

# ESP-Prog

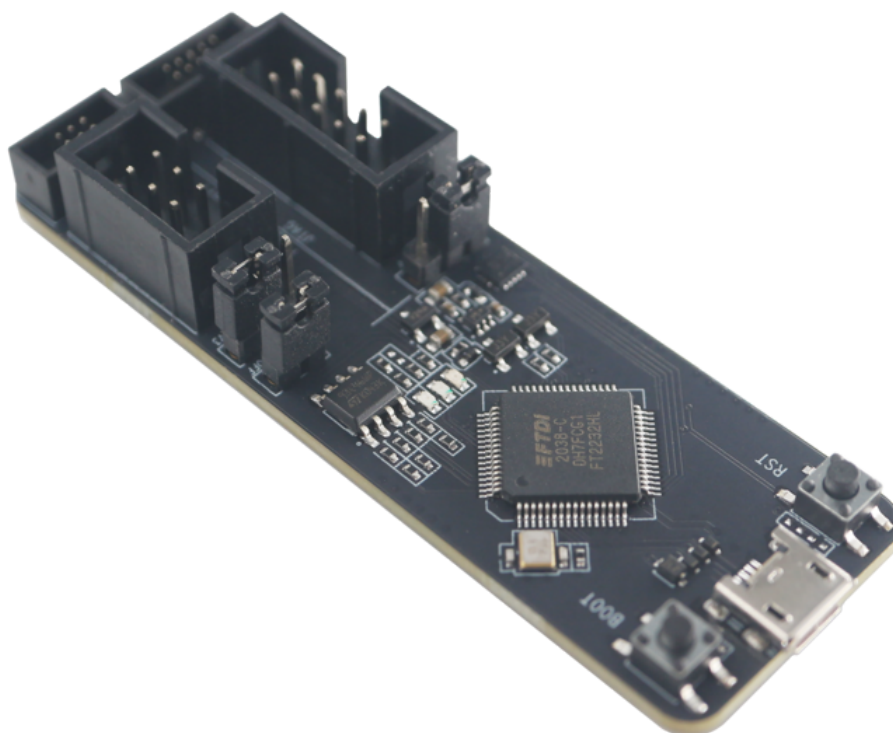
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This user guide will help you get started with ESP-Prog and will also provide more in-depth information.

ESP-Prog is one of Espressif's development and debugging tools, with functions including automatic firmware downloading, serial communication, and JTAG debugging. ESP-Prog's automatic firmware downloading and serial communication functions are supported on ESP8266, ESP32, ESP32-S2, ESP32-S3, and ESP32-C3, while the JTAG debugging is supported only on ESP32, ESP32-S2, ESP32-S3, and ESP32-C3.

ESP-Prog can be easily connected to a PC with the use of only one USB cable. Then, the PC can identify the board's Program and JTAG interfaces (functions) by their port numbers.

Given that the power supply voltage may vary on different user boards, either of the ESP-Prog interfaces can provide 5 V or 3.3 V power supply through pin headers, in order to ensure power compatibility. Power on ESP-Prog could be toggled between 3.3 V and 5 V, but the RX/TX & JTAG signals will always be at the 3.3 V level.



