waveshare 2-CH RS485 TO POE ETH (B)

User Manual: 2-Ch RS485 to POE Ethernet Converter

Brand: Waveshare | **Model:** 2-CH RS485 TO POE ETH (B)

1. INTRODUCTION

The Waveshare 2-Ch RS485 to POE Ethernet Converter is an industrial-grade isolated serial server designed for reliable data transmission. This device facilitates bi-directional transparent data communication between RS485 serial devices and an Ethernet network. It features dual independent RS485 channels and dual Power over Ethernet (PoE) enabled Ethernet ports, making it suitable for various industrial applications including Modbus and MQTT gateway functionalities.

Figure 1: Waveshare 2-Ch RS485 to POE Ethernet Converter. This image shows the compact, rail-mount metal case of the device with its various indicator LEDs and the green terminal block for RS485 connections.

2. KEY FEATURES

- **Dual Ethernet Port Cascade:** Onboard 2-channel Ethernet ports for communication and cascading. Either port can be used for dual serial server network communication, while the other can be used for cascading or

communication with other devices.

- **Flexible Power Supply:** Supports screw terminal (DC 6~45V) and DC power port, or Power over Ethernet (PoE) via the Ethernet port, compliant with IEEE 802.3af.

- **Modbus Gateway Support:** Suitable for Modbus networking upgrades, configurable with specific software. Supports TCP server / TCP client / UDP multicast / UDP modes.

- **MQTT/JSON to Modbus:** Offers flexible conversion between different protocols for enhanced data integration.

- **Multi-Host Roll-Polling:** Supports multiple hosts for data acquisition.

- **User-Defined Heartbeat/Registration Packet:** Customizable packets for cloud communication and device identification.

- **NTP Protocol Support:** Enables synchronization of network time for serial data output or upload.

- **Multiple Configuration Methods:** Configurable via host software, web browser, or device management functions library.

- **Robust Protection:** Onboard power supply and signal isolation, built-in TVS, resettable fuse, and protection diode for stable and safe operation against surge, over-current, and over-voltage.

- **Rail-Mount Design:** Industrial-grade rail design for compact size, easy installation, and cost-effectiveness.

Figure 2: Overview of the key features of the Waveshare 2-Ch RS485 to POE Ethernet Converter, highlighting industrial isolation, rail-mount capability, Modbus/MQTT/JSON gateway support, dual RS485 channels, multiple power options, and Ethernet port cascade.

3. PRODUCT PARAMETERS

Model: 2-CH RS485 TO POE ETH (B)

Product Type: Serial server, Modbus Gateway, MQTT Gateway

Basic Function: Bi-directional transparent data transmission between RS485 and Ethernet

Communication Interface: RS485 port × 2, Ethernet port × 2

Power Supply: DC 5.5 power port, 6 ~ 45V DC screw terminal, or PoE port

Isolation Protection: Power isolation, Signal isolation

Ethernet: RJ45 with PoE support, IEEE 802.3af compliant, 10 / 100M auto-negotiation RJ45 connector, 2 KV surge protection

Serial Port: Isolated RS485 (2 channels, independent receive and transmit)

Baudrate: 300 ~ 115200 bps

Parity Bit: None, odd, even, mark, space

Data Bit: 5 ~ 9 bits

Flow Control: N/A

Software Protocols: ETHERNET, IP, TCP, UDP, HTTP, ARP, ICMP, DHCP, DNS

Configuration: Host software, web browser, device management functions library

Communication Method: TCP/IP direct communication, VCOM

Operating Mode: TCP server, TCP client (coexisting with TCP server), UDP, UDP multicast

Operating Temperature: -40℃ ~ 85℃

Humidity Range: 5% ~ 95% relative humidity

Dimensions (L × W × H): 78.0 × 72.5 × 24.2 mm

4. SETUP AND CONNECTIONS

4.1 Power Supply Options

The device offers multiple ways to receive power:

- **DC 5.5 Power Port:** Connect a compatible DC power adapter to the 5.5mm power jack.
- **DC Screw Terminal:** Use the screw terminal block for a DC input voltage range of 6V to 45V. Ensure correct polarity.
- **PoE Port:** If using a PoE-enabled Ethernet switch or injector, power can be supplied directly through the Ethernet cable, compliant with IEEE 802.3af.

