

TRDP-Gateway

Datasheet

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Foreword

Notational Conventions

The following categorized signal words with defined meaning might appear in the manual.







Signal Words	Meaning
 DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
 CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, lower performance, or unpredictable result.
 ANTISTATIC	Indicates static sensitive equipment.
 DANGER! ELECTRIC SHOCK	Indicates High voltage danger.
 TIPS	Provides methods to help you solve a problem or save you time.
 NOTE	Provides additional information as the emphasis and supplement to the text.

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1 Overview

1.1 Introduction

The Yacer TRDP-Gateway train protocol conversion gateway, provides two TRDP redundant 100M Ethernet interfaces, one TCP/IP Ethernet interface and one serial port to implement protocol conversion between TRDP and UDP or serial port.

Industrial wide temperature, complete isolation and protection, compact size, suitable for train communication network.



1.2 Applications

- Protocol conversion between TRDP and UDP;
- Protocol conversion between TRDP and serial port;
- Train Control and Management System (TCMS);
- Train Communication Network (TCN);
- Embedded development and application.

1.3 Features

- Two 100M full-duplex Ethernet interfaces, supporting TRDP protocol;
- One 100M adaptive Ethernet interface, supporting TCP/IP protocol;
- One serial interface, supporting RS-232, RS-422;
- Supporting TRDP PD acquisition function
- Perfect isolation protection;
- Industrial wide temperature.

1.4 Order Information

Product Model	Power
TRDP-Gateway-300-LV	Nominal 24 V, Range 9 ~ 36VDC
TRDP-Gateway-300-MV	Nominal 36V, 48V, Range 18 ~ 75VDC
TRDP-Gateway-300-HV	Nominal 72V, 96V, 110V, Range 40 ~ 160VDC

1.5 Technical Specifications

Item	Parameters	Details
TRDP Ethernet Interface	Connector	2 x M12 with D-coding
	Rate	100 Mbps Full-duplex
	Network Protocol	TRDP
	Isolation	1.5 kVrms
TCP/IP Ethernet Interface	Connector	1 x RJ45
	Rate	100 Mbps Adaptive
	Network Protocol	TCP/IP
	Isolation	1.5 kVrms
UART Serial Port	Connector	pin connector with 5.08mm pitch
	Interface Type	RS-232、RS-422
	Duplex Mode	Full-duplex
	Baud Rate	≤ 1 Mbps
Configuration Management	Configuration tool	yacer-DMS configuration management software
	Console interface	Ethernet Interface
Power Requirements	Power Supply	LV: Nominal 24V, tolerance 9 ~ 36VDC MV: Nominal 36V, 48V, tolerance 18 ~ 75VDC HV: Nominal 72V, 96V, 110V, tolerance 40 ~ 160VDC
	Isolation	>1.5 kVrms, Anti-reverse protection

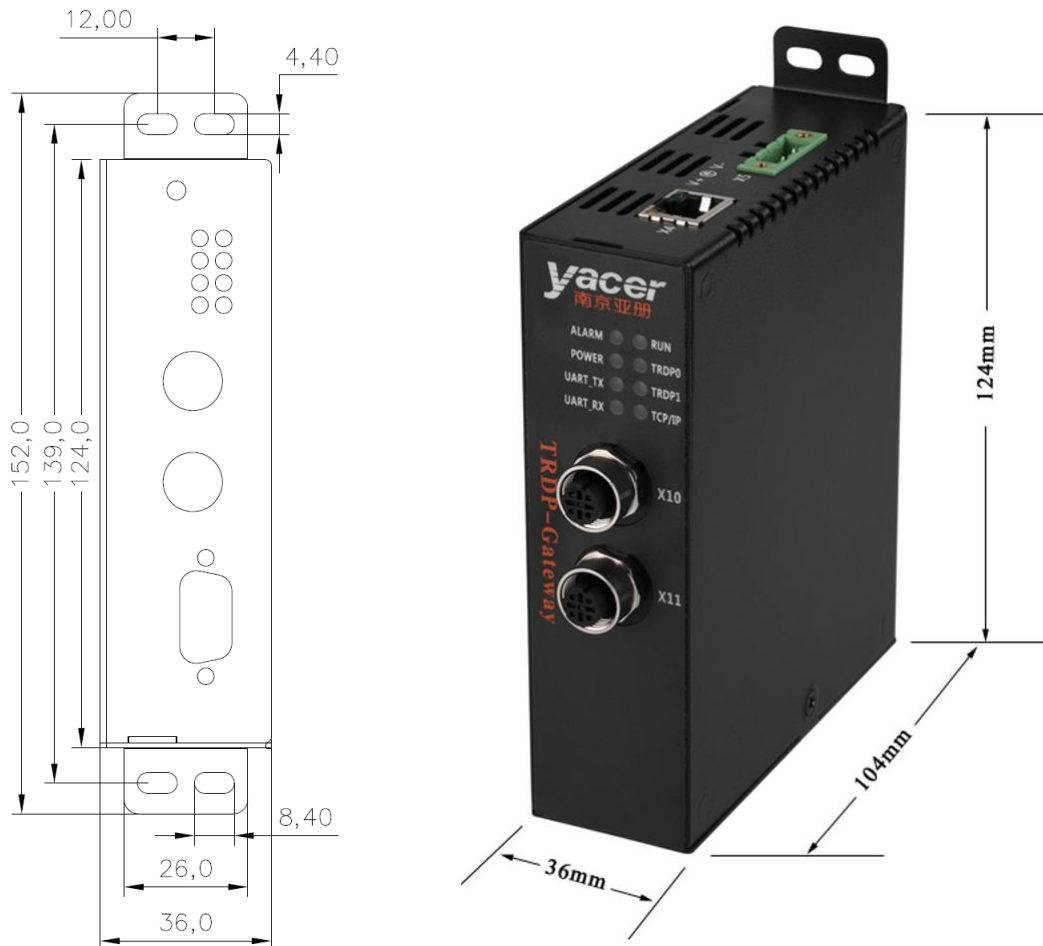
Item	Parameters	Details
	Power consumption	< 3 W
	Connector	3 pin connector with 5.08mm pitch
Mechanical Characteristics	Dimensions	H x W x D: 124 mm x 36 mm x 104 mm
	Weight	500g
Operating Environment	Operating temperature	-40 ~ +70°C
	Storage temperature	-40 ~ +85°C
	Operating humidity	5 ~ 95% RH (no condensation)

