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› AITRIP ESP32 Development Board and Breakout Board User Manual

AITRIP ESP32

AITRIP ESP32 Development Board and Breakout Board User Manual

Model: ESP32 | Brand: AITRIP

1. INTRODUCTION

This manual provides detailed instructions for the AITRIP 2 Sets 30PIN ESP32 ESP-32S Type-C USB CP2102 Development Board and ESP32 Breakout Board Shield. It covers product overview, specifications, setup, operation, maintenance, and troubleshooting to ensure optimal use of your development kit.

2. PRODUCT OVERVIEW

The AITRIP ESP32 development kit includes two sets of the ESP32-S Type-C USB CP2102 Development Board and the ESP32 Breakout Board. This combination facilitates easy access to GPIO pins for various projects.

2.1 Components Included

- 2 x 30Pins ESP32 Breakout Board
- 2 x Type-C USB CP2102 ESP-WROOM-32 ESP32 ESP-32S Development Board

2.2 Key Features

- 30PINS ESP32 Type C NodeMCU Development Board with ESP-WROOM-32 module.
- Integrated 2.4GHz Dual-Mode WiFi + Bluetooth Dual Cores Microcontroller.
- CP2102 Chip for reliable USB-to-UART bridge.
- Ultra-Low power consumption design.
- Support for LWIP protocol and FreeRTOS operating system.
- Supports three modes: AP (Access Point), STA (Station), and AP+STA.
- GPIO 1-into-2 breakout board for convenient expansion of GPIO pins.
- Compatible with Arduino IDE for development.

