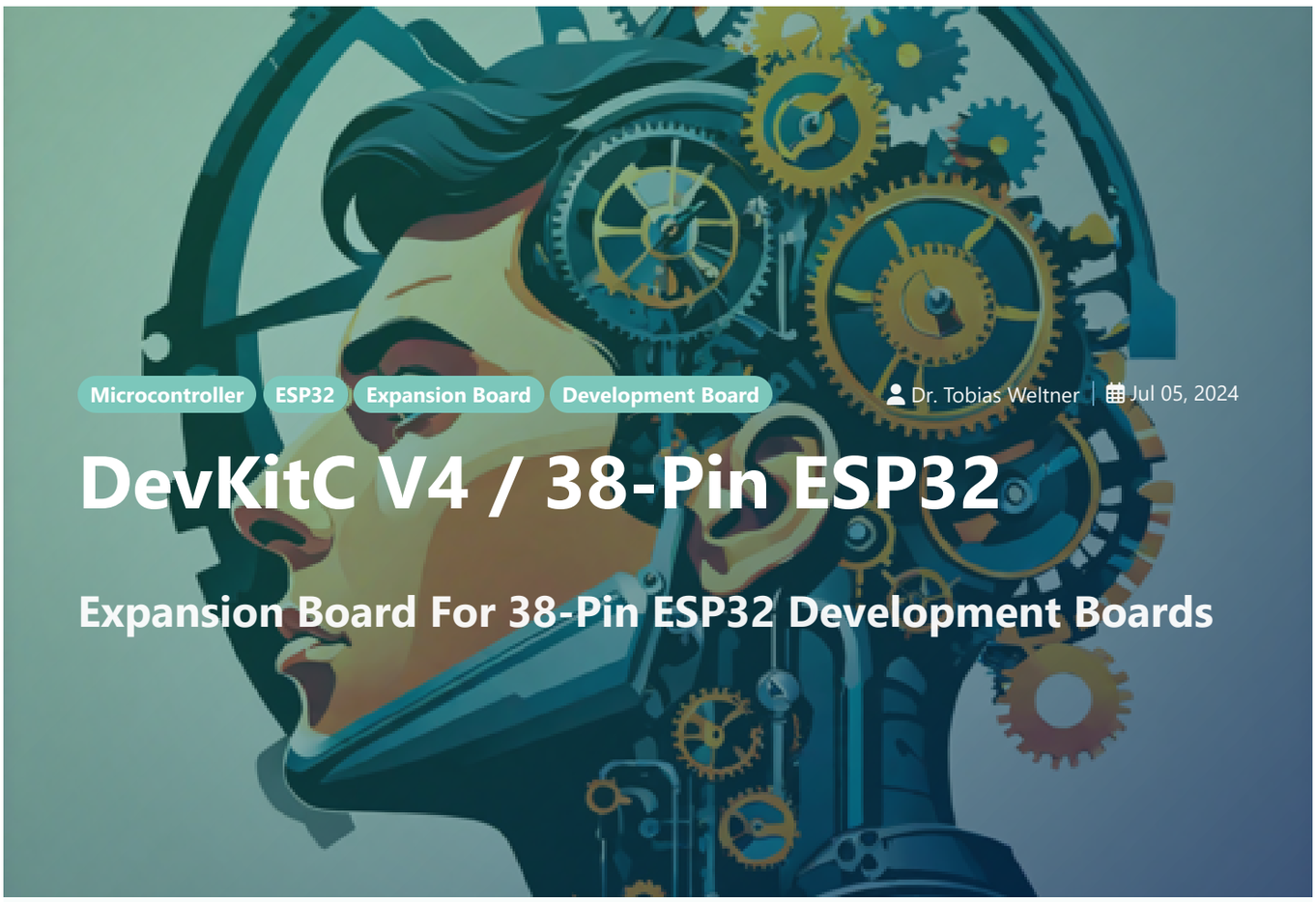


Microcontroller ESP32 Expansion Board Development Board

Dr. Tobias Weltner | Jul 05, 2024

DevKitC V4 / 38-Pin ESP32

Expansion Board For 38-Pin ESP32 Development Boards

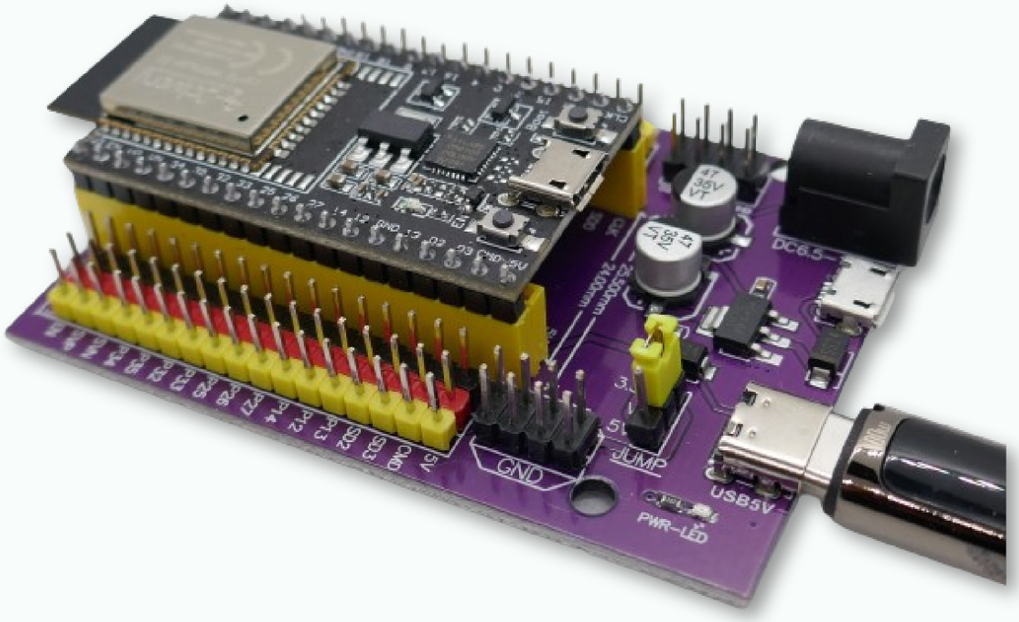
38-pin development boards are especially well suited to experiment with all *ESP32S* features as they provide access to almost every microcontroller pin.

At the same time, it makes such boards exceptionally large and a primary target for using *expansion boards* instead of *classic breadboards*.

ESP32S 38P/V4/Goouu Expansion Board

This *expansion board* is suited for most *38pin ESP32S* boards with a width of *24mm* or *25.5mm* (which is why there are *three* pin rows):

This *expansion board* was originally designed for the *ESP32 DevKitC V4* which has a width of *25.5mm* and plugs into the two outer pin rows, with the antenna facing outwards.



