

Isolated 1/2/4/8-Port RS-485 Hub

Chengdu Ebyte Electronic Technology Co.,Ltd.

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Chapter 1 Overview

1.1 Introduction

The E810-R11/E810-R11M/E810-R12/E810-R12M/E810-R14/E810-R18 are isolated repeaters (HUBs) from 1-channel RS-485 to 1/2/4/8-channel RS-485 interfaces, launched by Chengdu Ebyte Electronic Technology Co., Ltd. RS485 hubs support communication between one RS-485 master station device and one or more RS-485 slave station devices. They employ opto-isolation technology to protect the master and slave devices from interference. The circuit is designed according to EMC Level 3 standards, featuring 1.5KV isolation voltage, 4KV electrostatic discharge protection, 8KV air discharge protection, and lightning surge protection of 1KV differential mode and 2KV common mode, effectively isolating the equipment from damage caused by lightning strikes and electrostatic discharge. No configuration is required; transparent data transmission occurs between the master and slave interfaces.

This product is suitable for integrated RS485 communication systems such as automated control systems, monitoring systems, alarm systems, access control systems, IC card payment systems, meter reading systems, all-in-one card systems, and parking fee collection systems.

1.2 Features and Functions

- The power supply supports a wide input voltage range of DC 8-28V and features overcurrent and reverse connection protection.
- Supports communication between one RS485 master device and one or more RS485 slave devices.
- No configuration required, ready to use immediately
- The master interface can send data to all slave interfaces simultaneously, while the slave interfaces can send data to the master interface in a time-sharing manner.
- The signal interface has electrostatic discharge, lightning strike, and surge protection.
- Communication and power supply between the master and slave interfaces are completely isolated.
- Power and signal are fully isolated between the host interface and the slave interface.
- Employing high-strength anti-interference and high-speed isolation devices, the baud rate can reach up to 230400bps.
- The slave communication port supports a maximum of 32 nodes.

1.3 System parameters

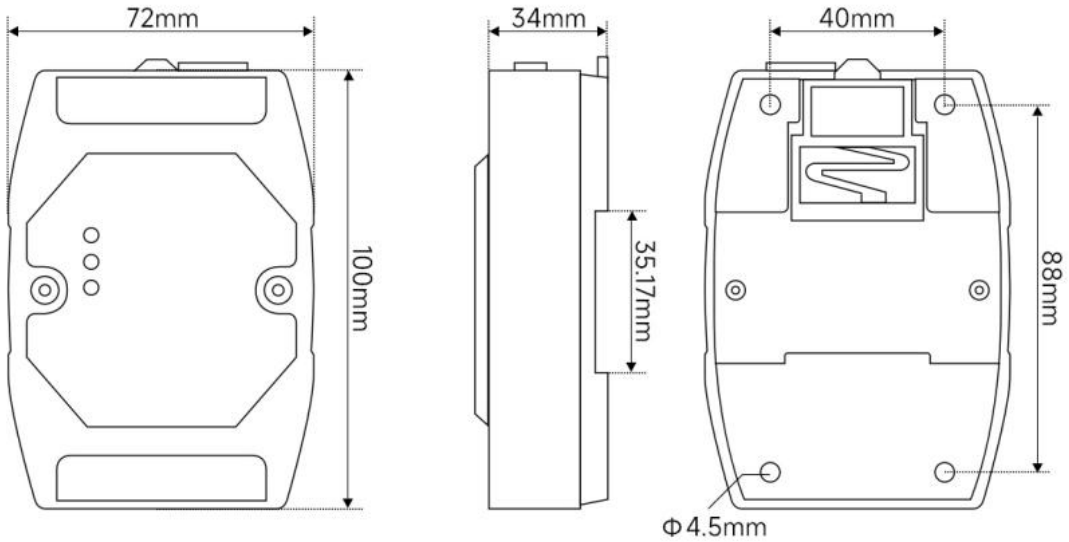
Parameter name	Parameter value	describe
General parameters	Data Interface	RS-485 interface
	baud rate	300~230400, supports custom baud rates
	Operating voltage	DC 8~28V
	Protection level	Industrial EMC Level 3
	Isolation voltage	1.5KV
	Electrostatic protection level	Contact voltage 4 kV, air voltage 8 kV
	Pulse surge	Differential mode 1kV, common mode 2kV
	Operating temperature and humidity	-40~85℃, 5%~95% (no condensation)