2.3 Product Visuals

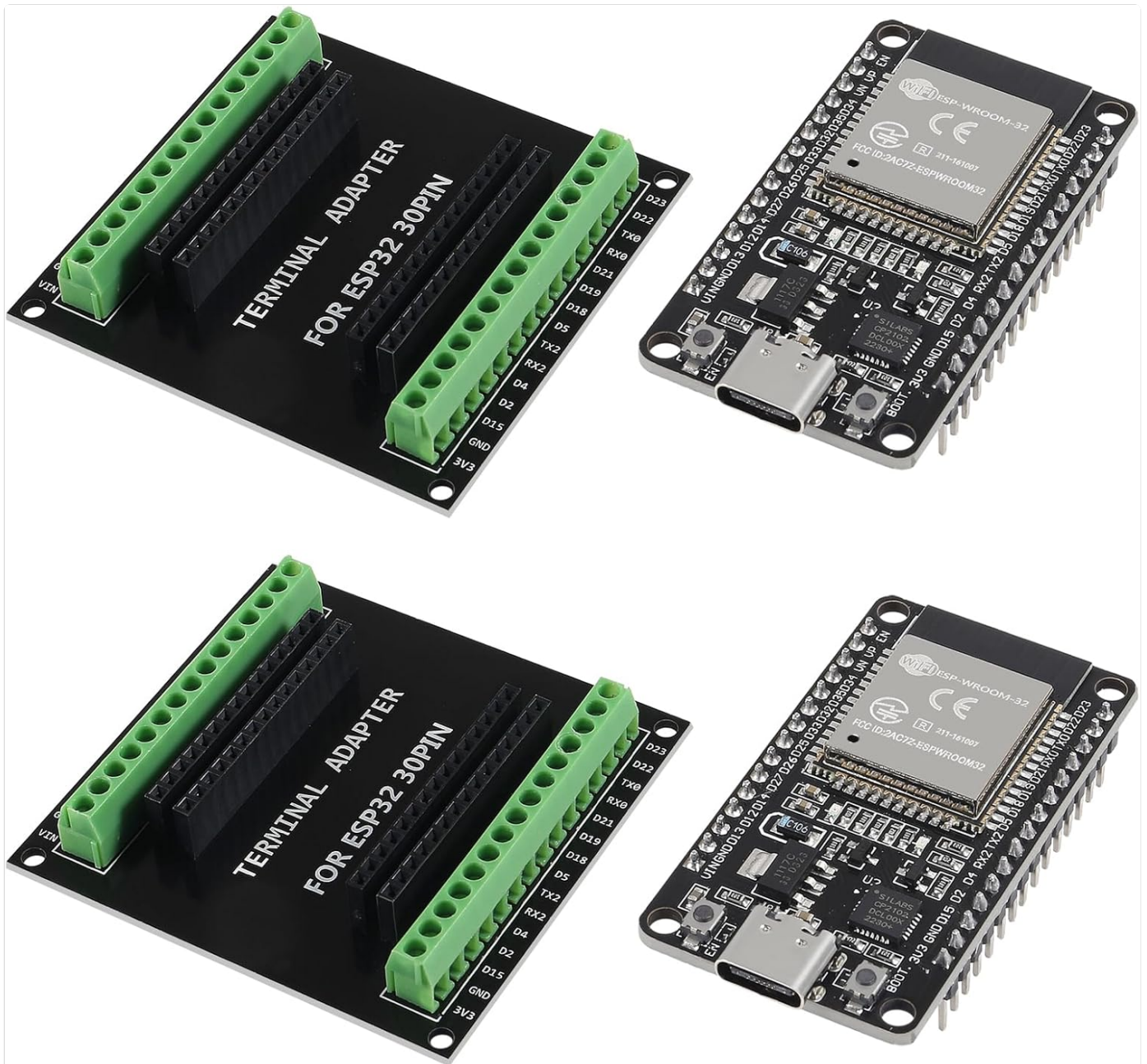


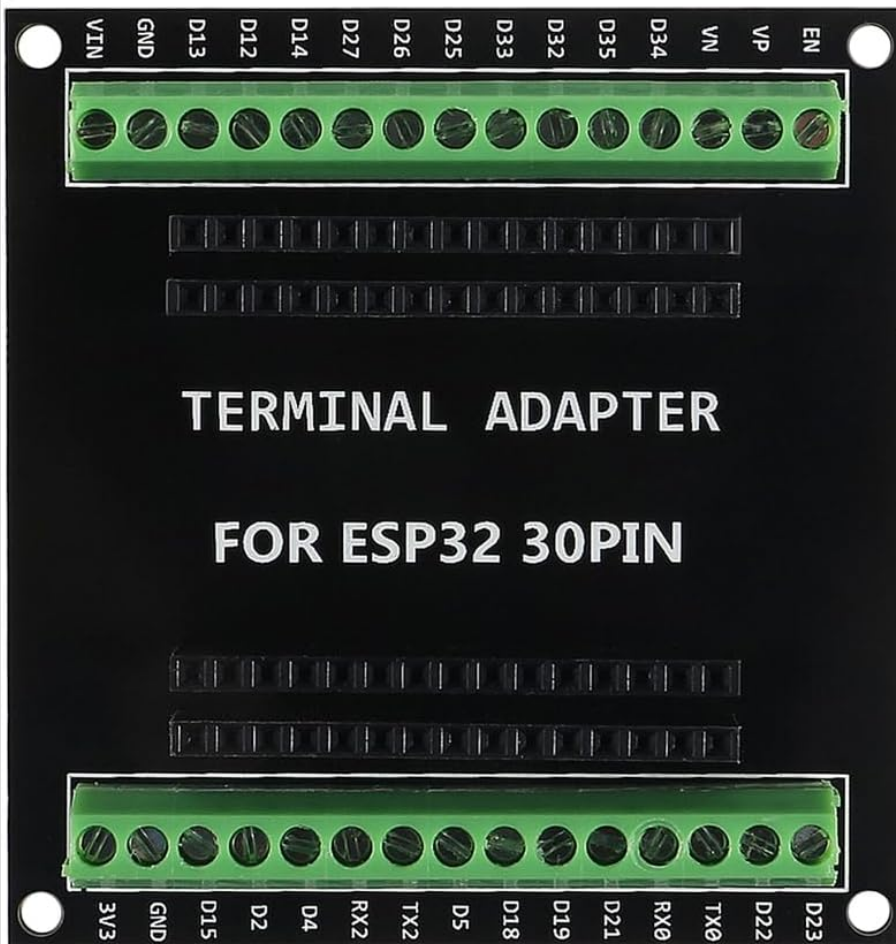
Figure 2.3.1: Overview of the two sets of ESP32 Development Boards and Breakout Boards included in the package.

51mm/2.00inch



28mm/1.10inch

63mm/2.48inch



66mm/2.59inch

Figure 2.3.2: Detailed dimensions of both the ESP32 development board (51mm x 28mm) and the 30PIN breakout board (63mm x 66mm).

