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› AITRIP Nano V3.0 Board and Expansion Board User Manual

## AITRIP Nano V3.0

# AITRIP Nano V3.0 Board and Expansion Board User Manual

Comprehensive instructions for the AITRIP Nano V3.0 ATmega328P CH340G Type-C board and Nano IO Shield.

## 1. INTRODUCTION

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This manual provides detailed instructions for the setup, operation, and maintenance of your AITRIP Nano V3.0 development board and its accompanying terminal adapter expansion board. The AITRIP Nano V3.0 is a compact, breadboard-friendly microcontroller board based on the ATmega328P, featuring a CH340G USB-to-serial converter and a convenient Type-C USB connector. The Nano IO Shield terminal adapter simplifies wiring for various projects, offering a robust alternative to traditional breadboards.

## 2. PRODUCT OVERVIEW

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The AITRIP Nano V3.0 kit includes the following components:

- **AITRIP Nano V3.0 Board:** A compact microcontroller board with ATmega328P and CH340G chip.
- **Nano Terminal Adapter Expansion Board (IO Shield):** A breakout board designed to simplify connections to the Nano V3.0.
- **USB Type-C Cable:** For connecting the Nano board to your computer.

### 2.1. Component Identification

Familiarize yourself with the main components of the Nano V3.0 board and the expansion board.

