

ES32-POE

ESP32-POE-ISO

User Manual  
olimex.com

Rev.1.0 May 2023

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# Introduction to ESP32-POE

[ESP32-PoE](#) is an IoT based on ESP32-WROOM-32E WIFI/BLE/Ethernet development board with Power-Over-Ethernet feature.

The PoE is handled by TPS2375/6 chip (Si3402-B in older revisions) 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-PoE](#) has **no galvanic 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. Also consider instead using Olimex [ESP32-PoE-ISO](#) board which is insulated.

[ESP32-POE-EA](#) has ESP32-WROOM-32UE module with U.FL connector and external antenna attached.

[ESP32-POE-IND](#) and [ESP32-POE-EA-IND](#) use industrial grade components suitable for -40+85C operating temperature.

[ESP32-POE-WROVER](#) comes with ESP32-WROVER-E with 4MB flash and 8MB PSRAM, while [ESP32-POE-WROVER-EA](#) uses ESP32-WROVER-IE module with U.FL connector and external antenna attached.

## ESP32-POE features

- ESP32-WROOM-32E Espressif Inc WiFi + Bluetooth ® + Bluetooth LE module with 4MB Flash 520 KB SRAM
- High reliable industrial grade -40+85C available (-IND)
- CE-RED and LVD certification
- Original design by OLIMEX Ltd
- Power Over Ethernet negotiation circuit 802.3 compliant, with minimum operating voltage of 35VDC
- DC-DC converter with output 5V 3A
- LiPo battery charger
- LiPo battery connector
- Battery level monitor pin on ADC
- External power supply detection pin on ADC
- [UEXT connector](#)
- User button
- Reset button
- Micro USB with programmer for ESP32 programming
- MicroSD card
- Two extension connectors 0.1" step spaced at 1"
- PCB dimensions: (80 x 28)mm ~ (3.15 x 1.1)"

## ESP32-POE-ISO features

- ESP32-WROOM-32E Espressif Inc WiFi + Bluetooth ® + Bluetooth LE module with 4MB Flash 520 KB SRAM
- Power Over Ethernet negotiation circuit 802.3 compliant, with minimum operating voltage of 35VDC
- High reliable industrial grade -40+85C available (-IND)
- 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
- 3000VDC galvanic insulation between the PoE Ethernet part and board's power supply circuit
- Micro USB connector for ESP32 programming
- MicroSD card working in 1 bit mode
- LiPo battery charger with LiPo battery connector
- Battery level monitor pin on ADC
- External power supply detection pin on ADC
- DC-DC 2W 5V/400mA
- [UEXT connector](#)
- User button
- Reset button
- Two extension connectors, 0.1" step spaced at 1"
- PCB dimensions: (98 x 28)mm ~ (3.8 x 1")

## PoE standard

ESP32-POE and ESP32-POE-ISO follow the original IEEE 802.3af PoE standard and provides up to 15.4 W of DC power (minimum 44 V DC and 350 mA). Only 12.95 W is assured to be available at the powered device as some power dissipates in the cable.

ESP32-POE-ISO have 2W DC-DC 5V-5V insulation converter which limits the power usage to 2W only!

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

ESP32-POE 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-POE** to computer USB port while it's connected to Ethernet POE!!! If you connect USB while ESP32-POE is powered by Ethernet you will damage the board or your computer or both. This also will void the warranty!!!

ESP32-POE-ISO is with 3000VDC galvanic insulation between the Ethernet POE part and ESP32 power supply, so there is no problem to connect to USB and program/debug while connected to Ethernet POE

## The difference between ESP32-POE and ESP32-POE-WROVER:

ESP-POE is with ESP32-WROOM-32E module with 4MB Flash and 520KB RAM

ESP-POE-WROVER is with ESP32-WROVER-E module with 4MB Flash and 8MB PSRAM.



WROVER module uses two GPIOs to connect to the PSRAM and these can't be used



## Order codes for ESP32-POE and accessories:

[ESP32-POE](#) commercial grade 0-70C board with internal antenna

[ESP32-POE-EA](#) commercial grade 0-70C board with external antenna

[ESP32-POE-IND](#) industrial grade -40+85C board with internal antenna

[ESP32-POE-EA-IND](#) industrial grade -40+85C board with external antenna

[ESP32-POE-WROVER](#) commercial grade 0-70C board with 8MB PSRAM and internal antenna

[ESP32-POE-WROVER-EA](#) commercial grade 0-70C board with 8MB PSRAM and external antenna

[BATTERY-LIPO1400mAh](#) - Lipo battery 3.7V 1400mAh – note these batteries can be shipped only by ground so we can deliver only to EU destinations.