1.6 Mechanical Characteristics and Installation

The housing is made of stainless steel with a thickness of 1 mm.

H x W x D: 124 x 36 x 104 mm.

Fixed with 4 M4 screws, mounting hole diameter = 4.4 mm.



2 Hardware and Physical Interface

2.1 LED Indicators

Using a 2x4 indicator matrix, the front view is arranged as follows:

ALARM	RUN
POWER	TCP/IP
UART_TX	TRDP0
UART_RX	TRDP1



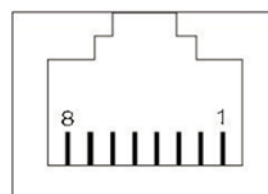
Indicator meanings are as follows:

LED	Description
ALARM	Alarm indicator, on when the device is not ready or fails, and constantly off during normal operation
POWER	Power indicator
UART_TX	Serial Transmit indicator
UART_RX	Serial Receive indicator
RUN	Running indicator, Green light flashes during normal operation
TRDP0	Link/ACT indication of the TDRP0 port
TRDP1	Link/ACT indication of the TDRP1 port
TCP/IP	Link/ACT indication of the TCP/IP Ethernet port

2.2 TCP/IP Interface: X4

X4 is a 100M adaptive Ethernet port for TCP/IP Ethernet port with RJ-45 connector and supports smart MDI/MDI-X.

RJ45 Pin	Ethernet signal
1	TX +
2	TX -

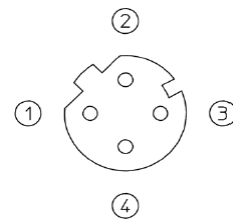


RJ45 Pin	Ethernet signal
3	RX +
6	RX -

2.3 TRDP Interface: X10、X11

X10 and X11 are 100M full-duplex Ethernet ports for TRDP0 and TRDP1 with M12 (D-coded) connectors, supporting smart MDI/MDI-X.

M12 Pin	Ethernet signal
1	TX +
2	RX +
3	TX -
4	RX -



2.4 Serial Interface: X6

Serial port uses a 8-pos 5.08mm terminal interface, supports RS-232 and RS-422, choose one of them according to the need when working.

Terminal Pin	Serial signal	Description
1	RS232_TX	RS-232 Data Transmission
2	RS232_RX	RS-232 Data Receiving
3	GND	Ground
4	FG	Protected Ground
5	RS422_TX+	RS-422 Data Transmit +
6	RS422_TX-	RS-422 Data Transmit -
7	RS422_RX+	RS-422 Data Receive +
8	RS422_RX-	RS-422 data receive -

2.5 Power Interface: X5

TRDP-Gateway is powered by DC power supply, supports isolation protection and surge protection, and provides anti-inverse protection.

Depending on the factory configuration, the power input range is as follows:

Model	Nominal Value	Minimum	Maximum
LV	24V	9V	36V
MV	36V、48V	18V	75V
HV	72V、96V、110V	40V	160V

The X5 uses a 3-pos 5.08mm terminal connector (Phoenix Contact MSTB 2,5 / 3-GF compatible).

Pin	Signal Name	Description
1	V +	Voltage +
2	FG	Protection Groud
3	V -	Voltage -

3 System and Configuration

3.1 Module Configuration

TRDP-Gateway provides a variety of easy and flexible configuration functions to meet different application scenarios.

3.1.1 Static Configuration

The TRDP-Gateway module has internal FLASH memory to save the configuration. When the module enters the normal operation state, users can use the following methods to configure the TRDP-Gateway:

- Use yacer-DMS configuration management software to configure it interactively through the network port;
- The host computer gives configuration commands through the serial port;

The new configuration generated by the above methods is saved in FLASH, and the configuration takes effect after the module is rebooted.

