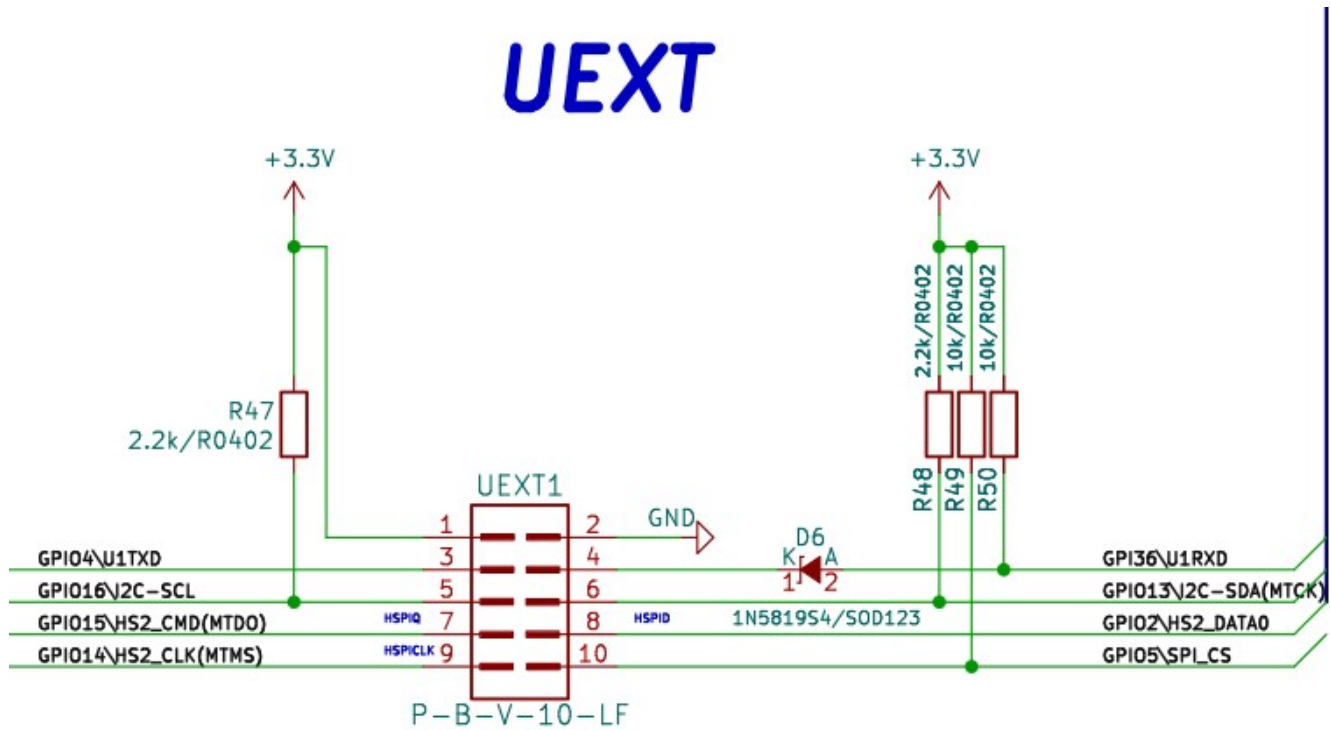


## SD card connector:

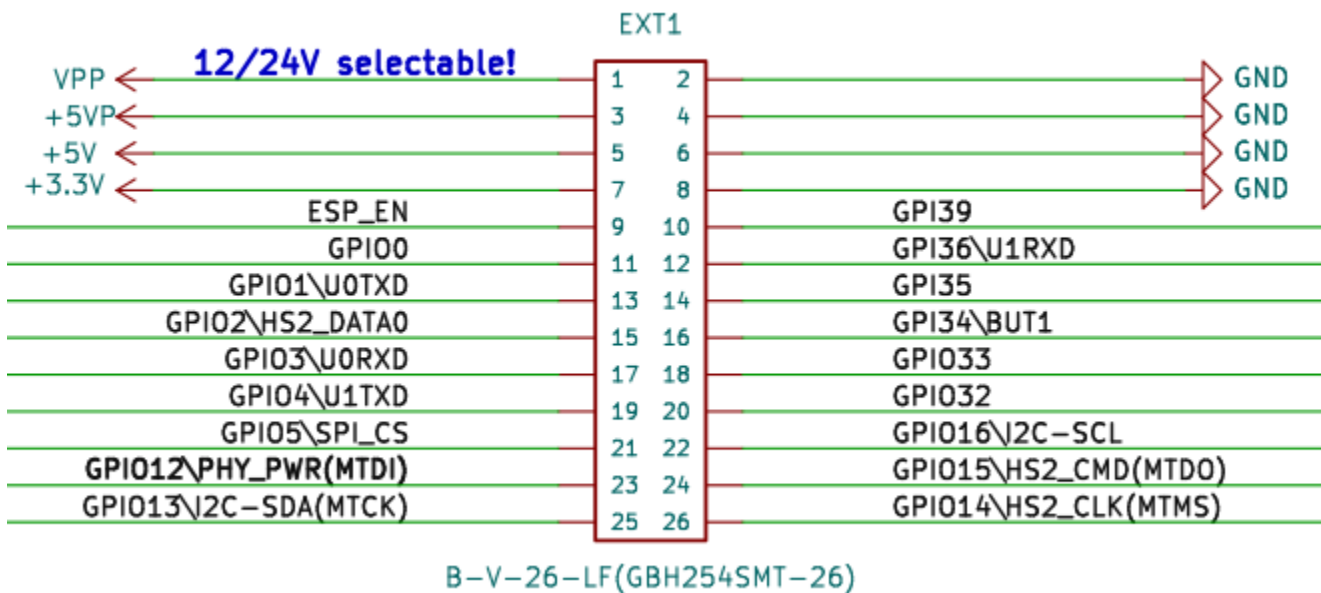
# SD/MMC Card



## UEXT connector:



## EXT1 connector:



## POWER SUPPLY:

**VPP** selectable 12/1.5A / 24V/0.75A output from PoE

**+5VP** 5V / 1.5A output from PoE

**+5V** 1. may be input and output

2. when board is connected to USB or to Ethernet PoE this line can be used as output and power supplement electronic

3. if you want to use as input i.e. to feed power from external 5V to this line make sure board is not connected to the USB!

**+3.3V** output which can source up to 0.5A @ 3.3V i.e. (1.65W)

## GPIOs:

**ESP\_EN** resets ESP32 module

**GPIO0, GPIO1** are used only during programming, after that are free to use

**GPIO2, GPIO14, GPIO15** are used for the SD-card, if no SD card they are free to use

**GPIO2, GPIO4, GPIO5, GPIO13, GPIO14, GPIO15, GPIO16, GPIO36** are shared on both UEXT and EXT1,2 so if you use them on the one connector do not use on the other

**GPIO39** is connected to measure external power supply voltage

**GPIO34** is connected to used button and have 10K pullup

**GPIO35** is free to use but may be connected to measure the LiPo battery voltage if SENS\_BAT\_E1 solder jumper

## ESP32-POE2 schematics:

[ESP32-POE2](#) latest schematic is on [GitHub](#)

## ESP32-POE2 power supply:

[ESP32-POE2](#) can be powered by 4 sources:

- Ethernet PoE
- USB-C connector
- LiPo battery
- EXT1 pin 5 (+5V) note that this signal is connected to USB 5V signal so when you power with this pin you should not connect the board to the USB!