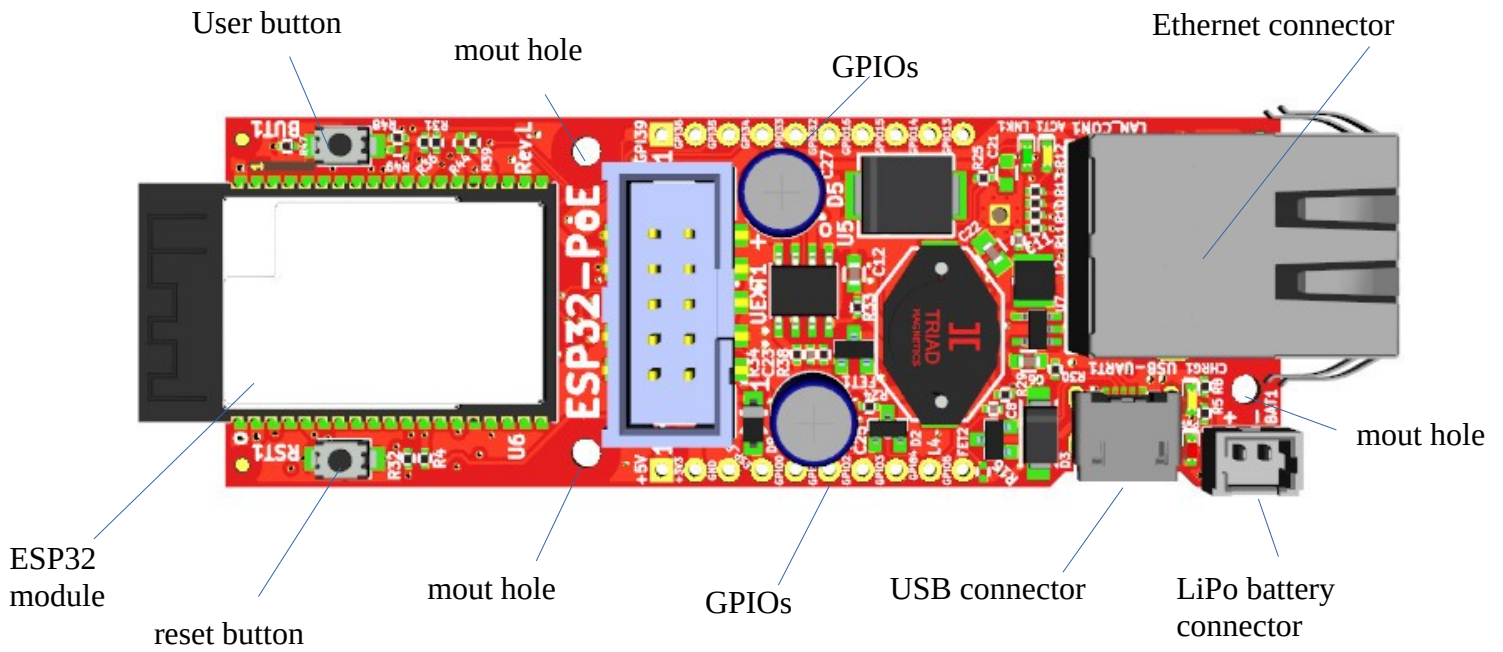
[UEXT modules](#) - different sensors, relays, LCDs, RTC, GSM, GPS etc accessories which can be connected to UEXT connector

