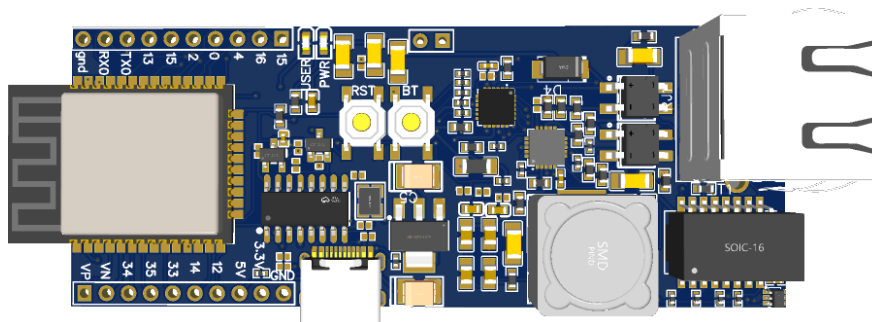## ESP32 POWER OVER ETHERNET ACTIVE BOARD DATASHEET
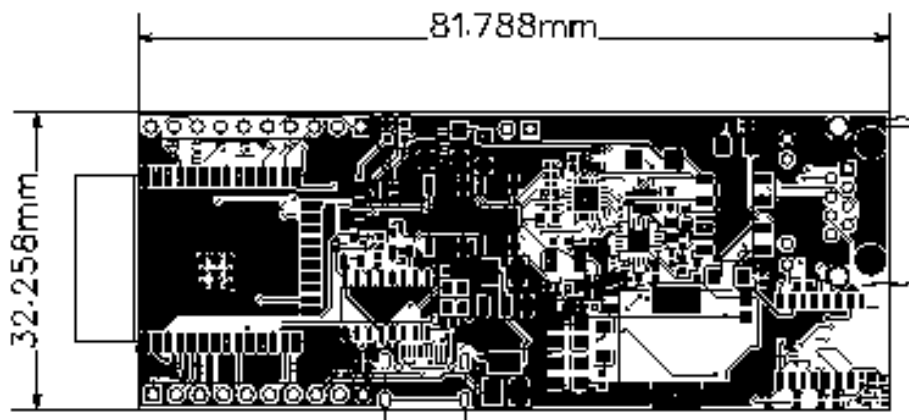
Introduction

ESP32-POE-A is a low-cost development kit for ESP32 with Active Power Over Ethernet support. The board uses LAN8720A chip for ethernet and CH340G USB-UART converter for communication with PC and programming. The board supports programming via SWDIO and SWCLK pins using for example ST-LINK programmer.
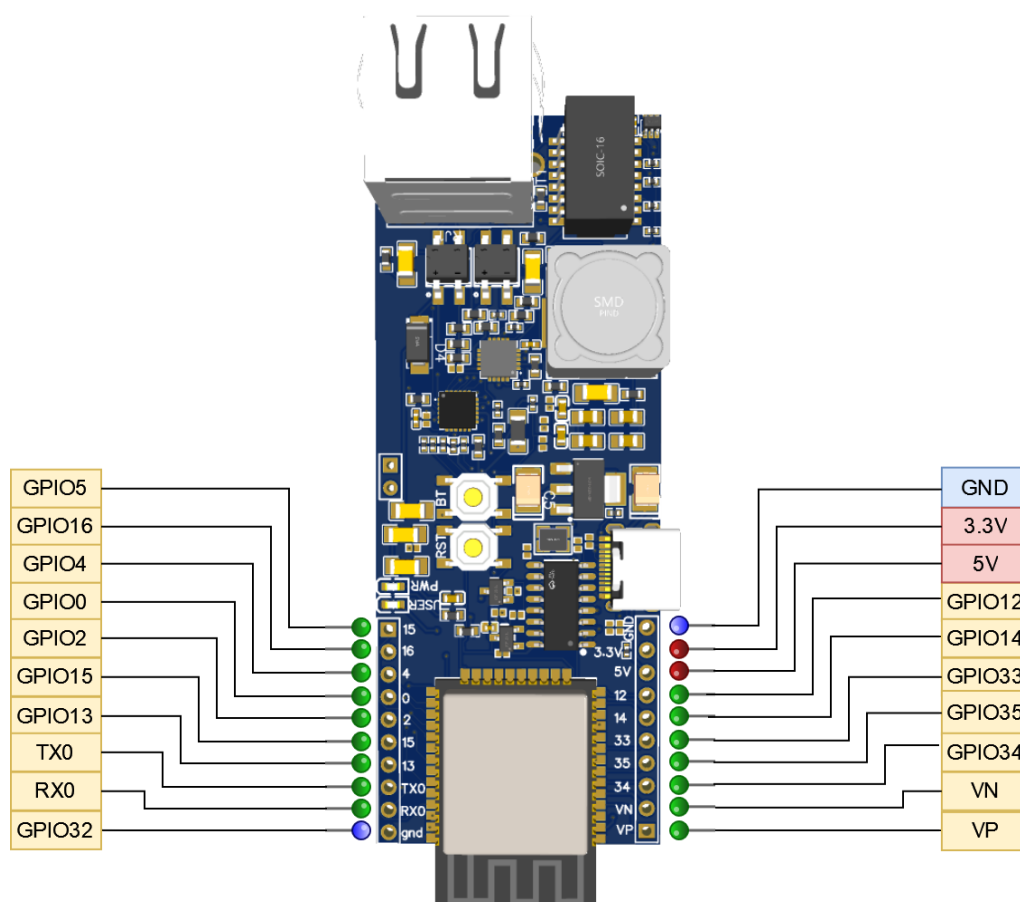
Features

