Robodo BE01121

User Manual: ESP8266 ESP-01 5V 2-Channel WiFi Relay Module

Model: BE01121 | Brand: Robodo

1. Introduction

This document provides comprehensive instructions for the Robodo ESP8266 ESP-01 5V 2-Channel WiFi Relay Module. This module integrates an ESP8266 WiFi module and a microcontroller, enabling wireless control of relays via serial port instructions from a mobile application within a Local Area Network (LAN). It is designed for controlling various electrical devices, making it ideal for smart home automation, remote lighting control, and triggering systems.

2. Product Overview and Features

The ESP8266 ESP-01 5V 2-Channel WiFi Relay Module is a versatile component for IoT projects. It allows for remote control of devices with high voltage requirements.

Key Features:

- **Wireless Control:** Enables remote control of devices via WiFi using a mobile application.
- **Relay Capacity:** Equipped with 5V, 10A/250V AC and 10A/30V DC relays, capable of 100,000 continuous pulls.
- **Diode Discharge Protection:** Ensures relay longevity and safe operation.
- **Fast Response Time:** Quick activation and deactivation of connected devices.
- **Smart Config Technology:** Simplifies WiFi module configuration with account and password memory.
- **Transmission Distance:** Up to 100 meters in open environments when directly connected to a mobile phone. Distance varies with router signal strength when connected via a router.
- **Indicator Lights:** Board mode selection and real-time working status indicators for easy monitoring.
- **Debug Interfaces:** Reserved UART debug interface and STM8 SWIM program download interface for development.

Figure 1: Top view of the Robodo ESP8266 ESP-01 5V 2-Channel WiFi Relay Module, showing the ESP-01 module and two blue relays.

3. Specifications

Parameter	Value
Model Number	BE01121
Relay Channels	2
Trigger Voltage (VDC)	5V
Switching Voltage (VAC)	250V @ 10A
Switching Voltage (VDC)	30V @ 10A
Baud Rate	9600

Transmission Distance (Open Environment)	Up to 100m (mobile phone to WiFi module)
Dimensions (LxWxH)	50 x 50 x 50 mm
Item Weight	20 g
Connector Type	Screw
Contact Material	Copper
Contact Type	Normally Closed
Mounting Type	PCB Mount

Figure 2: Angled view of the module, highlighting the screw terminals for connections.

4. Included Components

The package includes the following:

- 1 x ESP8266 ESP-01 5V 2-Channel WiFi Relay Module

5. Setup Guide

This section outlines the general steps for setting up your WiFi Relay Module. Specific programming and application setup may vary based on your project requirements.

5.1. Power Connection

1. Ensure all power sources are disconnected before making any connections.
2. Connect a stable 5V DC power supply to the module's power input terminals (usually marked **+V** and **GND**). Refer to the module's silkscreen for exact pinout.
3. Verify the power supply polarity to prevent damage to the module.

5.2. Relay Connections

The module features two relays, each with Common (COM), Normally Open (NO), and Normally Closed (NC) terminals.

1. Identify the load you wish to control (e.g., light, motor).
2. Connect one side of your load to the power source.
3. Connect the other side of your load to either the **NO** or **NC** terminal of the desired relay, depending on whether you want the load to be ON or OFF when the relay is de-energized.
4. Connect the **COM** terminal of the relay to the remaining side of your power source.
5. Repeat for the second relay if controlling another load.
6. *Caution:* When connecting AC loads, ensure proper insulation and safety measures are in place. Consult a qualified electrician if unsure.

5.3. ESP-01 Module Configuration

The ESP-01 module on the relay board needs to be configured to connect to your WiFi network and receive commands. This typically involves:

1. **Firmware Upload:** If not pre-programmed, you may need to upload custom firmware to the ESP-01 module using the UART debug interface. This requires an external USB-to-TTL converter.
2. **Mobile Application Setup:** Use a compatible mobile application (e.g., a custom app or a generic IoT control app) that can send serial commands over WiFi to the ESP-01 module.
3. **Smart Config:** Utilize the "Smart config" technology mentioned in the features to easily configure the ESP-01's WiFi credentials (SSID and password) via the mobile app.

