

HiLetgo 3-01-1287

HiLetgo ESP-WROOM-32 ESP32-S Development Board User Manual

Model: ESP-WROOM-32 ESP32-S

Brand: HiLetgo

1. INTRODUCTION

This manual provides essential information for the HiLetgo ESP-WROOM-32 ESP32-S Development Board. This board integrates 2.4GHz Dual-Mode WiFi and Bluetooth capabilities, making it suitable for a wide range of IoT and embedded projects. It features a dual-core microcontroller processor and is designed for ease of use with development environments like the Arduino IDE.

The ESP32-S module includes integrated antenna switches, RF balun, power amplifiers, low-noise amplifiers, filters, and power management modules, optimizing PCB area and power efficiency. It utilizes TSMC Ultra-low power consumption 40nm technology for reliable performance.

2. KEY FEATURES

- 2.4GHz Dual-Mode WiFi + Bluetooth connectivity.
- Ultra-low power consumption.
- Compatible with Arduino IDE.
- Supports LWIP protocol and FreeRTOS.
- Supports three operational modes: Access Point (AP), Station (STA), and AP+STA.
- Integrated antenna, RF AMP, and filter.

3. SETUP GUIDE

3.1. Software Installation (Arduino IDE)

1. **Install Arduino IDE:** Download and install the latest version of the Arduino IDE from the official Arduino website.
2. **Add ESP32 Board Manager URL:**
 - Open Arduino IDE.
 - Go to **File > Preferences**.

- In the "Additional Board Manager URLs" field, add: https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json
- Click **OK**.

3. Install ESP32 Boards:

- Go to **Tools > Board > Boards Manager...**
- Search for "ESP32" and install the "ESP32 by Espressif Systems" package.

4. Select Board:

- Go to **Tools > Board > ESP32 Arduino**
- Select **Node32s** or a similar ESP32 Dev Module option.

5. **Install USB Driver:** If your computer does not recognize the board, you may need to install the CP2102 USB to UART Bridge VCP Driver. Search online for "CP2102 driver" and download from Silicon Labs' official website.

3.2. Connecting the Board

Connect the HiLetgo ESP-WROOM-32 ESP32-S Development Board to your computer using a micro-USB cable. Ensure the cable is capable of data transfer, not just charging.