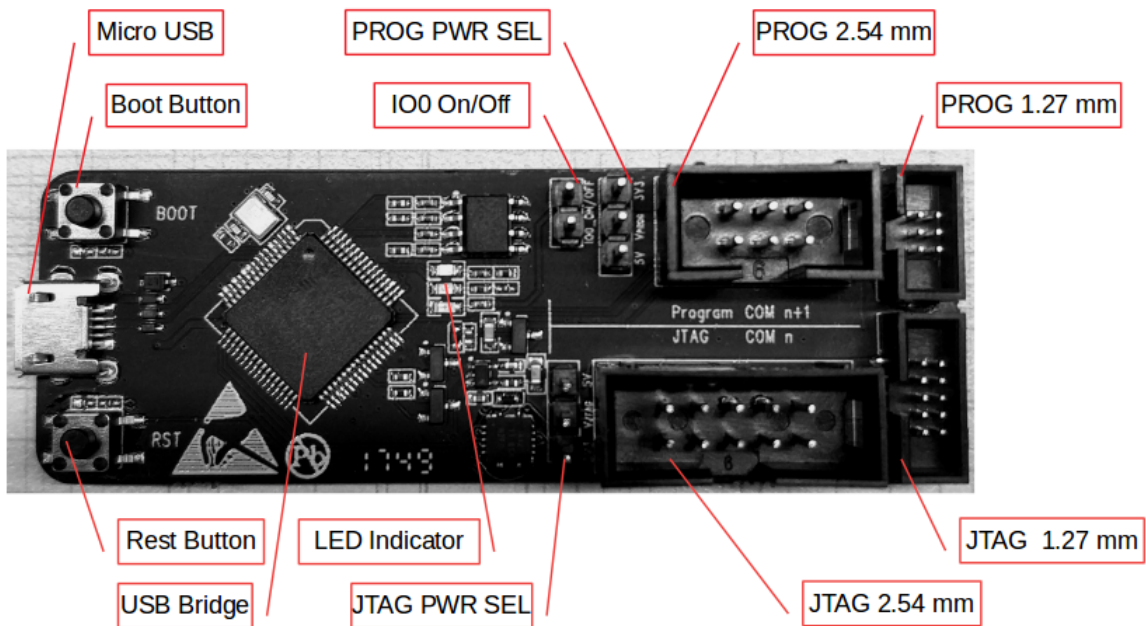
The document consists of the following major sections:

- [Getting started](#): Overview of the board and hardware/software setup instructions to get started.
- [Hardware Reference](#): More detailed information about the board's hardware.
- [Related Documents](#): Links to related documentation.

## Getting Started

This section provides a brief introduction of ESP-Prog on how to do the initial hardware setup.

## Description of Components



ESP-Prog - front (click to enlarge)

The key components of the board are described in a clockwise direction.

Key Component	Description
Micro USB	Interface between PC and ESP-Prog.
Boot Button	Download button. Holding down boot and then pressing reset initiates Firmware
IO0 On/Off	Pin Header to set the state of GPIO0 strapping pin.
PROG PWR SEL	Pin Header to select power input for the Program interface.
PROG 2.54 mm	Program interface with 2.54 mm (0.1") pin pitch.
PROG 1.27 mm	Program interface with 1.27 mm (0.05") pin pitch.
JTAG 1.27 mm	JTAG interface with 1.27 mm (0.05") pin pitch.

Key Component	Description
JTAG 2.54 mm	JTAG interface with 2.54 mm (0.1") pin pitch.
JTAG PWR SEL	Pin Header to select power input for the JTAG interface.
LED Indicator	LED to indicate ESP-Prog state. There are three LED modes: red, green, and blue.
USB Bridge	Single USB-to-UART bridge chip provides up to 3 Mbps of transfer rate.
Reset Button	Press this button to restart the system.

## Start Application Development

Before powering up your board, please make sure that it is in good condition with no obvious signs of damage.

## Required Hardware

- ESP-Prog
- USB 2.0 cable (Standard-A to Micro-B)
- Computer running Windows, Linux, or macOS
- Dupont lines or flat cables provided by Espressif for connecting the development board to

◀ ESP-Prog ▶

### Note

Be sure to use an appropriate USB cable. Some cables are for charging only and do not provide the needed data lines nor work for programming the boards.

## Hardware Setup

1. Connect the ESP-Prog board and the PC USB port via a USB cable.
2. The PC then detects the two ports of ESP-Prog, indicating that the board is connected successfully. If the ports are not detected install the [FT232HL chip driver](#) on your PC.
3. Select the output power voltage for the Program/JTAG interfaces, using PROG PWR SEL/JTAG PWR SEL pin headers.
4. Connect the ESP-Prog and ESP user board with the flat cables provided by Espressif.
5. Start programming (downloading) or JTAG debugging, using the official software tools or scripts provided by Espressif.

## Software Setup

Please proceed to [Get Started with ESP-IDF](#), where Section [Installation Step by Step](#) will quickly help you set up the development environment.

# Contents and Packaging

## Retail Orders

Each ESP-Prog board comes in an individual package.



*ESP-Prog Package Contents*

The contents are as follows:

- Development board

ESP-Prog

- Cables

**Two flexible flat cables:**

- One cable to connect to 2\*5-PIN 2.54 mm male shrouded box header.
- One cable to connect to 2\*3-PIN 1.27 mm male shrouded box header.

