TRDP-ETH

Datasheet

yacer 亚册
Building Blocks of Communication

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.

Table of Contents

1 Overview

1.1 Introduction

The Yacer TRDP-ETH dual redundant TRDP Ethernet card, 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.

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-ETH-300-LV	Nominal 24 V, Range 9 ~ 36VDC
TRDP-ETH-300-MV	Nominal 36V, 48V, Range 18 ~ 75VDC
TRDP-ETH-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	8 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 Dedicated DMS-UART interface (with Yacer ' s DMS-UART-8P configuration cable)
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
	Power consumption	< 3 W
	Connector	3 pin connector with 5mm pitch
Mechanical Characteristics	Dimensions	120 x 100 mm
	Weight	< 200g

Item	Parameters	Details
Operating Environment	Operating temperature	-40 ~ +85℃
	Storage temperature	-40 ~ +85℃
	Operating humidity	5 ~ 95% RH (no condensation)

1.6 Mechanical Characteristics and Installation
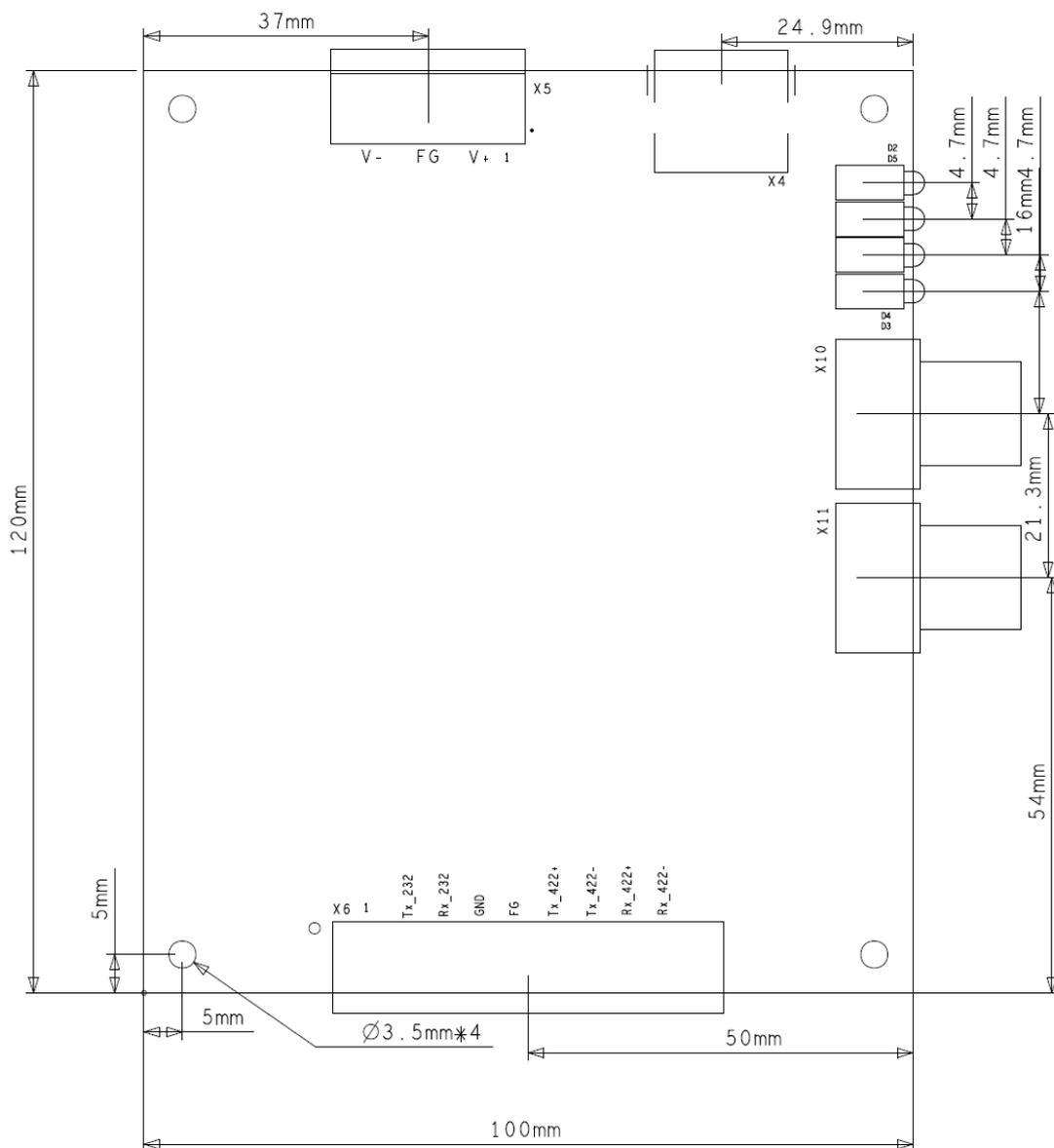
2 Hardware and Physical Interface

