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› AITRIP ESP8266 NodeMCU LUA CH340 ESP-12E WiFi Internet Development Board User Manual

AITRIP 15316

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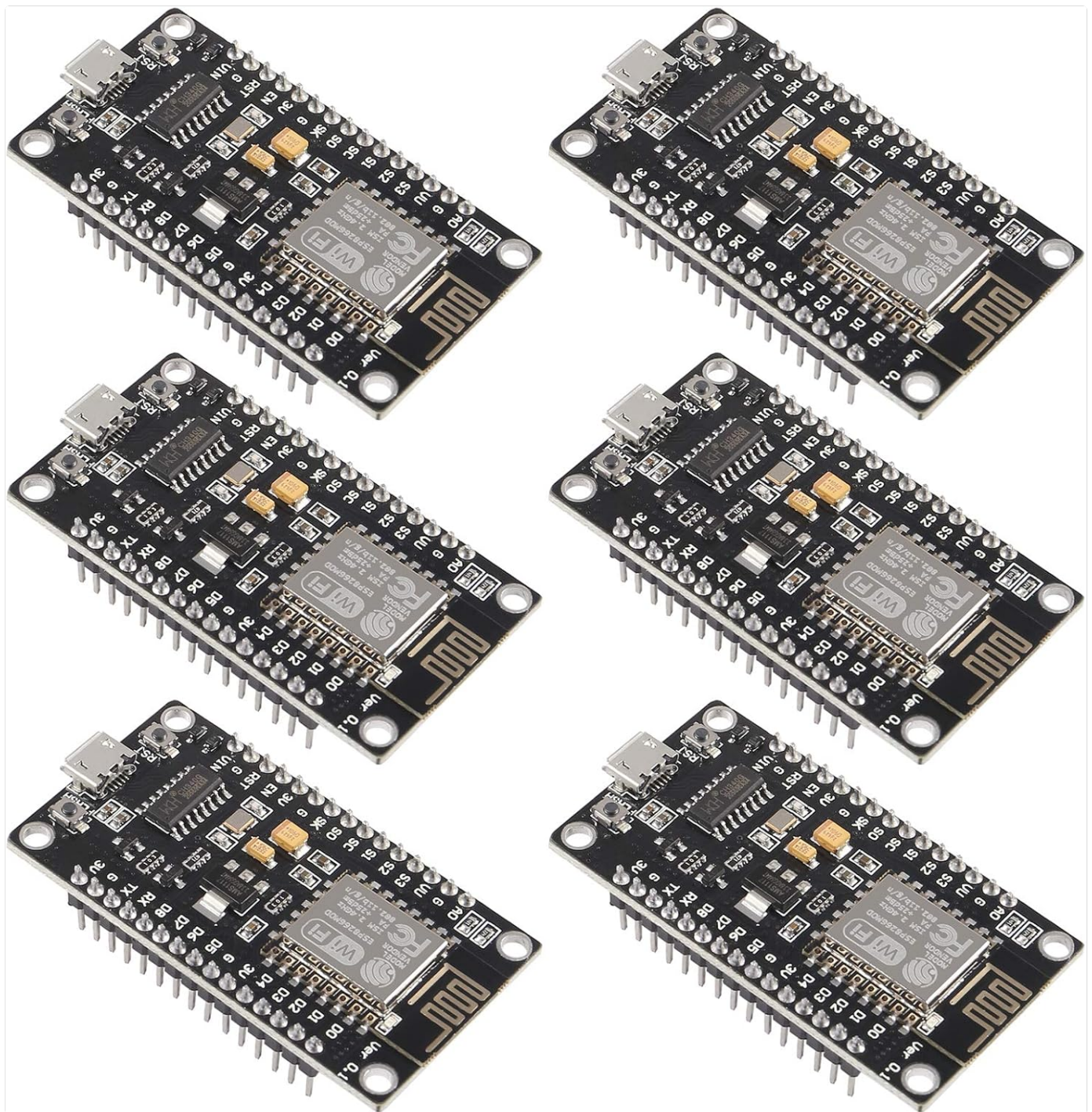
Brand: AITRIP | Model: 15316

1. INTRODUCTION

This manual provides comprehensive instructions for the AITRIP ESP8266 NodeMCU LUA CH340 ESP-12E WiFi Internet Development Board. This highly integrated chip is designed for a connected world, offering a complete and self-contained Wi-Fi networking solution. It can host applications or offload Wi-Fi networking functions from another application processor. The board features powerful on-board processing and storage capabilities, allowing integration with sensors and other application-specific devices via its GPIOs with minimal development effort. Its high degree of on-chip integration minimizes external circuitry, resulting in a compact solution.