4.2 Ethernet Connections

The converter features two RJ45 Ethernet ports (ETH1 and ETH2) that support 10/100M auto-negotiation and 2 KV surge protection. These ports can be used for network communication or for cascading multiple devices.

- **Network Communication:** Connect either ETH1 or ETH2 to your local area network (LAN) or directly to a computer.
- **Ethernet Port Cascade:** One Ethernet port can be used for network communication, while the other can be used to connect to another device, allowing for a cascaded setup. Each module in a cascade needs to be powered individually. The working current of the module is 12V/150mA (MAX), and up to 8 modules can be cascaded.

4.3 RS485 Connections

The device includes two isolated RS485 channels. Connect your RS485 serial devices to the green screw

terminal block. Ensure proper A/B line connections for each channel.
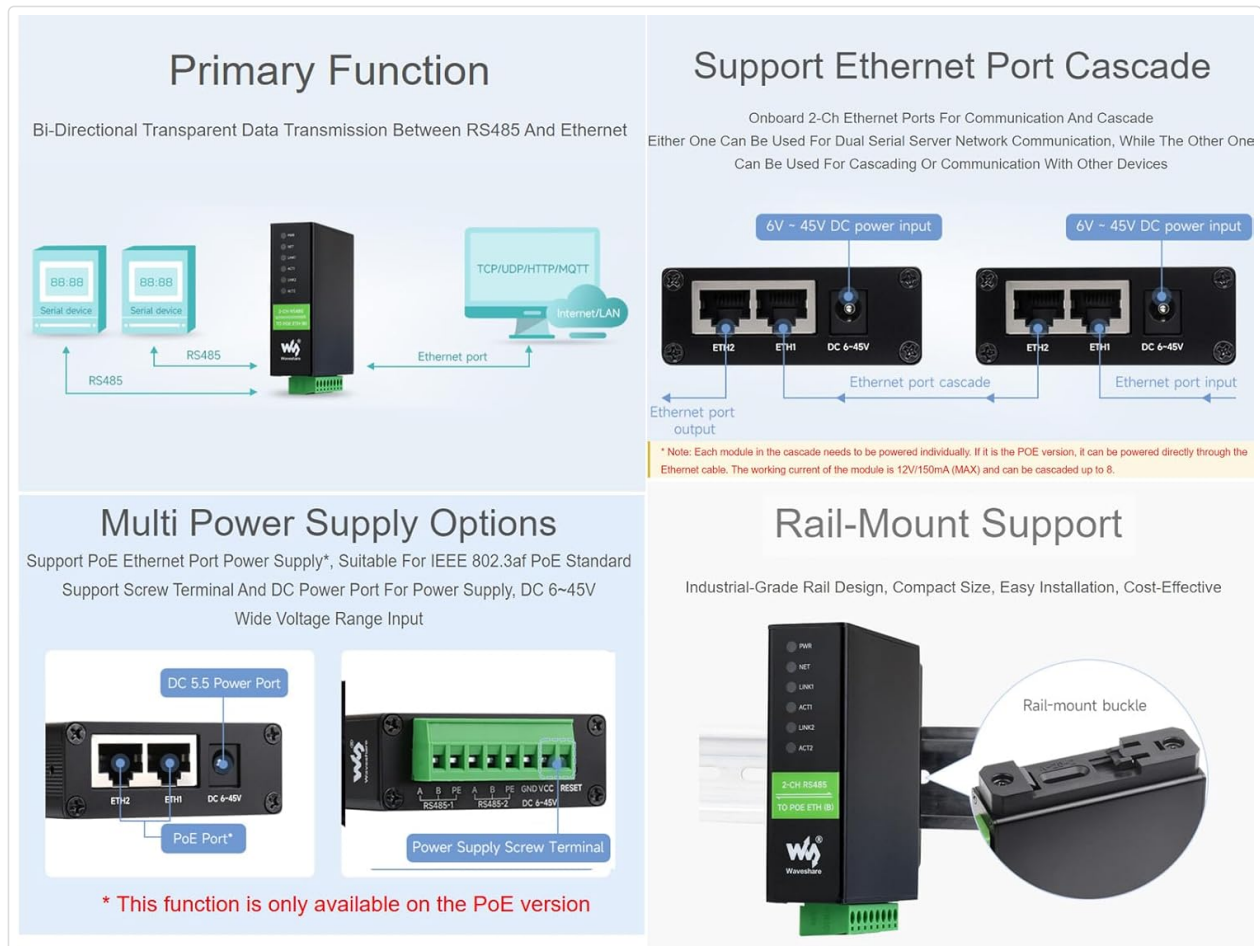

