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## eletechsup R4IOI16

# eletechsup R4IOI16 16-Channel RS485 Modbus RTU IO Board User Manual

Model: R4IOI16 (4DI-12DO with Pin Variant)

## 1. INTRODUCTION

The eletechsup R4IOI16 is a versatile 16-channel multi-function RS485 IO core board designed for industrial and home automation applications. It supports the Modbus RTU protocol and offers flexible Digital Input (DI) and Digital Output (DO) configurations. This board features a 2.54mm pin header terminal for easy integration into various IO expansion systems, including those based on Arduino, ESP32, and PLCs.

Key features include:

- Five configurable IO modes: 16DI, 16DO, 8DI-8DO, 4DI-12DO, and 12DI-4DO.
- Switchable NPN/PNP input and output levels via register configuration.
- Wide power supply range (DC 6-25V or DC 4-5V).
- Compact size and lightweight design.

# 16CH DC 5-24V RS485 Multifunctional DI-DO Module

## MODBUS RTU Protocol

### NPN/PNP Switchable DI-DO

### Small & Thin Size

16DI  
16DO  
8DI-8DO  
4DI-12DO  
12DI-4DO



Figure 1: eletechsup R4IOI16 board illustrating available configurations (Only Board and With Pin) and the five DI/DO modes.

## 2. SETUP AND HARDWARE CONFIGURATION

### 2.1 Power Supply

- **Power Supply 1:** DC 6-25V (with anti-reverse protection).
- **Power Supply 2:** DC 4-5V (reverse connection prohibited).

### 2.2 IO Mode Selection

The R4IOI16 supports five different IO configurations. These modes are selected by configuring jumpers ( $0\Omega$  resistors or wire links) on the board. The jumper locations are labeled M0, M1, M2, M3, M4 on the underside of the board.

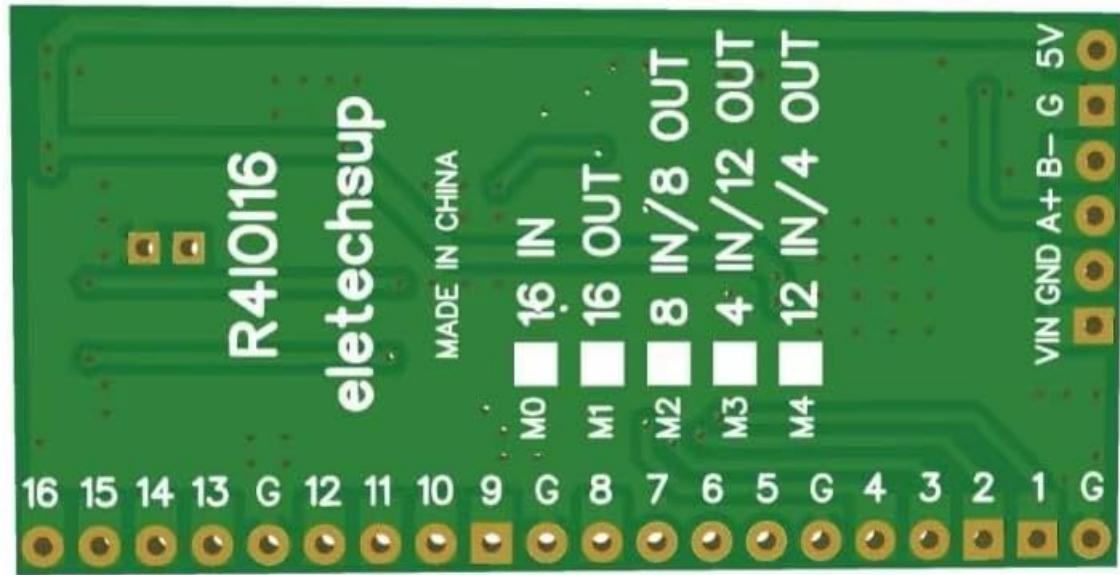


Figure 2: Underside of the R4IO16 board, indicating jumper configuration points M0-M4 for mode selection.  
The available modes are:

- 16 Digital Inputs (16DI)
- 16 Digital Outputs (16DO)
- 8 Digital Inputs and 8 Digital Outputs (8DI-8DO)
- 4 Digital Inputs and 12 Digital Outputs (4DI-12DO)
- 12 Digital Inputs and 4 Digital Outputs (12DI-4DO)