2. PRODUCT OVERVIEW

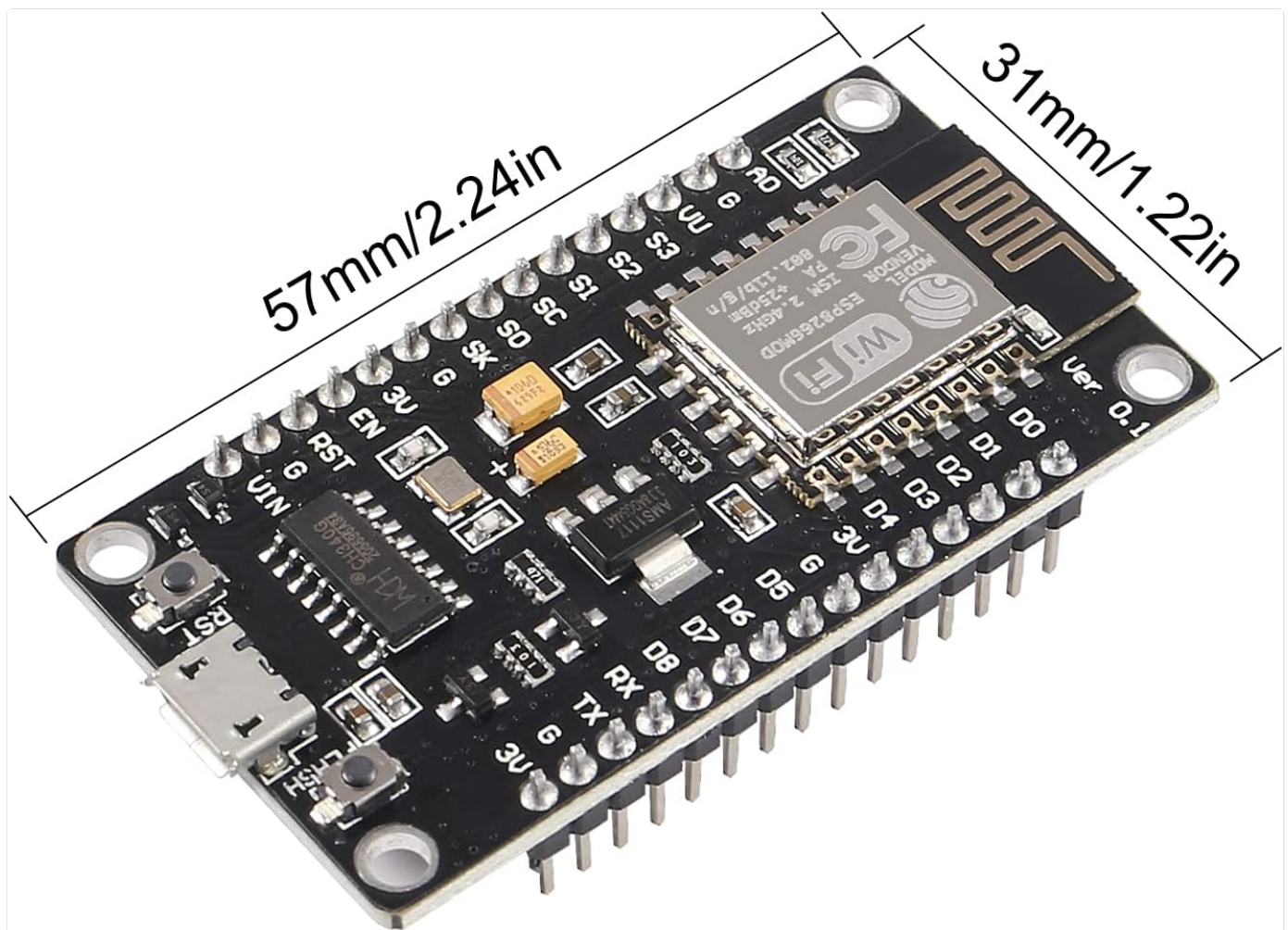
The ESP8266 NodeMCU development board is built upon the mature ESP8266 technology, leveraging extensive online resources. It integrates an ESP-12 based serial WiFi module, providing access to GPIO, PWM, ADC, I2C, and 1-WIRE resources. A built-in USB-TTL serial converter with an industrial-strength CH340 chip ensures superior stability across various platforms. This board is suitable for Internet of Things (IoT) projects, including home automation, and is compatible with Arduino development platforms and Micropython firmware.