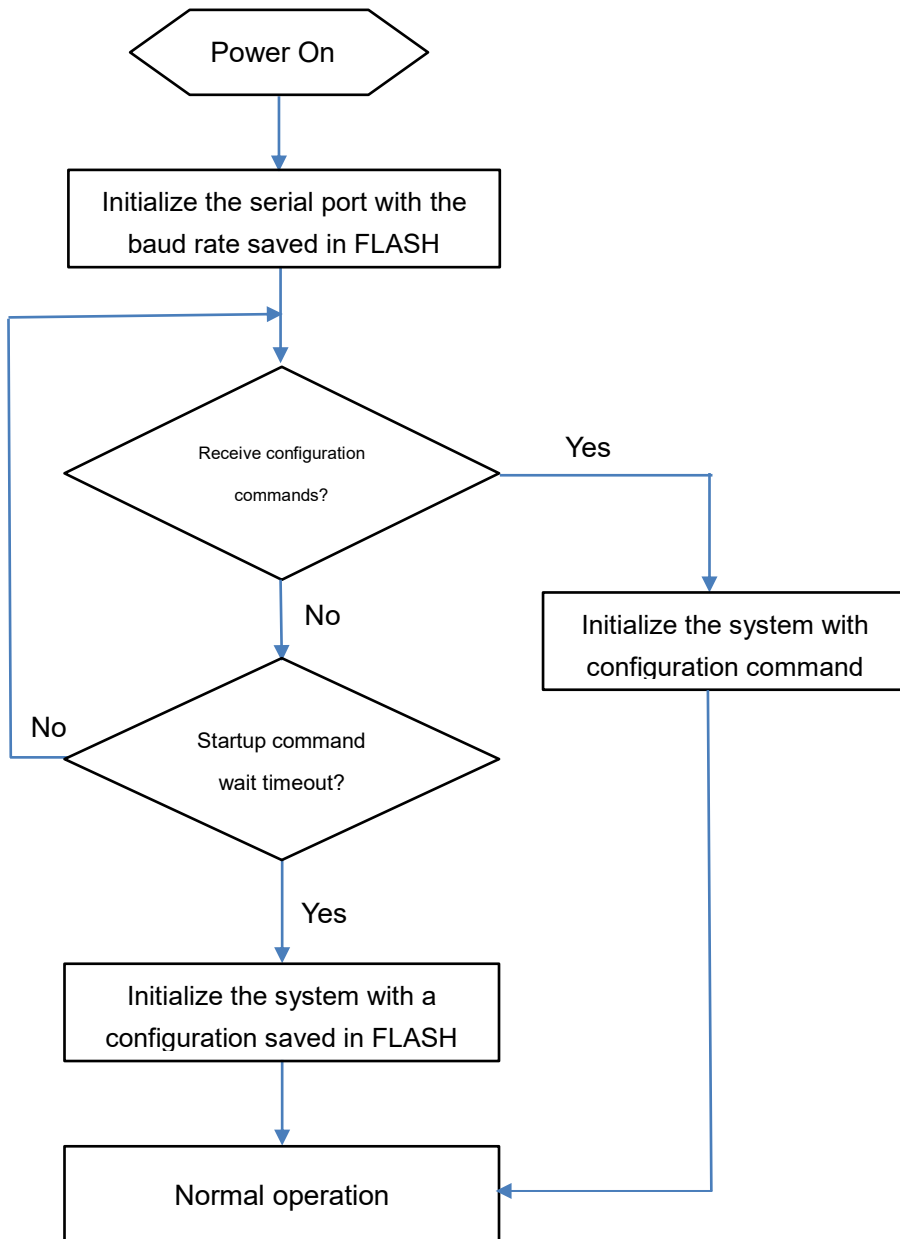
3.1.2 Dynamic Configuration

When the module is powered up and started, it initializes the serial port with the baud rate parameters saved in FLASH (factory default is 115200bps) and waits for the configuration command from the host computer.

If a legitimate configuration command is received within the waiting time window, the TRDP-Gateway is initialized with the configuration parameters carried by the command. If no configuration command is received after the timeout period, the TRDP-Gateway is initialized with the configuration saved in FLASH.

The wait time window defaults to 5 seconds and can be modified via static configuration. If the window is set to 0, the configuration is initialized by loading it directly from FLASH.