Figure 3: Connection diagrams for the Waveshare 2-Ch RS485 to POE Ethernet Converter, illustrating primary function, Ethernet port cascade, multi-power supply options (DC 5.5 port, screw terminal, PoE), and rail-mount support.

5. OPERATING MODES

The converter supports various communication and operating modes to suit different network environments and application requirements.

5.1 Communication Modes

- **TCP Server:** The device listens on configured ports and waits for TCP client connections. Data from the serial device is then transparently transmitted to all connected TCP clients. Supports up to 30 concurrent TCP connections.

- **TCP Client:** The device actively establishes a TCP connection with a configured IP address and port. It can coexist with TCP server mode and supports up to 22 concurrent client connections.

- **UDP:** Data is transmitted via UDP packets to a specified IP address and port, improving data transfer accuracy.

- **UDP Multicast:** Data is sent to a multicast group. Only devices within the multicast group receive the data, reducing network load.

5.2 Modbus Gateway

The device functions as a Modbus gateway, enabling Modbus RTU devices to communicate over a Modbus TCP/IP network. This is suitable for upgrading existing Modbus networks. Configuration is performed using

specific software.

5.3 MQTT/JSON to Modbus

When configured as an MQTT gateway, the device can upload serial data to an MQTT server via MQTT protocol. It supports transparent transmission, encrypted communication, and various cloud platforms (e.g., Baidu Cloud MQTT, Alibaba Cloud MQTT, China Mobile OneNet). The acquired Modbus