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› Waveshare Serial UART TTL to Ethernet Converter Module User Manual

waveshare UART TO ETH

Waveshare Serial UART TTL to Ethernet Converter Module User Manual

Model: UART TO ETH | Brand: Waveshare

1. PRODUCT OVERVIEW

The Waveshare Serial UART TTL to Ethernet Converter Module is designed to provide a reliable and efficient way to connect serial devices to an Ethernet network. This module features a high-speed, low-power design with high stability, making it suitable for various embedded applications requiring network connectivity for UART devices.

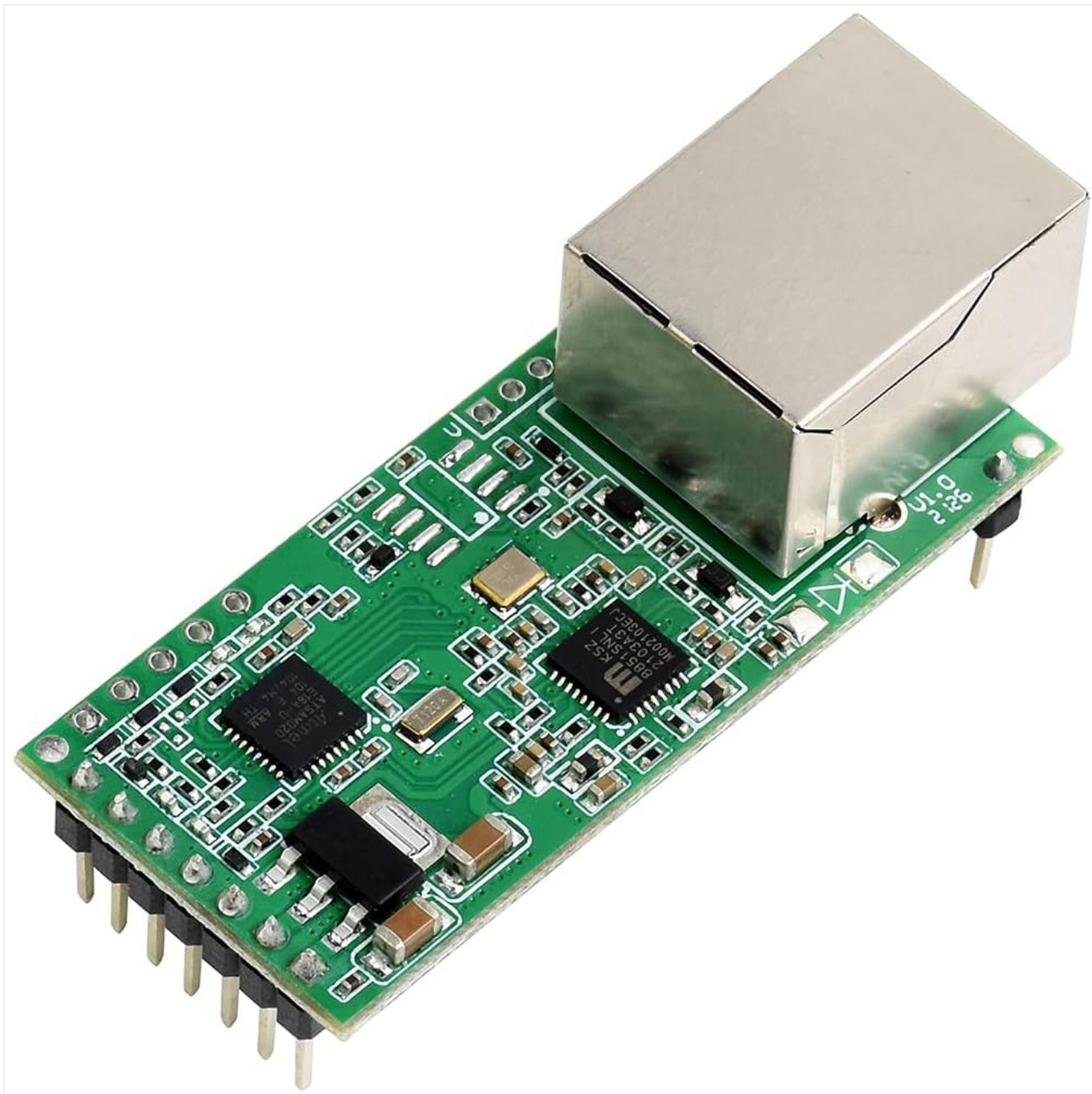


Figure 1.1: Top-down view of the Waveshare UART to Ethernet Converter Module, showing the Ethernet port and various components on the green PCB.



