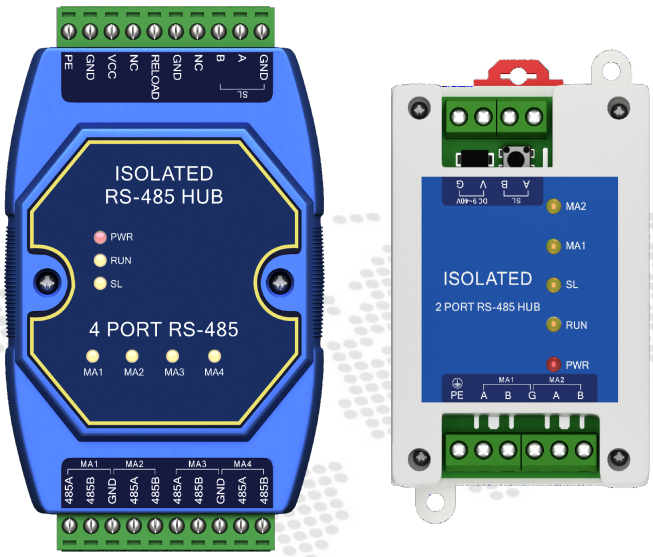
Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

Cached 2/4-channel to 1-channel RS-485



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1. Overview

1.1 Introduction

E810-R21/E810-R41 is a multi RS-485 to 1 RS-485 cache type isolation repeater from Chengdu Ebyte Electronic Technology Co., Ltd. The RS485 hub is a communication device that supports 2/4 RS-485 master devices and 1 RS-485 slave device. Optical isolation technology is used to protect the master and slave devices from interference. The circuit adopts EMC level 3 standard for design, with 1.5KV isolation voltage, electrostatic protection of contact discharge 4KV, air discharge 8KV, and differential mode 1KV and common mode 2KV lightning surge protection, which can effectively isolate the hazards caused by lightning and static electricity to the equipment. No need to configure, transparent data transmission between master and slave interfaces.

This product is suitable for automation control system, monitoring system, alarm, access control system, IC card charging, meter reading, one card, parking lot charging and other integrated RS485 communication system.

1.2 Features

- Power supply supports DC 8~28V wide voltage input, with overcurrent and reverse connection protection
- Supports 2/4 RS485 master devices to communicate with 1 RS485 slave device
- Can be configured through any serial port
- Supports multi-master mode (the data returned by the slave will only be returned to the corresponding requesting host) and bidirectional pass-through mode (the data returned by the slave will be returned to all hosts)
- Signaling interfaces are protected against static electricity, lightning strikes and surges.
- Complete isolation of communication and power supply between master and slave interfaces
- The power signal between the host interface and the slave interface is fully isolated
- Adopts super anti-interference and high-speed isolation devices, baud rate up to 115200bps.

1.3 System parameter

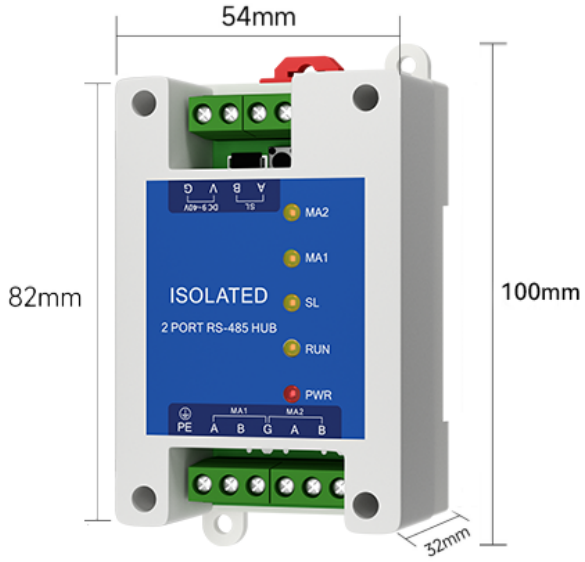
Parameter name	Parameter value	Description
Common parameter	Data Interface	RS-485 Interface
	Baud rate	1200~115200bps
	Data Bit	8-bit
	Stop Bit	1/2 bit
	Check Bit	None/Odd/Even
	Memory Space	Single host 3k Byte

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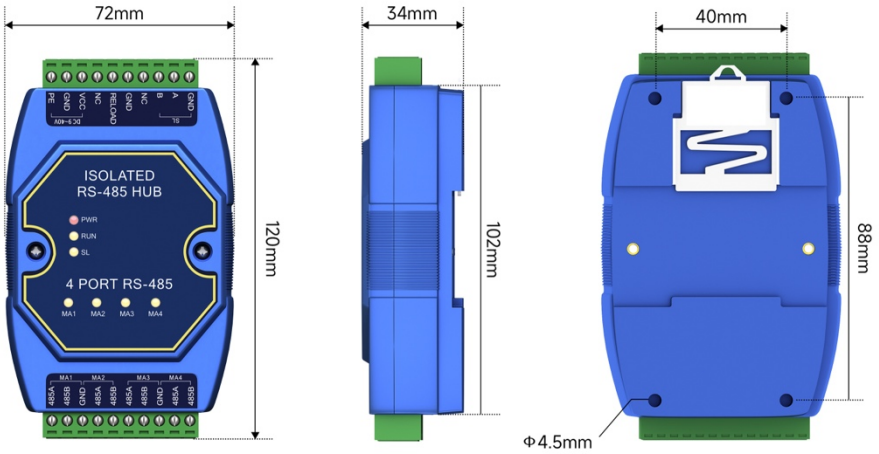
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	Working Voltage	DC 8~28V
	Protection class	Industrial EMC3
	Isolation Voltage	1.5KV
	Static protection grade	Contact 4 KV, Air 8KV
	Pulse surge	Differential mode 1KV, common mode 2KV
	Working temperature and humidity	-40~85℃, 5%~95% (no condensation)
	Storage temperature and humidity	-40~105℃, 5%~95% (no condensation)
	Ground terminal	Support
Difference parameter	Expansion Channels	E810-R21:2-channel RS-485 main unit E810-R41:4-channel RS-485 main unit
	Product Size	E810-R21:100×54×32mm E810-R41:120×72×34mm
	Weight	E810-R21:70±5g E810-R41:120±5g
	Interface Standard	E810-R21:5.08mm copper pin plug-in terminals E810-R41:5.08mm Plug-in Terminals