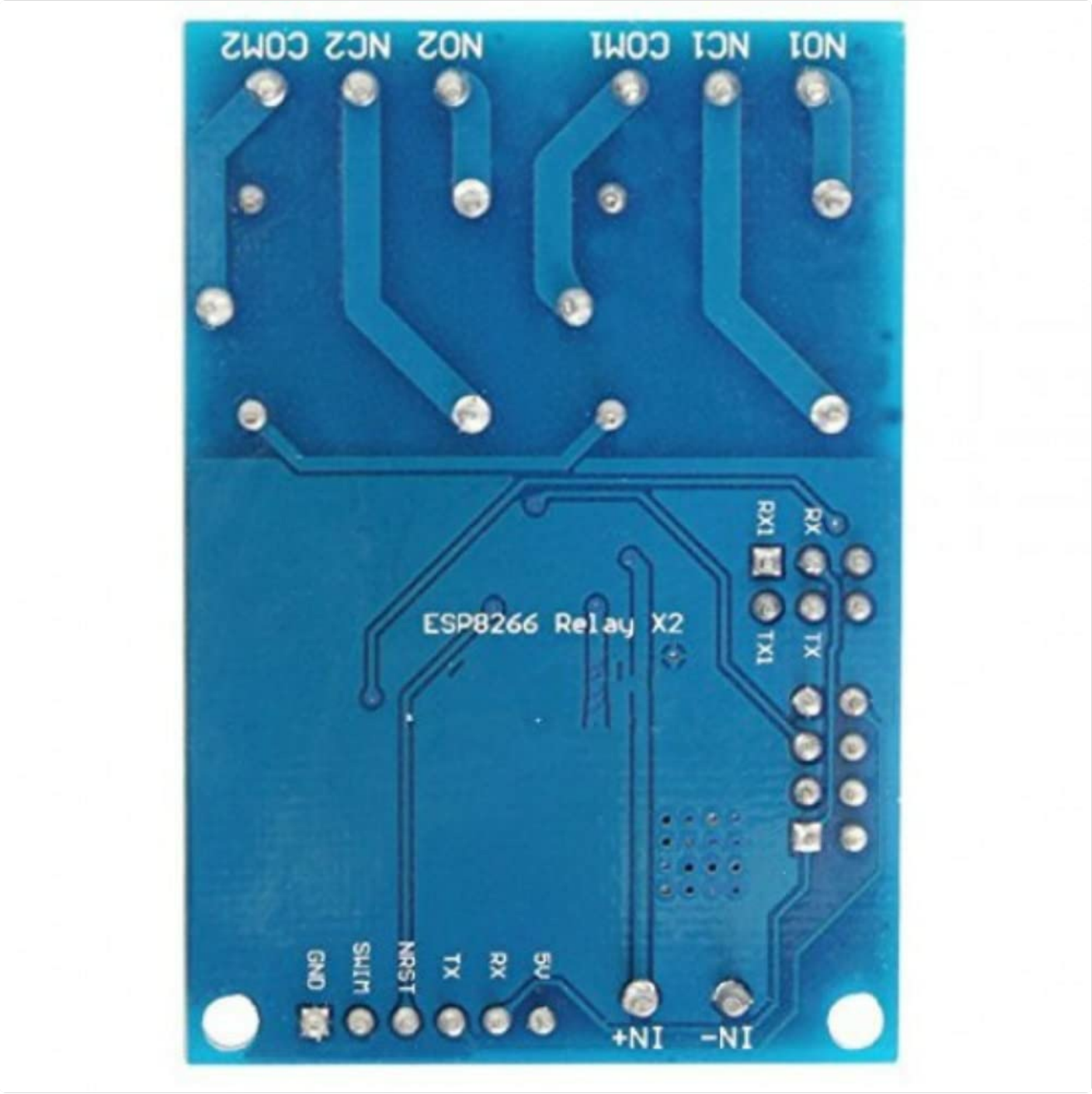

Figure 3: Bottom view of the module, illustrating the PCB layout and pin designations for ESP8266 Relay X2.

6. Operating Instructions

Once the module is powered and configured, you can operate the relays wirelessly.

1. Ensure your mobile device is connected to the same local area network (LAN) as the WiFi Relay Module.
2. Open the configured mobile application.
3. The application should detect the module or allow you to manually add its IP address.
4. Use the controls within the application to send commands to the module. These commands will trigger the relays to switch between ON and OFF states.
5. Observe the status indicator lights on the module to confirm relay activation.

Note: The specific commands and user interface will depend on the firmware loaded onto the ESP-01 and the mobile application used. Refer to your custom project documentation for detailed command protocols.

7. Maintenance

The ESP8266 ESP-01 5V 2-Channel WiFi Relay Module is designed for reliable operation with minimal maintenance.

- **Keep Dry:** Protect the module from moisture and humidity to prevent short circuits and corrosion.
- **Cleanliness:** Periodically inspect the module for dust or debris accumulation. Use a soft, dry brush or compressed air to clean if necessary. Do not use liquids.
- **Temperature:** Operate the module within its specified temperature range to ensure optimal performance and longevity.
- **Connections:** Regularly check all wire connections to ensure they are secure and free from corrosion. Loose connections can lead to intermittent operation or damage.
- **Firmware Updates:** If using custom firmware, periodically check for updates from your firmware developer to benefit from bug fixes and new features.

8. Troubleshooting

If you encounter issues with your WiFi Relay Module, refer to the following troubleshooting steps:

8.1. Module Not Powering On

- **Check Power Supply:** Ensure the 5V DC power supply is correctly connected and providing the specified voltage.
- **Polarity:** Verify that the power supply polarity is correct (+V to +V, GND to GND).
- **Loose Connections:** Inspect all power connections for looseness or damage.

8.2. No WiFi Connection

- **WiFi Credentials:** Confirm that the ESP-01 module has been configured with the correct WiFi SSID and password for your network.
- **Network Range:** Ensure the module is within range of your WiFi router.
- **Router Settings:** Check your router settings for any MAC address filtering or other security features that might block new devices.
- **Firmware:** Verify that the ESP-01 has appropriate firmware loaded that supports WiFi connectivity.
- **Interference:** Minimize potential interference from other electronic devices.

8.3. Relays Not Responding

- **Power to Relays:** Ensure the module itself is powered correctly.
- **Command Format:** Verify that the commands sent from your mobile application match the expected format for the ESP-01 firmware.
- **Load Connections:** Check the wiring of the load to the relay terminals (COM, NO, NC).
- **Load Functionality:** Test the connected load independently to ensure it is working correctly.
- **Relay Health:** While rare, a faulty relay might be the cause. If possible, test with a known working relay or module.

8.4. Intermittent Operation

- **Power Fluctuations:** Ensure a stable power supply. Voltage drops can cause erratic behavior.
- **WiFi Signal Strength:** A weak or unstable WiFi signal can lead to intermittent communication.
- **Overheating:** Ensure adequate ventilation around the module, especially if operating high-current loads.
- **Firmware Bugs:** If using custom firmware, consider checking for updates or known issues.

9. Warranty and Support

For warranty information and technical support, please refer to the official Robodo website or contact their customer service.

- **Manufacturer:** Bombay Electronics
- **Contact Information:** Refer to the product packaging or the official Robodo website for the latest support contact details.
- **Online Resources:** Visit the Robodo Store on Amazon for additional product information and resources.