An overview of the six ESP8266 NodeMCU development boards included in the package, showcasing their compact design.

Key Features:

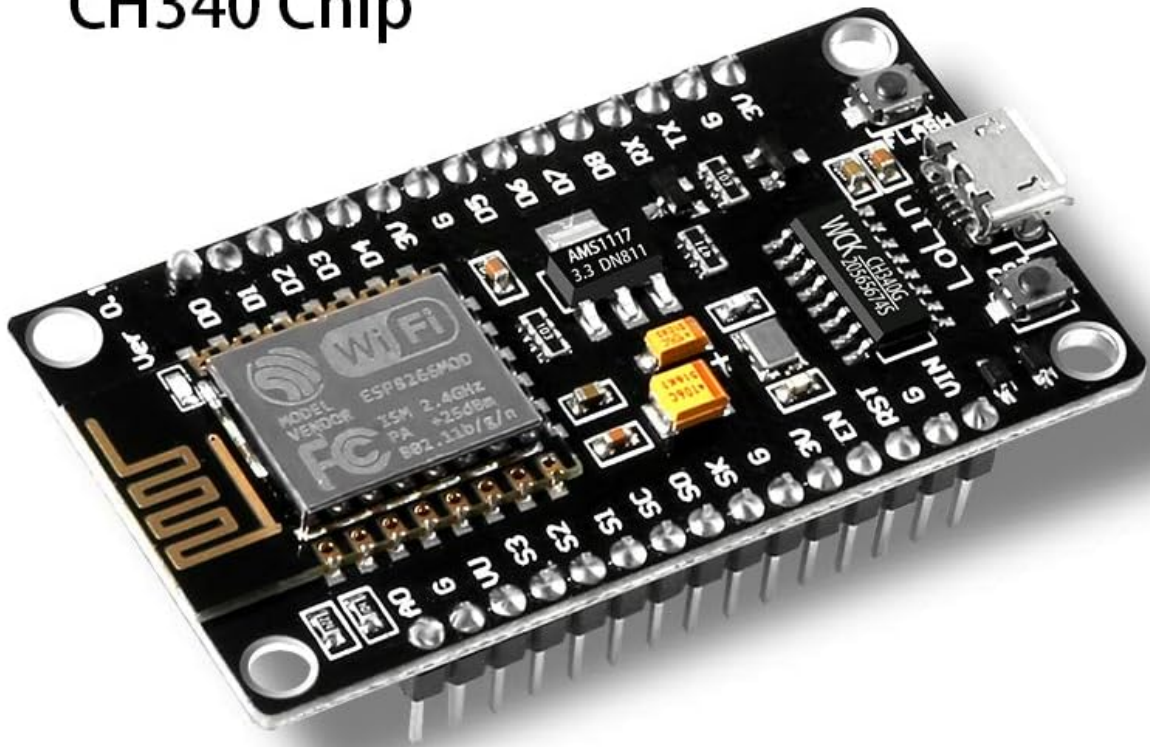
- Integrated ESP-12E WiFi Module for wireless connectivity.
- CH340G USB-to-Serial converter for easy computer communication.
- Access to GPIO, PWM, ADC, I2C, and 1-WIRE pins.
- 4MB Flash memory for program storage.
- Compatible with Arduino IDE and Micropython.
- Support for Smart Link and Smart Networking.