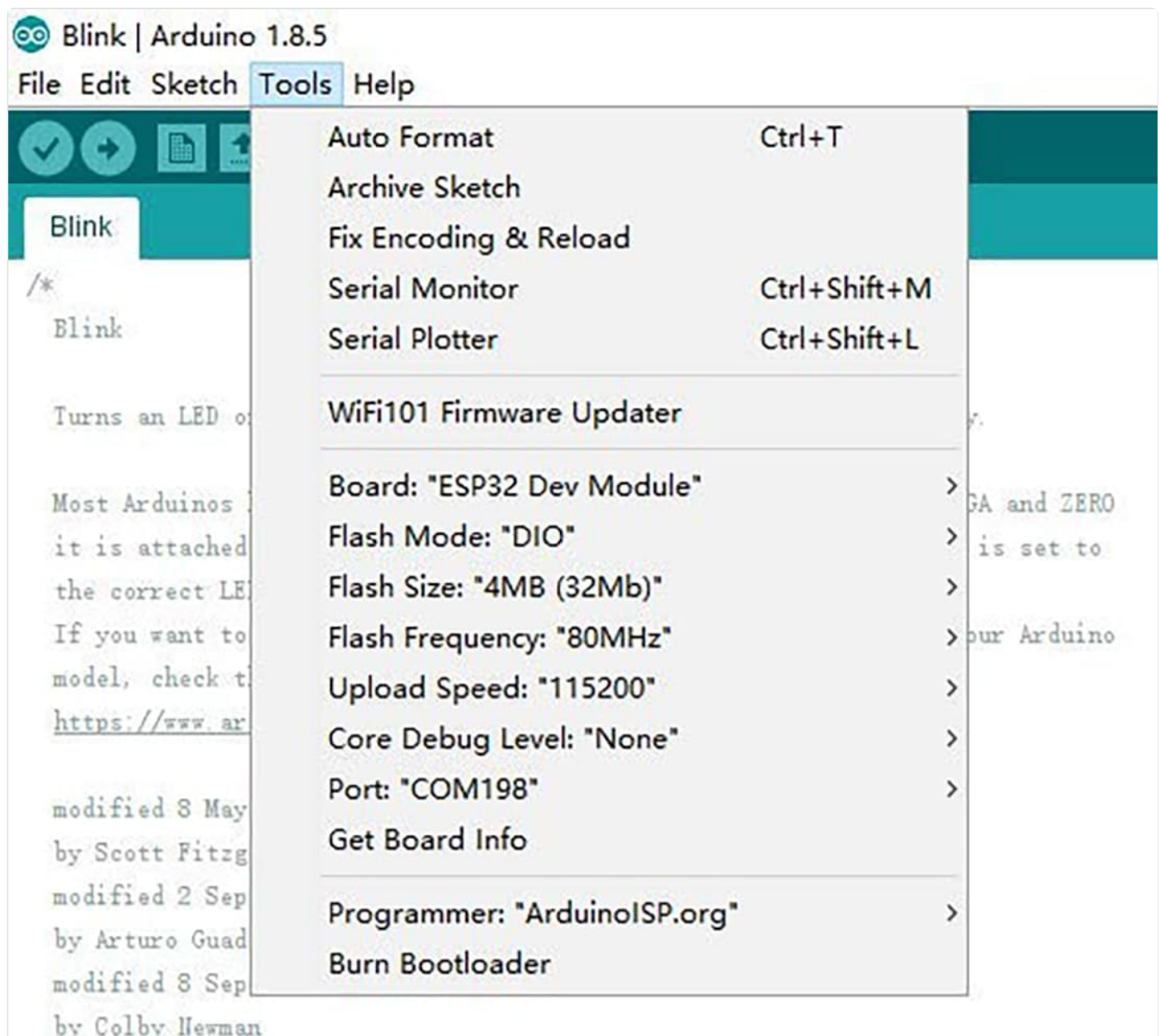


Figure 3.2.1: Arduino IDE Tools menu showing board selection and port settings.

4. OPERATING INSTRUCTIONS

4.1. Basic Programming (Blink Example)

1. **Open Example Sketch:** In Arduino IDE, go to **File > Examples > 01.Basics > Blink**
2. **Modify for ESP32:** The built-in LED on the HiLetgo ESP32 board is typically connected to GPIO2. Change the LED pin definition in the Blink sketch from `LED_BUILTIN` to `2`.

```
void setup() {  
  pinMode(2, OUTPUT); // Set GPIO2 as an output  
}  
  
void loop() {  
  digitalWrite(2, HIGH); // Turn the LED on  
  delay(1000);           // Wait for a second  
  digitalWrite(2, LOW);  // Turn the LED off  
  delay(1000);           // Wait for a second  
}
```

3. **Select Port:** Go to **Tools > Port** and select the COM port corresponding to your ESP32 board.
4. **Upload Sketch:** Click the **Upload** button (right arrow icon) in the Arduino IDE. During upload, you might need to press and hold the **BOOT** button (often labeled "IO0") on the ESP32 board until the upload process begins, then release it.
5. **Verify:** The onboard LED should start blinking at one-second intervals.

4.2. GPIO Pin Reference

When referencing GPIO pins in your code, use the numerical value directly. For example, to set GPIO13 high, use `digitalWrite(13, HIGH)`.