Figure 1.2: Angled view of the Waveshare UART to Ethernet Converter Module, highlighting the compact design and pin headers.

1.1 Hardware Versions

Please note that while providing compatible software functions, there are two different hardware versions of this module due to IC supply. These versions will be delivered randomly. Both versions offer the same core functionality.

Photos

While providing compatible software functions, there are two different hardware versions due to IC short supply, and they will be **delivered randomly**, we don't know in advance which one will be delivered for your order. Please make sure you don't mind it before placing order.

Version A



Version B



Figure 1.3: Depiction of Version A and Version B hardware variants of the module.

2. KEY FEATURES

- M0 series 32-bit ARM processor for fast speed and high efficiency.
- 10/100M Auto-MDI/MDIX Ethernet interface, compatible with both cross-over and straight-through cables.
- Automatic reconnection, providing a reliable TCP connection.
- Supports time-out reboot (no-data reboot), with configurable reboot time.
- Flexible serial port data framing, allowing customized packetization.
- Configurable baud rate from 600bps up to 460800bps, supporting five parity check options: None, Odd, Even, Mark, Space.
- Supports customized heartbeat packets to ensure connection integrity.
- Supports customized registration packets for connection status detection, with customizable packet header and MAC address inclusion.
- Customizable web page for module configuration.
- Supports RFC2217-like protocol for communication with devices whose serial settings may change.
- DNS domain name resolution support with configurable DNS server.
- DHCP support for auto-obtained IP or static IP configuration.
- Firmware upgradable via the network.
- Restore to factory settings via software and/or hardware.
- Comes with a default, customizable MAC address.
- Available working modes: TCP Server, TCP Client, UDP Server, UDP Client, HTTPD Client.
- Supported protocols: IP, TCP, UDP, ARP, ICMP, DHCP, DNS, HTTPD Client.
- Configurable via web page, AT commands, serial protocol, and network protocol.
- Provided software: module configuration software, TCP/UDP testing tool, VCOM virtual serial port software.
- Example code available for host computer (socket), VB, C++, Delphi, Android, iOS, etc.

3. SPECIFICATIONS

Attribute	Value
Product Dimensions	3.94 x 3.15 x 3.54 inches
Item Weight	0.352 ounces
Manufacturer	Waveshare
Item Model Number	UART TO ETH
Date First Available	November 4, 2016