2.1 LED Indicators

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

|	
ALARM	RUN
POWER	TRDP0
UART_TX	TRDP1
UART_RX	TCP/IP

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.
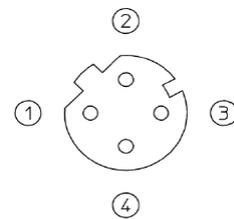
RJ45 Pin	Ethernet signal
1	TX +
2	TX -
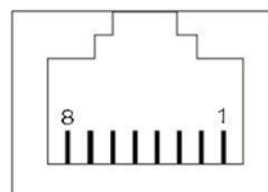
RJ45 Pin	Ethernet signal
3	RX +
6	RX -

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

3.1.1 Static Configuration

The TRDP-ETH 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-ETH:

- 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-ETH is initialized with the configuration parameters carried by the command. If no configuration command is received after the timeout period, the TRDP-ETH 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
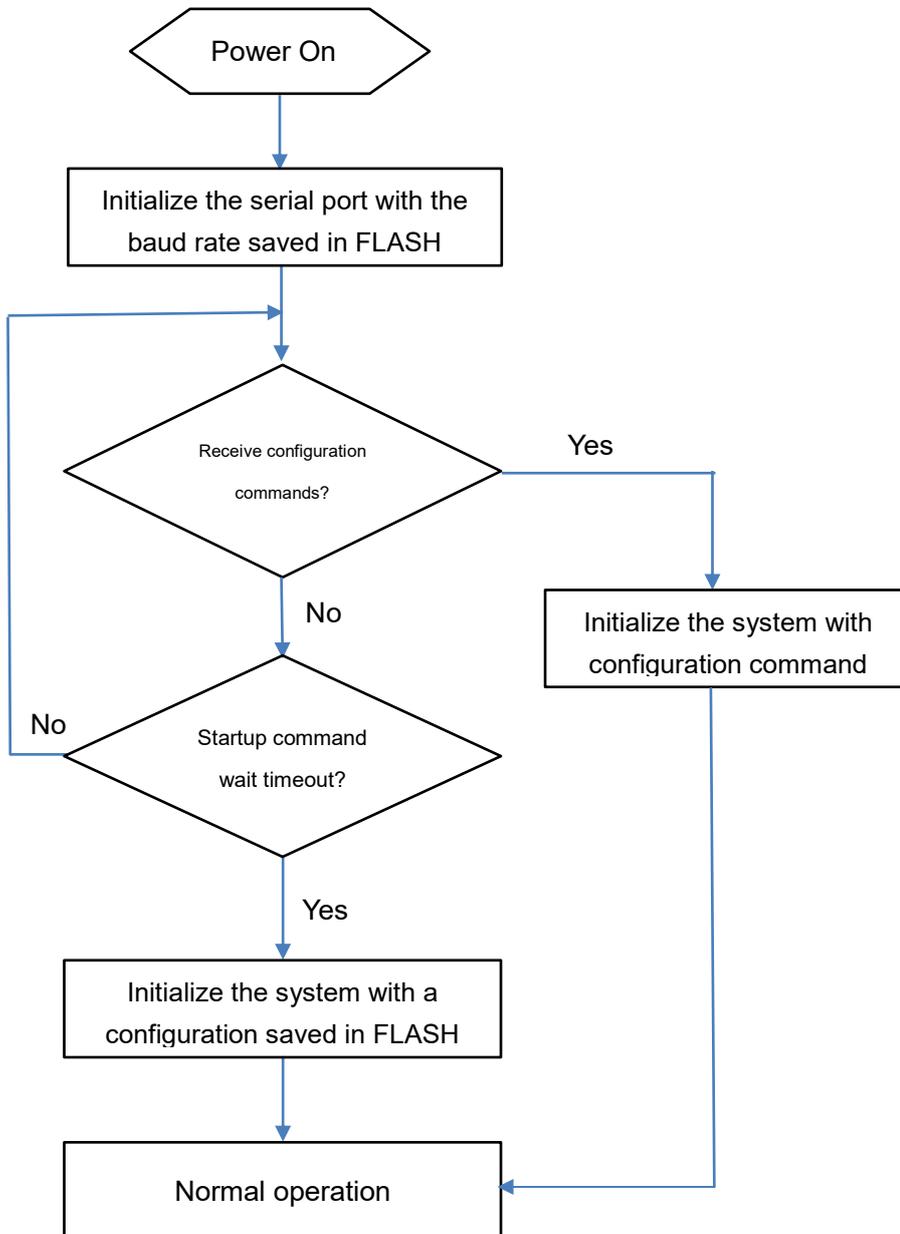
4 yacer-DMS Configuration Management

4.1 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-ETH accompanied U-Disk;
- Official website of Yacer (http://www.yacer.com.cn) Software channel.