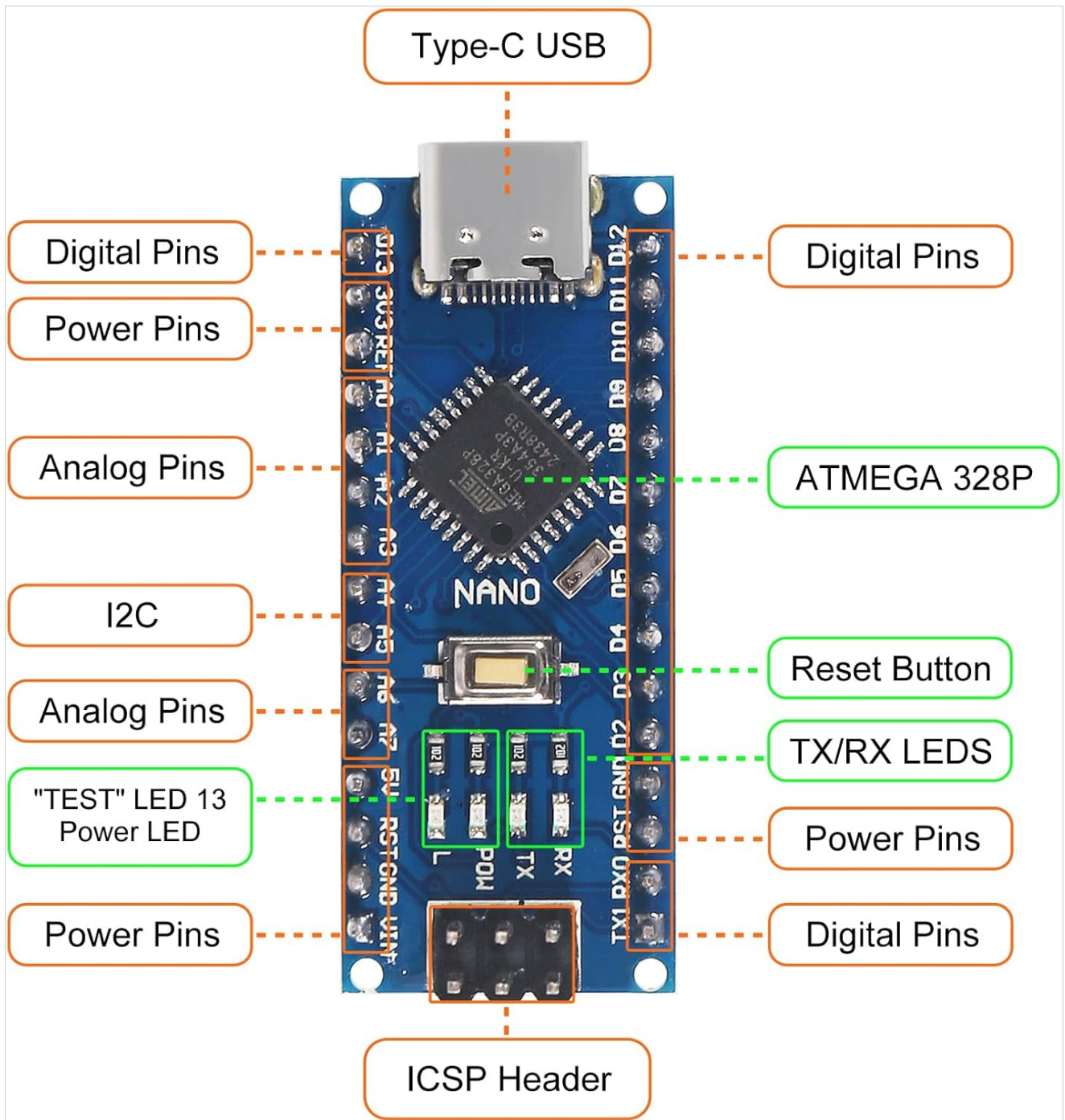


Figure 1: AITRIP Nano V3.0 Board with labeled components including Type-C USB, Digital Pins, Power Pins, Analog Pins, I2C, ATmega328P, Reset Button, TX/RX LEDs, Power LED, and ICSP Header.

FRONT

BACK

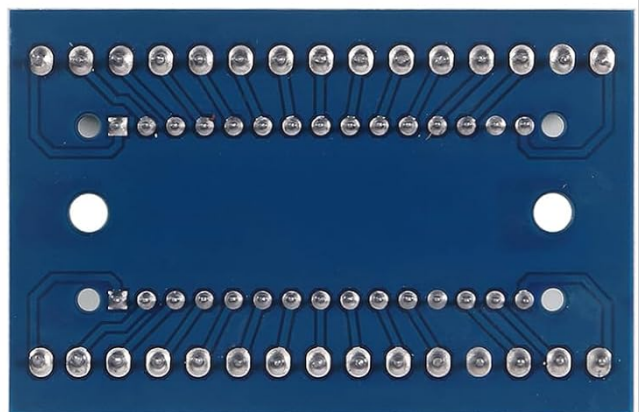