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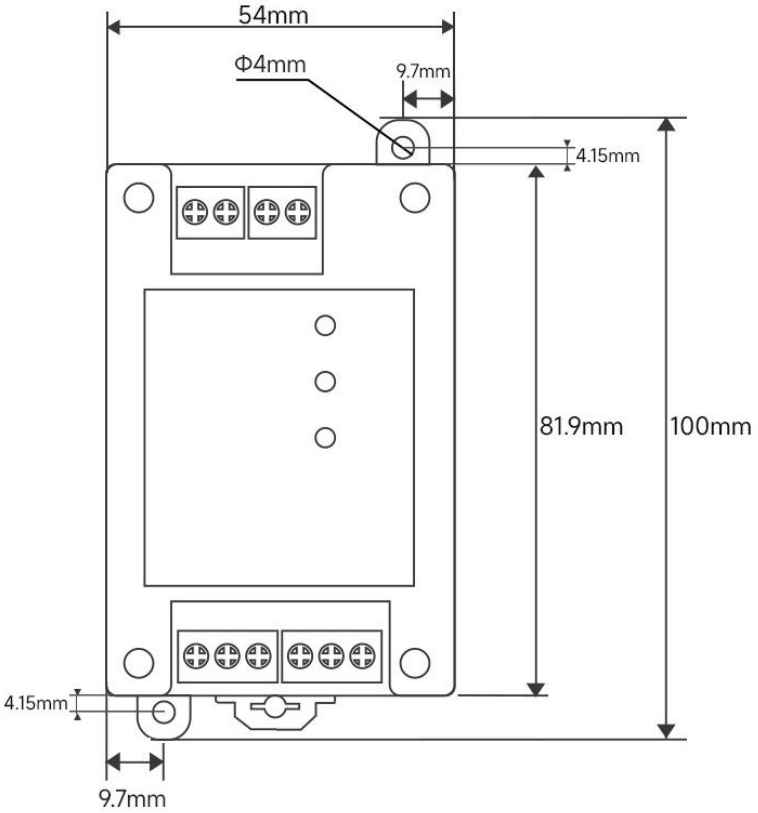
	Storage temperature and humidity	-40~105℃, 5%~95% (no condensation)
	Grounding terminal	support
Difference parameters	Expanding the number of paths	E810-R11/E810-R11M: 1 RS485 channel E810-R12/E810-R12M: 2-channel RS-485 E810-R14: 4-channel RS-485 E810-R18: 8-channel RS-485
	Product Dimensions	E810-R11M/E810-R12M:106×28×27mm E810-R11/E810-R12:100×54×32mm E810-R14/E810-R18:120×72×34mm
	Product weight	E810-R11M/E810-R12M: 40±5g E810-R11/E810-R12: 70±5g E810-R14/E810-R18: 120±5g
	Interface Standard	E810-R11M/E810-R12M: 2.54mm spring-loaded connector E810-R11/E810-R12: 5.08mm copper pin terminal E810-R14: 5.08mm pluggable terminal E810-R18: 3.81mm pluggable terminal