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.

## 4.2 Building Configuration Environment

4.2.1 Configuration via Ethernet port

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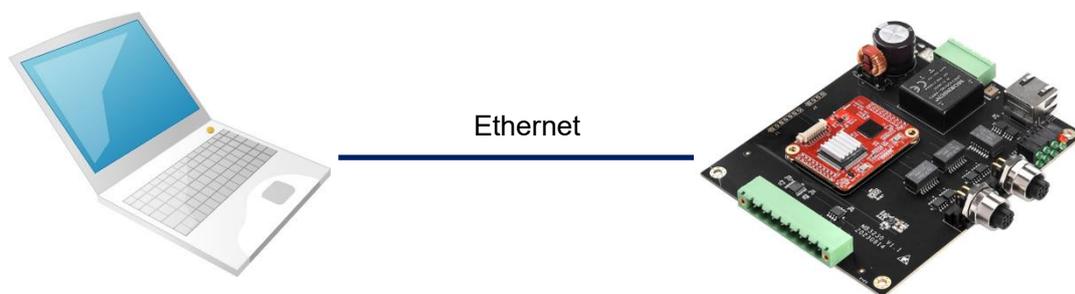

Ethernet

4.2.2 Configuration via DMS-UART (X3) interface

If the TRDP-ETH's Ethernet port is occupied, the DMS-UART-8P configuration cable can be used to connect the TRDP-ETH's DMS-UART interface to the computer's USB port.
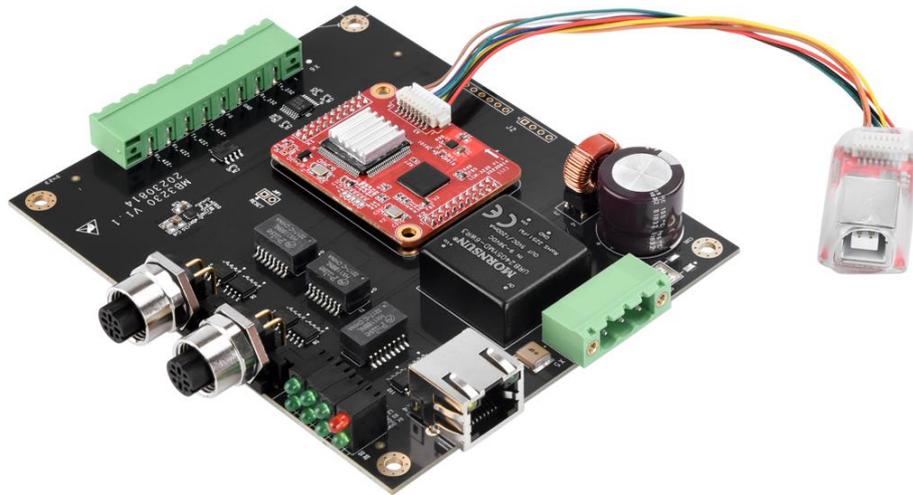
When DMS-UART-8P configuration cable is connected to the management computer USB interface, the computer will add a USB simulation serial port.