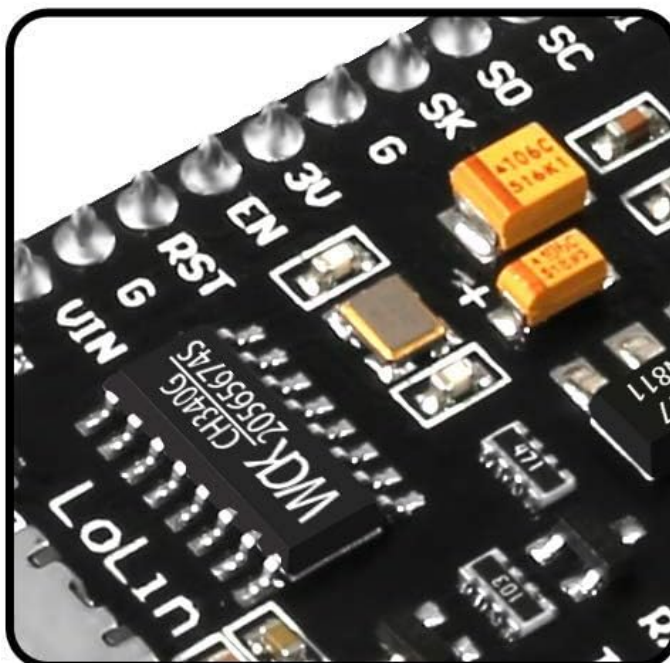
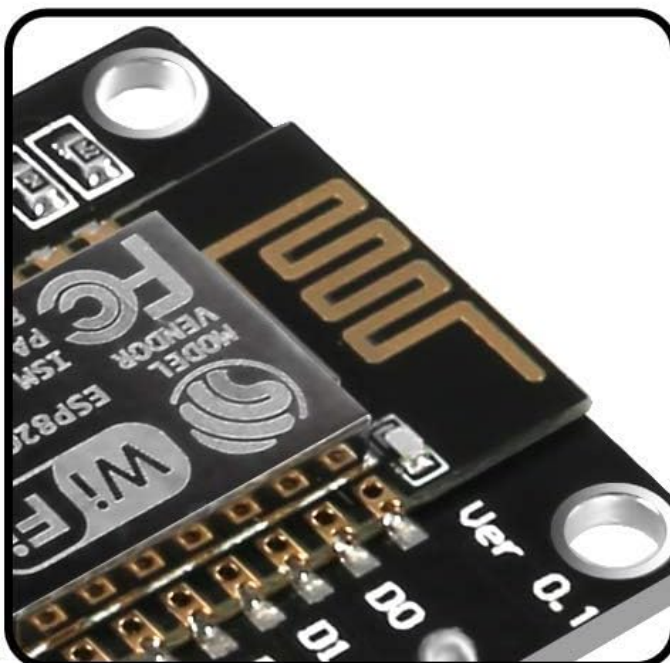
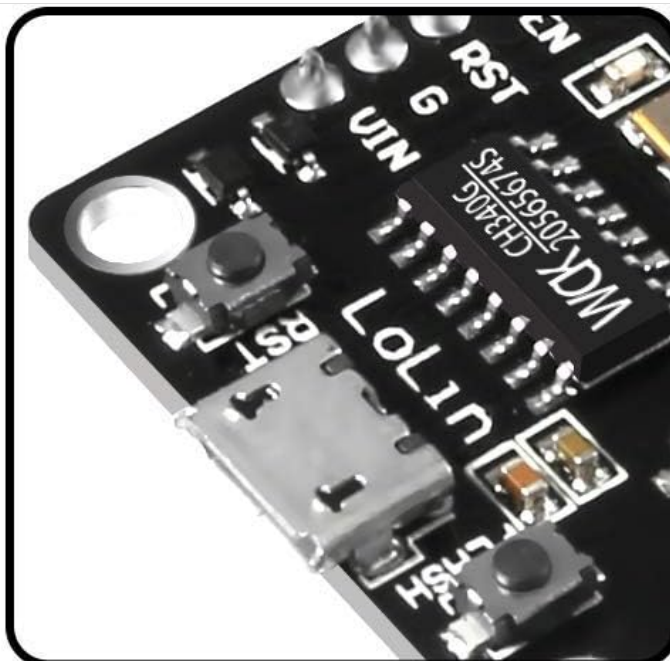
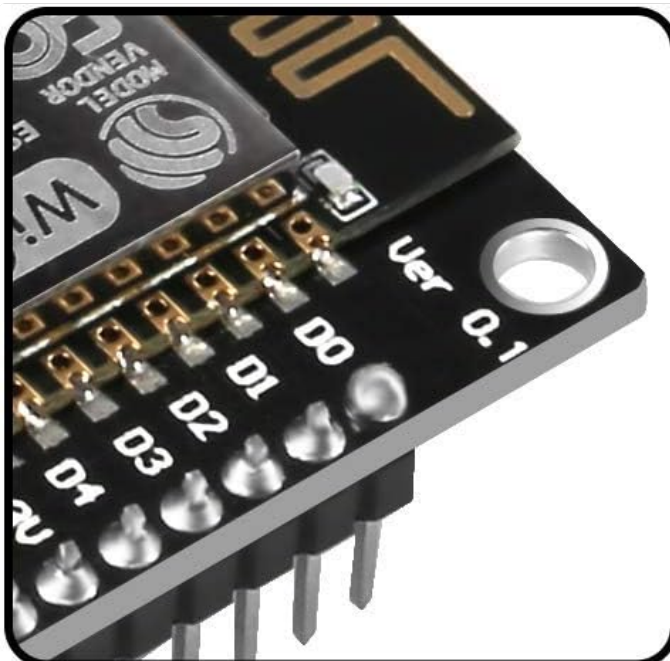
A detailed view of a single ESP8266 NodeMCU board, highlighting its physical dimensions of 57mm (2.24 inches) in length and 31mm (1.22 inches) in width.