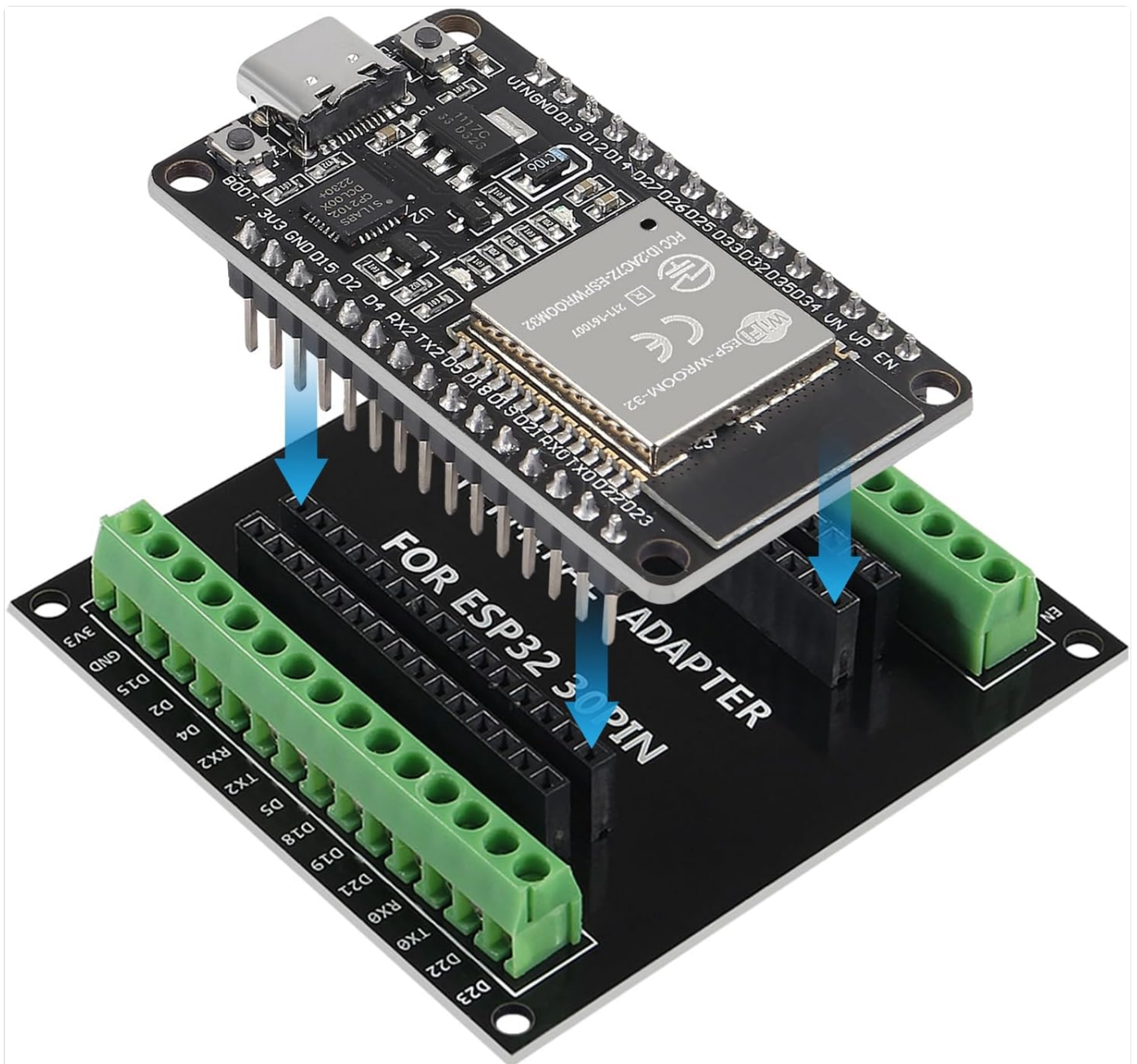


Figure 2.3.3: Illustration demonstrating how the ESP32 development board connects to the 30PIN breakout board.