Click the "Interface" button on the toolbar to pop up the "Host Interface for DMS" configuration dialog. Enter the "Serial" page, select the serial port of the computer connected to TRDP-ETH from the drop-down list, and click "Open Serial" button.
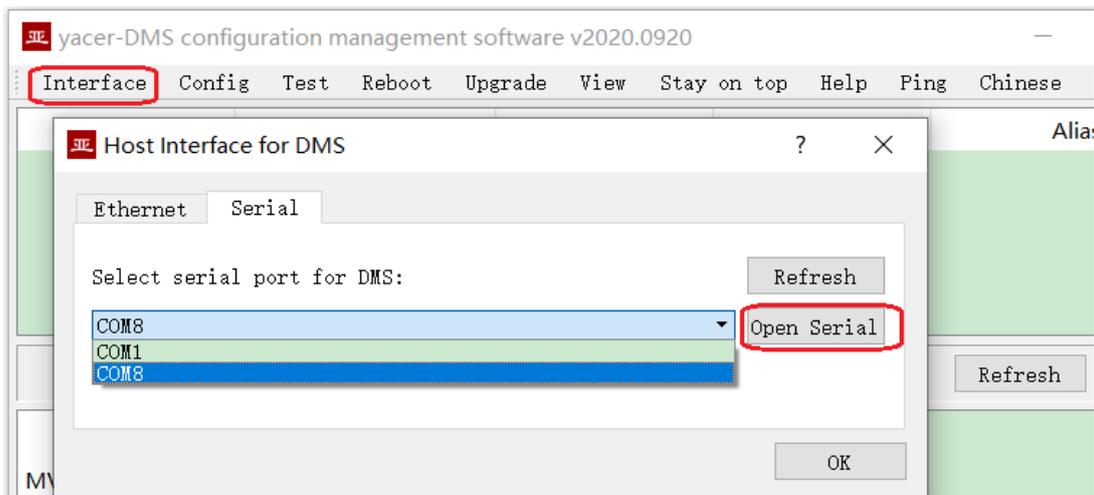
If the serial port is successfully opened, the status is as follows:
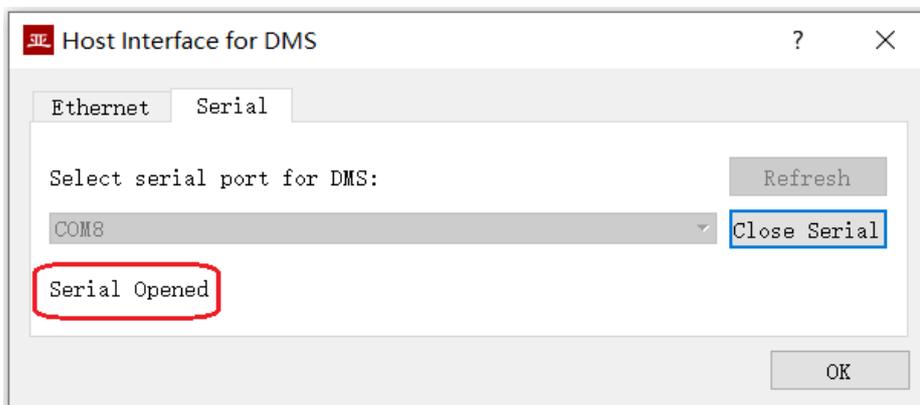
4.3 Main Window of yacer-DMS

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.
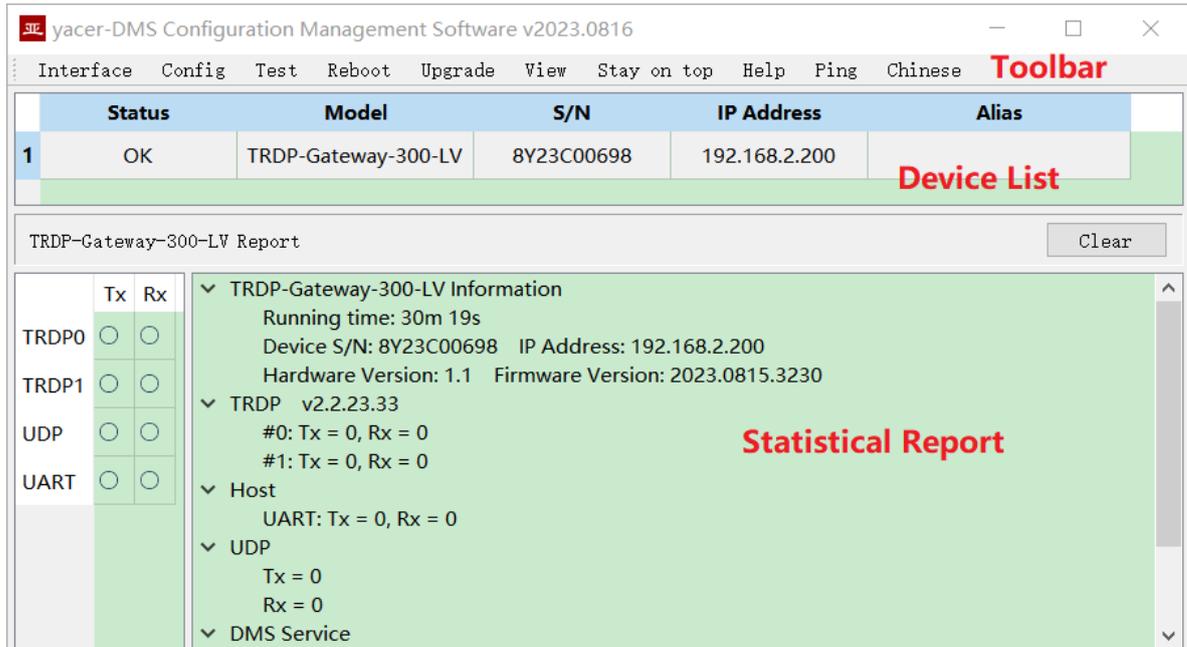
4.4 Statistical Report