- ESP32-Wroom module.
- USB-C connector.
- 17 GPIO pins are available.
- UART pins are available.
- LAN8720A chip for Ethernet.
- Si3404 for POE.
- CH340G USB-UART converter.
- POE-LED, USER-Led (GPIO2).
- Reset button and User button(GPIO0).
- Accepts power through:
    - USB
    - External source (1.8V-5V)
    - Active POE

Dimensions

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Pinout

Power over Ethernet

Power over Ethernet technology facilitates powering a Esp32-POE-A device over the same Ethernet cable as the data traffic. Compared to non-PoE devices, PoE devices feature with flexibility that allow you to easily place endpoints, sensors and drivers anywhere in the LAN or MAN, even places where it might be difficult to run a power outlet. The device is compatible with IEEE 802.3af standard (PoE can provide up to 15 W of DC power) and later IEEE 802.3at standard (PoE+ can provide up to 30 W of DC power). The POE-Jumper should be on to supply 3.3 V to ESP32 via POE. Maximum continuous operating current consumption is 600 mA.

When the Si3404 is connected via Ethernet cable to a PSE-enabled Ethernet switch, it has to provide a characteristic resistance (~25 kΩ) to the PSE in a given voltage range (2.7–10.1 V). This is called detection. After the PSE detects the PD, the PSE increases the voltage above the classification threshold 14.5 V. Then, the PD provides the classification current to inform the PSE about its required power class (Class 1, 2, 3, or 4). Type 1 PSEs cannot provide enough power for a Class 4 PD. Type 2 PSEs have additional voltage steps before switching on the PD. After an initial classification voltage pulse, the Type 2 PSE reduces the voltage below the