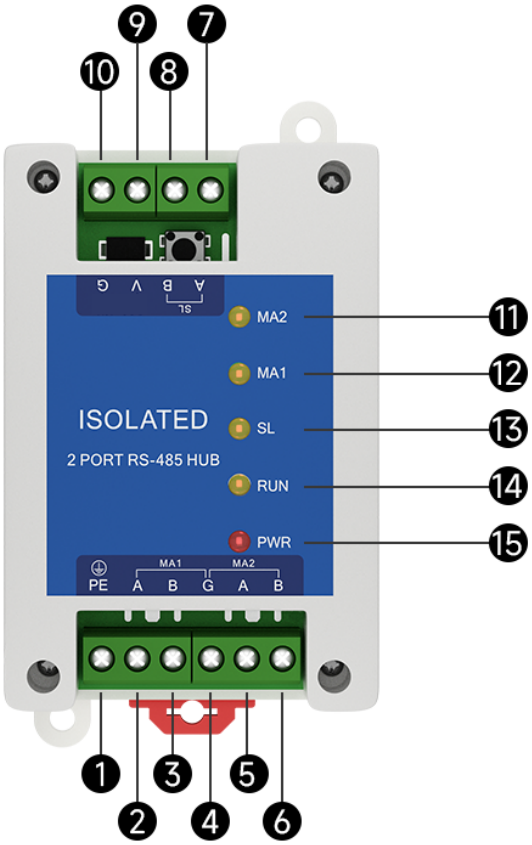
1.4 Product Size



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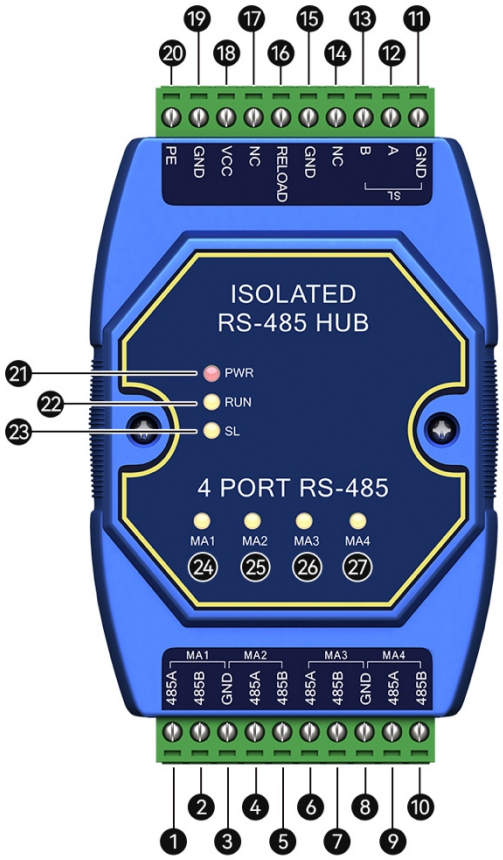
1.5 Pin Definitions



No	Name	Clarification
1	PE	5.08mm Terminal Block, Earth Connector
2	MA1-485A	5.08mm Terminal Block, MA1-485-A Connector
3	MA1-485B	5.08mm terminal block, MA1-485-B connector

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4	GND	5.08mm Terminal Block, Output Digital Signal Ground
5	MA2-485A	5.08mm terminal block, MA2-485-A connector
6	MA2-485B	5.08mm Terminal Block, MA2-485-B Interface
7	SL-485A	5.08mm Terminal Block, SL-485-A Connector
8	SL-485B	5.08mm Terminal Block, SL-485-B Connector
9	VCC	5.08mm Terminal Block, Power Input Positive
10	GND	5.08mm terminal block, power ground, not interoperable with digital signal ground
11	LED-MA2	Main interface 2 data transceiver indicator, blinking when there is a data interaction
12	LED-MA1	Master 1 data transmitting and receiving indicator, blinking when there is data interaction
13	LED-SL	Slave interface data transmitting and receiving indicator, blinking when there is data interaction
14	LED-RUN	Running indicator, blinking for normal operation, always on after entering the configuration
15	LED-PWR	Power indicator



No	Name	Description
1	MA1-485A	5.08mm terminal block, MA1-485-A connector
2	MA1-485B	5.08mm terminal block, MA1-485-B connector

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3	GND	5.08mm Terminal Block, Digital Signal Ground for Outputs
4	MA2-485A	5.08mm terminal block, MA1-485-A connector
5	MA2-485B	5.08mm Terminal Block, MA1-485-B Connector
6	MA3-485A	5.08mm terminal block, MA1-485-A connector
7	MA3-485B	5.08mm terminal block, MA1-485-B interface
8	GND	5.08mm Terminal Block, Digital Signal Ground for Outputs
9	MA4-485A	5.08mm Terminal Block, MA1-485-A Interface
10	MA4-485B	5.08mm Terminal Block, MA1-485-B Connector
11	SL-GND	5.08mm Terminal Block, Digital Signal Ground on Outputs
12	SL-485A	5.08mm terminal block, SL-485-A connector
13	SL-485B	5.08mm terminal block, SL-485-B interface
14	NC	Not yet available
15	GND	5.08mm Terminal Block, Digital Signal Ground
16	RELOAD	5.08mm terminal block, factory settings restored, pull down for 5-10 seconds to take effect
17	NC	Not yet available
18	VCC	5.08mm Terminal Block, Power Input Positive
19	GND	5.08mm terminal, power ground, not interoperable with digital signal ground
20	PE	5.08mm terminal, earth ground terminal
21	LED-PWR	Power indicator
22	LED-RUN	Running indicator, blinking for normal operation, always on after entering the configuration
23	LED-SL	Slave interface data transmitting and receiving indicator, blinking when there is data interaction.
24	LED-MA1	Master interface 1 data transmitting and receiving indicator, blinking when there is data interaction
25	LED-MA2	Master interface 2 data transmitting and receiving indicator, blinking when there is data interaction
26	LED-MA3	Master 3 data transceiver indicator, blinking with data interaction
27	LED-MA4	Main interface 4 data transceiver indicator, blinking with data interaction