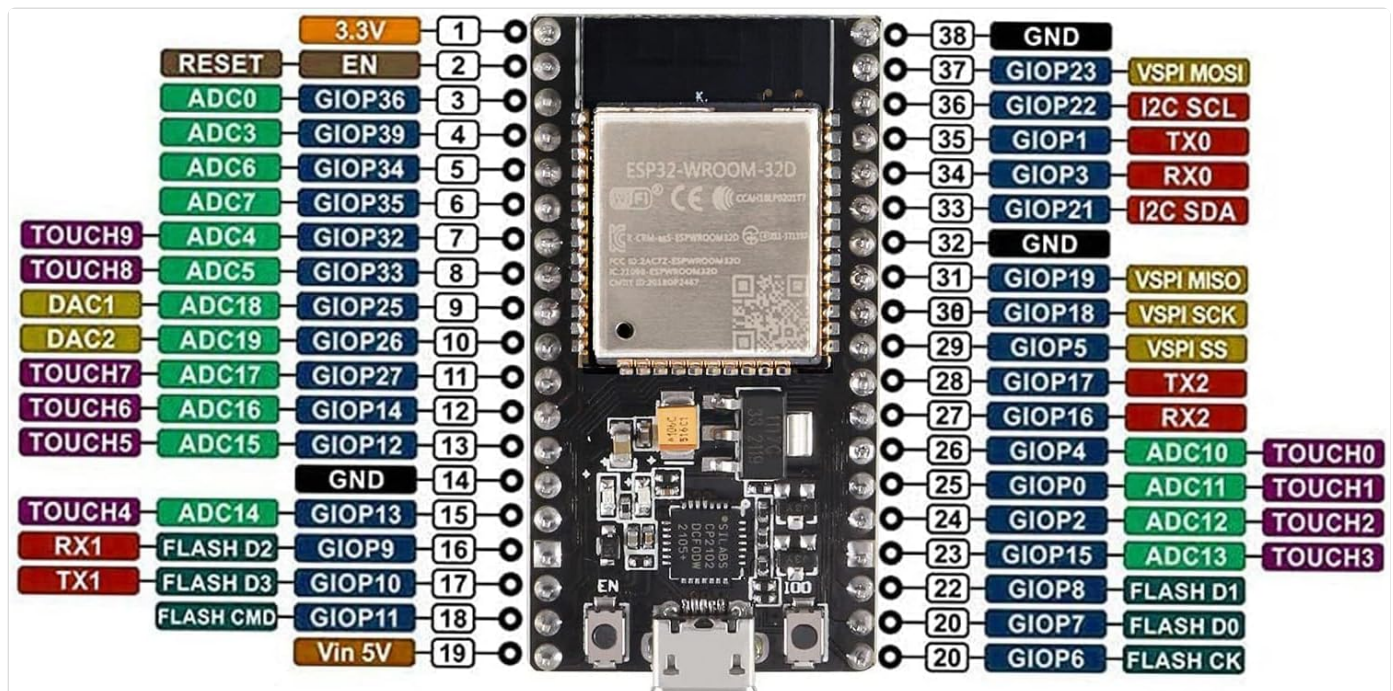


Figure 4.2.1: Pinout diagram of the ESP32-S Development Board.