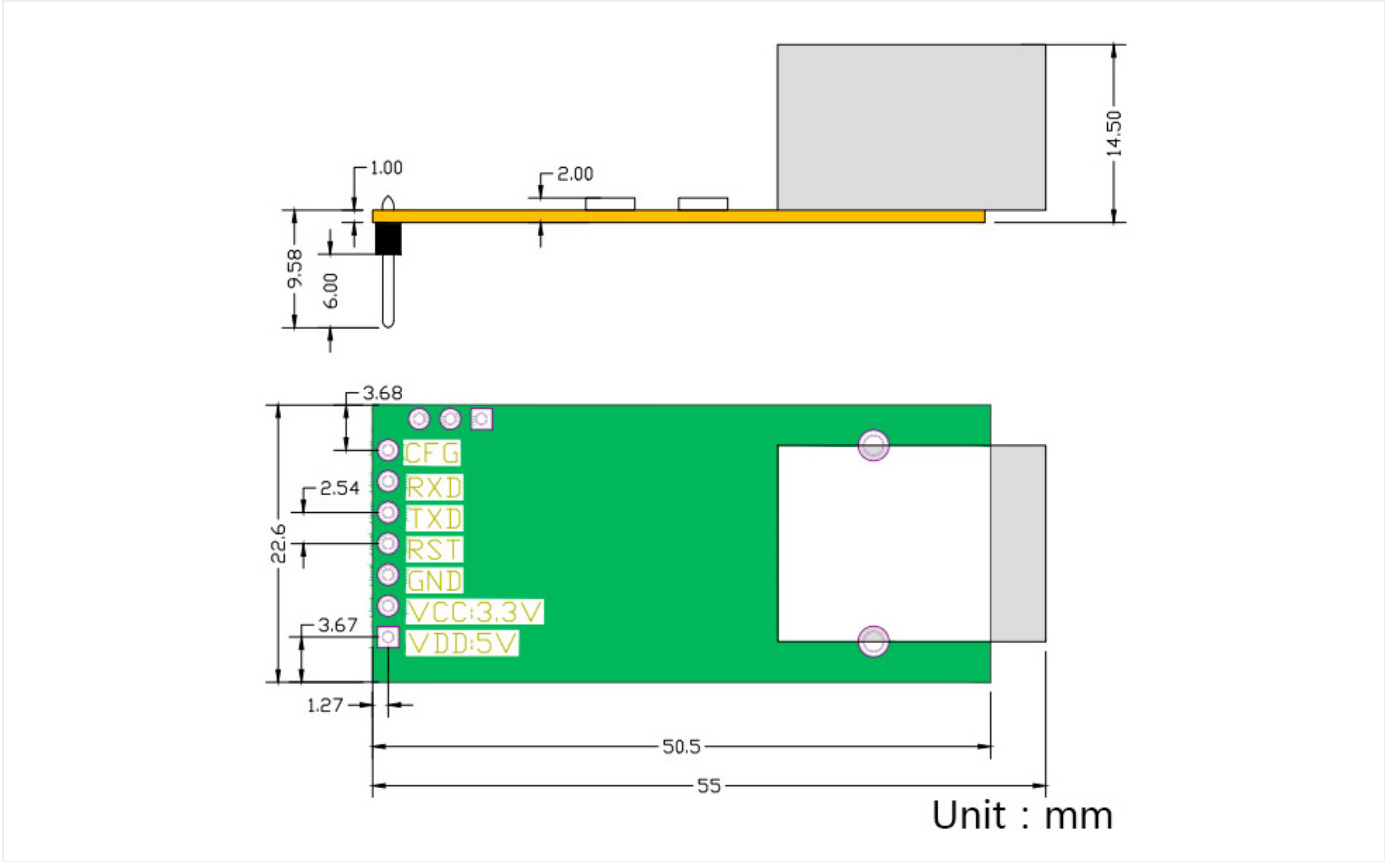


Figure 3.1: Detailed dimensions of the module in millimeters, showing pin spacing and overall size.

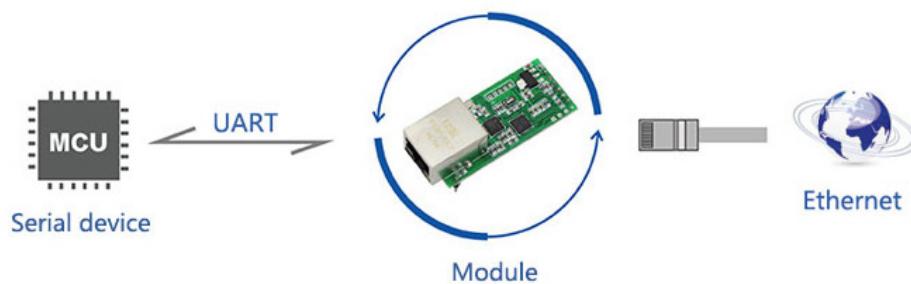
COMPARISON	UART TO ETH	RS485 TO ETH	RS232/485 TO ETH
Processor	Cortex-M0	Cortex-M0	Cortex-M4 (up to 120MHz frequency)
Ethernet	RJ45 (10/100Mbps self-negotiation)		
	Protocol: IP, TCP, UDP, ARP, ICMP, DHCP, DNS, HTTPD Client		
	Cache: TX 6Kbyte, RX 4Kbyte		Cache: TX 16Kbyte, RX 16Kbyte
Serial	UART	RS485	RS232+RS485 (allow to work at the same time)
	Baudrate: 600bps~460.8Kbps	Baudrate: 600bps~230.4Kbps	
	Hardware flow: NOT supported		Hardware flow: supported
	Data bit: 5, 6, 7, 8		
	Stop bit: 1, 2		
	Parity bit: None, Even, Odd, Space, Mark		
	Cache: RX 800byte		Cache: TX 2Kbyte, RX 2Kbyte
	Framing condition: 4 byte time interval, or 400 byte in length		Framing condition: 4 byte time interval, or customizable 0~1460 byte in length
Features	customized heartbeat packets, customized registration packets, customized webpage, RFC2217-like protocol, KeepAlive, timeout auto reboot, short connection, firmware upgrade via network		
	Modbus is not supported		Modbus gateway, Websocket (webpage to serial)
Working Modes	TCP Server, TCP Client, UDP Server, UDP Client, HTTPD Client		
Client Count	on TCP Server mode, customizable 1~16 Clients		on TCP Server mode, supports 2-ch Socket, 8 Clients per ch
Configuration	Built-in webpage, Host computer config software, Serial commands		
Interface Protection	Power: reverse-proof, ESD protection, anti-surge		
	Ethernet: 1.5KV electromagnetic isolation		
		RS485: 2KV ESD protection, 2.2KΩ pull up/down registers	
		lightningproof, over-current protection	
Power Supply	3.3V/5V	5~7V	5~36V
Operating Current	150mA@5V	110mA@5V	86.5mA@5V
Temperature	Operating Temperature: -25 ~ 75°C		Operating Temperature: -40 ~ 85°C
	Storage Temperature: -40 ~ 105°C		
Dimensions	50.5mm × 22.6mm × 15mm	70mm × 63.6mm × 25mm	82.8mm × 85.7mm × 25mm