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

4.4.1 Control Panel

Control Widget	Function
Clear	Clear the statistical report
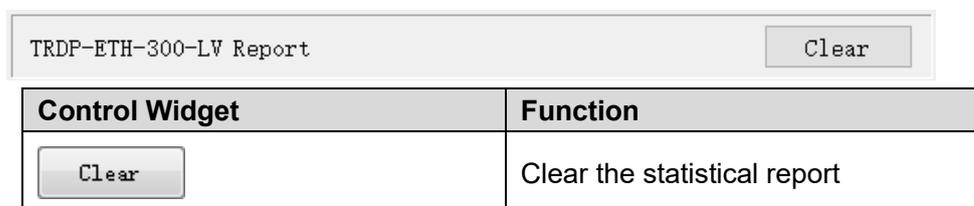
4.4.2 Receive/Transmit Indication Panel

- 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	○	○
TRDP1	○	○
UDP	○	○
UART	○	○

4.4.3 Information Panel

Display the following contents:

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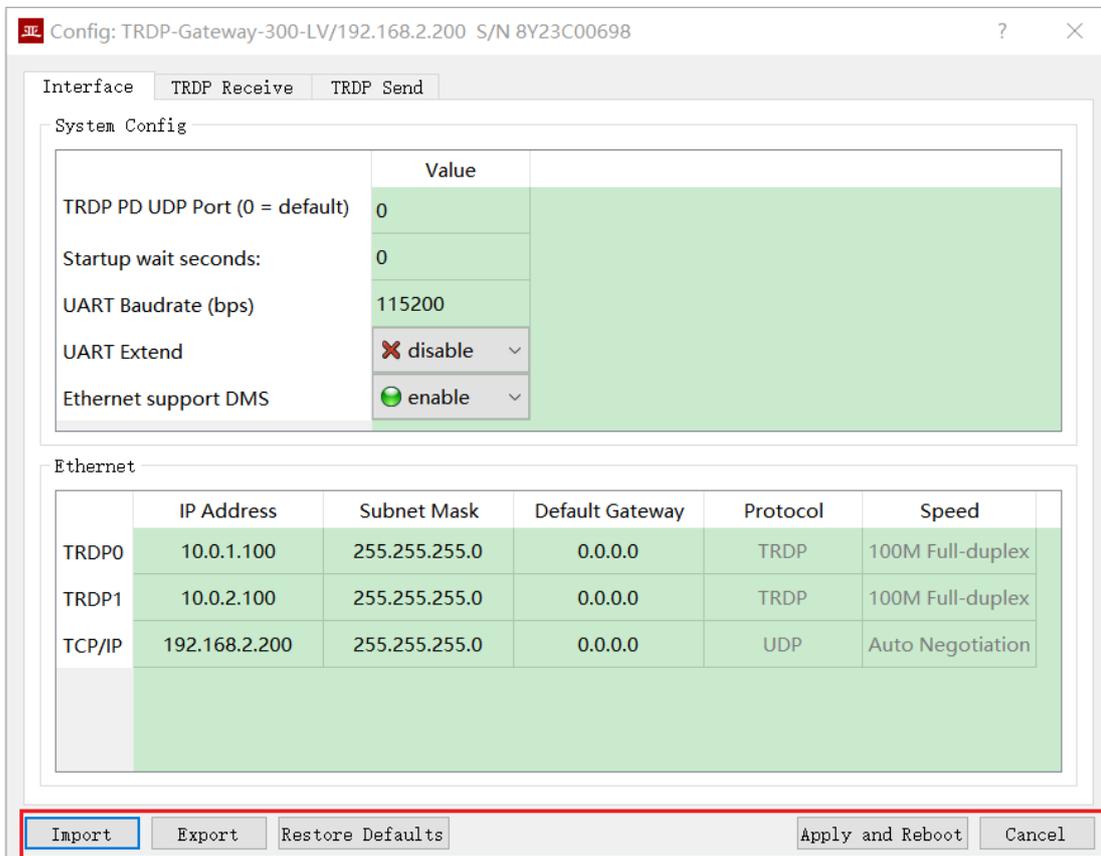- Host Interface: Serial port receive/transmit statistics;
- UDP: UDP transceiver statistics;
- DMS Service: DMS message receive/transmit statistics.

4.5 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.