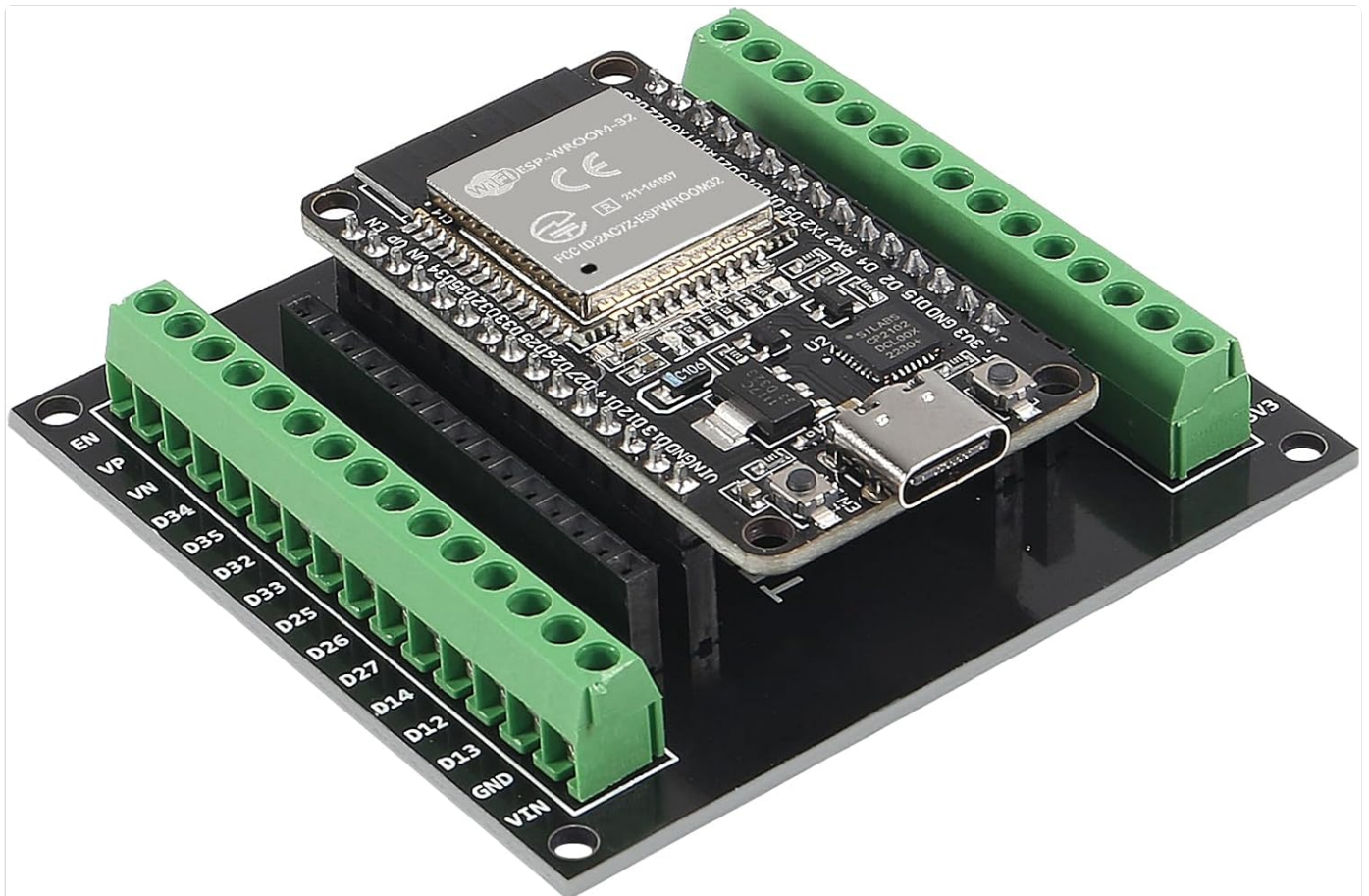
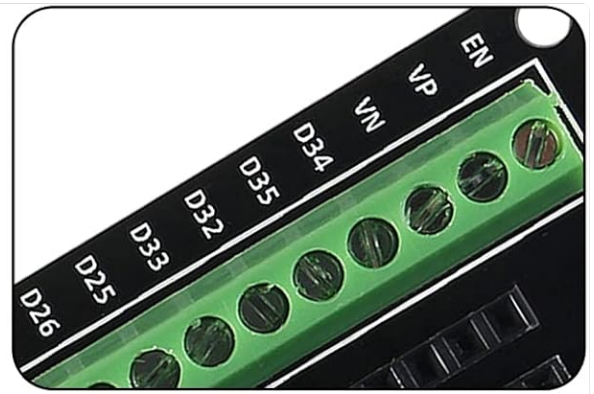
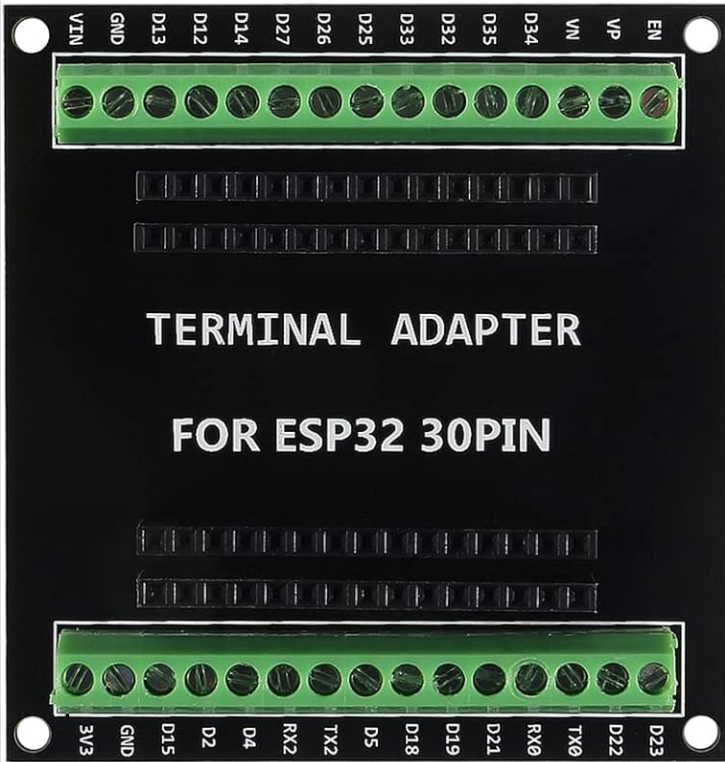