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mark threshold level (10 V) then raises it up again to the Class event range. Last, before switching ON the dc-dc, it reduces the voltage again.
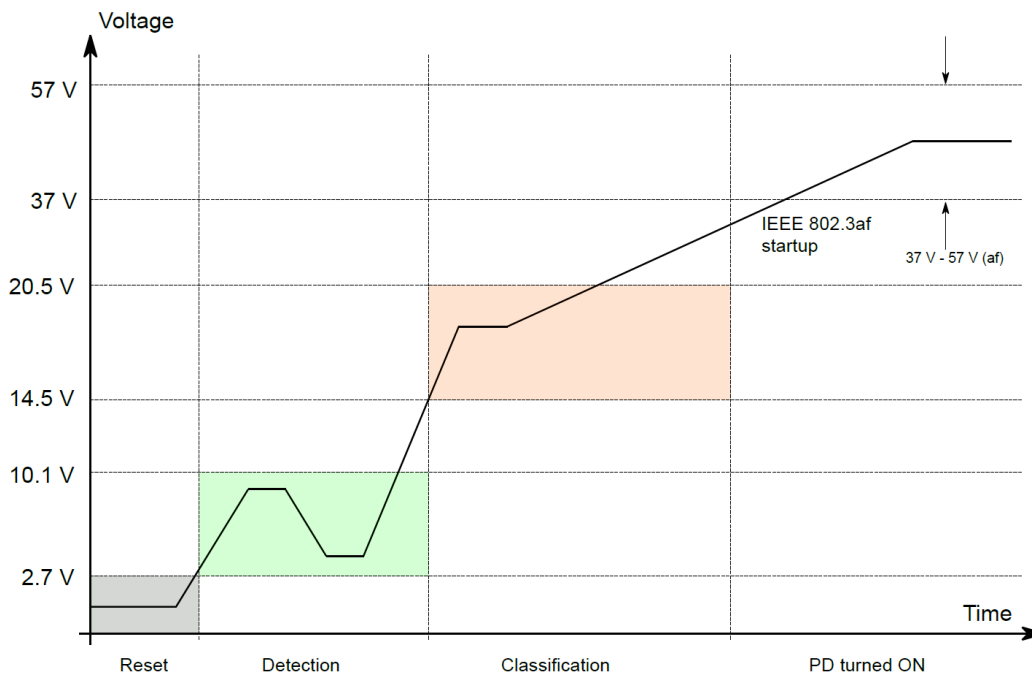
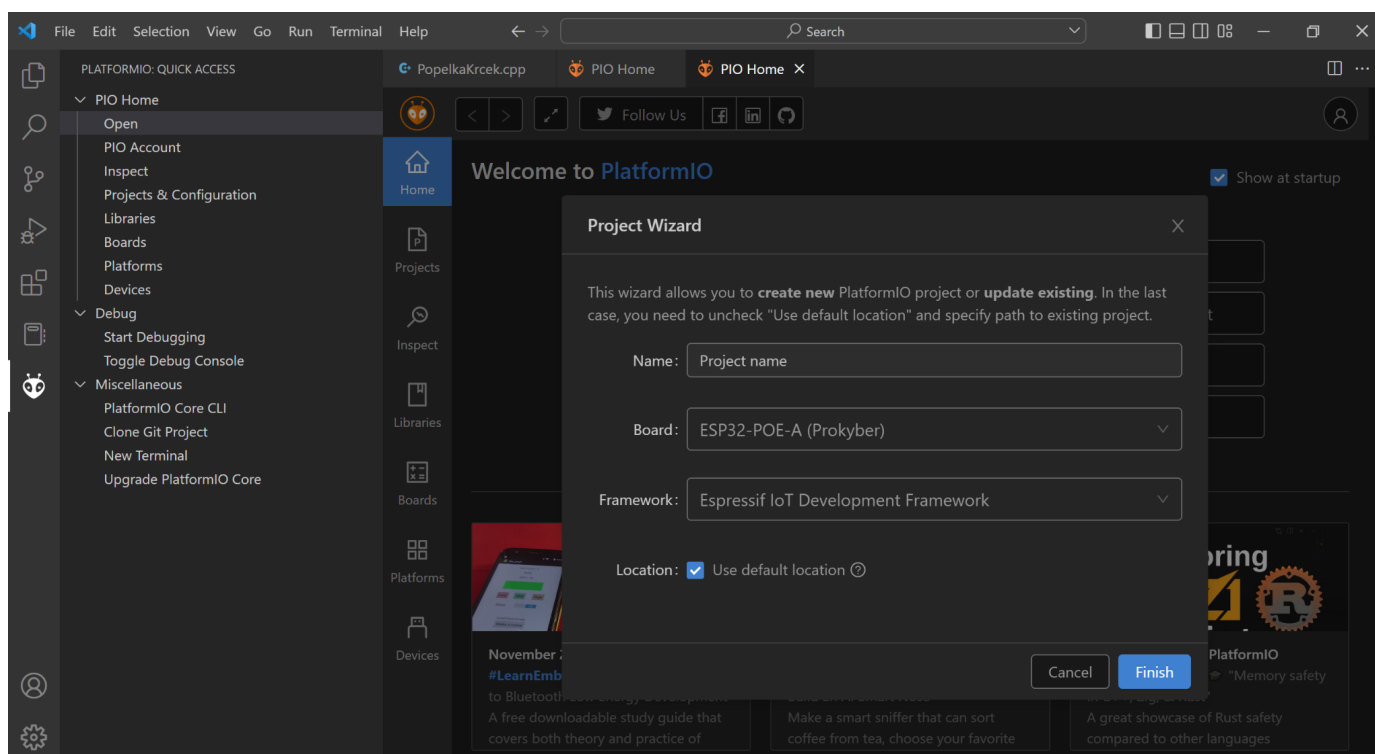<div style="border: 2px solid #8B0000; padding: 10px;">