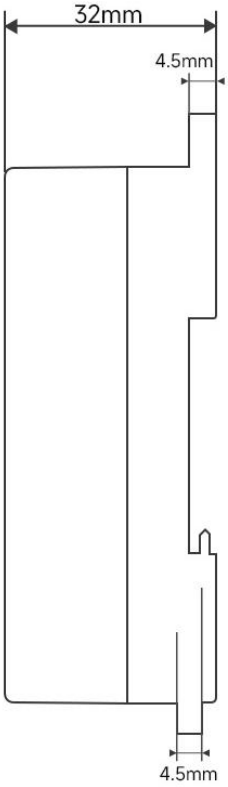
1.4 Product Dimensions

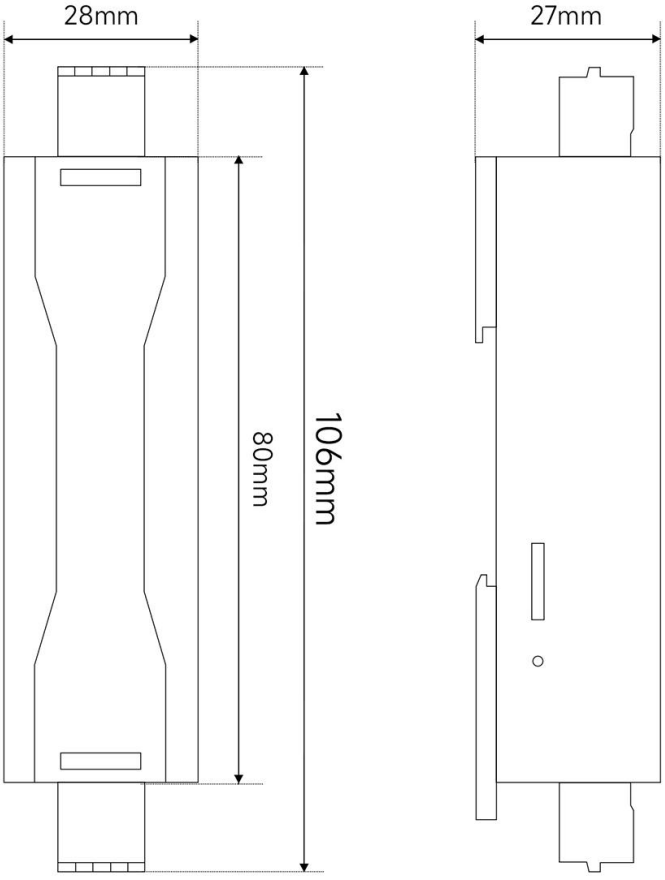


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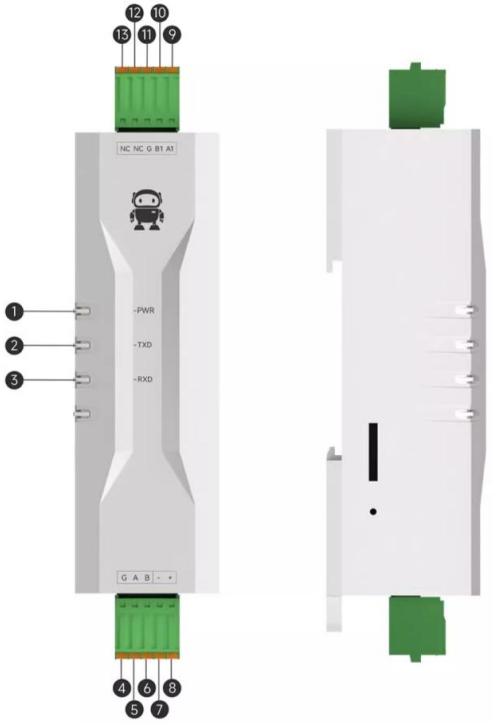




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1.5 Pin Definitions



Serial Number	name	illustrate
1	LED-PWR	Power indicator light, blue
2	LED-TXD	The RS485 master serial port data transmission indicator light is yellow and flashes when data is being transmitted.
3	LED-RXD	The RS485 master serial port data receive indicator light is green and flashes when data is being received.
4	G	2.54mm spring terminal block, RS485 input digital signal ground
5	A	2.54mm spring terminal block, RS485-A interface
6	B	2.54mm spring terminal block, RS485-B interface
7	-	2.54mm spring terminal block, DC 8~28V power input -
8	+	2.54mm spring-loaded terminal block, DC 8~28V power input positive stage
9	A1	2.54mm spring terminal block, RS485-1-A
10	B1	2.54mm spring terminal block, RS485-1-B
11	G	2.54mm spring terminal block, RS485 digital signal ground output.
12	NC	Suspended
13	NC	Suspended