PIN DEFINITION

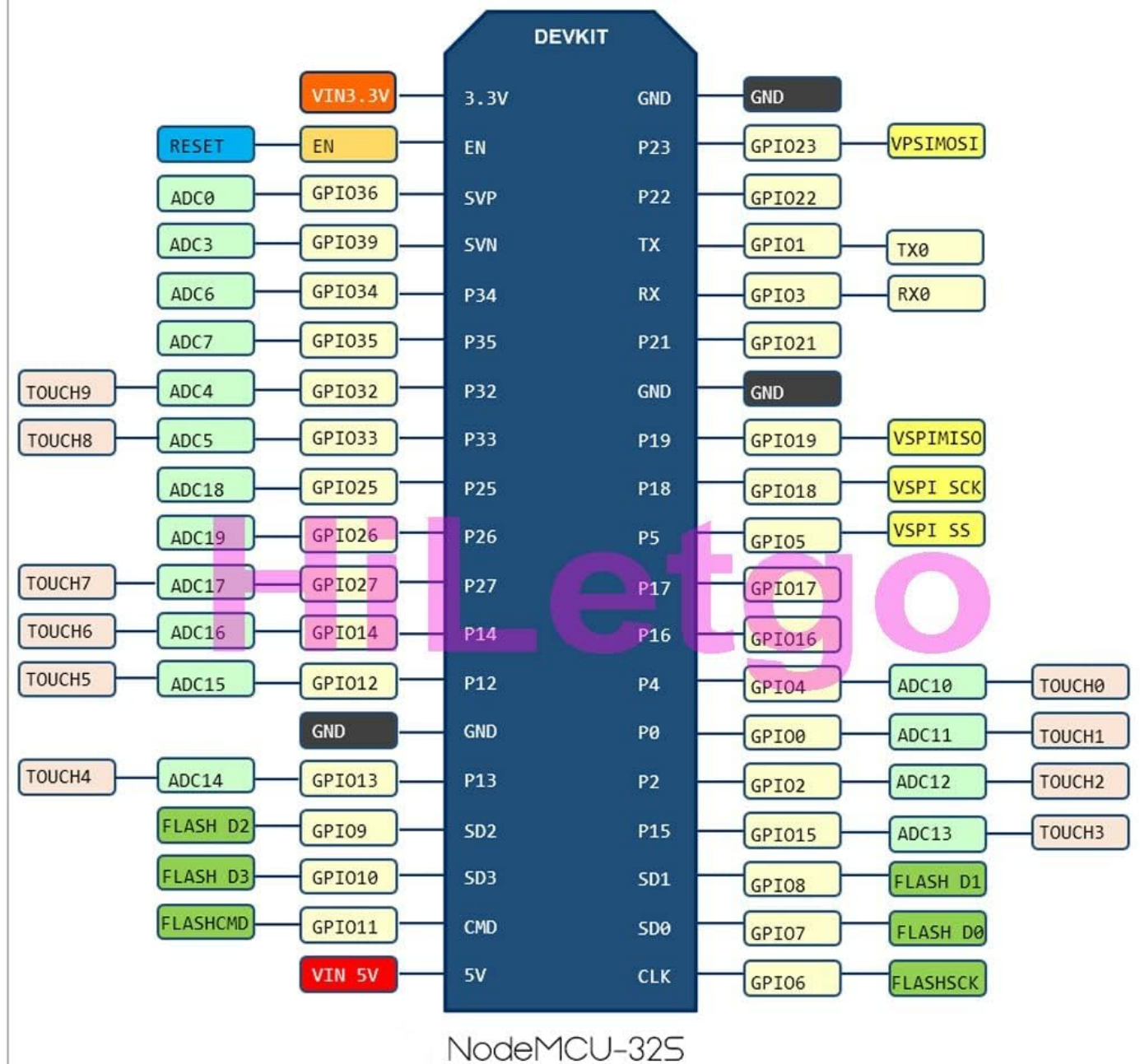


Figure 4.2.2: Pin definition table for the NodeMCU-32S, showing GPIO assignments.

5. MAINTENANCE

- **Storage:** Store the development board in an anti-static bag in a dry environment when not in use to prevent damage from static discharge or moisture.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air to remove dust. Avoid using liquids or abrasive materials.
- **Handling:** Always handle the board by its edges to minimize contact with components and prevent static damage.

6. TROUBLESHOOTING

- **Board Not Detected / Upload Errors:**

- Ensure the micro-USB cable is a data cable, not just a charging cable.
- Install the correct CP2102 USB-to-UART driver for your operating system.
- During upload, press and hold the **BOOT** button (IO0) on the board until the upload starts, then release.
- Verify the correct COM port is selected in the Arduino IDE.
- Try a different USB port or computer.

• **Bluetooth Not Working:**

- Ensure you have selected "Node32s" as the board in Arduino IDE, as suggested for Bluetooth functionality.
- Check your code for correct Bluetooth library usage and initialization.

• **WiFi Connectivity Issues:**

- Verify your WiFi credentials (SSID and password) in your code.
- Ensure the board is within range of your WiFi access point.
- Check for potential interference from other 2.4GHz devices.

7. SPECIFICATIONS

Feature	Detail
Model Number	3-01-1287
Connectivity	2.4GHz Wi-Fi, Bluetooth
Processor	Dual-core (Espressif)
Operating System Support	Linux, Windows
Compatible Devices	Arduino, NodeMCU
RAM Memory Technology	LPDDR3, LPDDR4
Dimensions (approx.)	48.26mm x 25.4mm (1.9in x 1.0in)