Config: TRDP-Gateway-300-LV/192.168.2.200 S/N 8Y23C00698

Interface | TRDP Receive | TRDP Send

System Config

	Value	
TRDP PD UDP Port (0 = default)	0	
Startup wait seconds:	0	
UART Baudrate (bps)	115200	
UART Extend	✖ disable ⌄	
Ethernet support DMS	🟢 enable ⌄	

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

Import | Export | Restore Defaults | Apply and Reboot | Cancel

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

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

4.6 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	✖ disable
Ethernet support DMS	🟢 enable

The other parameters of the serial UART are forced to be:
- Data bits: 8
- Checksum bits: none
- Stop bit: 1

4.7 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

4.8 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	● Enable ⌄	1001	0.0.0.0	
2	● Enable ⌄	1002	224.20.20.20	
3	✖ Disable ⌄	0	0.0.0.0	
	● Enable			
4	✖ Disable	0	0.0.0.0	
5	✖ Disable	0	0.0.0.0	

Data Forward to

Dest IP Address: 0.0.0.0   Dest UDP Port: 0   ☐ PD Acquisition Enable

4.9 TRDP Send Configuration

This page configures up to 16 TRDP Publish PD entries.

When the UDP receive port is 0, the TRDP-ETH 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-ETH 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.

	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
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 / disable	0	0	0.0.0.0	0.0.0.0
5	disable	0	0	0.0.0.0	0.0.0.0

Rx UDP Port: 8000   Rx Multicast: 0.0.0.0
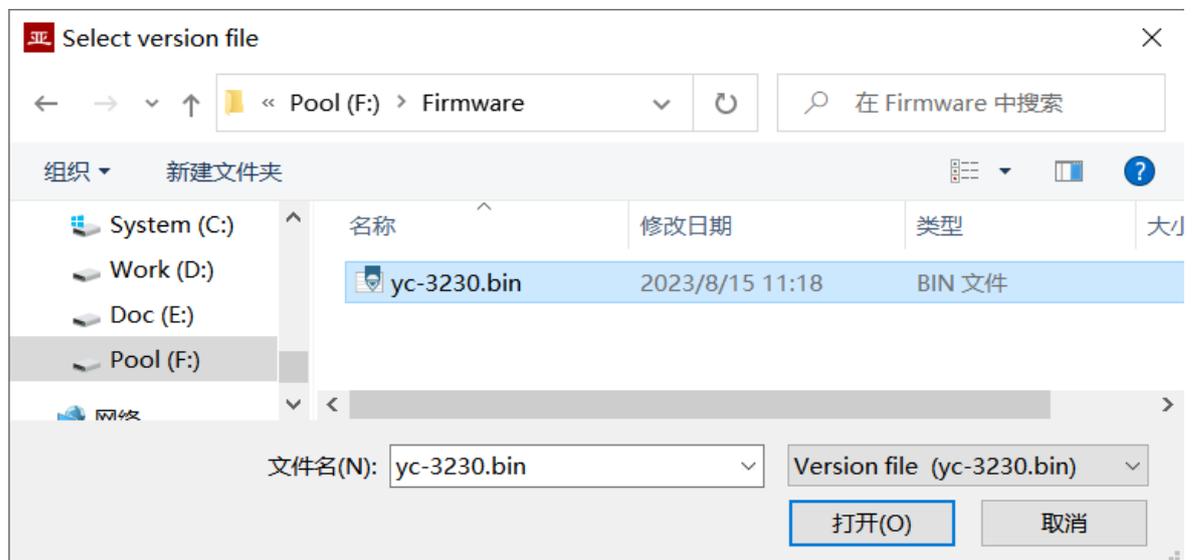
4.10 Firmware Version Upgrade