1.6 Default parameters

Parameter	Description
Working Mode	Bidirectional Transmission
Baud rate	9600
Stop Bit	1
Serial port parity bit	None
Packing time	15ms
Packing Length	512 bytes

Note: Packing time is recommended to be set to the time needed to transfer 2-5 bytes at the current baud rate, too short

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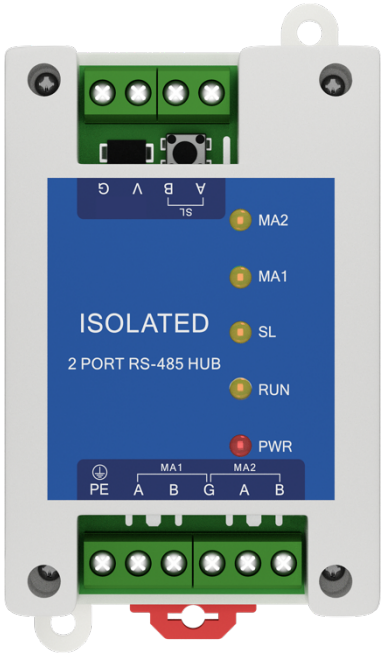
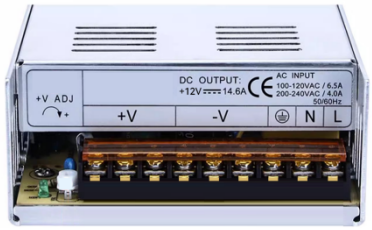
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may cause the data to be split.

2. Quick use

2.1 Hardware preparation

Note: E810-R21 and E810-R41 are used in exactly the same channel, here E810-R21 as an example.
The hardware required for this test is as follows:

	
1 E810-R21 mainframe	12V Switching Power Supply
	
USB to RS-485 Debugger 3pcs	A number of connecting cables

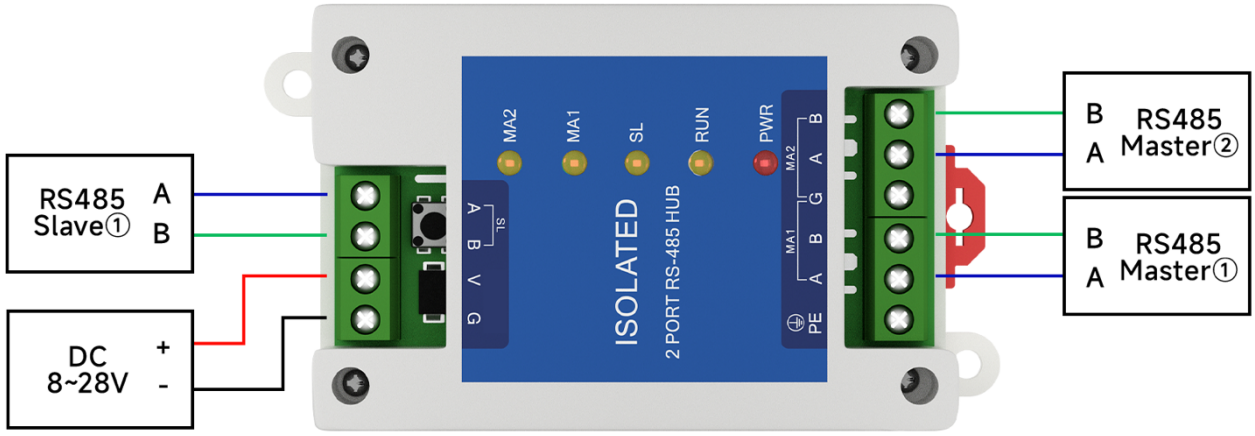
1. Connect the device host to the 12V switching power supply, the device VCC to the positive pole (V) of the switching power supply, and the device GND to the negative pole (G) of the switching power supply;
2. Use USB to RS-485 to connect with device 485_SL end (use computer to simulate slave here), device SL-A to connect

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with USB to RS-485 A end, device SL-B to connect with USB to RS-485 B end;

3. Use USB to RS-485 to connect with device MA1 and MA2 connection end respectively (here use computer to simulate the host), device MA1-A to connect with USB to RS-485 A end, device MA1-B to connect with USB to RS-485 B end;