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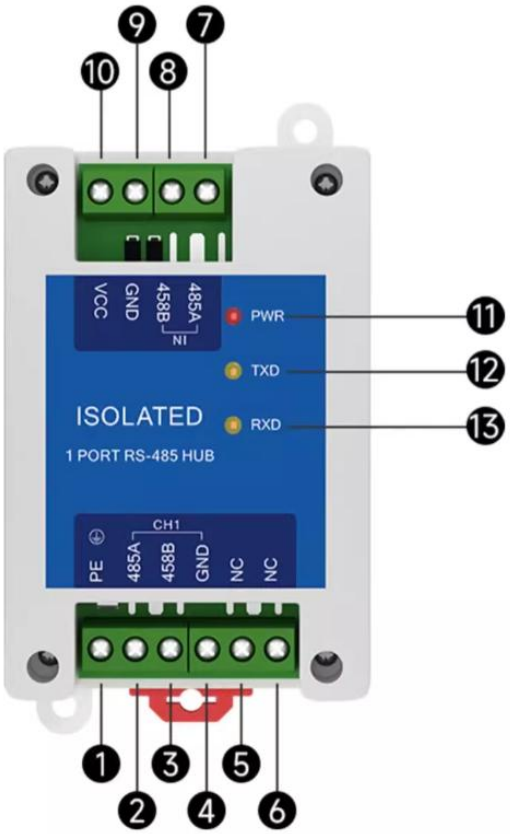
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Serial Number	name	illustrate
1	LED-PWR	Power indicator light, blue
2	LED-TXD	The RS485 master serial port data transmission indicator light is yellow and flashes when data is being transmitted.
3	LED-RXD	The RS485 master serial port data receive indicator light is green and flashes when data is being received.
4	G	2.54mm spring terminal block, RS485 input digital signal ground
5	A	2.54mm spring terminal block, RS485-A interface
6	B	2.54mm spring terminal block, RS485-B interface
7	-	2.54mm spring terminal block, DC 8~28V power input -
8	+	2.54mm spring-loaded terminal block, DC 8~28V power input positive stage
9	A1	2.54mm spring terminal block, RS485-1-A
10	B1	2.54mm spring terminal block, RS485-1-B
11	G	2.54mm spring terminal block, RS485 digital signal ground output.
12	A2	2.54mm spring terminal block, RS485-2-A, one channel is left floating.
13	B2	2.54mm spring terminal block, RS485-2-B, one channel is left floating.

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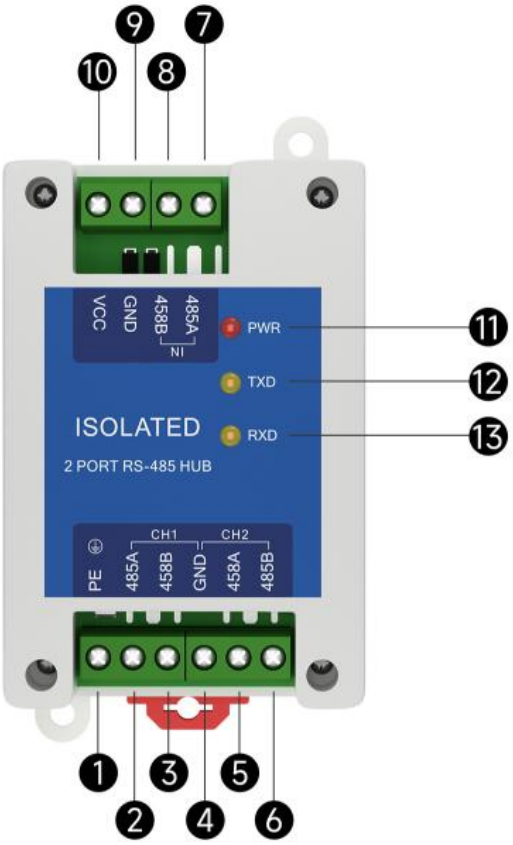
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Serial Number	name	illustrate
1	PE	5.08mm terminal block, connected to ground terminal.
2	CH1-485A	5.08mm terminal block, CH1 output terminal A interface
3	CH1-485B	5.08mm terminal block, CH1 output terminal B interface
4	GND	5.08mm terminal block, digital signal ground at output.
5	NC	Suspended
6	NC	Suspended
7	IN-485A	5.08mm terminal block, RS485 input A interface
8	IN-485B	5.08mm terminal block, RS485 input port B interface
9	GND	5.08mm terminal block, power ground, not interconnected with digital signal ground.
10	VCC	5.08mm terminal block, positive power input.
11	LED-PWR	Power indicator light
12	LED-TXD	Main serial port data transmission indicator
13	LED-RXD	Main serial port data receiving indicator light