Figure 3.2: Comparison table highlighting key differences between various Waveshare converter modules, including processor, Ethernet, UART, serial, and power supply specifications.

4. SETUP AND CONNECTION

The UART to Ethernet module facilitates communication between a serial device (like a microcontroller) and an Ethernet network. Ensure proper power supply (3.3V DC or 5V DC) and correct UART connections (TX, RX, GND) to your serial device.

Bi-direction transparent transmission between TTL and wired Ethernet:



Extend the communication distance for serial devices:

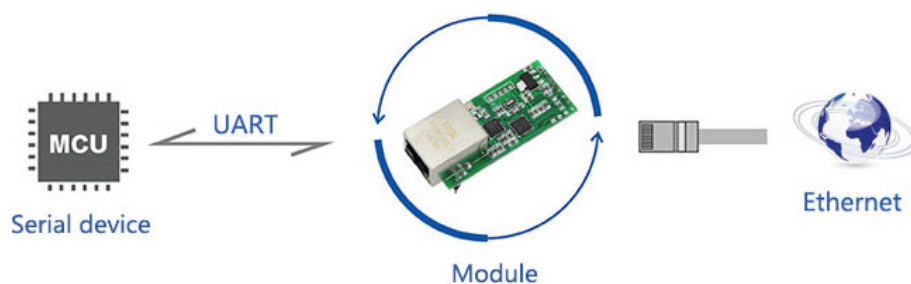


Figure 4.1: Basic connection diagram illustrating bi-directional data flow between a microcontroller (MCU) via UART, through the converter module, and to an Ethernet network.

4.1 Extending Communication Distance

The module can be used in pairs to extend the communication distance of serial devices over an Ethernet network.

Bi-direction transparent transmission between TTL and wired Ethernet:



Extend the communication distance for serial devices:



Figure 4.2: Diagram depicting how two UART to Ethernet modules can be used to extend the reach of a serial device connection across an Ethernet infrastructure.

5. OPERATING MODES AND CONFIGURATION

The module supports various operating modes and can be configured through multiple methods.

5.1 Supported Working Modes

- TCP Server
- TCP Client
- UDP Server
- UDP Client
- HTTPD Client

5.2 Configuration Methods

The module can be configured using:

- Web page interface
- AT commands
- Serial protocol
- Network protocol

5.3 Remote Management

The module allows for remote management of serial client devices via a web server or multiple web clients.