4. Connect the USB to the computer (you need to install the corresponding USB to serial port driver);

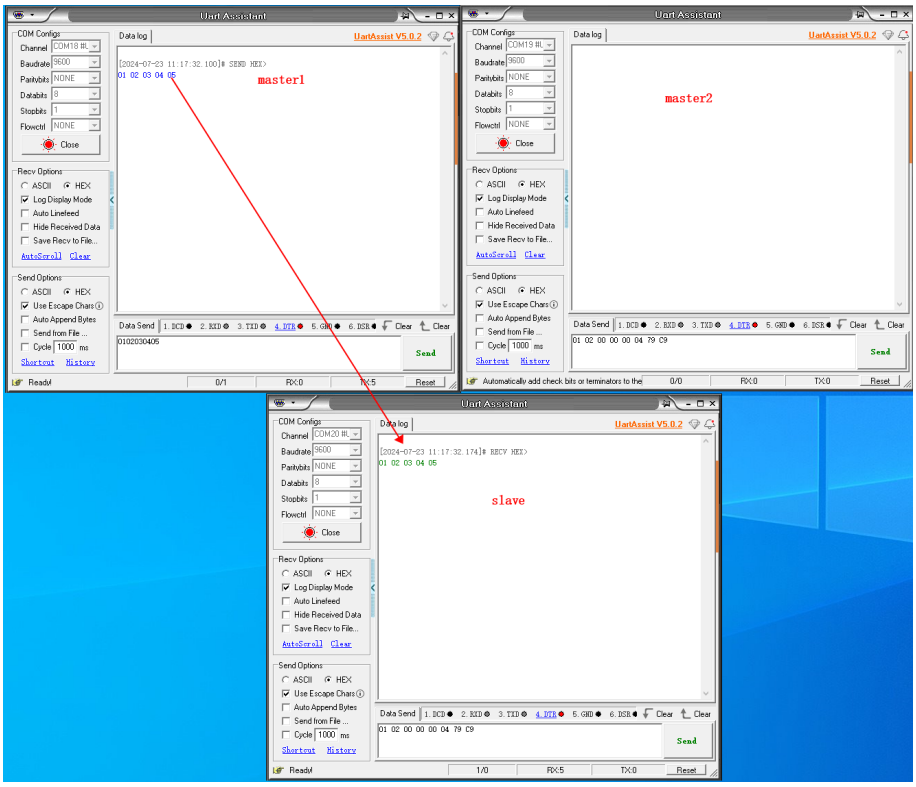
5. Turn on the power;

6. Open the host and slave serial port respectively.

2.2 Communications test

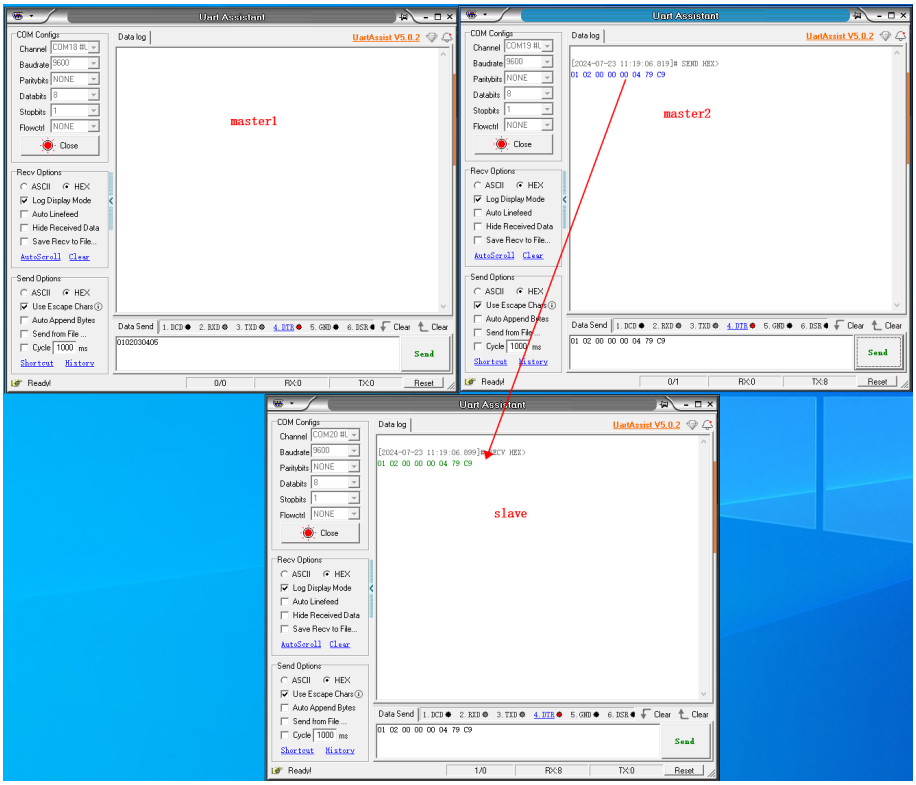
Bi-directional pass-through mode (factory default)