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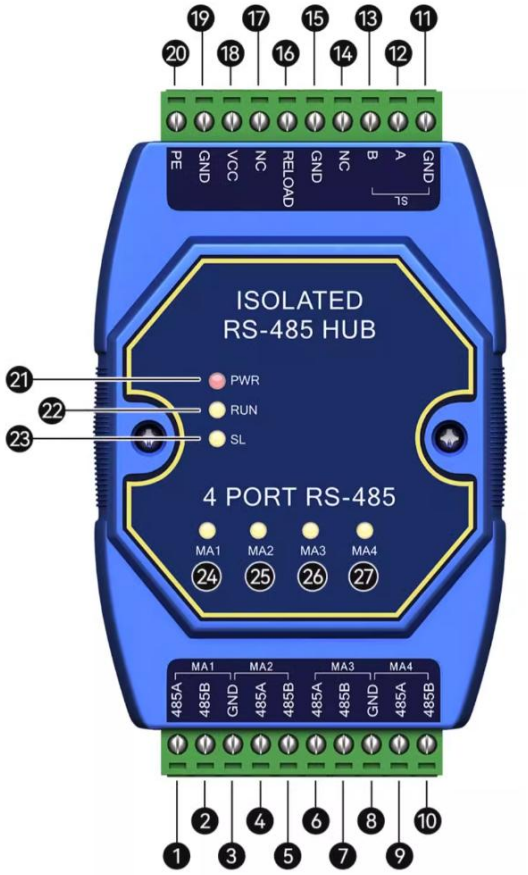
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Serial Number	name	illustrate
1	PE	5.08mm terminal block, connected to ground terminal.
2	CH1-485A	5.08mm terminal block, CH1 output terminal A interface
3	CH1-485B	5.08mm terminal block, CH1 output terminal B interface
4	GND	5.08mm terminal block, digital signal ground at output.
5	CH2-485A	5.08mm terminal block, CH2 output terminal A interface, E810-R11 is left floating.
6	CH2-485B	5.08mm terminal block, CH2 output terminal B interface, E810-R11 is left floating.
7	IN-485A	5.08mm terminal block, RS485 input A interface
8	IN-485B	5.08mm terminal block, RS485 input port B interface
9	GND	5.08mm terminal block, power ground, not interconnected with digital signal ground.
10	VCC	5.08mm terminal block, positive power input.
11	LED-PWR	Power indicator light
12	LED-TXD	Main serial port data transmission indicator
13	LED-RXD	Main serial port data receiving indicator light

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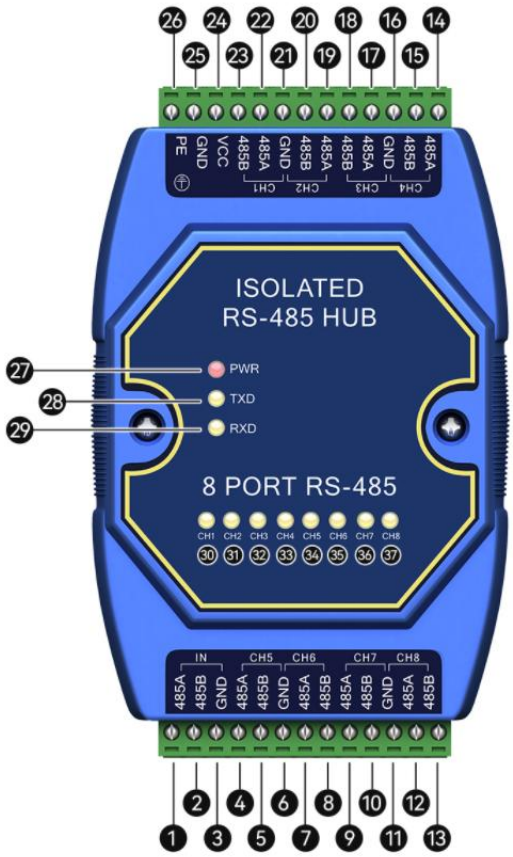