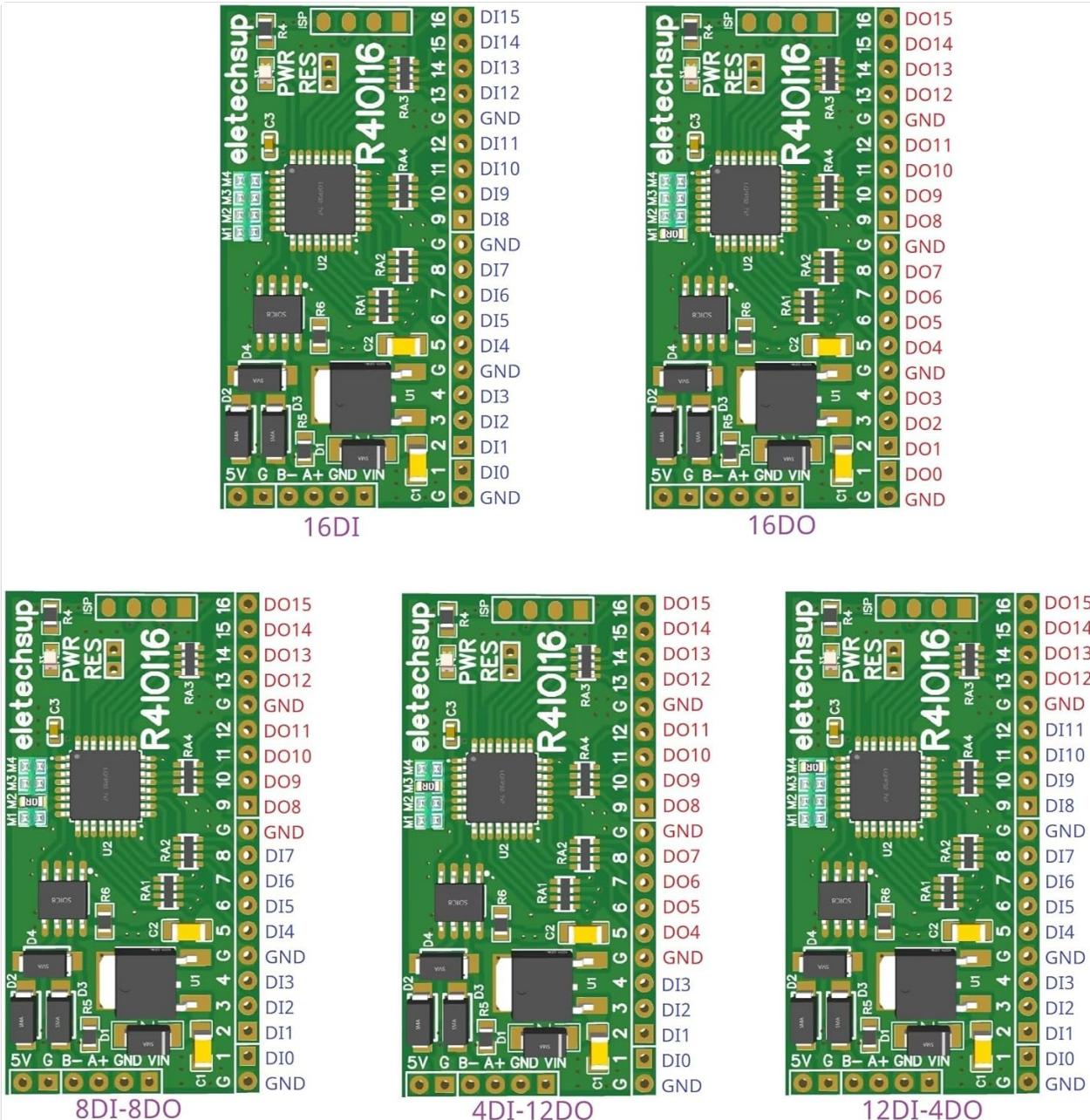


Figure 3: Pin definitions for the five configurable DI/DO modes.

## 2.3 Wiring Diagrams

The R4IOI16 supports both NPN and PNP input/output configurations, which can be switched via software registers. Below are typical wiring diagrams for different NPN/PNP settings.