Caveats

There are two caveats to watch out for when using this board:

Firmware Upload

You cannot use the *USB connectors* on this board to upload firmware to the microcontroller. The USB connectors on the *expansion port* are solely used to supply power.

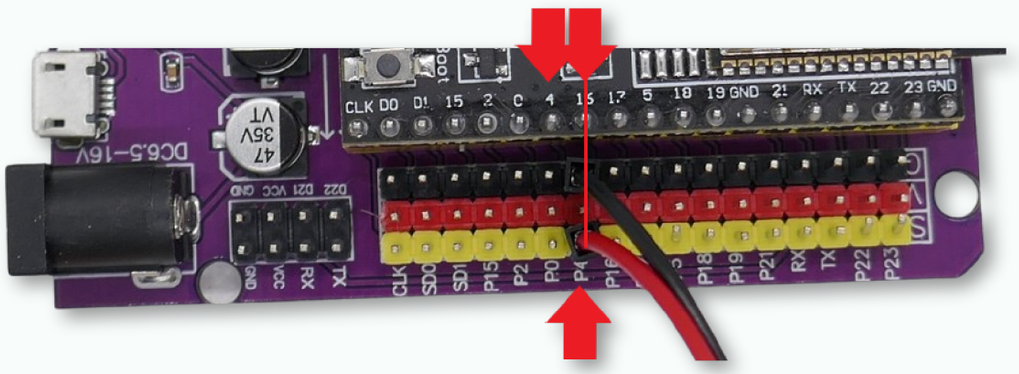
When you want to upload new firmware to the microcontroller via USB, you need to use the original USB connector on the *development board*, and **not** the USB connectors on the *expansion board*.

> The recommended way generally is to enable *OTA* (*over-the-air*) updates on your microcontroller so you can upload new firmware wirelessly. The easiest way to enable *OTA* is to use **ESPHome**.

Pin Offset

The pins on the *expansion board* do not exactly align with the pins on the *development board*. This can easily lead to wrongly connected wires when you connect wires based on the *development board labels*.