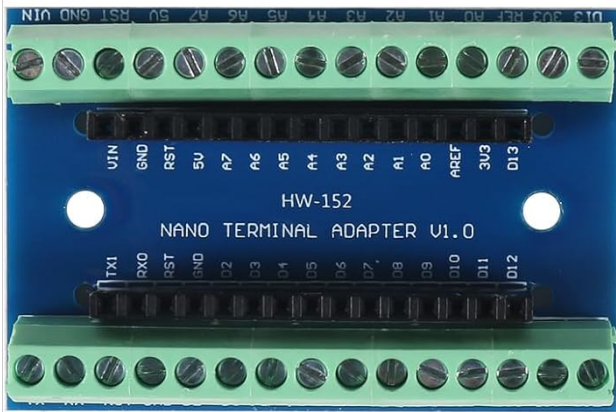
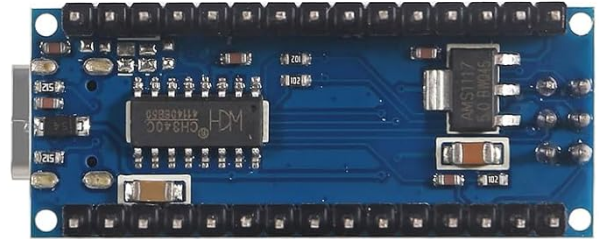
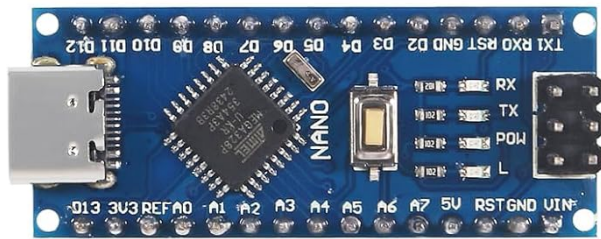


Figure 2: Front and back views of the AITRIP Nano V3.0 board and the Nano Terminal Adapter V1.0, showing pin headers and screw terminals.