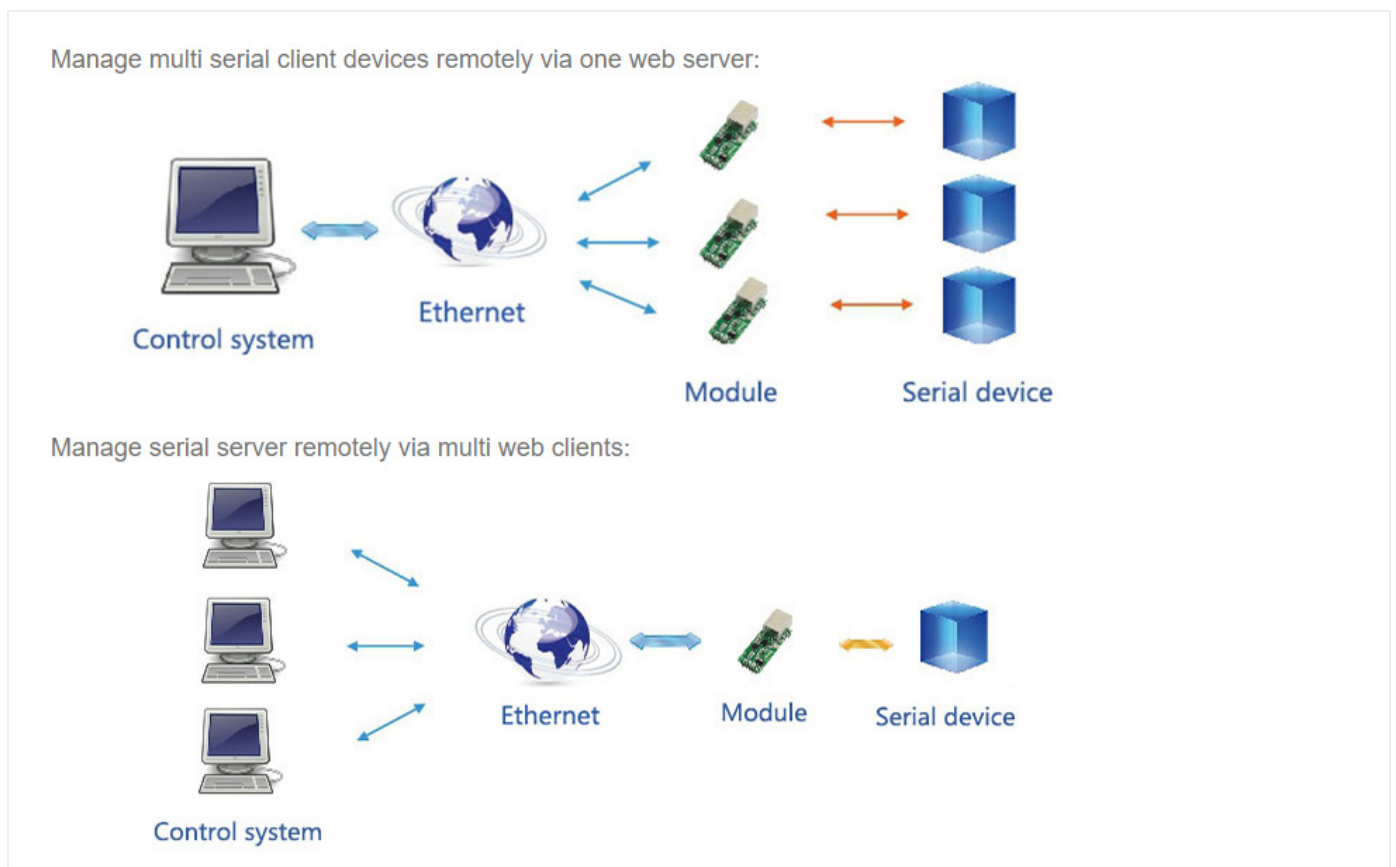
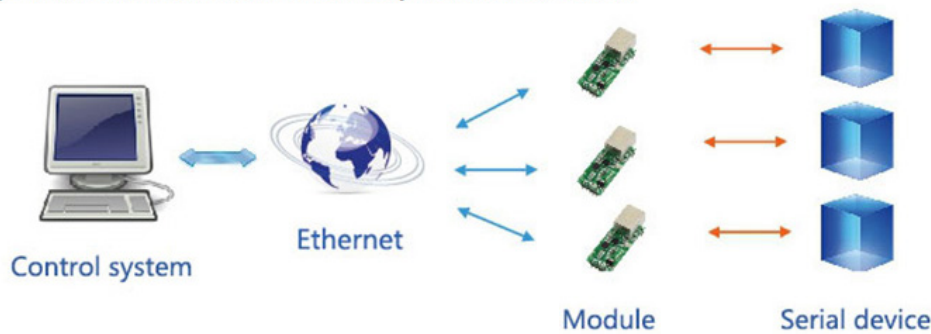


Figure 5.1: Illustration of managing multiple serial client devices remotely through a single web server interface.