Serial Number	name	illustrate
1	CH1-485A	5.08mm terminal block, CH1 output terminal A interface
2	CH1-485B	5.08mm terminal block, CH1 output terminal B interface
3	GND	5.08mm terminal block, digital signal ground at output.
4	CH2-485A	5.08mm terminal block, CH2 output terminal A interface
5	CH2-485B	5.08mm terminal block, CH2 output terminal B interface
6	CH3-485A	5.08mm terminal block, CH3 output terminal A interface
7	CH3-485B	5.08mm terminal block, CH3 output terminal B interface
8	GND	5.08mm terminal block, digital signal ground at output.
9	CH4-485A	5.08mm terminal block, CH4 output terminal A interface
10	CH4-485B	5.08mm terminal block, CH4 output terminal B interface
11	PE	5.08mm terminal block, connected to ground terminal.
12	GND	5.08mm terminal block, power ground, not interconnected with digital signal ground.
13	VCC	5.08mm terminal block, positive power input.
14	IN-485A	5.08mm terminal block, RS485 input A interface
15	IN-485B	5.08mm terminal block, RS485 input port B interface
16	IN-GND	5.08mm terminal block, RS485 input GND interface
17	DC power plug	DC plug, outer diameter 5.5mm, inner diameter 2.0mm, recommended for external 12V/24V power supply.
18	LED-PWR	Power indicator light

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19	LED-TXD	Main serial port data transmission indicator
20	LED-RXD	Main serial port data receiving indicator light
twenty one	LED-CH1	CH1 Data Transmission Indicator
twenty two	LED-CH2	CH2 Data Transmission Indicator
twenty three	LED-CH3	CH3 Data Transmission Indicator
twenty four	LED-CH4	CH4 Data Transmission Indicator



Serial Number	name	illustrate
1	IN-485A	3.81mm terminal block, RS485 input A interface
2	IN-485B	3.81mm terminal block, RS485 input B interface
3	IN-GND	3.81mm terminal block, digital signal ground at the input end.
4	CH5-485A	3.81mm terminal block, CH5 output terminal A interface
5	CH5-485B	3.81mm terminal block, CH5 output terminal B interface
6	GND	3.81mm terminal block, digital signal ground at output.
7	CH6-485A	3.81mm terminal block, CH6 output terminal A interface
8	CH6-485B	3.81mm terminal block, CH6 output terminal B interface
9	CH7-485A	3.81mm terminal block, CH7 output terminal A interface

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10	CH7-485B	3.81mm terminal block, CH7 output terminal B interface
11	GND	3.81mm terminal block, digital signal ground at output.
12	CH8-485A	3.81mm terminal block, CH8 output terminal A interface
13	CH8-485B	3.81mm terminal block, CH8 output terminal B interface
14	CH4-485A	3.81mm terminal block, CH4 output terminal A interface
15	CH4-485B	3.81mm terminal block, CH4 output terminal B interface
16	GND	3.81mm terminal block, digital signal ground at output.
17	CH3-485A	3.81mm terminal block, CH3 output terminal A interface
18	CH3-485B	3.81mm terminal block, CH3 output terminal B interface
19	CH2-485A	3.81mm terminal block, CH2 output terminal A interface
20	CH2-485B	3.81mm terminal block, CH2 output terminal B interface
twenty one	GND	3.81mm terminal block, digital signal ground at output.
twenty two	CH1-485A	3.81mm terminal block, CH1 output terminal A interface
twenty three	CH1-485B	3.81mm terminal block, CH1 output terminal B interface
twenty four	VCC	3.81mm terminal block, positive power input.
25	GND	3.81mm terminal block, power ground, not interconnected with digital signal ground.
26	PE	3.81mm terminal block, connected to ground terminal.
27	LED-PWR	Power indicator light
28	LED-TXD	Main serial port data transmission indicator
29	LED-RXD	Main serial port data receiving indicator light
30	LED-CH1	CH1 Data Transmission Indicator
31	LED-CH2	CH2 Data Transmission Indicator
32	LED-CH3	CH3 Data Transmission Indicator
33	LED-CH4	CH4 Data Transmission Indicator
34	LED-CH5	CH5 Data Transmission Indicator
35	LED-CH6	CH6 Data Transmission Indicator
36	LED-CH7	CH7 Data Transmission Indicator
37	LED-CH8	CH8 Data Transmission Indicator

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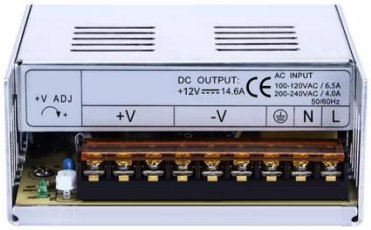
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Chapter Two: Quick Start

2.1 Hardware preparation

Note: The usage of E810-R11 is exactly the same as that of E810-R12, E810-R14, and E810-R18. This example uses E810-R12.