RTU or non-standard serial data can be parsed into JSON format and packaged into MQTT data packets for uploading. When used as a JSON data acquisition gateway, devices can be connected to data acquisition instruments through RS485 connection. The device then acquires data automatically, converts it into JSON format, and posts it to a server. The acquired data supports Modbus RTU 645 instrument 97 version, 645 instrument 07 version, as well as non-standard RS485 protocols. The uploaded data format can be configured via host, and the JSON upload protocol can be MQTT protocol, HTTP POST protocol, HTTP GET protocol, and so on.
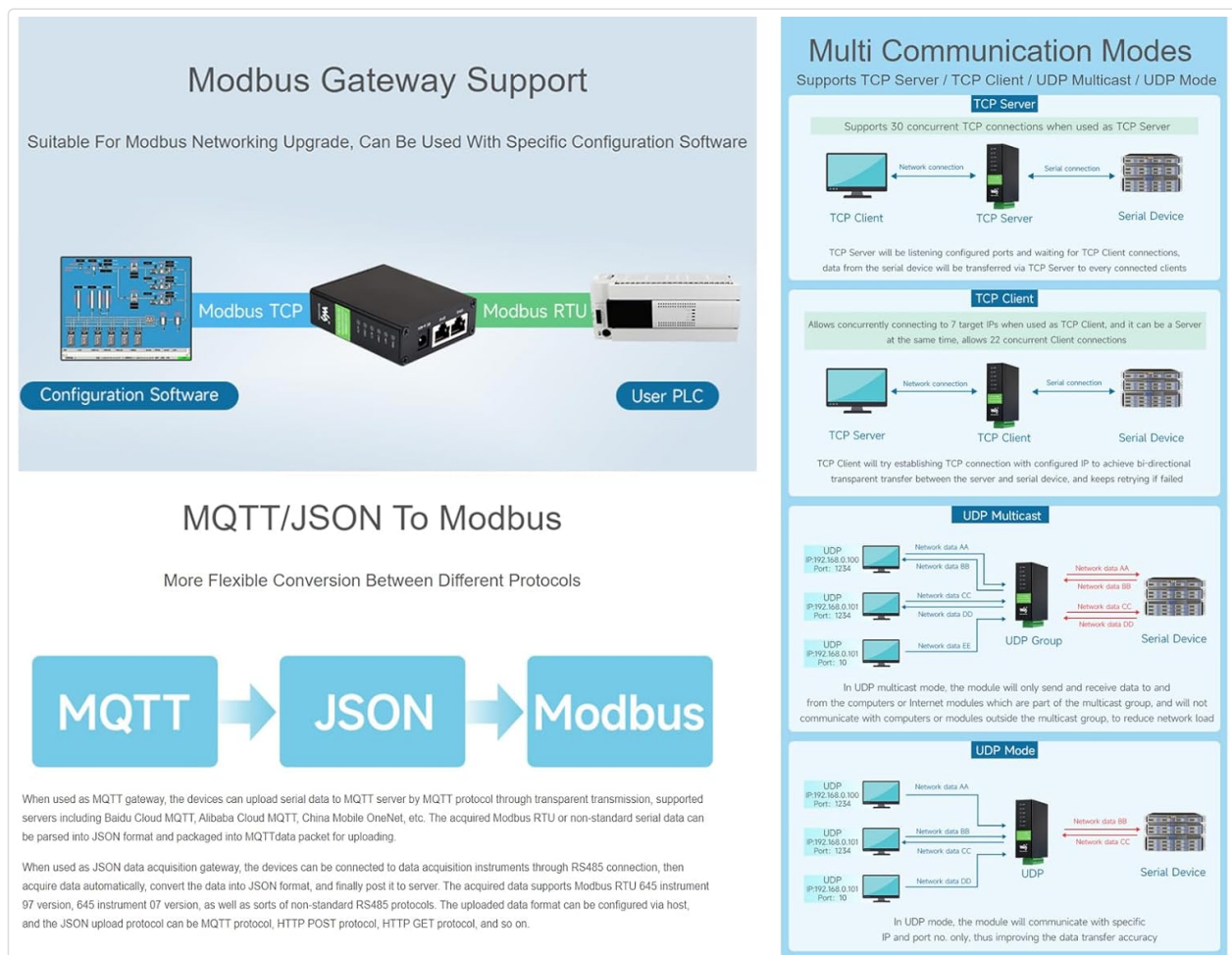

Figure 4: Detailed illustration of Modbus Gateway support, MQTT/JSON to Modbus conversion, and various communication modes including TCP Server, TCP Client, UDP Multicast, and UDP Mode.

6. ADVANCED FEATURES

6.1 Multi-Hosts Roll-Polling Support

The device supports roll-polling from multiple hosts. Different network devices will be identified and responded to respectively, preventing crosstalk issues while communicating with multiple network devices.

6.2 NTP Protocol Support

The converter supports the Network Time Protocol (NTP) for obtaining network time information. This ensures accurate timestamps for serial data output or data uploads, which is crucial for data logging and synchronization.

6.3 User-Defined Heartbeat/Registration Packet

Users can define custom heartbeat and registration packets. These packets are essential for cloud communication and device identification, allowing for flexible integration into various IoT platforms and monitoring systems.