CH340 Chip



A magnified view of the CH340G chip, which serves as the USB-to-Serial converter, facilitating communication between the development board and a computer.



A composite image showing close-ups of key features on the ESP8266 NodeMCU board: the micro-USB port for power and data, the reset button, the flash button, and the integrated ESP-12E WiFi module.

3. SPECIFICATIONS

Feature	Detail
Brand	AITRIP
Model Name	NodeMCU
Item Model Number	15316
Wireless Type	802.11b/g/n (Wi-Fi)

Feature	Detail
Memory Storage Capacity	4 MB Flash
Operating System Compatibility	Micropython, NodeMCU Firmware
Connectivity Technology	GPIO, USB, Wi-Fi
USB-to-Serial Chip	CH340G
Item Weight	2.08 ounces (approx. 59g)
Package Dimensions	4.96 x 3.86 x 1.61 inches (approx. 12.6 x 9.8 x 4.1 cm)

4. SETUP GUIDE

4.1 Driver Installation (CH340)

Before connecting the NodeMCU board to your computer, you may need to install the CH340G USB-to-Serial driver. This driver enables your computer to recognize the board as a serial port.

1. **Download the CH340 Driver:** Search online for "CH340G driver" for your operating system (Windows, macOS, Linux). Download the appropriate version from a reputable source.
2. **Install the Driver:** Follow the installation instructions provided with the driver package. On Windows, this usually involves running an executable. On macOS, it might involve a package installer.
3. **Verify Installation:** After installation, connect the NodeMCU board to your computer using a micro-USB cable. Open your computer's Device Manager (Windows) or check `/dev/tty.*` (macOS/Linux) to confirm that a new serial port (e.g., COMx or `/dev/tty.wchusbserial`) has appeared.

4.2 IDE Setup (Arduino IDE)

To program the NodeMCU using the Arduino IDE:

1. **Install Arduino IDE:** Download and install the latest version of the Arduino IDE from the official Arduino website.
2. **Add ESP8266 Board Manager URL:** Go to **File > Preferences**. In the "Additional Boards Manager URLs" field, add:
`http://arduino.esp8266.com/stable/package_esp8266com_index.json`
3. **Install ESP8266 Boards:** Go to **Tools > Board > Boards Manager....** Search for "ESP8266" and install the "esp8266 by ESP8266 Community" package.
4. **Select NodeMCU Board:** Go to **Tools > Board > ESP8266 Boards** and select "NodeMCU 1.0 (ESP-12E Module)".
5. **Select Serial Port:** Go to **Tools > Port** and select the serial port corresponding to your connected NodeMCU board (identified in step 4.1).