IMPORTANT NOTICE!
There is no galvanic isolation, so the board should not be connected to POE while programming. Disconnect POE jumper or use non-POE cable and supply power via USB.

</div>

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Programming options

Using Vscode Platformio and Arduino/Espressif IoT Development Framework:

1) Open Vscode and click on the Platformio extension 'ant' icon in the left menu of the left bar (extensions sometimes take longer to load) and click on 'Open' in the 'PIO Home' menu, which will bring up the 'PIO Home' tab where you can create a new project via 'Quick Access'. This will launch the 'Project Wizard' and in it you set Name, Board: ESP-POE-A (Prokyber), Framework: 'Espressif IoT Development Framework' or 'Arduino'. If you don't see the 'ESP-POE-A (Prokyber)' board, go to the Platform installation in this document.

2) Write your code.
3) Connect the computer and the Esp32-POE-A board with a USB-C cable.

> **IMPORTANT NOTICE!**
> There is no galvanic isolation, so the board should not be connected to POE while programming.
> Disconnect POE jumper or use non-POE cable and supply power via USB.

4) Establish Serial Connection with ESP32.
5) If the PC did not recognize the connected USB device, install the driver CH340 USB-UART drivers and software or from the project repository.
6) After connection press ctrl-alt-u (upload) to compile and upload the code.

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Uploading example project

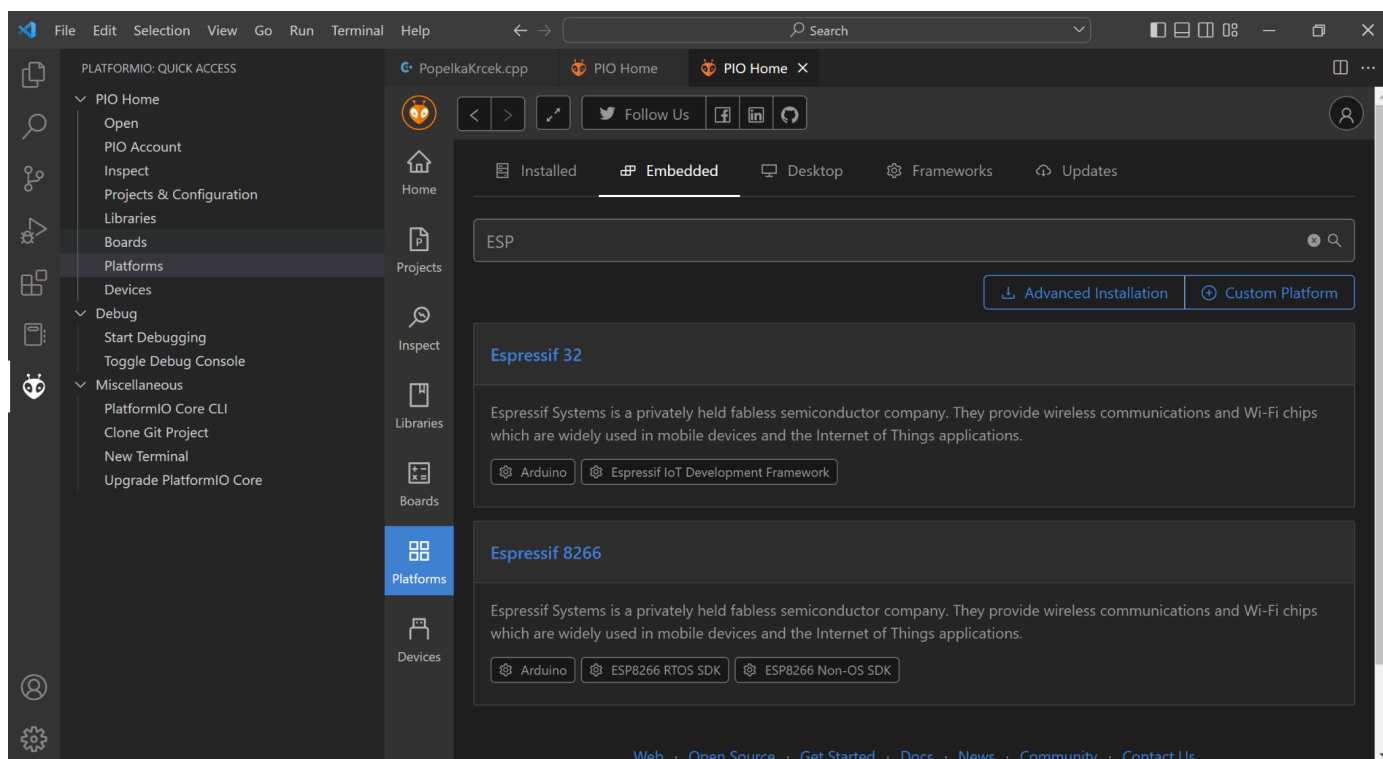For example project in Vscode IDE and Platformio extension go to:
https://github.com/prokyber/ESP32-POE-A-PlatformIO-Example