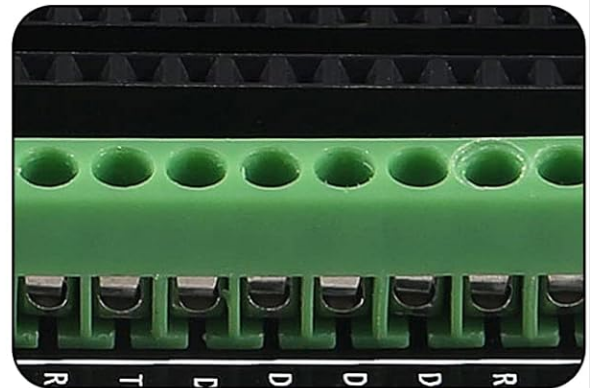
Figure 2.3.4: Top-down view of the ESP32 development board securely mounted onto the breakout board, showing the expanded GPIO pins.



Pin Indication



Connect to ESP32 Development Board



Expansion Interface Screw Terminal

Figure 2.3.5: Close-up showing the pin indications on the breakout board, the connection point for the ESP32 development board, and the expansion interface screw terminals.

Feature	Detail
Processor	Dual-core (ESP-WROOM-32)
Wireless Connectivity	2.4GHz Wi-Fi (802.11 b/g/n), Bluetooth (v4.2 BR/EDR and BLE)
USB Chip	CP2102
Operating System Support	FreeRTOS, LWIP protocol
Operating Modes	AP, STA, AP+STA
PCB Material	High quality FR-4 material, 2 layers
PCB Thickness	1.6mm
Pads	Tin plated
Item Weight	3.2 ounces (approx. 90.7g)
Product Dimensions (ESP32 Board)	51mm x 28mm (approx. 2.00 x 1.10 inches)
Product Dimensions (Breakout Board)	63mm x 66mm (approx. 2.48 x 2.60 inches)
Compatibility	30 pins ESP32 development board

4. SETUP GUIDE

Follow these steps to set up your AITRIP ESP32 development board and breakout board:

- Unpack Components:** Carefully remove all components from the packaging. Verify that you have two ESP32 development boards and two breakout boards.
- Connect ESP32 to Breakout Board:**
 - Align the pins of the ESP32 development board with the female headers on the 30PIN breakout board.
 - Gently press the ESP32 board into the headers until it is fully seated. Ensure all pins are correctly aligned to prevent bending. Refer to Figure 2.3.3 for visual guidance.
- Install USB Driver (if necessary):** The CP2102 chip typically requires a USB-to-UART driver. If your operating system does not automatically install it, download the appropriate driver for the CP2102 from the Silicon Labs website (silabs.com/drivers).
- Connect to Computer:** Use a USB Type-C cable (not included) to connect the ESP32 development board to your computer. The board should power on, indicated by an LED (if present).
- Prepare Development Environment:**
 - Install the Arduino IDE if you haven't already (arduino.cc/software).
 - Add ESP32 board support to the Arduino IDE. This typically involves adding the ESP32 board manager URL in preferences and then installing the ESP32 boards package from the Boards Manager. Detailed instructions can be found on the Espressif GitHub page or various online tutorials.
- Verify Connection:** In the Arduino IDE, select the correct board (e.g., "ESP32 Dev Module") and the corresponding COM port for your connected ESP32 board. You can test the connection by uploading a simple "Blink" sketch.