Here is an example:



The pin *GPIO4* on the *development board* surfaces slightly offset to the right as *P4* on the *expansion board*, and when you connect wires, you could easily connect the wire wrongly to *P0* (*GPIO0*) when in reality you want to connect to *GPIO4*.

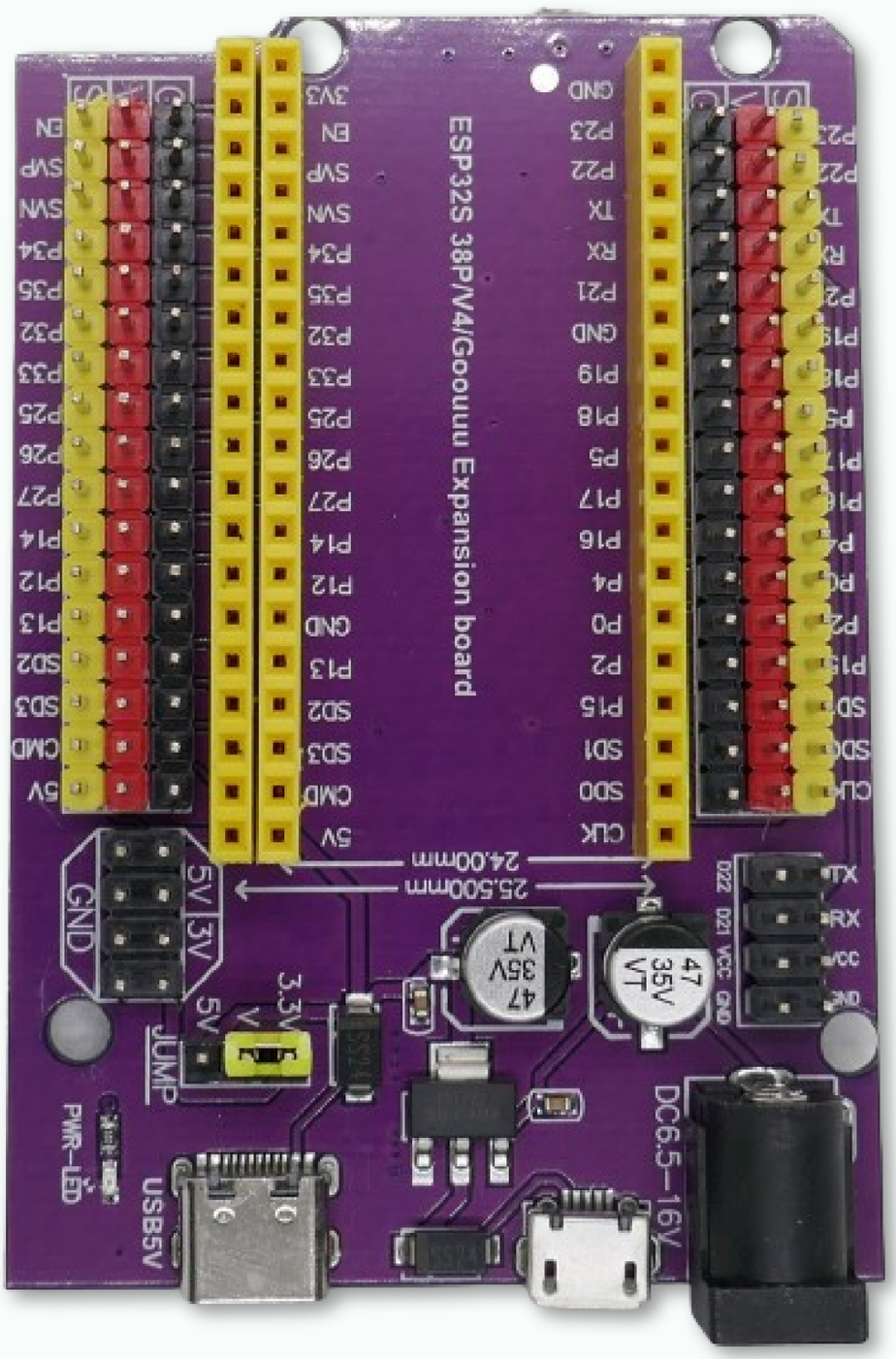
> When using *expansion boards*, make it a habit to always conform to the labels printed on the *expansion board* only.

Aside from the offset, another benefit of *expansion boards* is their better PCB quality: labels are much more readably marked compared to many *development boards*.