Power consumption of [ESP32-POE2](#) is between 50 and 200mA depend on the operation mode.

If LiPo battery is connected it's charged automatically when power supply is attached with about 100mA.

When the LiPo battery is attached and external power supply is missing internal DCDC step-up converter and switching circuit automatically powers ESP32-POE from the battery. 1400mAh battery will provide about 8 hours of stand alone operation.



The LiPo battery connector is JST 2.0 mm connector and with Olimex's battery polarity. If you use batteries from other manufacturers please make PLUS and MINUS are connected properly as you may damage the board!!!

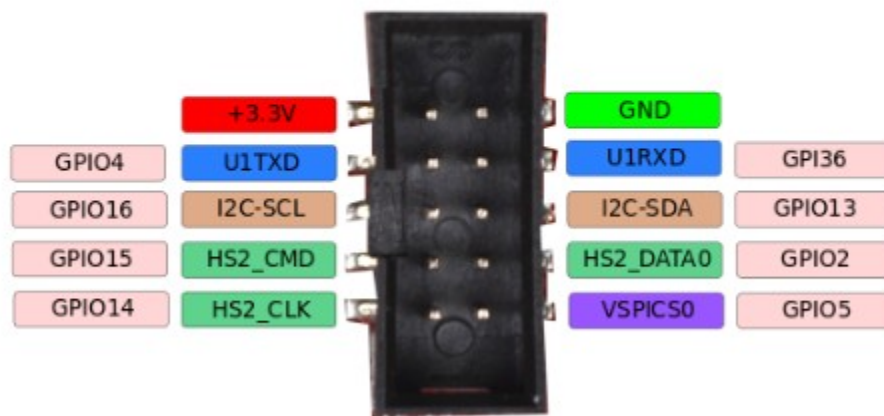
## UEXT connector:

UEXT connector stands for Universal EXTension connector and contain +3.3V, GND, I2C, SPI, UART signals.

UEXT is 0.1" 2.54mm step boxed plastic connector. All signals are with 3.3V levels.

## UEXT connector

note it share same pins with EXT1 and EXT2



Olimex has developed number of [MODULES](#) with this connector. There are temperature, humidity, pressure, magnetic field, light sensors. Modules with LCDs, LED matrix, Relays, Bluetooth, Zigbee, WiFi, GSM, GPS, RFID, RTC, EKG, sensors and etc.



## SOFTWARE:

[ESP32-POE2](#) uses same software as ESP32-POE which is very popular board and supported by

- [Espressif ESP-IDF](#)
- [MicroPython](#)
- [Arduino IDE](#)
- [Esphome](#)
- [PlatformIO](#)

# Revision History

Revision 1.0 April 2024