# Wiring Diagram

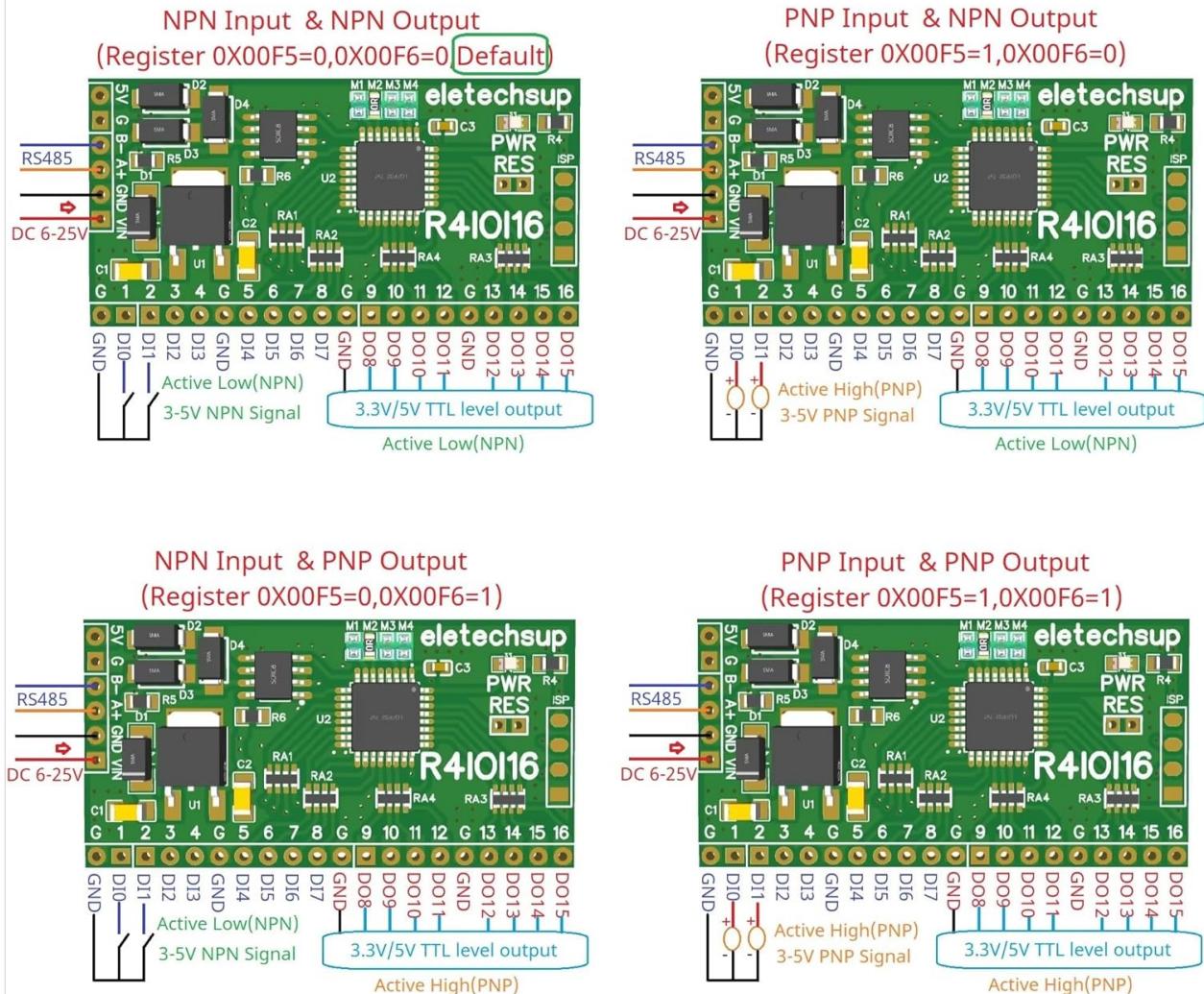


Figure 4: Detailed wiring diagrams for various NPN/PNP input and output level combinations.

## 3. OPERATING INSTRUCTIONS

### 3.1 MODBUS RTU Communication

The R4IOI16 communicates using the MODBUS RTU protocol over RS485. It supports the following function codes:

- **Write:** 05 (Write Single Coil), 06 (Write Single Register), 15 (Write Multiple Coils), 16 (Write Multiple Registers)
- **Read:** 01 (Read Coils), 02 (Read Discrete Inputs), 03 (Read Holding Registers)

In MODBUS command mode, the board can support up to 247 devices in parallel on the RS485 bus.