## Order codes for ESP32-POE-ISO and accessories:

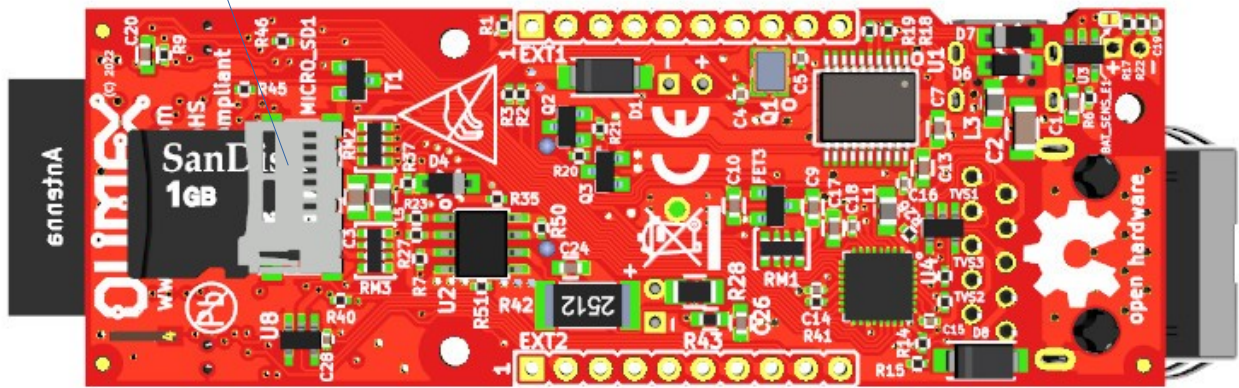
<a href="#"><u>ESP32-POE-ISO</u></a>	commercial grade 0-70C board with internal antenna
<a href="#"><u>ESP32-POE-ISO-EA</u></a>	commercial grade 0-70C board with external antenna
<a href="#"><u>ESP32-POE-ISO-IND</u></a>	industrial grade -40+85C board with internal antenna
<a href="#"><u>ESP32-POE-ISO-EA-IND</u></a>	industrial grade -40+85C board with external antenna
<a href="#"><u>ESP32-POE-ISO-WROVER</u></a>	commercial grade 0-70C board with 8MB PSRAM and internal antenna
<a href="#"><u>ESP32-POE-ISO-WROVER-EA</u></a>	commercial grade 0-70C board with 8MB PSRAM and ext. antenna
<a href="#"><u>BATTERY-LIPO1400mAh</u></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="#"><u>UEXT modules</u></a>	- different sensors, relays, LCDs, RTC, GSM, GPS etc accessories which can be connected to UEXT connector

# HARDWARE

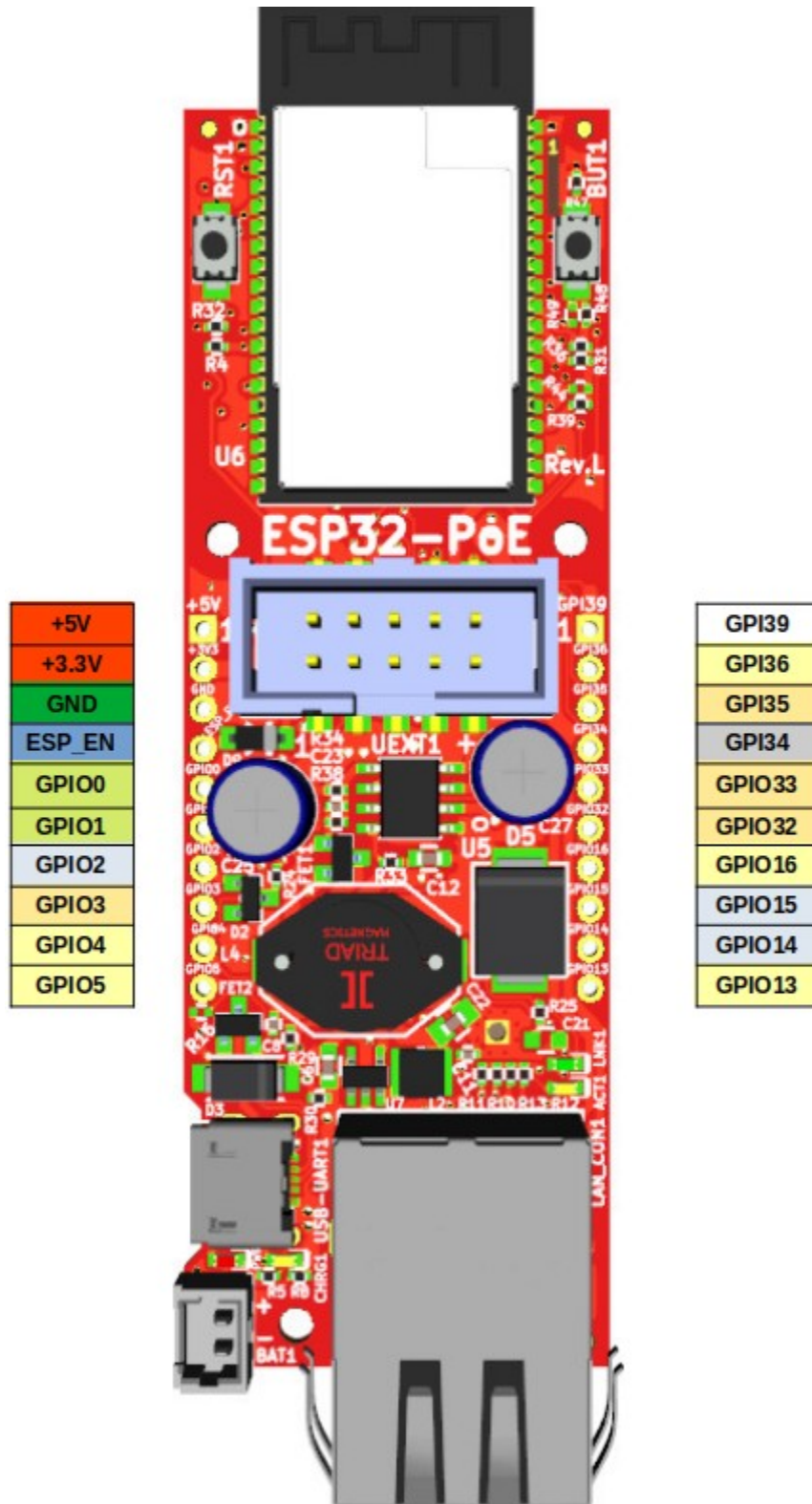
# ESP32-POE layout:



Micro SD card connector



# ESP32-POE GPIOs:



## POWER SUPPLY:

- +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 USB!
  4. when you use as output i.e. you feed external electronics from it up to 0.8A @ 5V (i.e. 4W) can be sourced maximum. This includes the 3.3V power output. The combined power must not exceed 4W.
- +3.3V** output which can source up to 0.5A @ 3.3V i.e. (1.65W) Make sure the combined power sourced from +3.3V and +5V do not exceed 4W

## 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

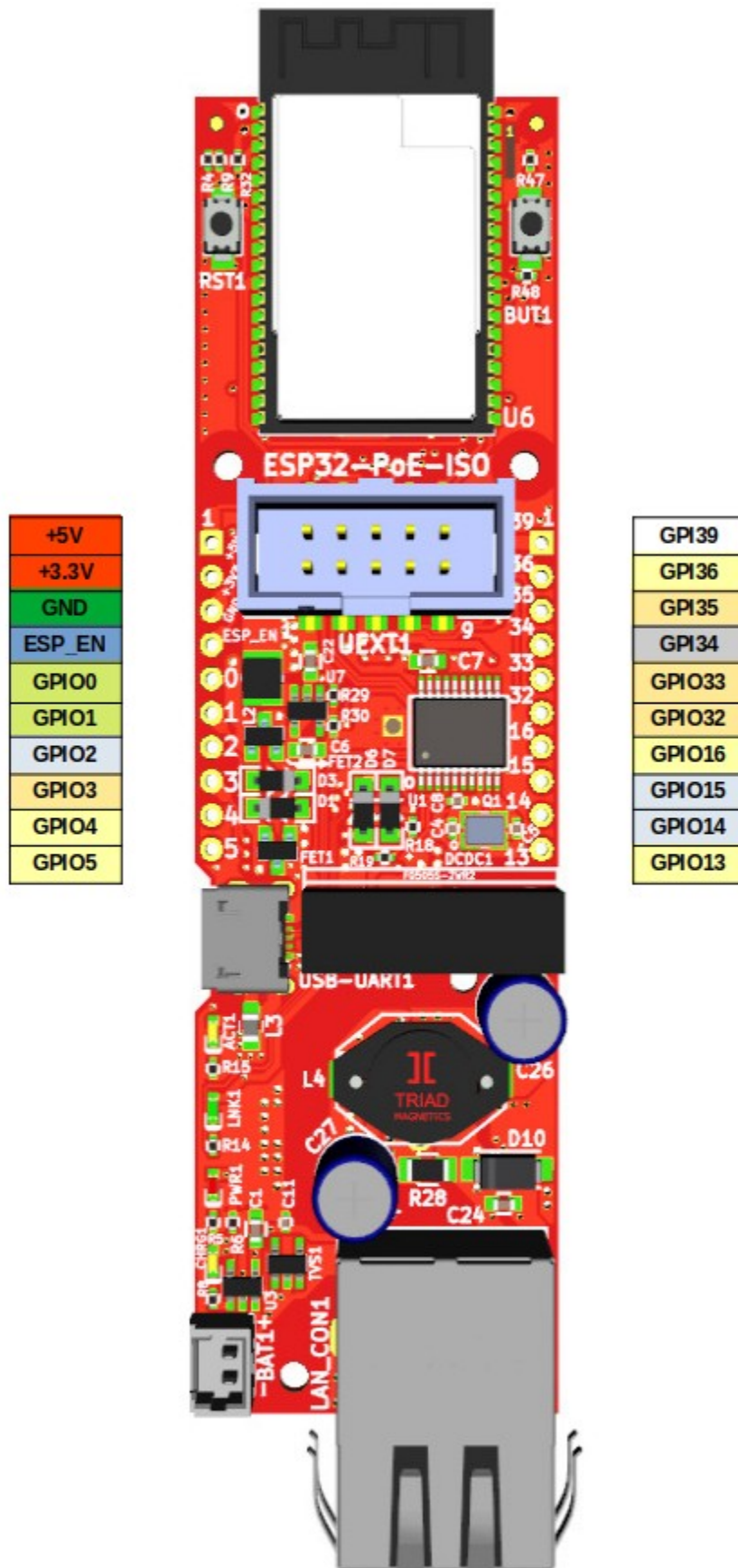
**GPIO34** is connected to used button and have 10K pullup