6.4 Multi-Configuration Methods

The device offers several methods for configuration:

- **Host Software:** Utilize dedicated software for comprehensive configuration.
- **Web Browser:** Access the device's web interface for configuration, supporting dynamic IP via DHCP and DNS protocol connected domain server address.
- **Device Management Functions Library:** Integrate configuration into custom applications using the provided library.
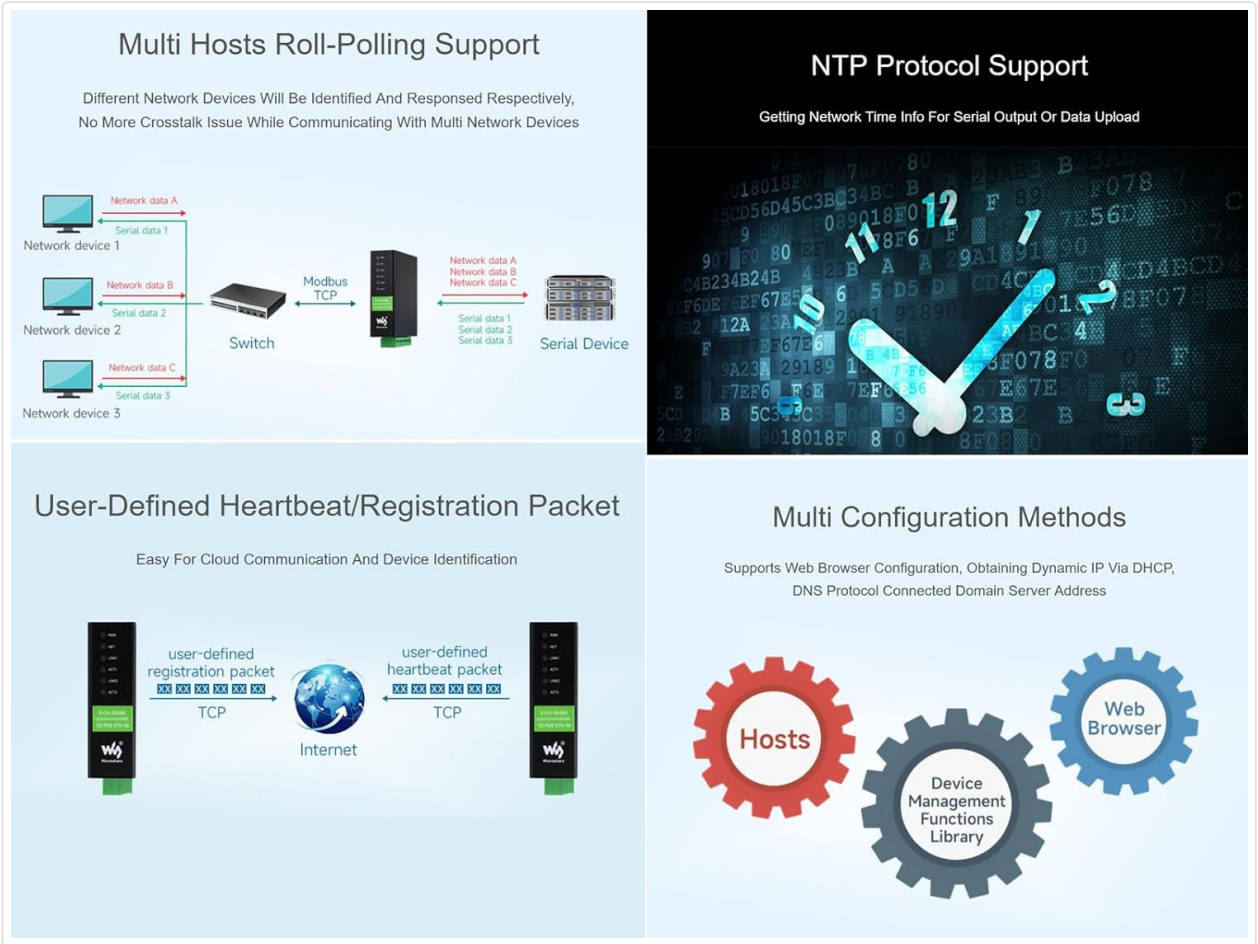

Figure 5: Visual representation of advanced features including multi-host roll-polling, NTP protocol support for time synchronization, user-defined heartbeat/registration packets for device identification, and various configuration methods.