The hardware required for this test is as follows:

	
One E810-R12 host computer	12V switching power supply
	
Three USB to RS-485 debuggers	Several connecting wires

1. Connect the main unit of the device to a 12V switching power supply. Connect the device's VCC to the positive terminal (V+) of the switching power supply, and connect the device's GND to the negative terminal (V-) of the switching power supply.

2. Connect the USB to RS-485 adapter to the 485_IN port of the device (using a computer to simulate the host), connect the 485A device to the A port of the USB to RS-485 adapter, and connect the 485B device to the B port of the USB to RS-485 adapter;

3. Connect the USB to RS-485 adapter to the CH1 and CH2 terminals of the device respectively (using a computer to simulate a slave device). Connect device 485A to the A terminal of the USB to RS-485 adapter, and device 485B to the B terminal of the USB to RS-485 adapter.

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

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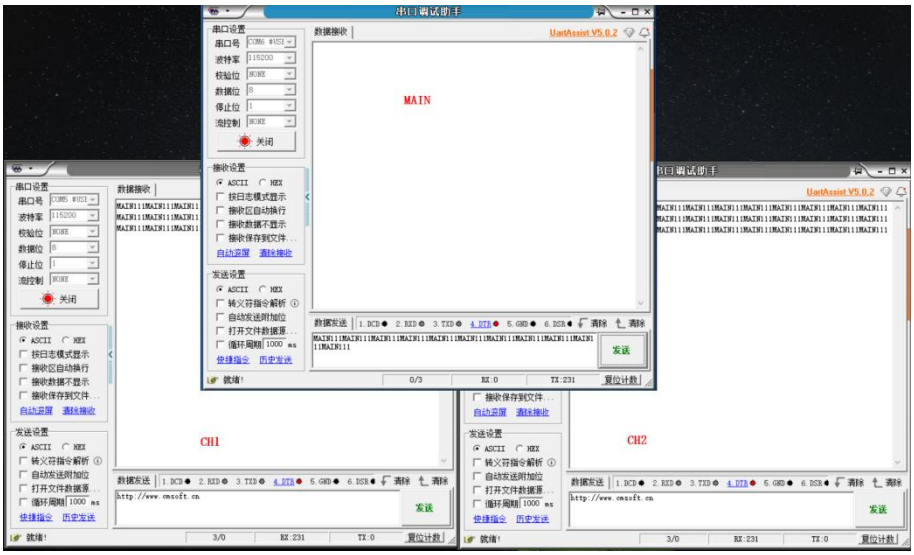
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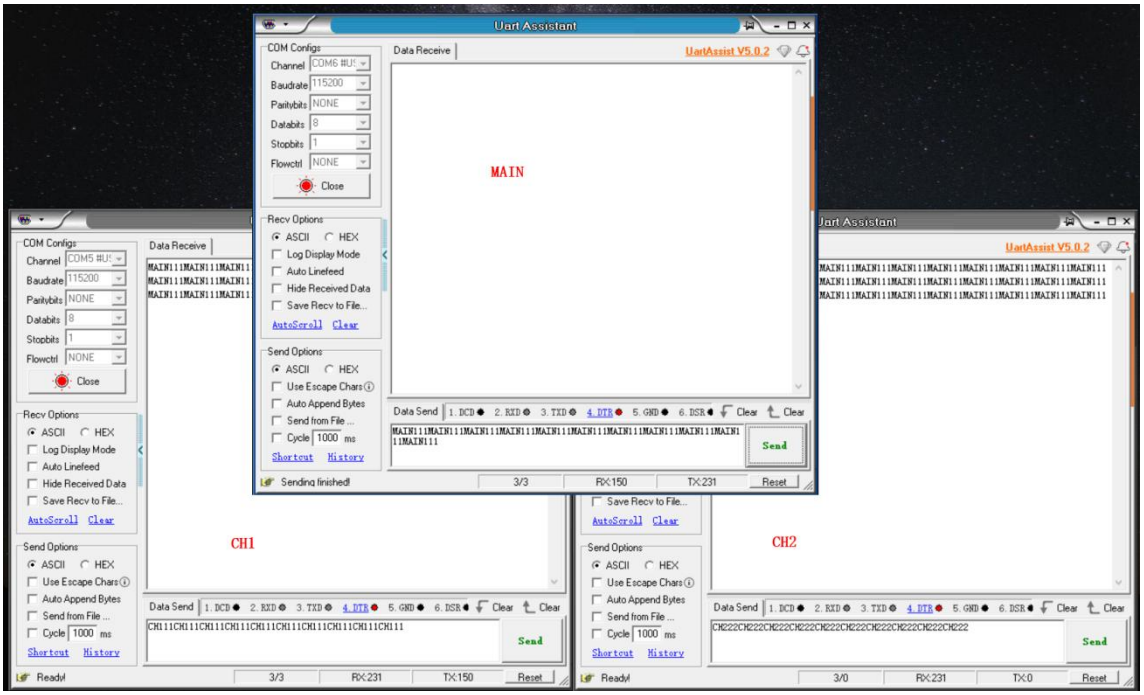
5. Connect the power supply;
6. Open the serial ports of the host and slave devices respectively.