1. Host 1 sends data to slave

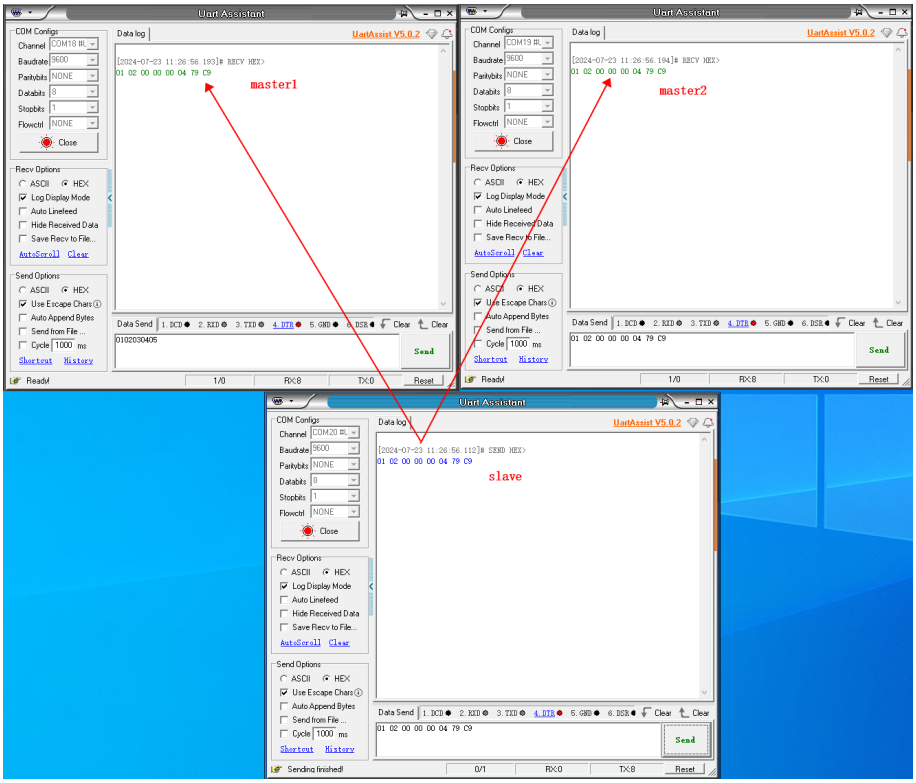


2、Master2 sends data to slave

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3、Slave sends data to two hosts respectively

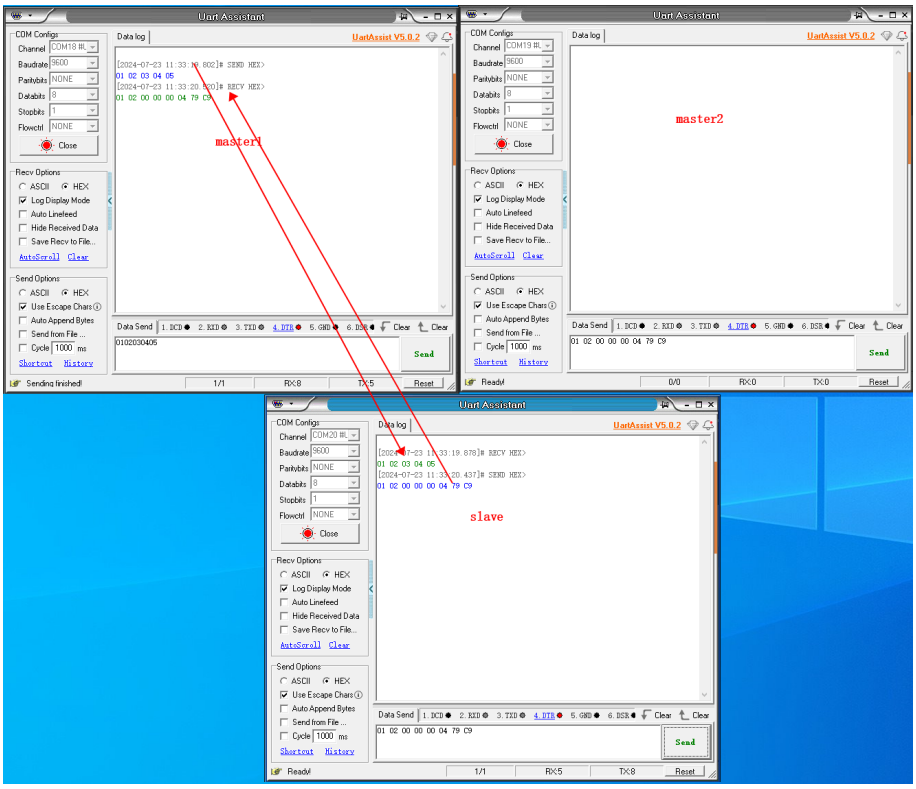


Multi-Host Mode (requires configuration changes)

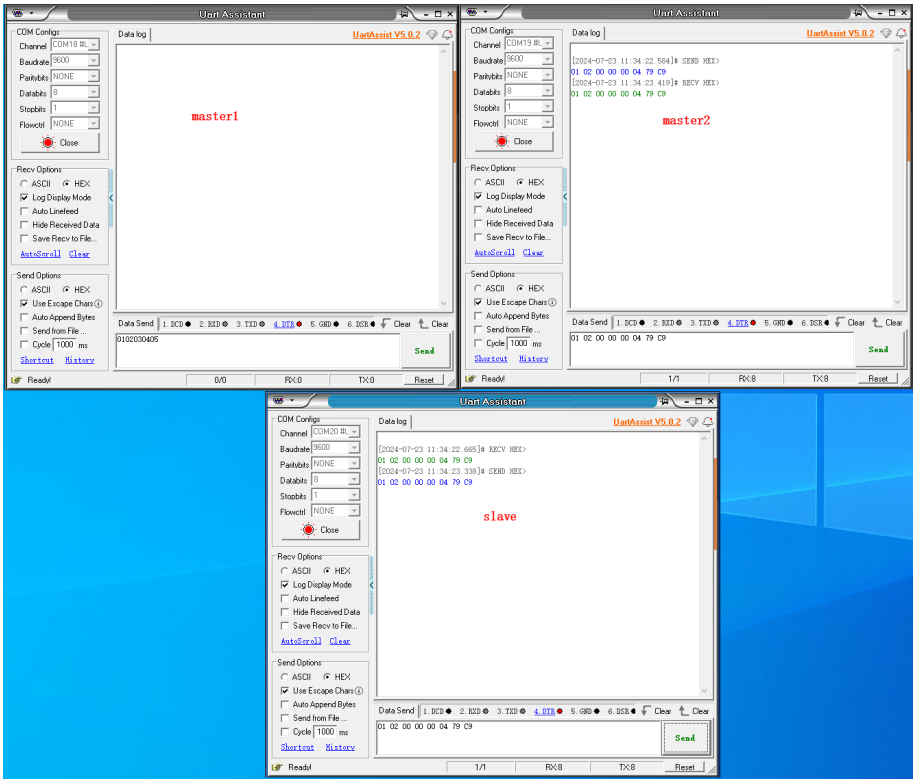
1. Host 1 sends data to the slave, and the slave sends data back to host 1 only