For example project in Arduino IDE go to:
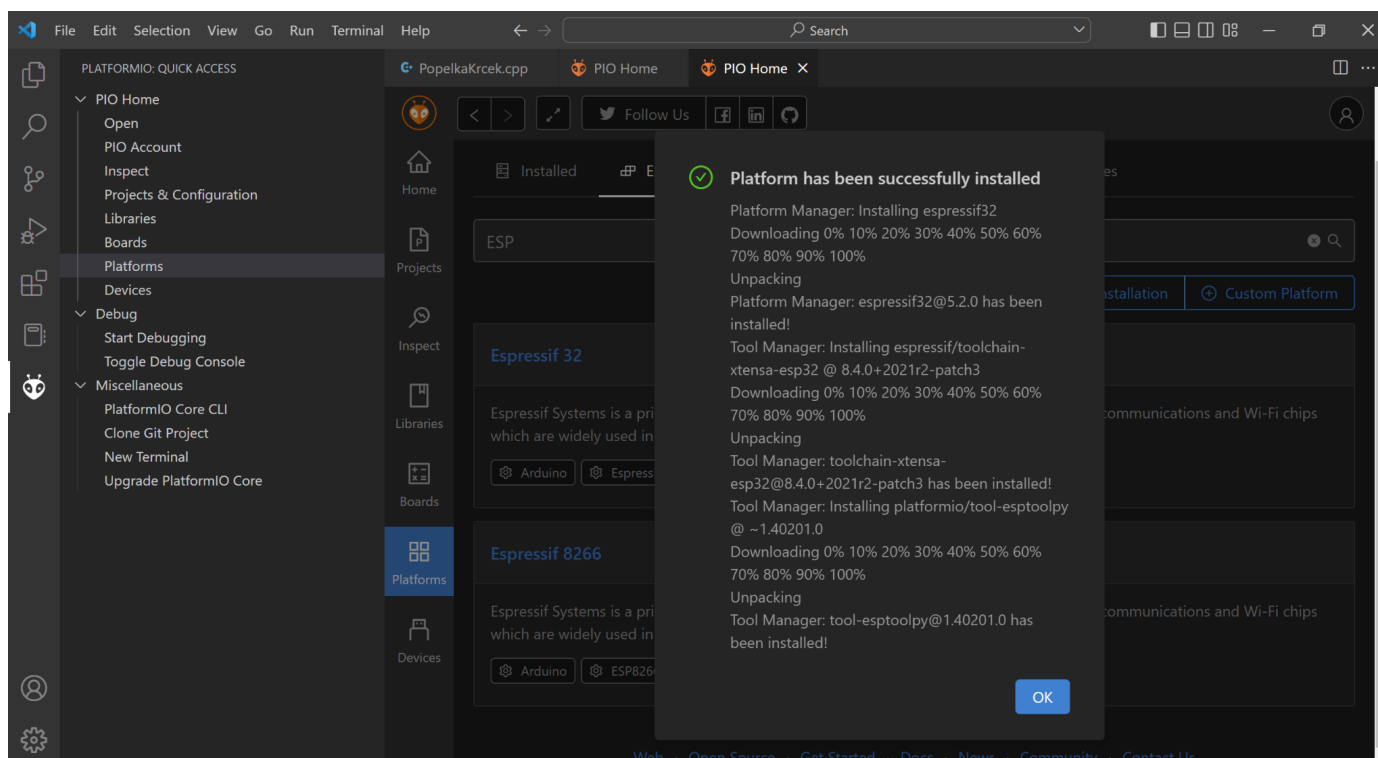