5. OPERATING INSTRUCTIONS

The AITRIP ESP32 development board is designed for prototyping and development of IoT applications. Here are general operating guidelines:

5.1 Programming the ESP32

- **Using Arduino IDE:** Write your code (sketches) in the Arduino IDE. Ensure the correct board and port are selected. Click the "Upload" button to compile and flash your code to the ESP32.
- **Other Development Frameworks:** The ESP32 also supports other development frameworks such as Espressif IDF (IoT Development Framework), MicroPython, and PlatformIO. Refer to their respective documentation for setup and usage.

5.2 Utilizing the Breakout Board

The breakout board expands each GPIO pin of the ESP32 to two screw terminals, making it easier to connect wires and external components without soldering. This is particularly useful for projects requiring multiple connections to a single GPIO pin or for more robust wiring.

- **Connecting Wires:** Use a small screwdriver to loosen the screw terminals. Insert the stripped end of your wire into the terminal opening and tighten the screw to secure the connection.
- **Pin Mapping:** Refer to the pin labels on the breakout board (e.g., D13, RX2, TX0) which correspond to the ESP32's GPIO pins. Consult the ESP32 datasheet or pinout diagrams for detailed functionality of each pin.

5.3 Powering the Board

- The primary power source is via the USB Type-C port.
- The board can also be powered via the VIN pin (typically 5V) or 3V3 pin (3.3V) on the breakout board, but ensure the voltage is within the ESP32's specified operating range to avoid damage.

6. MAINTENANCE

Proper care and maintenance will extend the lifespan of your ESP32 development kit:

- **Handle with Care:** Electronic components are sensitive. Avoid dropping the boards or applying excessive force.
- **Static Discharge:** Always handle the boards in a static-safe environment. Use an anti-static wrist strap if possible.
- **Storage:** Store the boards in a dry, cool environment, away from direct sunlight and extreme temperatures. Use anti-static bags for long-term storage.
- **Cleaning:** If necessary, gently clean the boards with a soft, dry brush or compressed air to remove dust. Do not use liquids or abrasive cleaners.
- **Power Off Before Connecting/Disconnecting:** Always disconnect power before making or changing any electrical connections to the board.

7. TROUBLESHOOTING

If you encounter issues with your AITRIP ESP32 development kit, refer to the following common problems and solutions:

Problem	Possible Cause / Solution
Board not recognized by computer.	<ul style="list-style-type: none"> ◦ Ensure USB Type-C cable is fully inserted and functional. ◦ Install the correct CP2102 USB-to-UART driver for your operating system. ◦ Try a different USB port on your computer. ◦ Restart your computer.
Upload errors in Arduino IDE.	<ul style="list-style-type: none"> ◦ Verify that the correct ESP32 board model is selected in "Tools > Board". ◦ Ensure the correct COM port is selected in "Tools > Port". ◦ Check if the board is in programming mode (sometimes requires holding down the "BOOT" button while pressing "EN" or "RESET", then releasing "BOOT"). ◦ Ensure no other program is using the COM port. ◦ Reinstall ESP32 board support in Arduino IDE.
Wi-Fi or Bluetooth not working.	<ul style="list-style-type: none"> ◦ Check your code for correct Wi-Fi/Bluetooth initialization and credentials. ◦ Ensure adequate power supply to the board. ◦ Verify antenna connection (if external antenna is used). ◦ Test with example sketches provided by the ESP32 library.
Board gets hot during operation.	<ul style="list-style-type: none"> ◦ Ensure the input voltage is within the specified range (typically 5V via USB). ◦ Check for short circuits in your wiring or connected components. ◦ Reduce the load on the ESP32's GPIO pins. ◦ Disconnect power immediately if excessive heat is detected.

8. WARRANTY AND SUPPORT

AITRIP products are designed for reliability and performance. While specific warranty details may vary by region or retailer, general support is available for product inquiries and technical assistance.

- For technical support, please refer to the AITRIP product page on Amazon or contact the seller directly through the Amazon platform.
- Many online communities and forums dedicated to ESP32 development (e.g., Espressif forums, Arduino forums, Stack Overflow) can also provide valuable assistance for programming and project-related questions.
- Keep your purchase receipt for any warranty claims.