4.3 Initial Test (Blink LED)

A simple test to ensure your setup is working:

1. Open the Arduino IDE.
2. Go to **File > Examples > ESP8266 > Blink**.
3. Click the "Upload" button (right arrow icon) to compile and upload the sketch to your NodeMCU board.
4. If successful, the built-in LED on the board should start blinking.

5. OPERATING INSTRUCTIONS

5.1 Programming with Arduino IDE

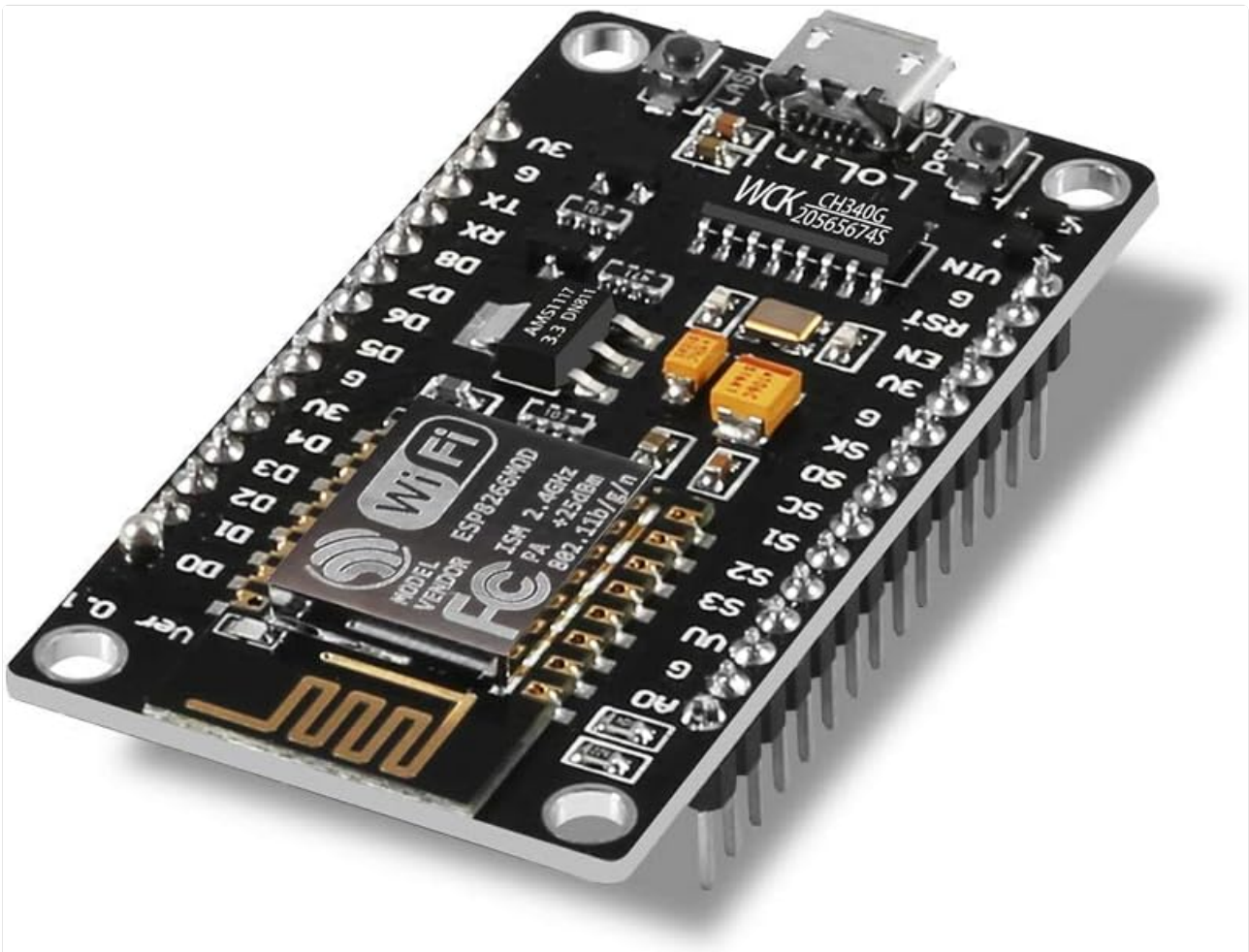
The Arduino IDE allows you to write C++ code (sketches) for the NodeMCU. You can utilize various libraries for Wi-Fi connectivity, sensor integration, and more. After writing your code, ensure the correct board and port are selected under **Tools**, then click **Upload**.