7. PHYSICAL CHARACTERISTICS AND PROTECTION

7.1 Aluminium Alloy Enclosure

The converter is housed in a solid and durable aluminium alloy enclosure with sandblasting and anodic oxidation treatment. This provides excellent physical protection and heat dissipation, ensuring reliable operation in industrial environments.

7.2 Multiple Protection Mechanisms

For enhanced safety and stability, the device incorporates several protection features:

- **Power Supply and Signal Isolation:** Provides stable isolation voltage with high reliability and strong anti-interference capabilities.

- **Built-in TVS:** Transient Voltage Suppression (TVS) tube effectively suppresses surge voltage and transient peak voltage in the circuit.

- **Resettable Fuse:** Built-in resettable fuse ensures stable output current and prevents over-current conditions.

- **Protection Diode:** Prevents over-voltage conditions and improves shock resistance.

- **ESD Protection:** Electrostatic Discharge protection safeguards the device from static electricity.

Figure 6: Illustration of the multiple protection features and the robust aluminium alloy enclosure of the Waveshare 2-Ch RS485 to POE Ethernet Converter, emphasizing its industrial design.

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8. Interface Introduction and Indicators

8.1 Interface Layout

The device features the following interfaces:

- **DC Power Port:** 5.5mm jack for external DC power supply.

- **Ethernet Ports (ETH1, ETH2):** RJ45 connectors for network and PoE (optional) connections.

- **RS485 Screw Terminals:** Two independent channels (RS485-1 and RS485-2) with A, B, GND, VCC connections.

- **Reset Button:** For factory reset or rebooting the device.

- **DC 6-36V Power Input:** Screw terminals for direct DC power input.

8.2 Indicator Description

The front panel includes several LED indicators to show the device's status:

- **PWR:** Power indicator. Lit when the device is powered on.
- **NET:** Network indicator. Blinks when connected to Ethernet.
- **LINK1:** Lights up when Channel 1 connection is established.
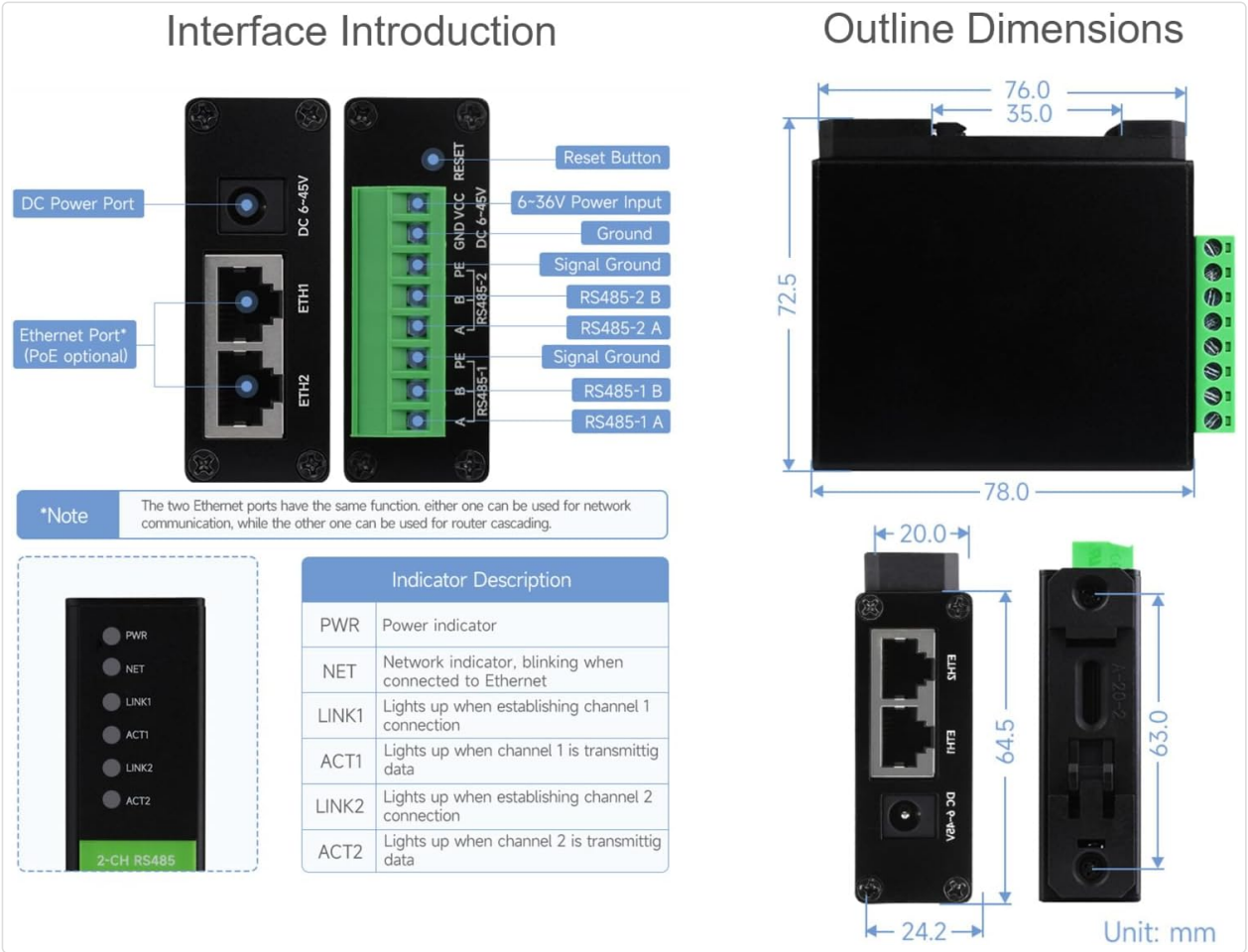- **ACT1:** Lights up when Channel 1 is transmitting data.
- **LINK2:** Lights up when Channel 2 connection is established.
- **ACT2:** Lights up when Channel 2 is transmitting data.