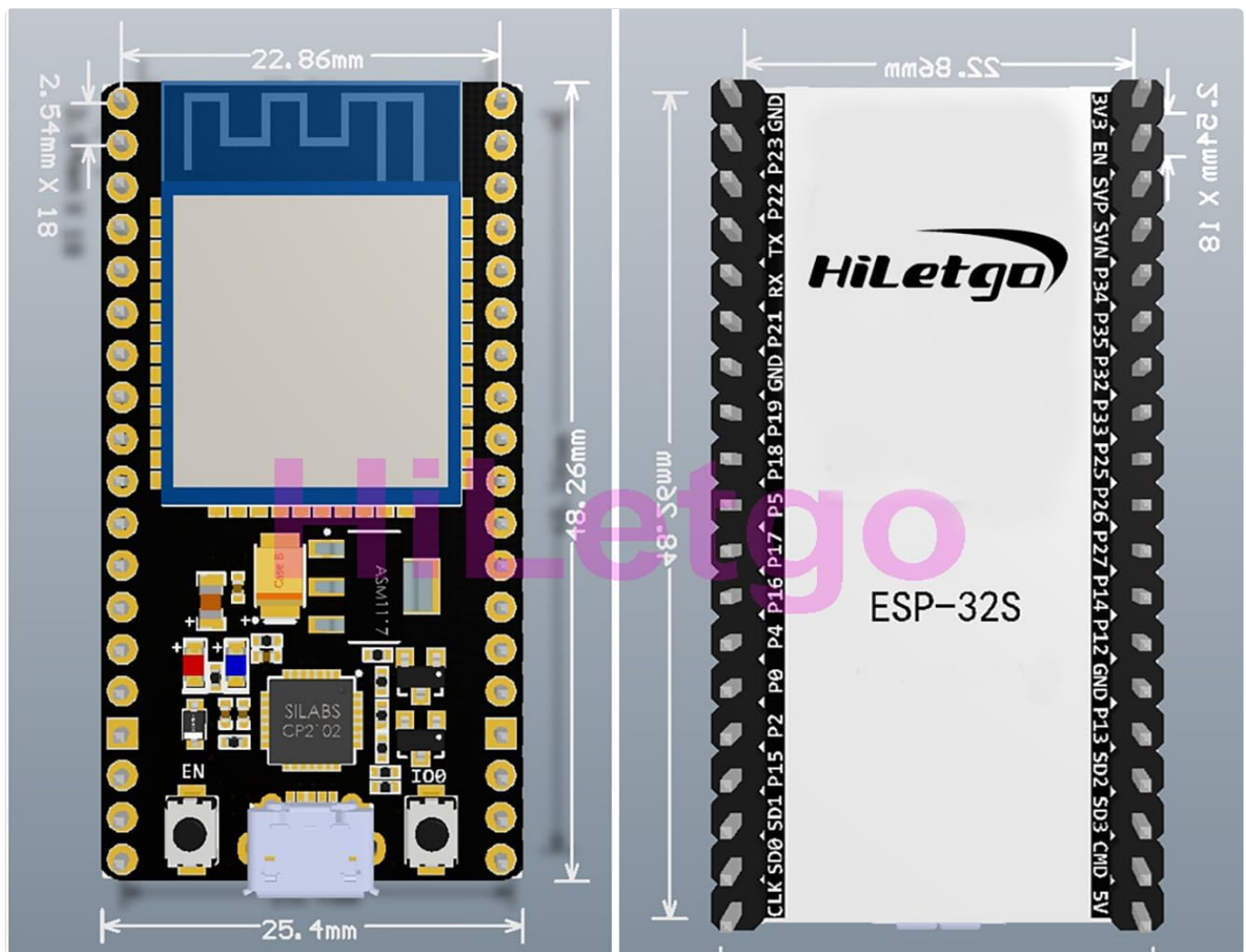


Figure 7.1.1: Top view with key dimensions of the ESP32-S Development Board.



Figure 7.1.2: Detailed top view of the ESP32-S Development Board with dimensions.