4.10.1 Start Upgrade

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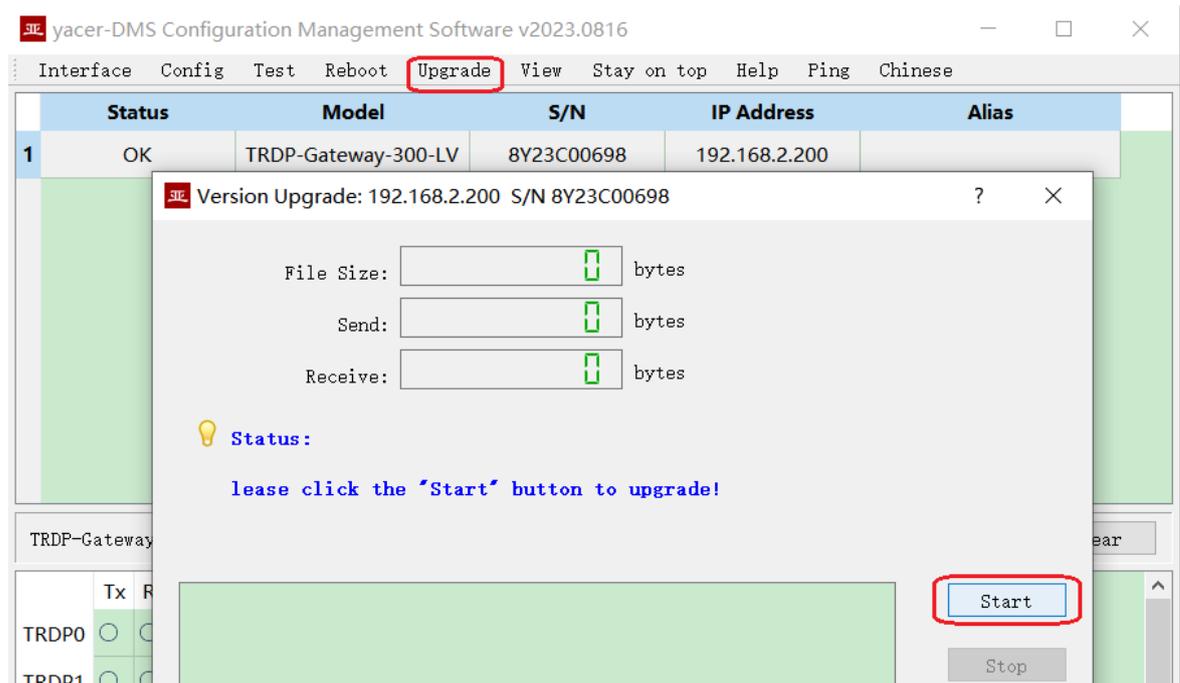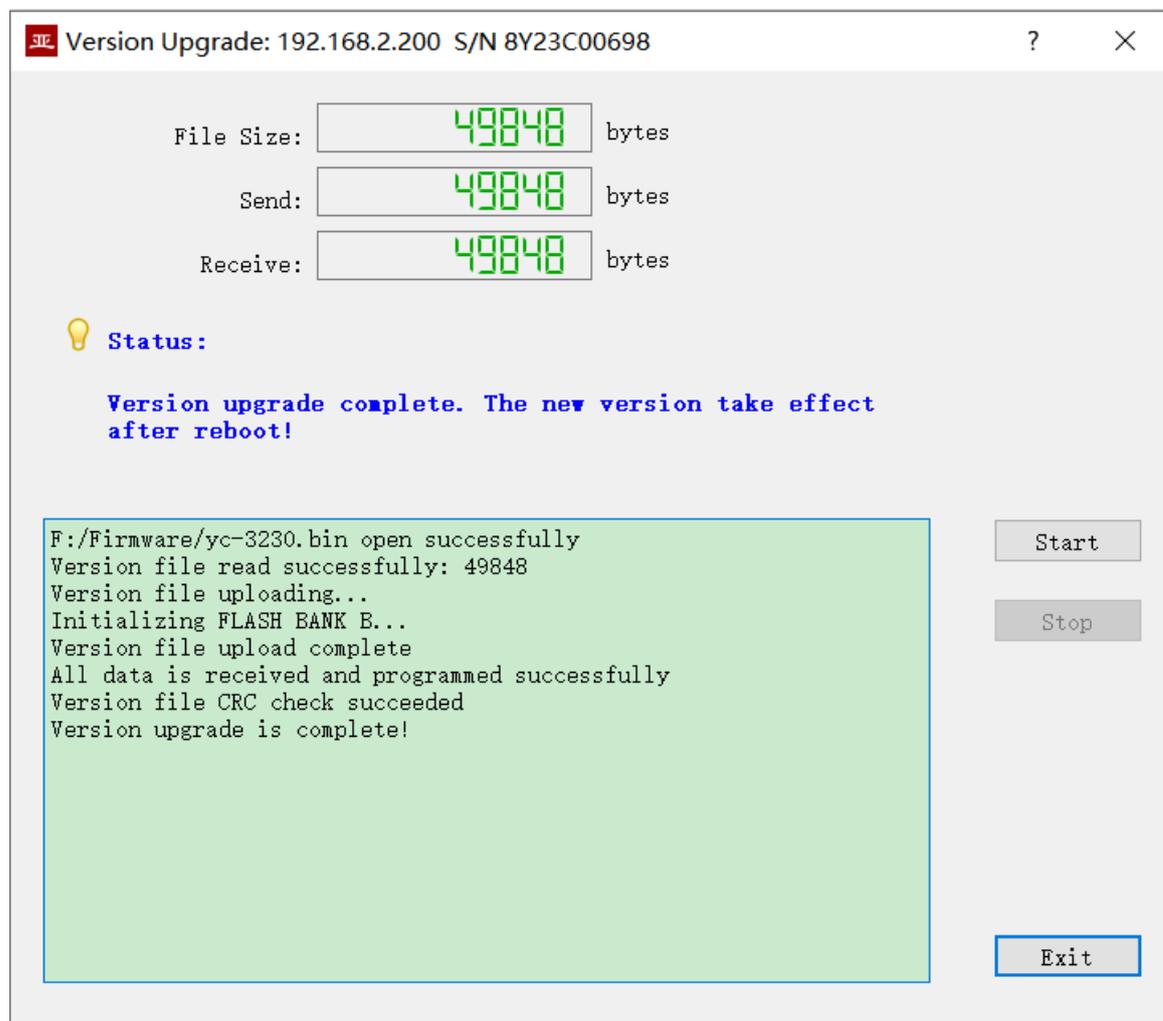