### 3. SETUP INSTRUCTIONS

#### 3.1. Connecting the Nano Board to the Expansion Board

1. Align the pin headers of the AITRIP Nano V3.0 board with the corresponding female headers on the Nano Terminal Adapter Expansion Board.
2. Gently press the Nano board into the expansion board until it is securely seated. Ensure all pins are correctly aligned to prevent damage.

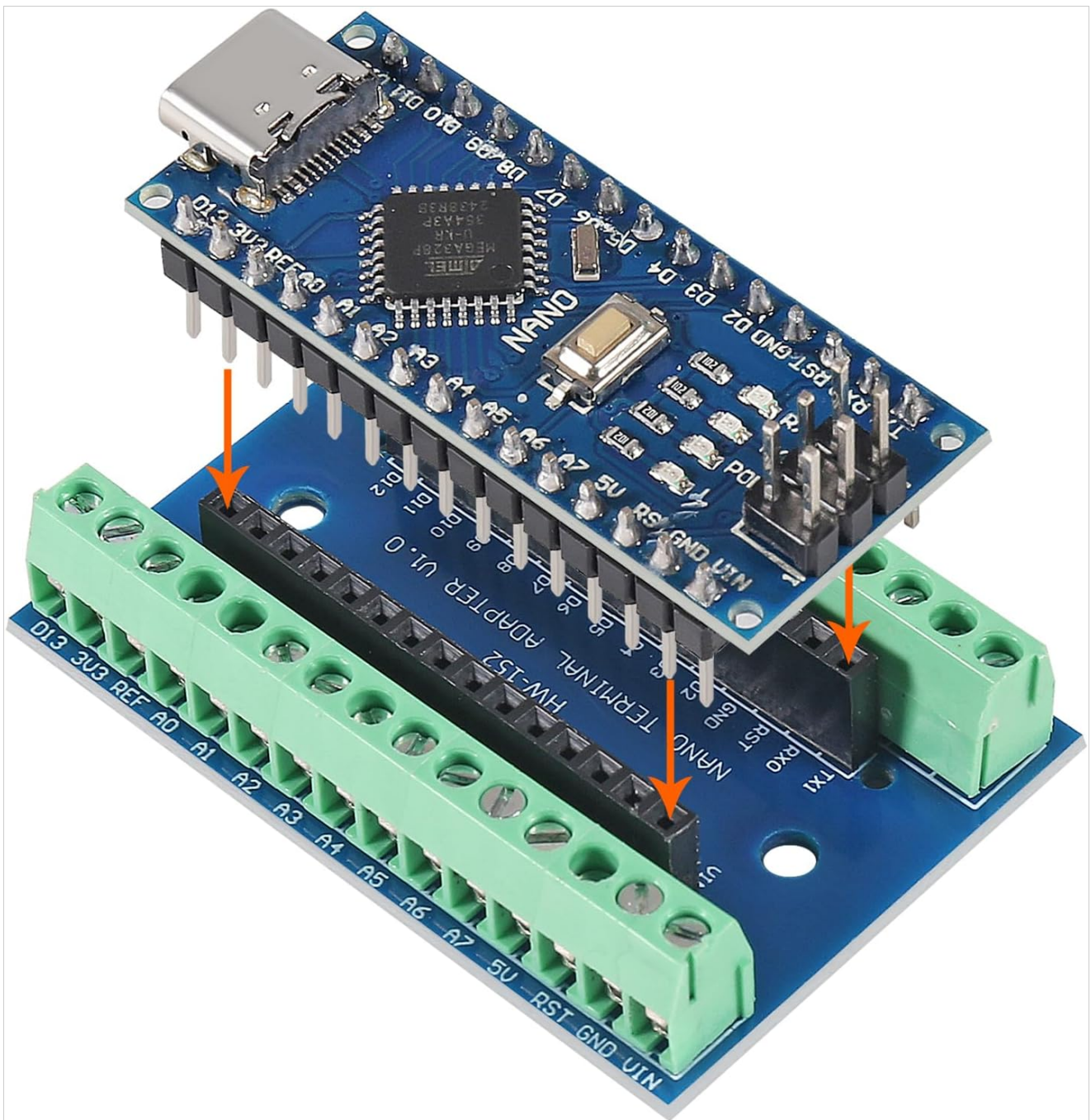


Figure 3: Proper alignment and connection of the Nano V3.0 board onto the Nano Terminal Adapter.

### 3.2. Driver Installation (CH340G)

The AITRIP Nano V3.0 uses the CH340G chip for USB-to-serial communication. Most modern operating systems (Windows 10/11, macOS, Linux) may automatically install the necessary drivers. If the board is not recognized, you may need to manually install the CH340G driver.

- **Windows:** Search online for "CH340G driver Windows" and download from a reputable source. Follow the installation instructions.
- **macOS:** Search online for "CH340G driver macOS". Note that newer macOS versions might require specific security settings adjustments.
- **Linux:** Drivers are typically built into the kernel. If issues arise, consult Linux community forums for specific distributions.

After installation, connect the Nano board to your computer using the provided USB Type-C cable. Verify successful driver installation by checking your device manager (Windows) or system information (macOS/Linux) for a new COM port (Windows) or `/dev/ttyUSBx` device (Linux/macOS).