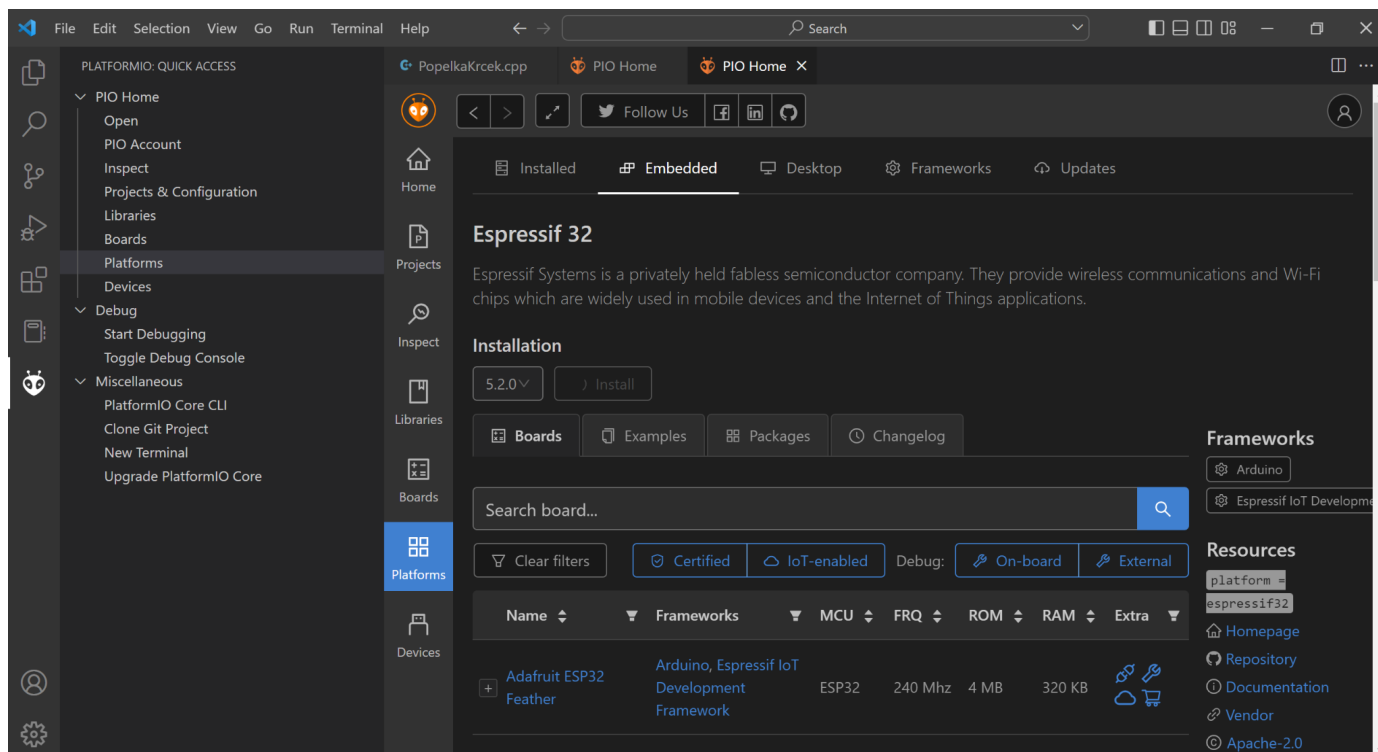https://github.com/prokyber/ESP32-POE-A-ArduinoIde-Example