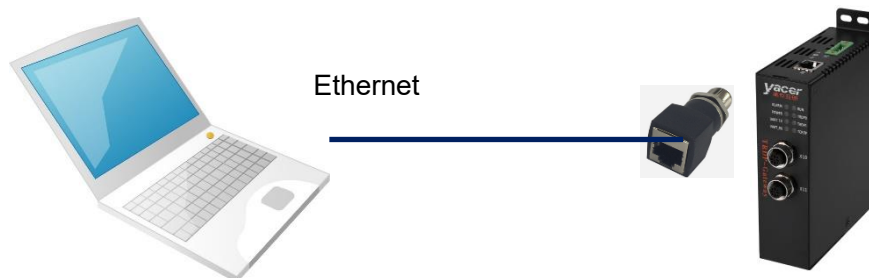
3.2 Startup Process



4 yacer-DMS Configuration Management

4.1 Connect Configuration Computer to TRDP-Gateway

Connect the management computer with any Ethernet interface port of TRDP-Gateway through network cable, and run yacer-DMS configuration management software on the computer to configure the parameters and monitor running status of TRDP-Gateway.



If S3 and S4 are serial ports, when configured as DMS-ISP mode, the computer serial port can be connected, configured and managed by yacer-DMS.

4.2 Get Configuration Management software yacer-DMS

Users can obtain the compressed package yacer-DMS.zip of configuration management software through the following ways:

- “Softwares” directory of TRDP-Gateway accompanied U-Disk;
- Official website of Yacer (<http://www.yacer.com.cn>) Software channel.

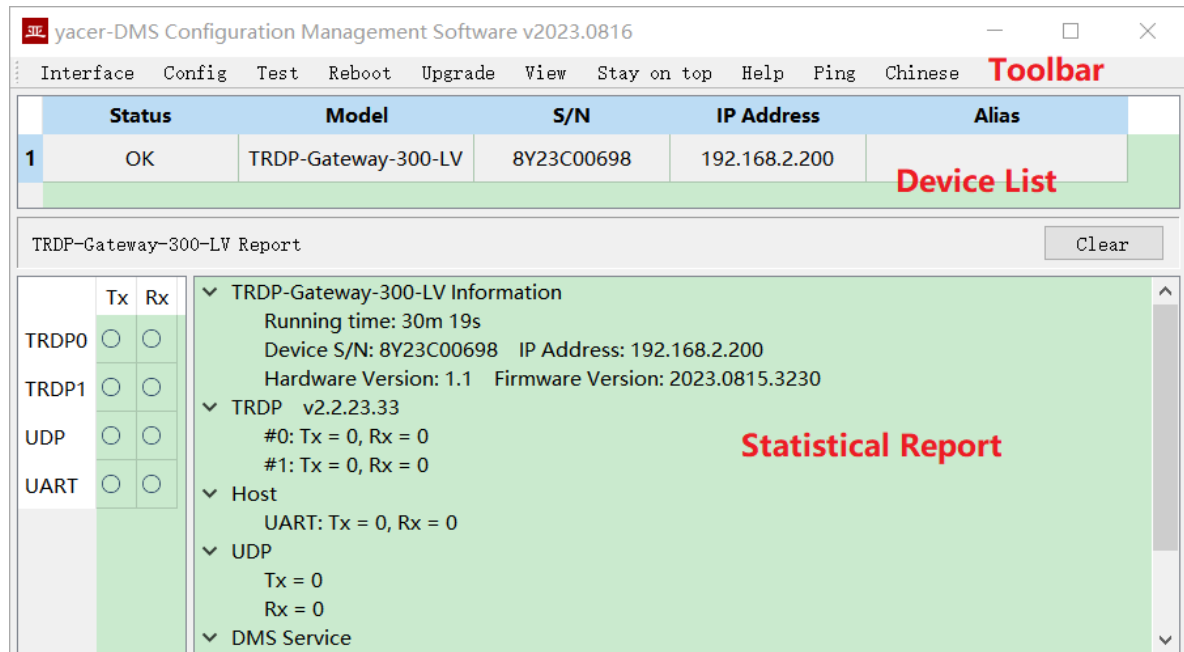
4.3 Run yacer-DMS Software

The yacer-DMS is an installation free application software, unzip yacer-DMS.zip, enter the working directory and double click the file yacer-DMS.exe to run.

4.4 Main Window of yacer-DMS

The following figure is the main interface of the configuration management software, which can be divided into three parts:

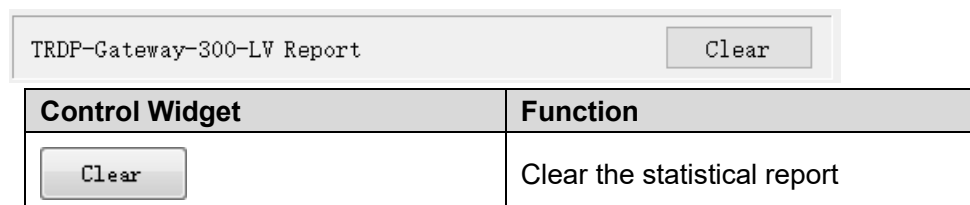
- **Toolbar:** Functional operation buttons;
- **Device List:** Displaying the basic information and operation status of online devices;
- **Statistical Report:** Displaying the receive/transmit indication & statistics, and device details.



4.5 Statistical Report

The statistical report has three panels: control panel, receive/transmit indication panel and information panel.