5.2 Using Micropython

The NodeMCU also supports Micropython, a lean and efficient implementation of the Python 3 programming language optimized to run on microcontrollers. To use Micropython, you will first need to flash the Micropython firmware onto the board. Tools like ``esptool.py`` can be used for this purpose. Once flashed, you can interact with the board using a serial terminal and upload Python scripts.

5.3 GPIO Pin Usage

The NodeMCU board exposes several General Purpose Input/Output (GPIO) pins. These pins can be configured as digital inputs or outputs, and some support additional functionalities like PWM, I2C, SPI, and ADC. Refer to the NodeMCU pinout diagrams for specific pin capabilities and their corresponding labels in your chosen programming environment (e.g., D0-D8 in Arduino IDE).



An angled perspective of the ESP8266 NodeMCU development board, providing a clear view of its components and pin headers, which include GPIO pins.

5.4 Wi-Fi Connectivity

The ESP8266 is primarily known for its Wi-Fi capabilities. You can program it to connect to existing Wi-Fi networks (Station mode), create its own Wi-Fi network (Access Point mode), or operate in both modes simultaneously. Libraries like ``ESP8266WiFi.h`` in Arduino IDE provide functions for managing Wi-Fi connections, scanning networks, and setting up web

servers.

6. MAINTENANCE

6.1 General Care and Handling

- Handle the board by its edges to avoid touching components, especially the pins, to prevent electrostatic discharge (ESD).
- Store the boards in anti-static bags when not in use.
- Keep the boards away from moisture, extreme temperatures, and direct sunlight.
- Ensure proper ventilation if the board is enclosed in a project.

6.2 Firmware Updates

Periodically check for updates to the NodeMCU firmware or ESP8266 core for Arduino IDE. Updates often include bug fixes, performance improvements, and new features. Follow the instructions provided by the respective communities for updating firmware or board packages.

7. TROUBLESHOOTING

7.1 Board Not Recognized by Computer

- **Check CH340 Driver:** Ensure the CH340G driver is correctly installed for your operating system. Reinstall if necessary.
- **USB Cable:** Try a different micro-USB cable. Some cables are for charging only and do not support data transfer.
- **USB Port:** Try a different USB port on your computer.

7.2 Failed to Upload Sketch/Firmware

- **Correct Board and Port:** Verify that the correct NodeMCU board type and serial port are selected in your IDE (e.g., Arduino IDE: **Tools > Board** and **Tools > Port**).
- **Press Flash Button:** For some boards or specific flashing tools, you might need to hold down the "Flash" (or "GPIO0") button while pressing and releasing the "Reset" button, then release the "Flash" button to put the board into flashing mode.
- **Power Supply:** Ensure the board is receiving adequate power.
- **Serial Monitor:** Close any open serial monitors that might be using the serial port.

7.3 Wi-Fi Connectivity Issues

- **SSID and Password:** Double-check that the Wi-Fi network name (SSID) and password in your code are correct.
- **Signal Strength:** Ensure the board is within range of your Wi-Fi router.
- **Router Settings:** Some older routers or specific security settings might cause issues. Try connecting to a different network if possible.

7.4 Breadboard Compatibility

The NodeMCU board is wider than standard DIP packages, which can make it difficult to use with a single solderless breadboard as it occupies all pin rows. A common solution is to use two breadboards side-by-side, or a wider breadboard designed for such modules, to allow access to both rows of pins.

8. WARRANTY AND SUPPORT

This product is subject to a return policy that allows for refund or replacement within 30 days of purchase. For technical support, troubleshooting assistance beyond this manual, or warranty claims, please contact AITRIP customer service through the platform where the product was purchased. Please provide your order details and a clear description of the issue to facilitate prompt assistance.

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.

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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

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