Platform installation

In the case, you don't see the 'ESP-POE-A (Prokyber)' board in the Platformio 'Project Wizard' or if do you have new Visual Studio Code installation, install board/platform step by step:
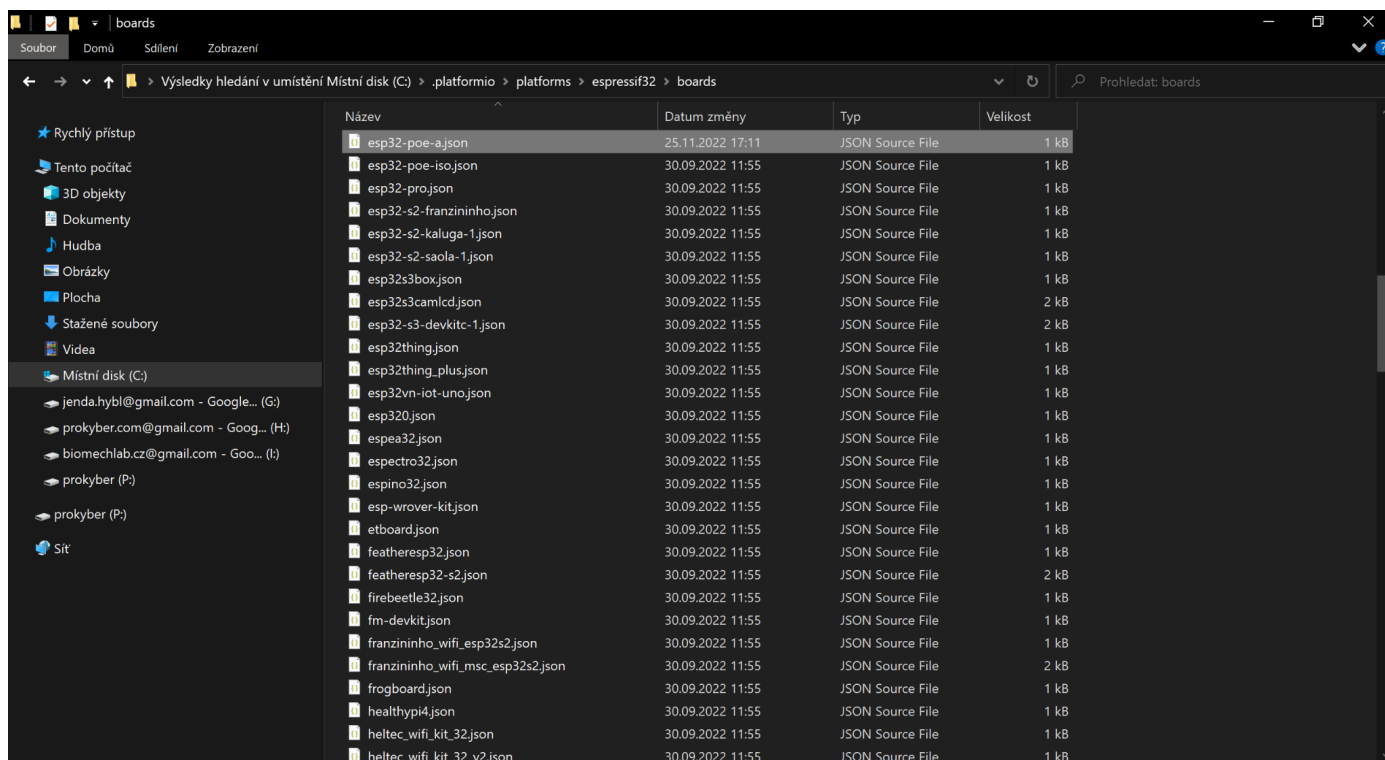
1) Open Vscode and click on the Platformio extension 'ant' icon in the left menu of the left bar (extensions sometimes take longer to load) and click on 'Platforms'. Type 'ESP' and click Espressif 32 blue text.