4.5.1 Control Panel



4.5.2 Receive/Transmit Indication Panel

- Tx: The interface sends a frame of data, corresponding Tx indicator blinks once;
- Rx: The interface receives a frame of data, corresponding Rx indicator blinks once.

	Tx	Rx
TRDP0	<input type="checkbox"/>	<input type="checkbox"/>
TRDP1	<input type="checkbox"/>	<input type="checkbox"/>
UDP	<input type="checkbox"/>	<input type="checkbox"/>
UART	<input type="checkbox"/>	<input type="checkbox"/>

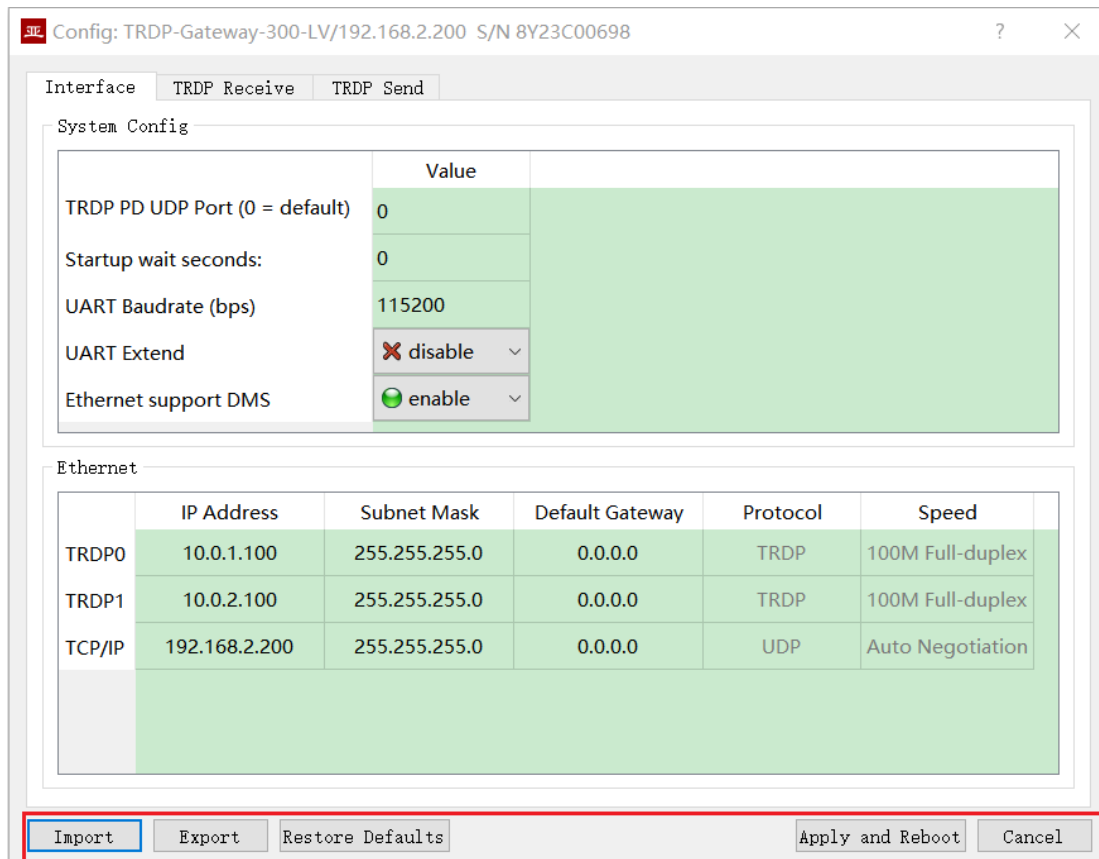
4.5.3 Information Panel

Display the following contents:

- Device information: Running time, S/N, IP address and Version number;
- TRDP: TRDP protocol transceiver statistics;
- Host Interface: Serial port receive/transmit statistics;
- UDP: UDP transceiver statistics;
- DMS Service: DMS message receive/transmit statistics.

4.6 Configure Device

Click the 'Config' button on the toolbar or double-click the selected device in the device list, yacer-DMS pops up the configuration dialog. According to the interface and function, the dialog divides the configuration items into several configuration pages.



The bottom of the dialog box includes the following operation buttons:

Button	Function
<input type="button" value="Import"/>	Open the configuration file, read the configuration parameters refresh the configuration dialog
<input type="button" value="Export"/>	Export configuration parameters from the configuration dialog to a file for saving
<input type="button" value="Restore Defaults"/>	Refresh the configuration dialog with the factory paramters
<input type="button" value="Apply and Reboot"/>	Write the configuration parameters in the dialog to the deivce, and restart the device to make the configuration take effect
<input type="button" value="Cancel"/>	Cancel current configuration operation

4.7 System Configuration

The system configuration includes the following:

- TRDP PD UDP Port: TRDP process data UDP port, if set to 0 it works on default port 17224.
- Startup Command Wait Seconds: users can set the startup command wait time here to adjust the dynamic configuration time window.
- Serial UART Baud Rate: configure the serial communication baud rate.
- Serial UART Extended Mode: when disable, the serial port works in RS-232 mode, when enable, the serial port works in RS-422 mode.
- Ethernet Support DMS: if enabled allows the Ethernet port to support yacer-DMS configuration.