Manage multi serial client devices remotely via one web server:



Manage serial server remotely via multi web clients:

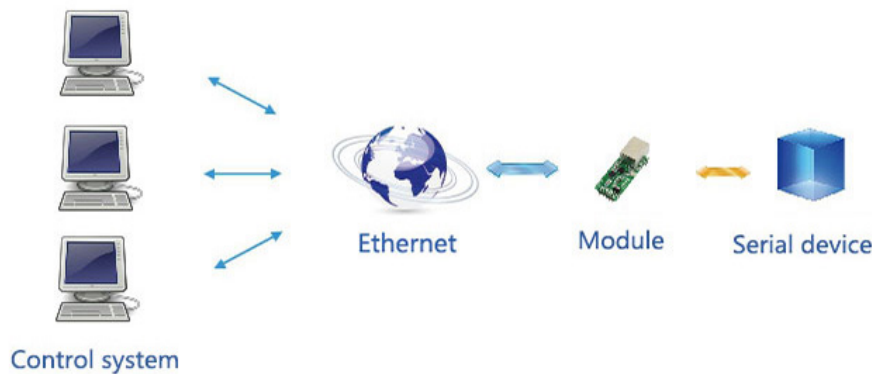


Figure 5.2: Illustration of managing a serial server remotely using multiple web clients.

6. MAINTENANCE

To ensure the longevity and optimal performance of your Waveshare UART to Ethernet Converter Module, follow these general maintenance guidelines:

- **Keep Dry:** Protect the module from moisture and humidity, which can damage electronic components.
- **Cleanliness:** Keep the module free from dust and debris. Use a soft, dry cloth for cleaning. Avoid liquid cleaners.
- **Temperature:** Operate the module within its specified temperature range (typically -25°C to 75°C for operation, -40°C to 105°C for storage).
- **Power Supply:** Always use a stable and correct power supply (3.3V DC or 5V DC) to prevent damage.
- **Firmware Updates:** Regularly check for and apply firmware updates from the manufacturer's official website to ensure the latest features and bug fixes.
- **Physical Inspection:** Periodically inspect the module for any signs of physical damage, loose connections, or corrosion.

7. TROUBLESHOOTING

This section provides solutions to common issues you might encounter with the Waveshare UART to Ethernet Converter Module.

7.1 Module Not Appearing on Network (DHCP Issues)

If the module does not obtain an IP address via DHCP or is not visible on your network:

1. **Check Physical Connections:** Ensure the Ethernet cable is securely connected to both the module and the network switch/router. Verify that the link/activity LEDs on the module and network device are active.
2. **Verify Power Supply:** Confirm that the module is receiving the correct voltage (3.3V DC or 5V DC) and that the

power supply is stable.

3. **Hardware Reset:** Attempt a hardware reset to restore the module to factory settings. Refer to the detailed user guide for the specific reset procedure. This can resolve configuration issues preventing network connection.
4. **Static IP Configuration:** If DHCP is problematic, try configuring a static IP address for the module within your network's subnet. Ensure the IP address is not already in use.
5. **Network Configuration:** Check your router's DHCP server settings. Ensure there are available IP addresses and that MAC address filtering is not preventing the module from connecting.
6. **Test with Different Cable/Port:** Try a different Ethernet cable or connect the module to a different port on your network switch/router to rule out faulty hardware.

7.2 Serial Communication Issues

If data is not being transmitted or received correctly via the serial port:

1. **Verify UART Connections:** Double-check that TX from your serial device is connected to RX on the module, and RX from your serial device is connected to TX on the module. Ensure GND is also connected.
2. **Baud Rate and Parity:** Confirm that the baud rate, data bits, parity, and stop bits configured on the module match those of your serial device.
3. **Flow Control:** Ensure that flow control settings (if any) are correctly matched between the module and your serial device.
4. **Serial Device Functionality:** Test your serial device independently to ensure it is functioning correctly.

8. ADDITIONAL RESOURCES

For more detailed information, advanced configurations, and software tools, please refer to the official user guide and resources provided by Waveshare.

- **Official User Guide (PDF):** [Download PDF](#)
- **Waveshare Official Website:** Visit the [Waveshare Store on Amazon](#) for product updates and support.

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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.

Name

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Email

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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