Figure 7: Detailed view of the device's interfaces, including DC power, Ethernet ports, RS485 terminals, and reset button. Also shows the indicator LED descriptions and outline dimensions.

9. Outline Dimensions

The physical dimensions of the Waveshare 2-Ch RS485 to POE Ethernet Converter are as follows:

Length: 78.0 mm (3.07 inches)

Width: 72.5 mm (2.85 inches)

Height: 24.2 mm (0.95 inches)

Refer to Figure 7 for a detailed diagram of the outline dimensions.

10. Specifications

Product Dimensions: 3.07 x 2.85 x 0.95 inches

Item Weight: 4.6 ounces

Manufacturer: Waveshare

ASIN: B0CCP9MVBV

Item Model Number: 2-CH RS485 TO POE ETH (B)

Brand: waveshare

Platform: Web Browser

Model Name: 2-Ch RS485 to POE ETH Serial Server

Main Power Connector Type: 2.5mm Power Jack

Graphics Card Interface: Integrated (*Note: This specification appears to be a generic listing and not directly applicable to this device's function.*)

Memory Slots Available: 2 (*Note: This specification appears to be a generic listing and not directly applicable to this device's function.*)

Number of Ports: 4 (2x RS485, 2x Ethernet)

Total Ethernet Ports: 2

UPC: 790885235115

11. Troubleshooting

This section provides general guidance for common issues. For specific technical problems, refer to the support section.

11.1 No Power Indicator (PWR LED Off)

- **Check Power Source:** Ensure the DC power adapter or PoE source is correctly connected and supplying the specified voltage (6-45V DC).
- **Verify Connections:** Confirm that power cables are securely attached to the DC jack or screw terminal. If using PoE, ensure the Ethernet cable is connected to a PoE-enabled port.