System Config	
	Value
TRDP PD UDP Port (0 = default)	0
Startup wait seconds:	0
UART Baudrate (bps)	115200
UART Extend	<input checked="" type="checkbox"/> disable ▾
Ethernet support DMS	<input checked="" type="checkbox"/> enable ▾

The other parameters of the serial UART are forced to be:

- Data bits: 8
- Checksum bits: none
- Stop bit: 1

4.8 Ethernet Interface

TRDP0 and TRDP1 are dual redundant TRDP network ports, which are forced to work in 100M full duplex mode.

The TCP/IP network port works in adaptive mode and uses UDP to communicate with the host computer.

Ethernet						
	IP Address	Subnet Mask	Default Gateway	Protocol	Speed	
TRDP0	10.0.1.100	255.255.255.0	0.0.0.0	TRDP	100M Full-duplex	
TRDP1	10.0.2.100	255.255.255.0	0.0.0.0	TRDP	100M Full-duplex	
TCP/IP	192.168.2.200	255.255.255.0	0.0.0.0	UDP	Auto Negotiation	

4.9 TRDP Receive Configuration

This page configures up to 16 TRDP Subscription PD entries.

If the destination IP for data forwarding is a legitimate unicast, multicast, or broadcast address, the subscribed TRDP PD data is forwarded to the destination IP in real time via the Ethernet port.

If the destination IP is 0, the subscribed TRDP PD data is forwarded to the host computer through the UART interface.

If the 'PD Acquisition Enable' is checked, all TRDP PD data on the network that the destination IP is multicast or broadcast is collected in real time and forwarded to the destination IP through Ethernet.

Interface
TRDP Receive
TRDP Send

TRDP PD Subscribe

	Enable	TRDP Rx COMID	TRDP Rx Multicast	
1	<input checked="" type="checkbox"/> Enable	1001	0.0.0.0	
2	<input checked="" type="checkbox"/> Enable	1002	224.20.20.20	
3	<input checked="" type="checkbox"/> Disable	0	0.0.0.0	
4	<input checked="" type="checkbox"/> Enable	0	0.0.0.0	
5	<input checked="" type="checkbox"/> Disable	0	0.0.0.0	

Data Forward to

Dest IP Address: Dest UDP Port: PD Acquisition Enable

4.10 TRDP Send Configuration

This page configures up to 16 TRDP Publish PD entries.

When the UDP receive port is 0, the TRDP-Gateway receives data from the host computer through the serial port, flushes the PD buffer of the TRDP protocol, and then periodically sends the PD data according to the PD publishing configuration, whose destination address can be unicast, multicast, or broadcast.

When the UDP receive port is a legal port number, the TRDP-Gateway receives the PD data to be forwarded over Ethernet. If you wish to receive multicast data, you need to set the corresponding receive multicast address.

Interface
TRDP Receive
TRDP Send

Data Receive from _____

Rx UDP Port: Rx Multicast:

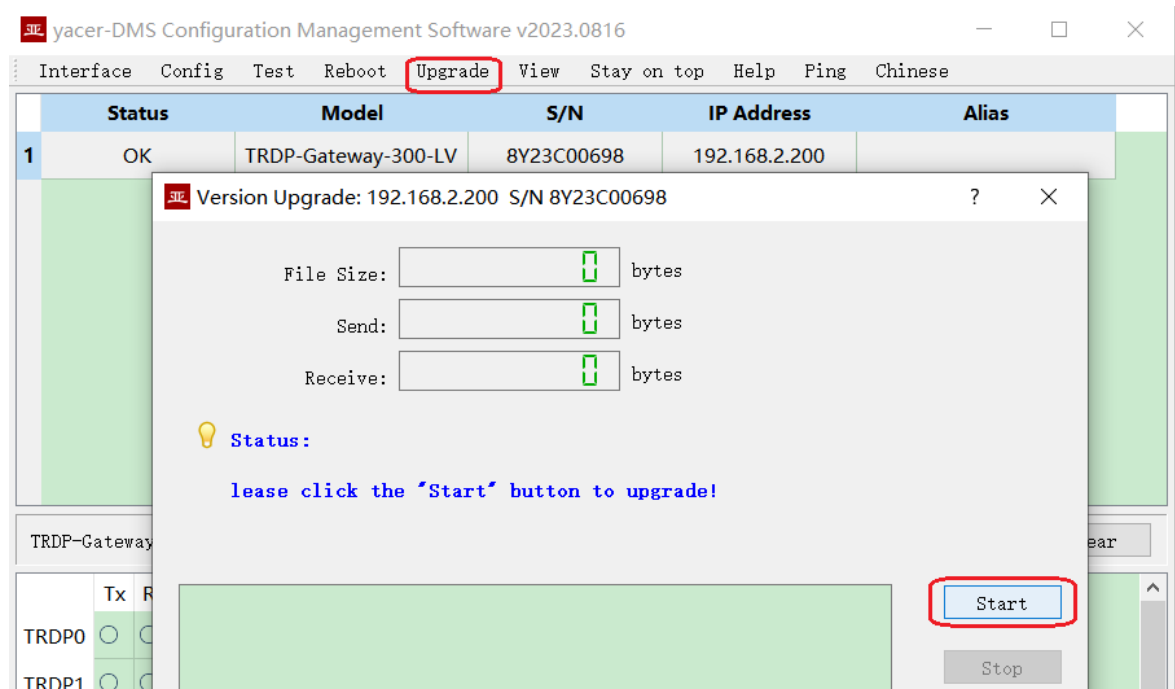
TRDP PD Publish

	Enable	TRDP Tx COMID	TRDP Tx Interval(ms)	TRDP Tx Destination IP	TRDP Tx Destination IP2	
1	● enable	2000	32	10.0.1.200	10.0.2.200	<div style="border-left: 1px solid #ccc; border-right: 1px solid #ccc; height: 100px; width: 10px;"></div>
2	● enable	2001	50	224.10.10.10	224.10.10.10	
3	✘ disable	2002	100	10.0.1.200	10.0.1.200	
4	● enable	0	0	0.0.0.0	0.0.0.0	
5	✘ disable	0	0	0.0.0.0	0.0.0.0	

4.11 Firmware Version Upgrade

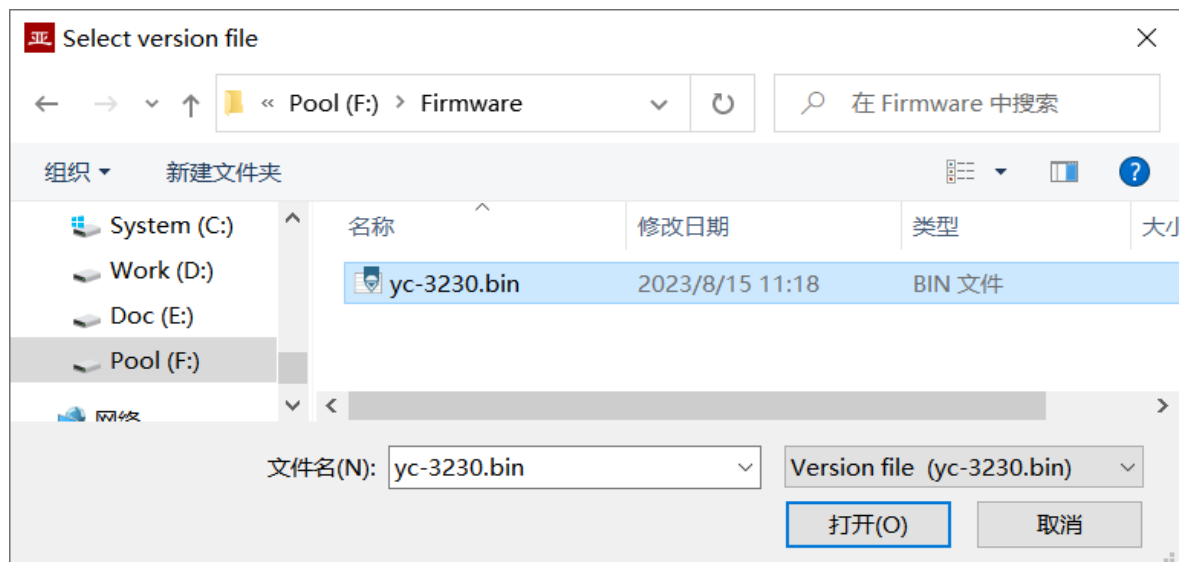
4.11.1 Start Upgrade

Click the “Upgrade” button on the toolbar to pop up the version upgrade dialog, and then click the “Start” button.



4.11.2 Select Version File

Pop up the “Select version file” dialog, and find the firmware version file to be updated, select it and click “Open”.



4.11.3 Complete Upgrade

When the page displays “Version upgrade complete” status, it indicates that the version upgrade is completed.

Version Upgrade: 192.168.2.200 S/N 8Y23C00698

File Size: 49848 bytes

Send: 49848 bytes

Receive: 49848 bytes

Status:

Version upgrade complete. The new version take effect after reboot!

```
F:/Firmware/yc-3230.bin open successfully
Version file read successfully: 49848
Version file uploading...
Initializing FLASH BANK E...
Version file upload complete
All data is received and programmed successfully
Version file CRC check succeeded
Version upgrade is complete!
```

Start

Stop

Exit

4.11.4 Re-Power Up to Take Effect

Re-power the device and wait a minute or so for the new version to boot up and take effect.

NOTE: The device cannot be powered down during the waiting period.