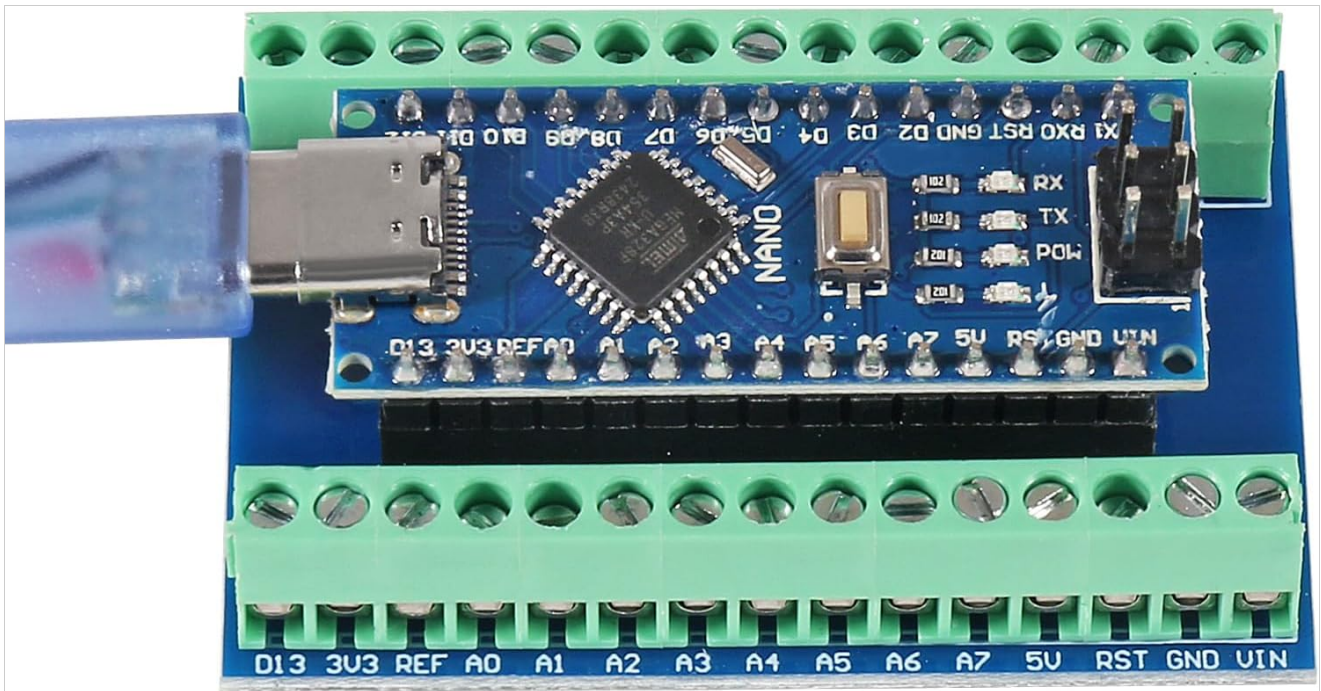


Figure 4: The AITRIP Nano V3.0 board securely connected to the expansion board and powered via the USB Type-C cable.

### 3.3. Powering the Board

The AITRIP Nano V3.0 board can be powered in several ways:

- **USB Type-C Connection:** Connect the board to your computer or a USB power adapter (5V).
- **Unregulated External Power Supply (VIN pin):** Provide 6-12V DC to the VIN pin.
- **Regulated External Power Supply (5V pin):** Provide a regulated 5V DC to the 5V pin.

The recommended input voltage for the VIN pin is 7-12V. The board's operating voltage is 5V.

## 4. OPERATING INSTRUCTIONS

### 4.1. Programming the Nano V3.0

The AITRIP Nano V3.0 is compatible with the Arduino IDE. Follow these steps to upload your first program:

1. **Install Arduino IDE:** Download and install the Arduino IDE from the official Arduino website ([www.arduino.cc/en/software](http://www.arduino.cc/en/software)).
2. **Select Board:** In the Arduino IDE, go to **Tools > Board > Arduino Nano**.
3. **Select Processor:** Go to **Tools > Processor > ATmega328P (Old Bootloader)**. If you encounter upload errors, try **ATmega328P** (without "Old Bootloader").
4. **Select Port:** Go to **Tools > Port** and select the COM port associated with your CH340G device.
5. **Upload Sketch:** Open an example sketch (e.g., **File > Examples > 01.Basics > Blink**) and click the "Upload" button (right arrow icon).

The built-in LED (connected to D13) should start blinking if the upload is successful.

### 4.2. Using the Nano Terminal Adapter

The expansion board provides screw terminals for easy and secure connection of wires to the Nano's pins. This is particularly useful for permanent or semi-permanent projects where breadboards might be unreliable.

- Identify the desired pin on the Nano (e.g., D2, A0, 5V, GND).
- Locate the corresponding screw terminal on the expansion board.

- Loosen the screw, insert the stripped end of your wire, and tighten the screw to secure the connection.

Refer to the pinout diagram for accurate pin identification.

## 5. MAINTENANCE

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- **Handling:** Handle the boards by their edges to avoid touching components, especially the microcontroller chip, to prevent electrostatic discharge (ESD) damage.
- **Storage:** Store the boards in an anti-static bag or container when not in use, away from dust and moisture.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air. Avoid using liquids.
- **Power Supply:** Always ensure your power supply voltage and current are within the specified limits to prevent damage to the board.