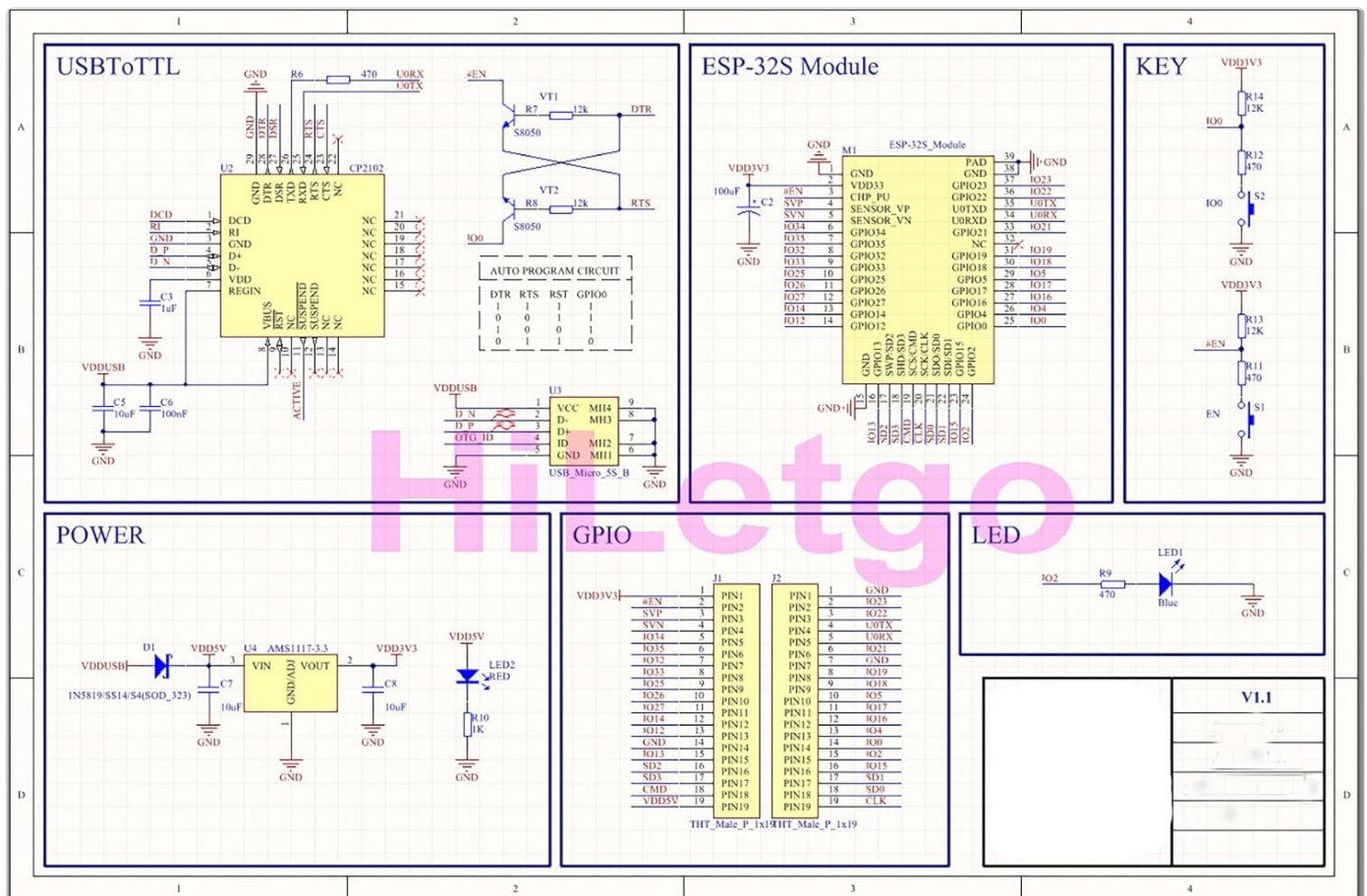


Figure 7.1.3: Schematic diagram of the ESP32-S Development Board, showing internal connections and components.

8. SUPPORT AND CONTACT INFORMATION

For technical support or any issues encountered with your HiLetgo ESP-WROOM-32 ESP32-S Development Board, please contact our support team:

- **Email:** support@hiletgo.com
- **Website:** www.hiletgo.com

Additional resources and community support can be found at:

- [ESP32 Arduino Core GitHub Repository](#)
- [NodeMCU ESP32 Firmware GitHub Repository](#)

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ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question