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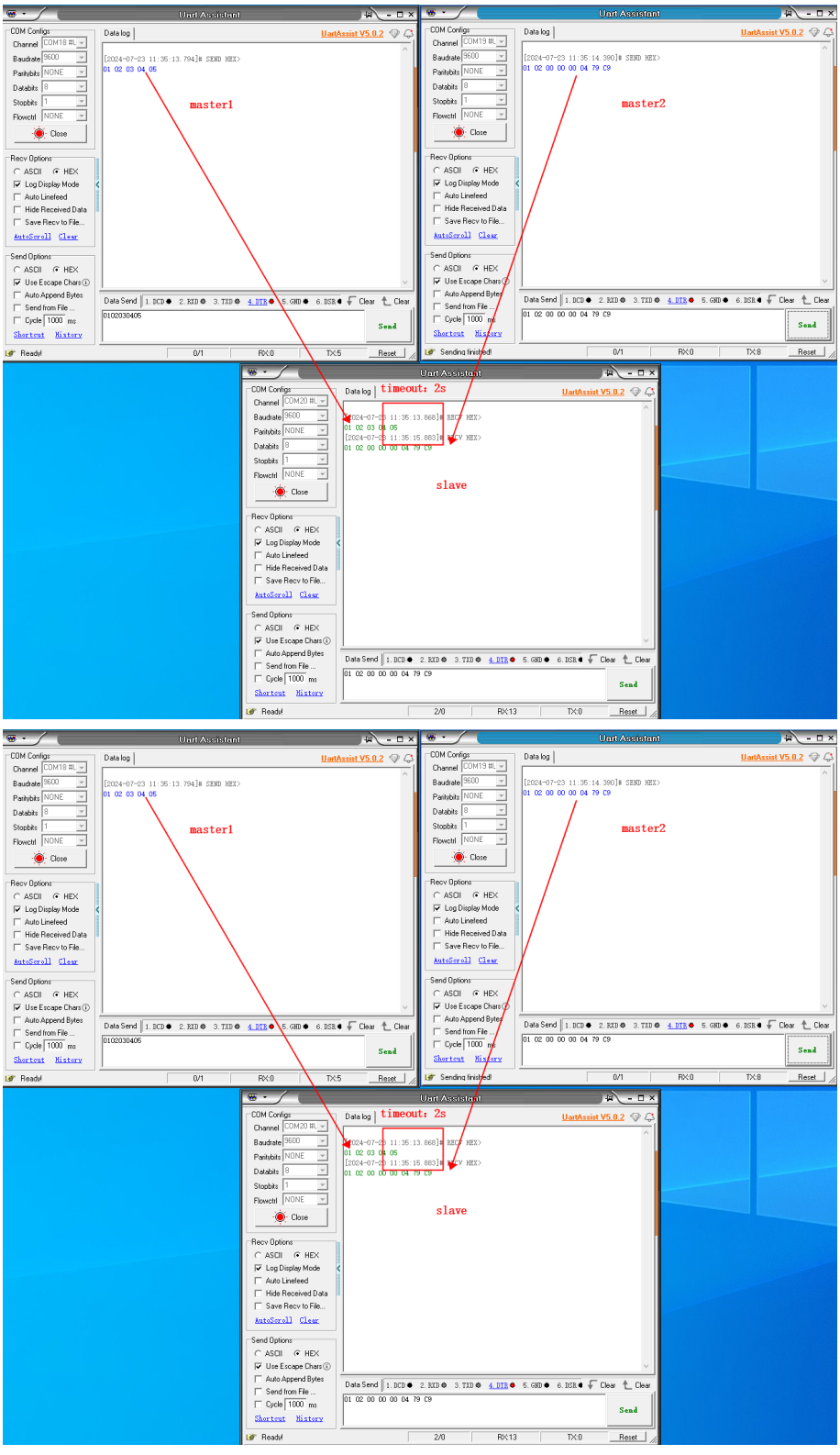
2. Host 2 sends data to the slave, and the slave sends data only back to host 2



3. Host 1 sends the data while host 2 sends the data, and the device will send out the data from host 2 after host 1's timeout expires

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2.3 Configuration Mode

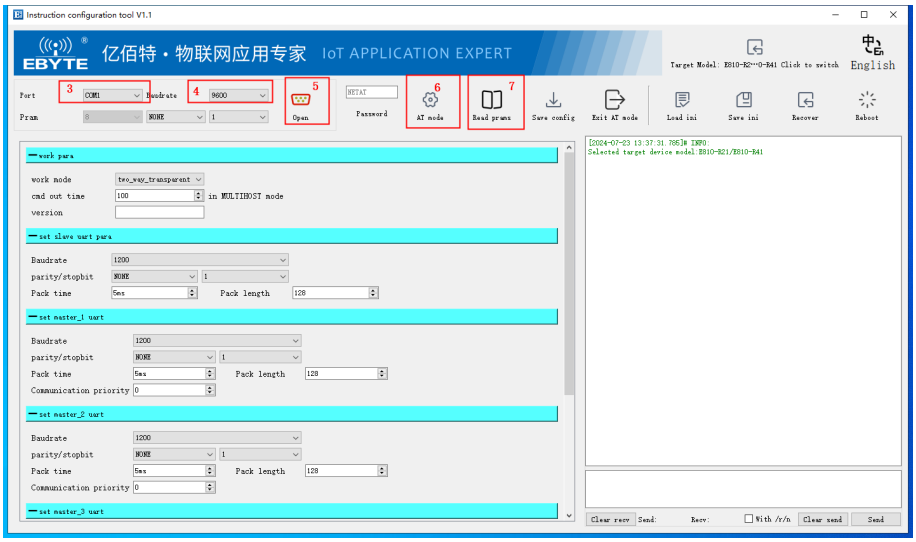
You can use any serial port on the host side to enter the configuration mode, and use the current serial port baud rate to enter the configuration mode, default 9600.