## 6. TROUBLESHOOTING

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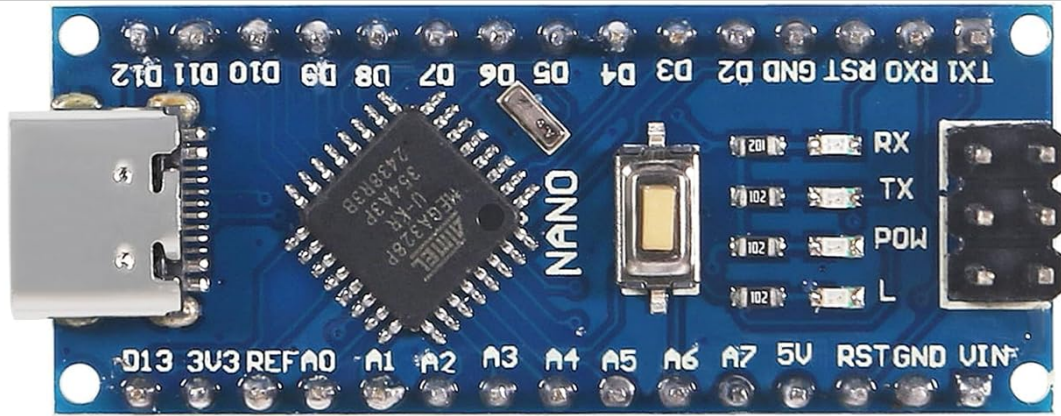
- **Board Not Recognized by Computer:**
  - Ensure the USB Type-C cable is fully inserted and functional.
  - Verify that the CH340G driver is correctly installed (refer to Section 3.2).
  - Try a different USB port on your computer.
- **Upload Errors in Arduino IDE:**
  - Confirm that "Arduino Nano" is selected under **Tools > Board**.
  - Try both "ATmega328P (Old Bootloader)" and "ATmega328P" options under **Tools > Processor**.
  - Ensure the correct COM port is selected under **Tools > Port**.
  - Check for syntax errors in your code.
- **Board Not Powering On:**
  - Verify the power source (USB or external) is providing the correct voltage and current.
  - Check for any visible damage to the board or connections.
- **Incorrect Sensor Readings or Output:**
  - Double-check your wiring connections, especially to the expansion board terminals.
  - Review your code for logical errors.
  - Ensure external components are correctly powered and functioning.

## 7. SPECIFICATIONS

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### 7.1. AITRIP Nano V3.0 Board Specifications

<b>Feature</b>	<b>Specification</b>
Microcontroller	ATmega328P
USB to Serial Chip	CH340G
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (6 provide PWM output)
Analog Input Pins	8
DC Current per I/O Pin	40 mA
Flash Memory	32 KB (ATmega328P) of which 2 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
USB Connector	Type-C
Dimensions	43 mm x 18 mm (approx.)
Weight	Approximately 7g



Connector	Type-C USB	
PIN	Built-in LED Pin	D14
	Digital I/O Pins	15
	Analog input pins	9
	PWM pins	10
Communication	UART	RX/TX
	I <sup>2</sup> C	A4(SDA) A6(SCL)
	SWD	HAVE
	SPI	D11(COPI) D12(CIPI) D14(SCK) Use any GPIO for Chip Select(CS)
Power	I/O Voltage	6V
	Input voltage(nominal)	7-13V
	DC Current Per /O Pin	30mA(6 of them support 81mA high current)
Clock Speed	Processor	Internal 16MHz (Maximum 33MHz)
Memory		2KB SRAM,32K(1K for boot,2k for emulated errom) 2KB EEPROM

Figure 5: Detailed specifications table for the AITRIP Nano V3.0 board, including connector types, pin functions, communication protocols, power requirements, clock speed, and memory.