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



**ESP32-POE-WROVER** has no GPIO16 connected!

# ESP32-POE-ISO layout:



## ESP32-POE-ISO GPIOs:

### POWER SUPPLY:

- +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 USB!
  4. when you use as output i.e. you feed external electronics from it up to 0.2A @ 5V (i.e. 1W) can be sourced maximum. This includes the 3.3V power output. The combined power must not exceed 1W.
- +3.3V** output which can source up to 0.33A @ 3.3V i.e. (1W) Make sure the combined power sourced from +3.3V and +5V do not exceed 1W

### 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

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



**ESP32-POE-WROVER** has no GPIO16 connected!



## **ESP32-POE(-ISO) schematics:**

ESP32-POE latest schematic Rev.L is on [GitHub](#)

ESP32-POE board revision changes are on [GitHub](#)

ESP32-POE-ISO schematic Rev.L is on [GitHub](#)

ESP32-POE-ISO board revision changes are on [GitHub](#)

## ESP32-POE(-ISO) power supply:

ESP32-POE(-ISO) can be powered by 4 sources:

- Ethernet PoE
- USB-micro connector
- LiPo battery
- EXT1 pin 1 (+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-POE(-ISO) 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!!!

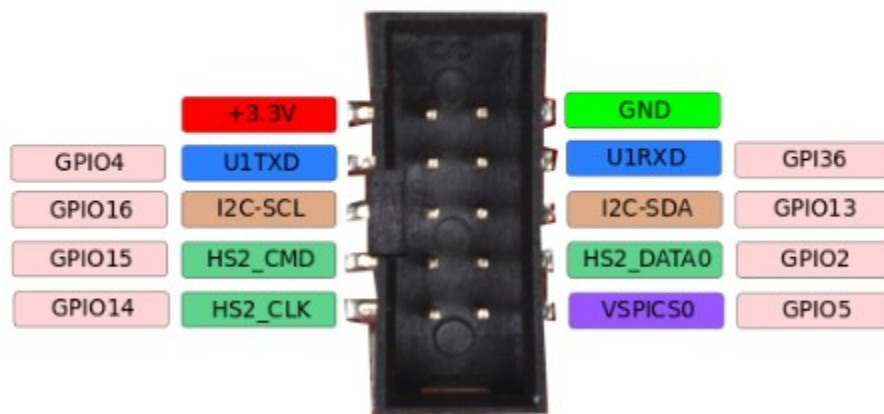
## UEXT connector:

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-POE and ESP32-POE-ISO are very popular boards and supported by

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