Dedicated Power Supply Pins

What sets this board apart from most others are the dedicated *red and black* power supply pins per *GPIO*:

Each *GPIO* is exposed via a *yellow* male pin that is accompanied by a *red* and a *black* power supply pin. Being able to route power to any component right at the pin level reduces wires and clutter.



Selecting Component Voltage

Components require either *3.3V* or *5V* - which is why you can choose the voltage supplied by the *red* pins. A jumper controls this voltage:

- **3.3V:** When the jumper is set to the *3.3V* position, then the *3.3V output* from the plugged in development board is routed to the *red* pins.
- **5V:** When the jumper is set to the *5V* position, then the *extension boards' 5V* is available at all *red* pins.
- **Custom:** When no jumper is used, then all *red* pins are disconnected. More precisely, they are connected to the *middle* pin of the jumper terminal. To route *custom* signals to the *red* pins, connect the desired signal to this *middle pin*.

> Since the *expansion board* is not producing *3.3V*, the maximum current for *3.3V* depends entirely on the built-in voltage regulator on the development board you plugged in.

Additional Pins

VCC (*3.3V*), *GND*, *RX*, and *TX* are exposed via a separate pin pad.

Power Supply

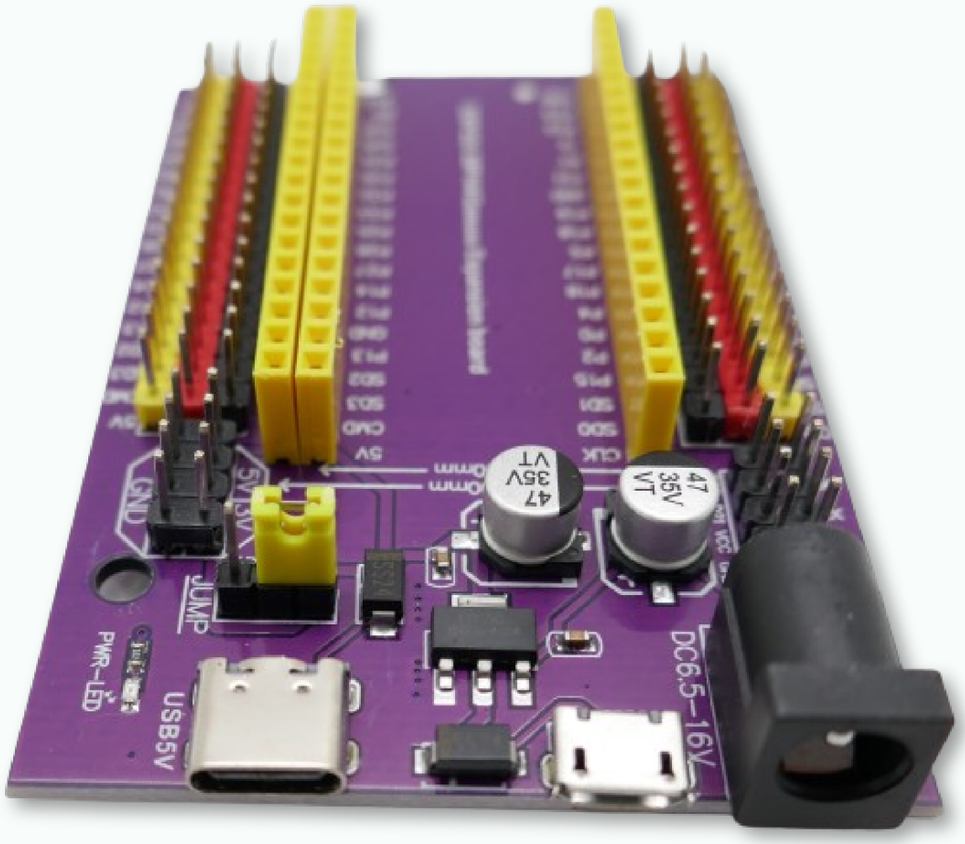
The board comes with a solid *800mA 5V* **LD1117C50** voltage regulator that can be powered by a *USB-C* or *Micro-USB* connector, or a round *DC plug*. It accepts input voltage up to *15V*.

Microcontroller Supply

The board supplies *5V* to the microcontroller, and in turn draws power from its *3.3V* output pin.

Two dedicated *5V* auxiliary pins are powered directly off the voltage regulator, and two dedicated *3.3V* auxiliary pins are powered by the microcontroller board.

> As mentioned, the *jumper* controls the voltage routed to the *red* pins.



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