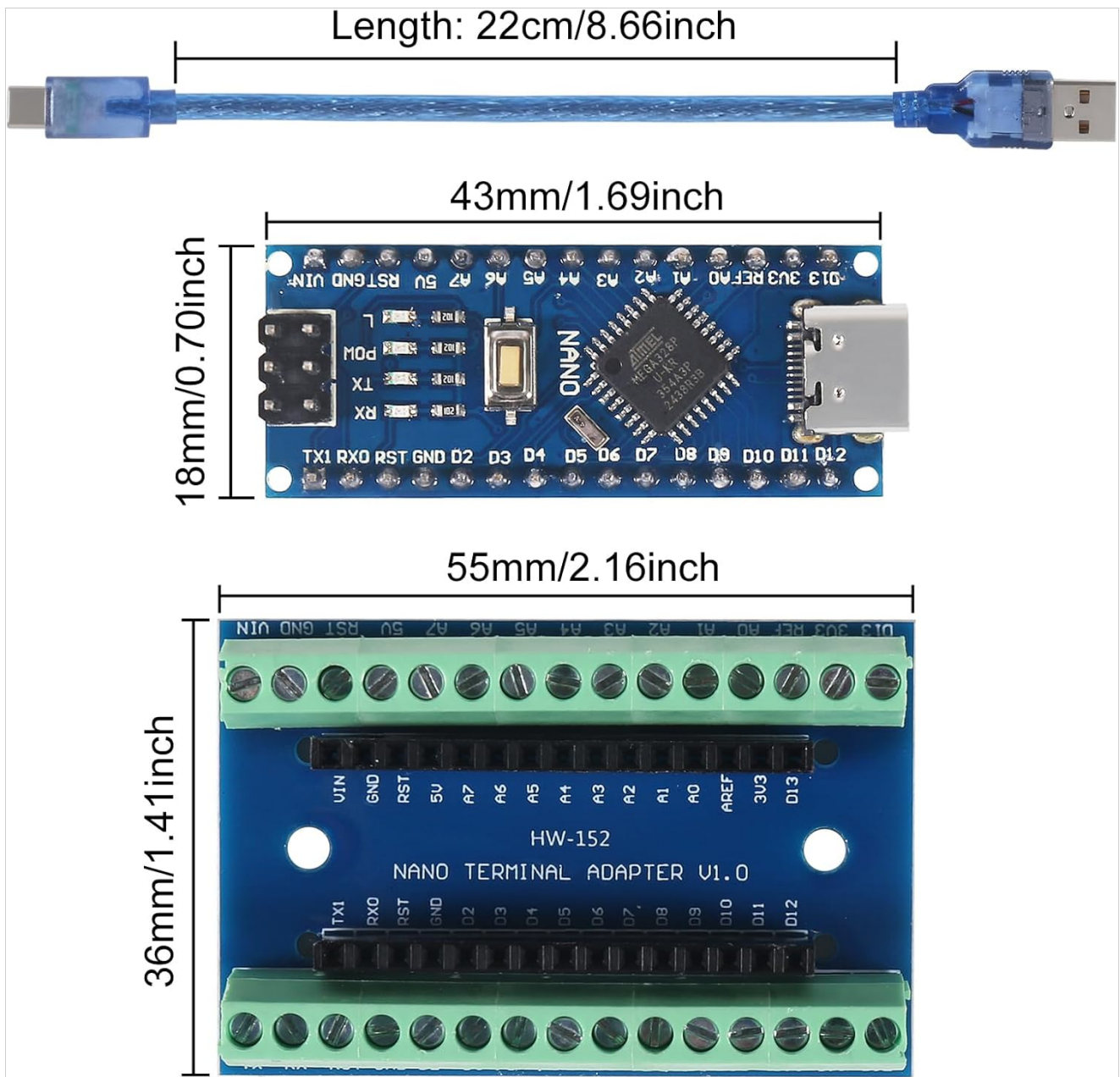


Figure 6: Dimensional measurements for both the AITRIP Nano V3.0 board and the Nano Terminal Adapter V1.0.

## 7.2. Nano Terminal Adapter Expansion Board Specifications

- **Compatibility:** Designed for Arduino Nano V3.0.
- **Features:** Terminal expansion adapter, fully assembled, no soldering required.
- **Dimensions:** Approximately 56 mm x 42 mm x 13 mm (2.21" x 1.65" x 0.50" L\*W\*H).

## 8. WARRANTY AND SUPPORT

AITRIP products are designed for reliability and performance. For specific warranty information, please refer to the product listing on the retailer's website or contact AITRIP customer support directly.

If you encounter any issues or have questions regarding the AITRIP Nano V3.0 board or expansion board, please contact AITRIP customer service through the platform where you purchased the product. Provide your order number and a detailed description of the issue for prompt assistance.