### 3.2 Input and Output Level Switching (NPN/PNP)

The input and output levels (NPN/PNP) can be switched by modifying specific registers:

- **Register 0X00F5:** Controls Input Level (0 for NPN, 1 for PNP)
- **Register 0X00F6:** Controls Output Level (0 for NPN, 1 for PNP)

Default settings are NPN Input & NPN Output (0X00F5=0, 0X00F6=0).

### 3.3 Communication Anomaly Handling

- **Restart on Communication Anomaly:** By setting register 0X00F3, the board can be configured to restart if communication is lost or abnormal.
- **Close Output Ports on Communication Anomaly:** By setting register 0X00F4, all output ports can be configured to close automatically if communication becomes abnormal.

### 3.4 Input and Output Characteristics

- **Input Mode:** Supports 3.3V/5V TTL level input. Two input modes are available: low level input (default) and high level input.
- **Output Mode:** 5V TTL level, configurable for low level (default) or high level output.

### 3.5 Input Port Status

Input port status supports both query (default behavior) and automatic reporting, providing flexibility in how input changes are monitored.

### 3.6 Baud Rate Settings

The following baud rates are supported, with 9600 bps as the default:

- 1200, 2400, 4800, **9600 (default)**, 19200, 38400, 57600, 115200 bps.

Parity options include None, Odd, and Even.

## 4. MAINTENANCE

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To ensure the longevity and reliable operation of your eletechsup R4IOI16 board, follow these general maintenance guidelines:

- **Environment:** Operate the board in a clean, dry environment, free from excessive dust, moisture, and corrosive gases.
- **Temperature:** Avoid exposing the board to extreme temperatures outside its specified operating range.
- **Static Discharge:** Always handle the board with anti-static precautions to prevent damage from electrostatic discharge.
- **Connections:** Periodically check all wiring connections to ensure they are secure and free from corrosion.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air. Avoid using liquid cleaners.

## 5. TROUBLESHOOTING

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If you encounter issues with your R4IOI16 board, consider the following troubleshooting steps:

- **No Power:** Verify that the power supply is connected correctly and provides the specified voltage (DC 6-25V or DC 4-5V). Check for proper polarity.
- **Communication Failure:**
  - Ensure RS485 A+ and B- lines are correctly connected.
  - Check that the baud rate and parity settings match between the R4IOI16 and your master device.
  - Verify the Modbus slave address of the R4IOI16.
  - Confirm that the RS485 bus is properly terminated if necessary.

- **Incorrect IO Behavior:**

- Review the jumper settings (M0-M4) to ensure the correct DI/DO mode is selected.
- Check the NPN/PNP input/output level settings in registers 0X00F5 and 0X00F6.
- Verify wiring according to the NPN/PNP configuration.
- Ensure input signals are within the 3.3V/5V TTL level range.

- **Intermittent Operation:** Check for loose connections, power supply fluctuations, or electromagnetic interference.

## 6. SPECIFICATIONS

Feature	Specification
Model	R4IOI16
Power Supply 1	DC 6-25V (anti-reverse)
Power Supply 2	DC 4-5V (reverse connection prohibited)
Working Current	5.6mA
Communication Protocol	MODBUS RTU
Communication Interface	RS485
MODBUS Function Codes	Write: 05/06/15/16; Read: 01/02/03
Configurable IO Modes	16DI, 16DO, 8DI-8DO, 4DI-12DO, 12DI-4DO
Input/Output Levels	NPN/PNP Switchable (via registers 0X00F5/0X00F6)
Input Signal	3.3V/5V TTL (low level default)
Output Signal	5V TTL (low level default)
Max Devices (MODBUS)	247
Baud Rates	1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200
Parity	None/Odd/Even
Interface Type	2.54mm pin header
Dimensions	51 x 26 x 3.8 mm
Weight	6 grams

## 7. WARRANTY INFORMATION

Warranty details for the eletechsup R4IOI16 board are not explicitly provided in the product description. Please refer to the seller's return policy or contact the seller directly for specific warranty terms and conditions.

## 8. SUPPORT

For further assistance, technical support, or inquiries regarding the eletechsup R4IOI16 board, please contact the seller directly through the platform where the product was purchased. You may also visit the official eletechsup store on Amazon for additional product information and resources:

[Visit the eletechsup Store on Amazon](#)

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