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Each serial port parameters can be set independently.

1. Double-click to open the parameter configuration software
2. Select the product model E810-R21/E810-R41.

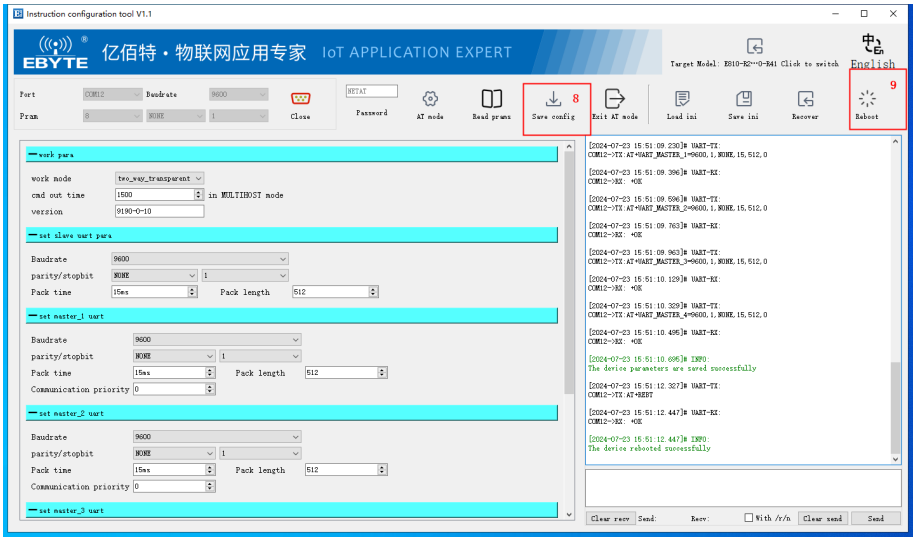




3. Select the corresponding serial port number (use any host port)
4. Select the corresponding serial port baud rate (default 9600)
5. Click to open the serial port
6. Click to enter the configuration
7. Click to read the parameters
8. After the parameter settings are complete, click Save Configuration
9. Click to restart the device

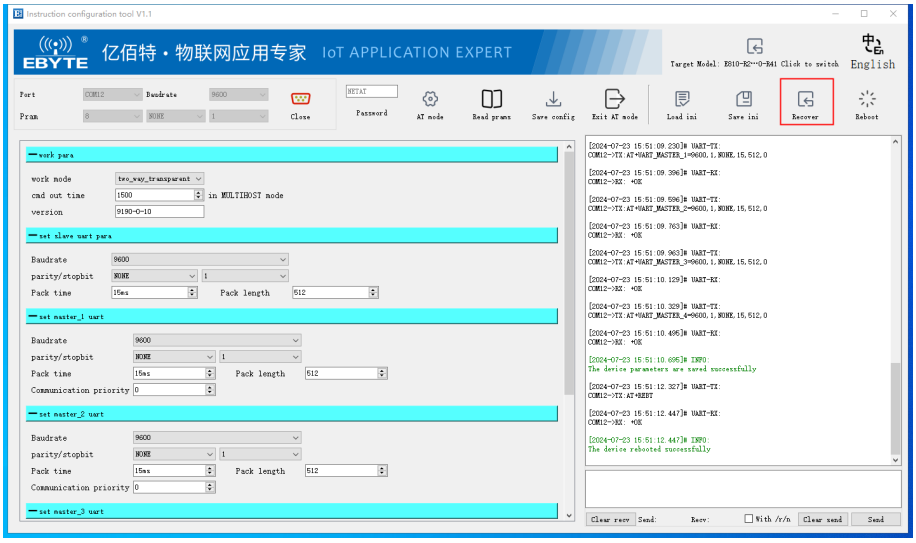
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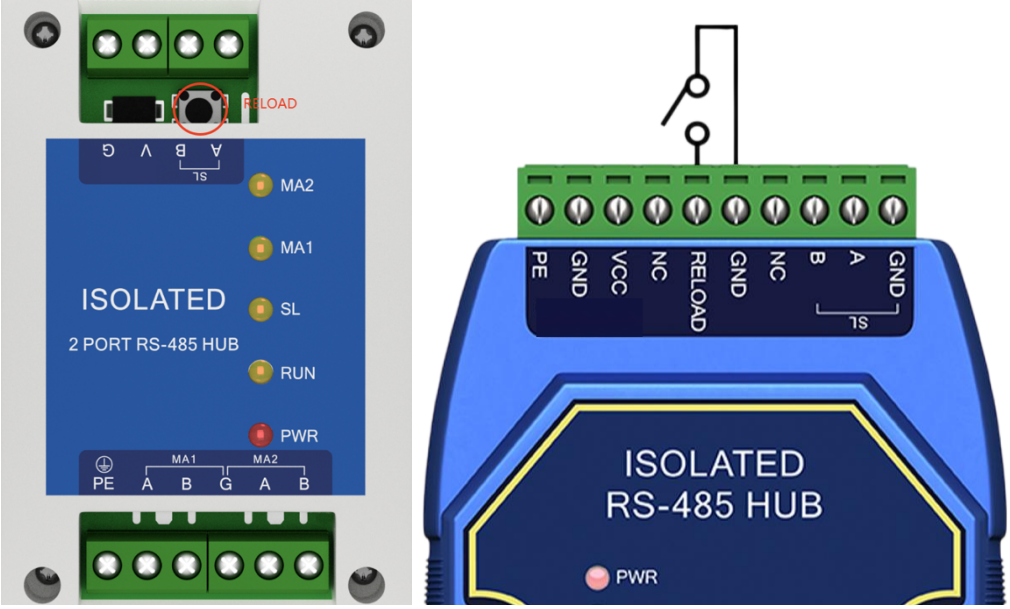
2.4 Restore Factory Settings

The device can be restored to factory settings in configuration mode, or hardware can be used to restore the device to factory settings.