4.10.2 Select Version File

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

4.10.3 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          ?    X

     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          Start
  Version file read successfully: 49848
  Version file uploading...
  Initializing FLASH BANK B...                        Stop
  Version file upload complete
  All data is received and programmed successfully
  Version file CRC check succeeded
  Version upgrade is complete!


                                                      Exit
```

4.10.4 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.

4.10.5 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.

4.11 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.
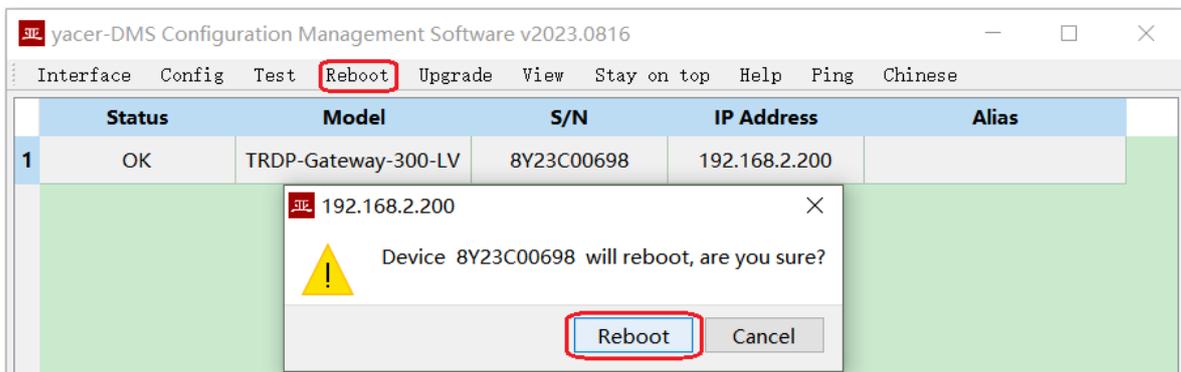
4.12 Ping

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-ETH is working properly.

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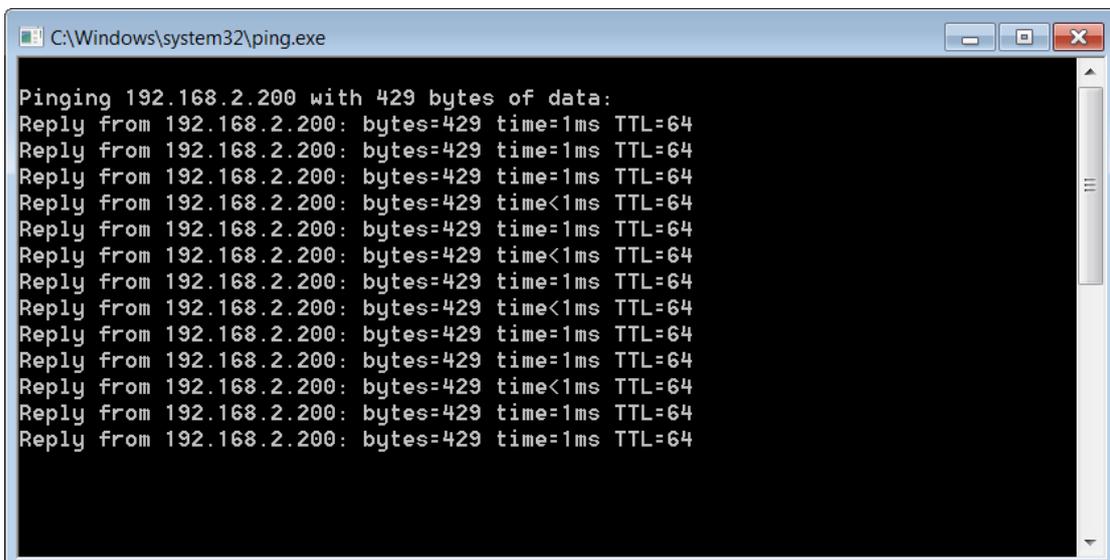
5 Software Development

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.