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2) Install Espressif 32 and wait until installation finishes

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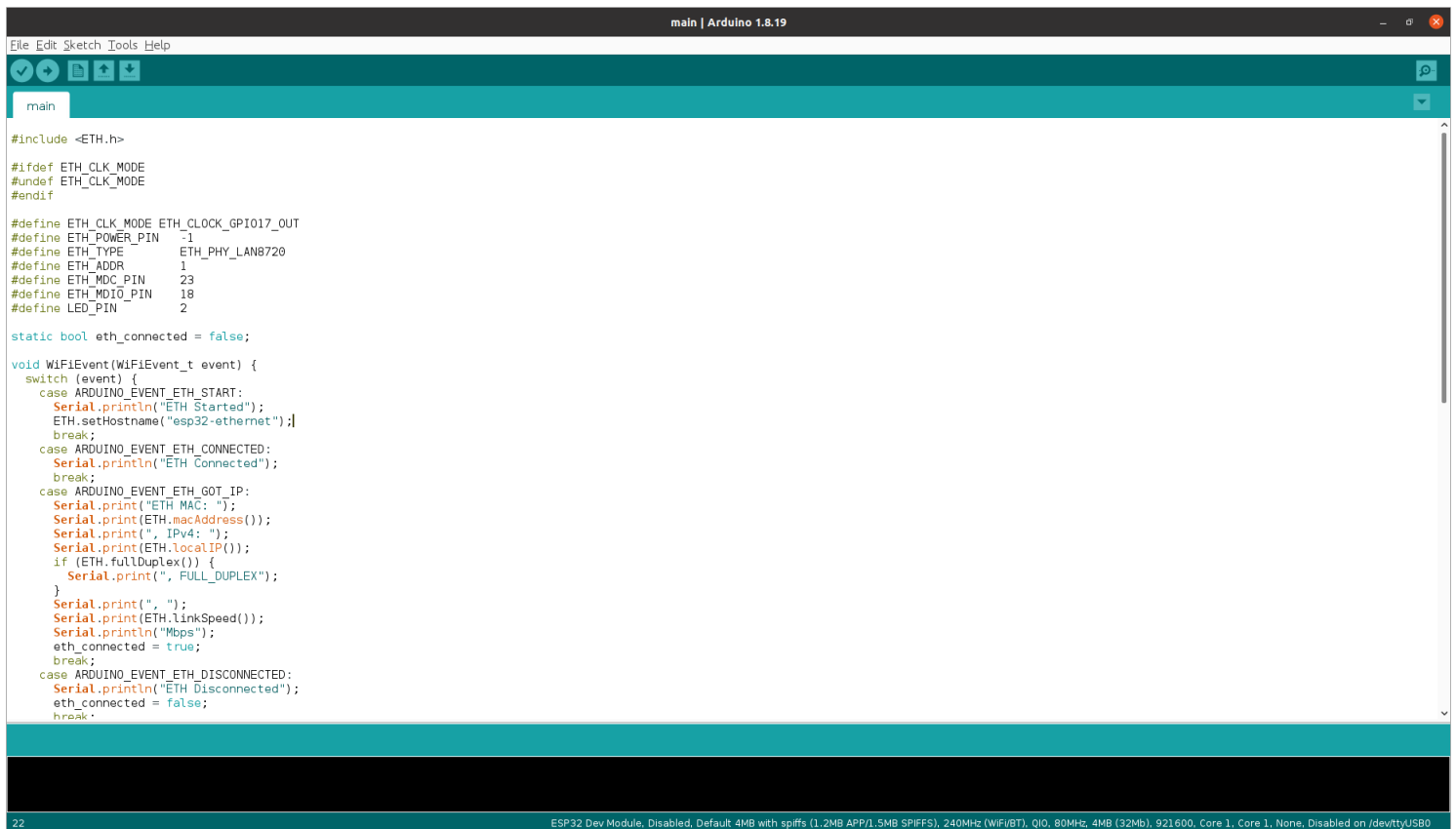www.prokyber.cz
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3) Copy 'esp32-poe-a.json' file to the '.platformio' directory in your home folder:
   a) Linux: .platformio/platforms/espressif32/boards
   b) Windows: C:\Users\user\.platformio\platforms\espressif32\boards

If you use Arduino IDE:

1)open your project(or example project from https://github.com/prokyber/ESP32-POE-A-ArduinoIde-Example)

2)Go to Tools->Board->Esp32 Arduino->Esp32 Dev Module. This will set the board to 'Esp32 Dev Module'.

3)Upload your code using upload button.

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