If you order a few samples, each board comes in an individual package in either antistatic bag or any packaging depending on your retailer.

For retail orders, please go to <https://www.espressif.com/en/company/contact/buy-a-sample>.

## Wholesale Orders

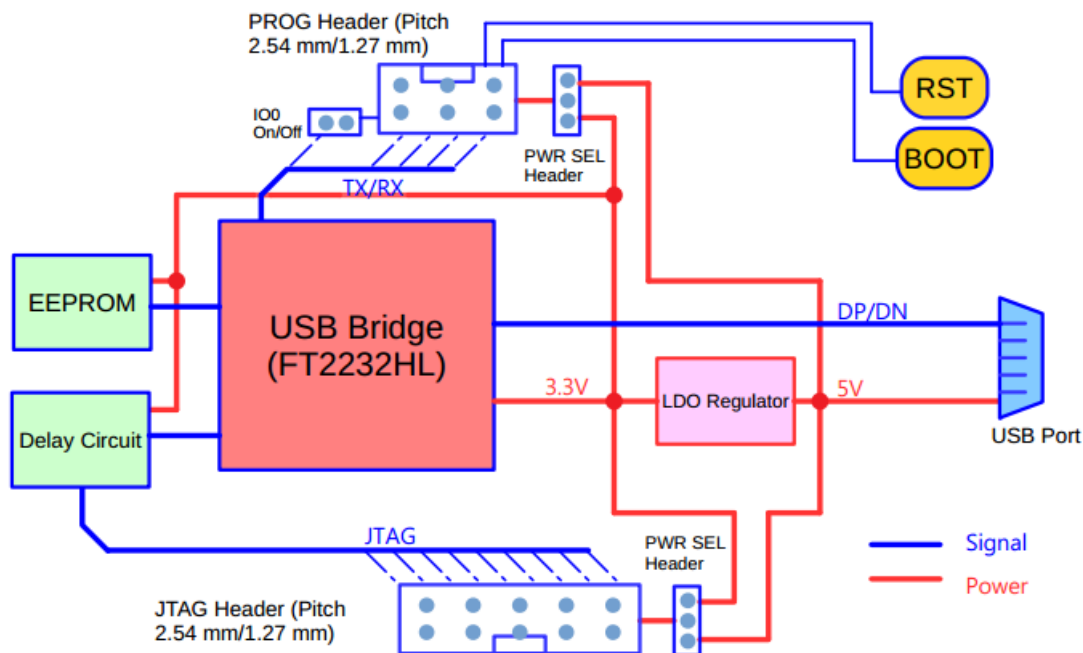
If you order in bulk, the boards come in large cardboard boxes.

For wholesale orders, please go to <https://www.espressif.com/en/contact-us/sales-questions>.

## Hardware Reference

### Block Diagram

The block diagram below shows the components of ESP-Prog and their interconnections.



ESP-Prog Block Diagram (click to enlarge)

## Power Supply Options

There are three mutually exclusive ways to provide power to the board:

- ESP-Prog USB Port, default power supply (recommended)
- 5 V and G (GND) pins
- 3.3 V and G (GND) pins

## Header Block

The two tables below provide the **Name** and **Function** of the pins on both sides of the board (Program Interface and JTAG Interface). The pin names are shown in the front view of the ESP-Prog board. The numbering is the same as in the [ESP-Prog Schematic](#) (PDF).

### Program Interface

No.	Name	Function
1	ESP_EN	Enable signal
2	VDD	Power supply
3	ESP_TXD	TX pin
4	GND	Ground
5	ESP_RXD	RX pin
6	ESP_IOO	Strapping pin

### JTAG Interface

No.	Name	Function
1	VDD	Power supply
2	ESP_TMS	JTAG TMS pin, mode selection
3	GND	Ground
4	ESP_TCK	JTAG TCK pin, clock input
5	GND	Ground
6	ESP_TDO	JTAG TDO pin
7	GND	Ground
8	ESP_TDI	JTAG TDI pin
9	GND	Ground
10	NC	None

## Related Documents

- [ESP-Prog Schematic](#) (PDF)
- [ESP-Prog PCB Layout](#) (PDF)
- [ESP-Prog Dimensions](#) (PDF)

For further design documentation for the board, please contact us at [sales@espressif.com](mailto:sales@espressif.com).

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