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3. Functional description

3.1 Bidirectional transmission mode

After entering the bidirectional pass-through mode, any data sent from the host side will be sent to the slave side, and the data sent from the slave side will be returned to both hosts.

3.2 Multi-Host Mode

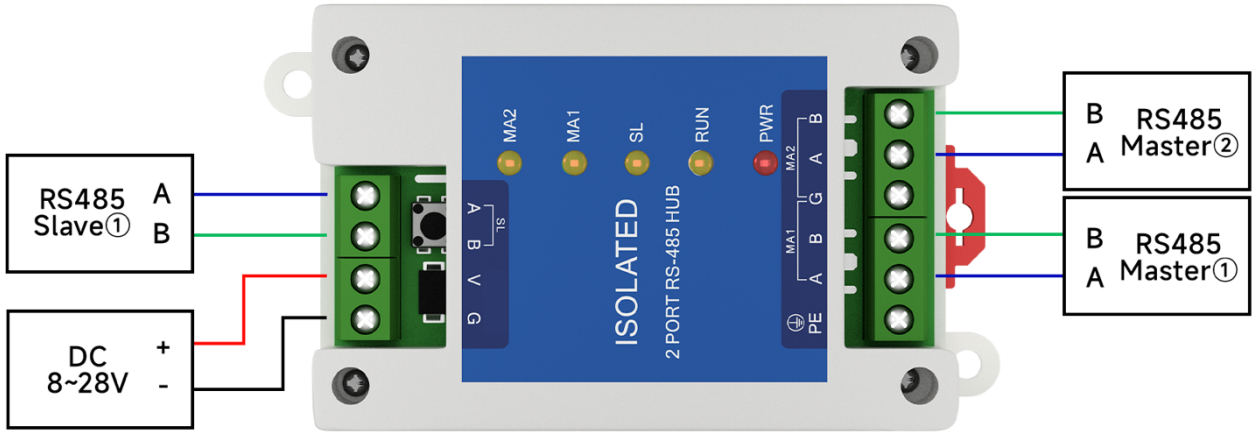
After entering the multi-host mode, the data sent by the host will be sent to the slave port in order of priority, and the device will not process the data sent by other hosts without processing the data sent by the current host.
For example, after host 1 sends data, the device will send the data to the slave, and the data returned by the slave will only be returned to host 1. At this time, if other hosts are sending data to the device, the device will store the data in the device storage space until the slave returns the data to host 1, and then it will process the data sent by other host ports. If the response time of the slave reaches the command timeout, the device will consider the query command sent by host 1 invalid before processing the data sent by the other hosts.

4. Connection Schematic

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5. Wiring Precautions



5.1 RS485 Bus Wiring Specifications

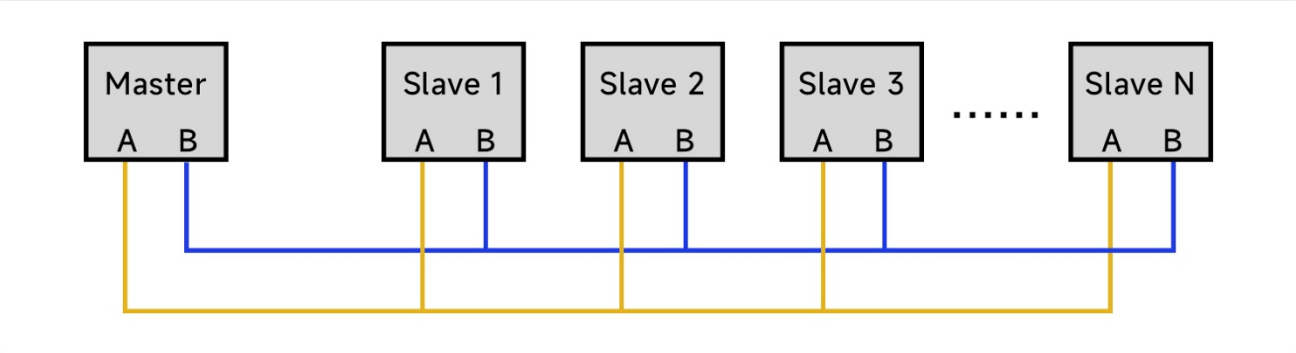
1, using standard RS485 bus wiring commonly known as hand in hand connection, should try to avoid star connection.
2, the use of 2-core shielded twisted-pair cable, the bus length of not more than 1200 meters, the bus hook-up equipment not more than 32 units, the length of the branch line is not more than 10 meters.
3, the communication line should be as far as possible from the source of interference, the communication line should go to the weak well, can not and strong electricity or radio frequency signal line parallel line, if you must parallel line, the distance should not be greater than 0.5 meters.

5.2 RS485 Wiring Precautions

1, 485 communication standard maximum communication distance of 1200 meters, but the actual application to this distance, and the higher the baud rate the shorter the communication distance, the general communication distance of more than 500 meters need to increase the 485 signal repeater.
2, more devices connected to the bus to avoid signal reflection, should be the furthest away from a device between the communication port AB and connect a 120 ohm matching resistor.

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3, the shielding of the communication line should be connected to the ground, the ground is the earth is not the negative pole of the power supply.

Cable Selection Recommendation Table

Cabling Distance	Wire Material
Less than 200 meters	2*0.5 Two-conductor shielded twisted pair cable
200-500 meters	2*0.75 Two-core shielded twisted pair cable
Greater than 500 meters	2*1.0 Two-core shielded twisted pair cable

Revision history

Versions	Revision Date	Revision Notes	Maintaining people
1.0	2024-7-23	Initial Version	LYL

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