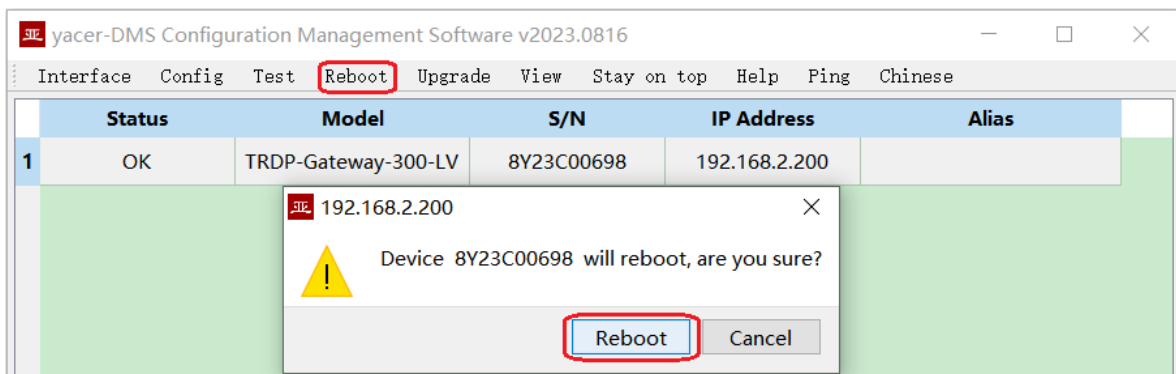
4.11.5 Confirm Upgrade

After the upgrade is completed, power up the device again, observe the version information in the statistical report, and determine whether the new version is successfully updated by the version date.

▼ TRDP-Gateway-300-LV Information
Running time: 34m 1s
Device S/N: 8Y23C00698 IP Address: 192.168.2.200
Hardware Version: 1.1 Firmware Version: 2023.0815.3230

4.12 Reboot Device

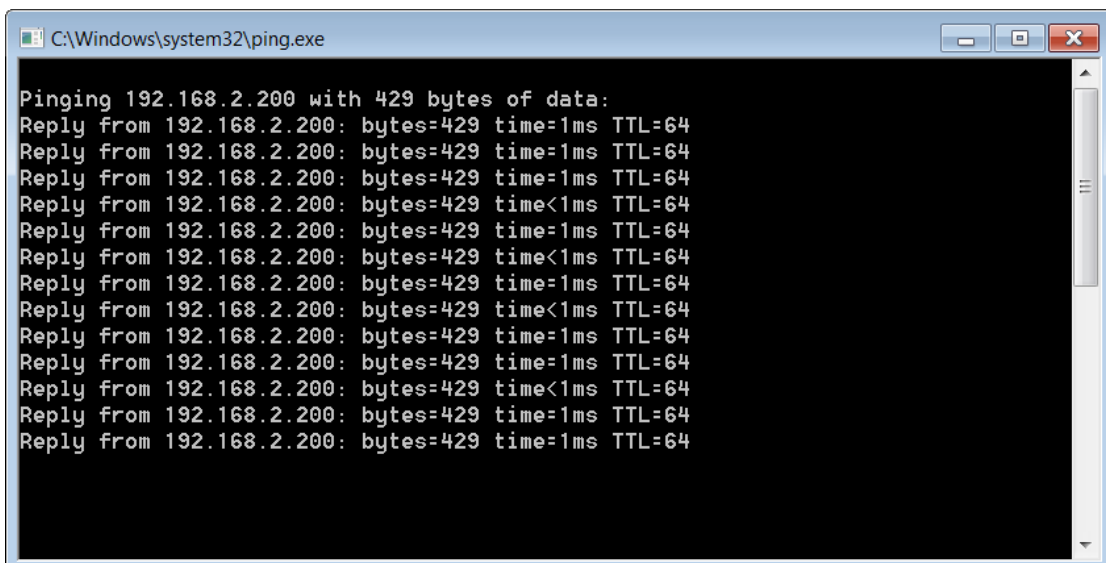
Click the "Reboot" button on the toolbar to pop up the device reboot dialog, and then click the "Reboot" button to reboot the device.



4.13 Ping

By clicking the "Ping" button on the toolbar, DMS automatically starts the ping command on the selected device to check whether the network connection between the configuration management computer and TRDP-Gateway is working properly.

Before executing the Ping command, first make sure that the IP addresses of the computer and TRDP-Gateway are in the same subnet.



5 Software Development

5.1 Data Format Conversion

See *TCN-PACKET Programming Manual*.

5.2 Configuration Management

See *TCN-UMS Programming Manual*.

About the Manual

- The manual is for reference only. If there is inconsistency between the manual and the actual product, the actual product shall prevail.
- We are not liable for any loss caused by the operations that do not comply with the manual.
- All the designs and software are subject to change without prior written notice. The product updates might cause some differences between the actual product and the manual. Please contact the customer service for the latest program and supplementary documentation.
- There still might be deviation in technical data, functions and operations description, or errors in print. If there is any doubt or dispute, we reserve the right of final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- Please visit our website, contact the supplier or customer service if there is any problem occurring when using the device.
- If there is any uncertainty or controversy, we reserve the right of final explanation.