11.2 No Network Connectivity (NET LED Off/Not Blinking)

- **Check Ethernet Cable:** Ensure the Ethernet cable is properly connected to one of the device's RJ45 ports and to a functional network switch or router.
- **Verify Network Settings:** Confirm that the device's IP address, subnet mask, and gateway settings are correct and compatible with your network. If using DHCP, ensure a DHCP server is available.
- **Test with Another Port/Cable:** Try connecting to a different Ethernet port on the device or using a different Ethernet cable.

11.3 No RS485 Data Transmission (ACT LEDs Off)

- **Verify RS485 Wiring:** Ensure the A and B lines of your RS485 device are correctly connected to the corresponding A and B terminals on the converter.
- **Check Serial Parameters:** Confirm that the baud rate, parity, data bits, and stop bits configured on the converter match those of your RS485 serial device.

- **Test RS485 Device:** Ensure the connected RS485 device is functional and actively transmitting/receiving data.

12. MAINTENANCE

To ensure the longevity and optimal performance of your Waveshare 2-Ch RS485 to POE Ethernet Converter, follow these general maintenance guidelines:

- **Keep Clean:** Regularly clean the device's exterior with a soft, dry cloth. Avoid using liquid cleaners or solvents.
- **Environmental Conditions:** Operate the device within the specified temperature (-40℃ ~ 85℃) and humidity (5% ~ 95% RH) ranges. Avoid exposure to extreme conditions, direct sunlight, or excessive dust.
- **Secure Connections:** Periodically check all cable connections (power, Ethernet, RS485) to ensure they are secure and free from damage.
- **Firmware Updates:** Check the manufacturer's website for any available firmware updates. Applying updates can improve performance, add features, or resolve known issues.

13. TECHNICAL SUPPORT

Waveshare provides online development resources and technical support for this product. If you encounter any problems or require assistance with setup, configuration, or troubleshooting, please do not hesitate to contact Waveshare support.

For further information and resources, please visit the Waveshare Store on Amazon or their official website.

Related Documents

	[Waveshare RS232/485 to WiFi PoE Ethernet (B) Serial Server User Manual](#) Explore the Waveshare RS232/485 to WiFi PoE Ethernet (B) User Manual, a comprehensive guide for the serial server that converts RS232/485 to TCP/IP network interfaces, enabling bidirectional data transmission via WiFi and Ethernet.
	[Waveshare RS485 to WiFi/ETH MQTT Communication User Manual](#) Comprehensive user manual for the Waveshare RS485 to WiFi/ETH module, guiding users through software and hardware preparation, network configuration, and establishing MQTT communication with platforms like EMQX.

[Waveshare RS232/485 TO WIFI ETH (B) User Manual: Setup, Features, and Applications](#)
Comprehensive user manual for the Waveshare RS232/485 TO WIFI ETH (B) serial server. Learn about its features, hardware and network setup, data transmission, various working modes, and application scenarios for industrial and IoT communication.

[Waveshare RS232/485 to Ethernet Converter User Manual](#)
This is an industrial-grade RS232/485 to Ethernet module from Waveshare, enabling bidirectional transparent data transmission between RS232, RS485, and RJ45 Ethernet ports. It features a 32-bit ARM M4 processor, 10/100M Ethernet, multiple operating modes (TCP Server/Client, UDP, HTTPD), Modbus gateway, and Websocket support, offering high speed, low power consumption, and stability for industrial IoT applications.

Documents - waveshare – 2-CH RS485 TO POE ETH (B)

[pdf] Specifications
Sparwan Distributor of IoT IT equipment RS232 RS485 TO POE ETH B Waveshare Wiki 1 v 1718975927 cdn shopify s files 0747 1438 2601 |||
RS232 RS485 TO POE ETH B From Waveshare Wiki Jump to: navigation, search Overview RS232 RS485 TO POE ETH B Introduction This is a dual serial port device data acquisitor / IoT gateway designed for the industrial environment, 1-ch RS232 and 1-ch RS485 can work simultaneously without interfering...
lang:en score:21 filesize: 1.83 M page_count: 17 document date: 2023-09-06