2.2 Software preparation

This section only demonstrates two-way communication, using a serial port tool as an example.

1、The master sends data, and the two slave devices CH1/CH2 receive it respectively.

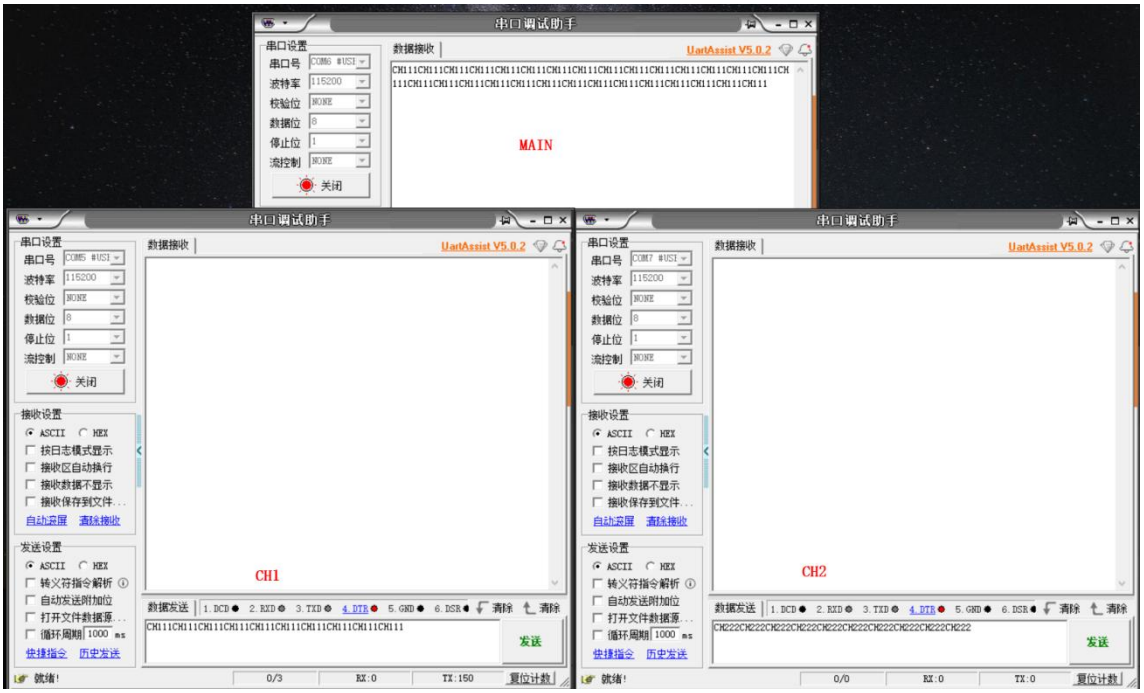




2、CH1 sends data, host receives.

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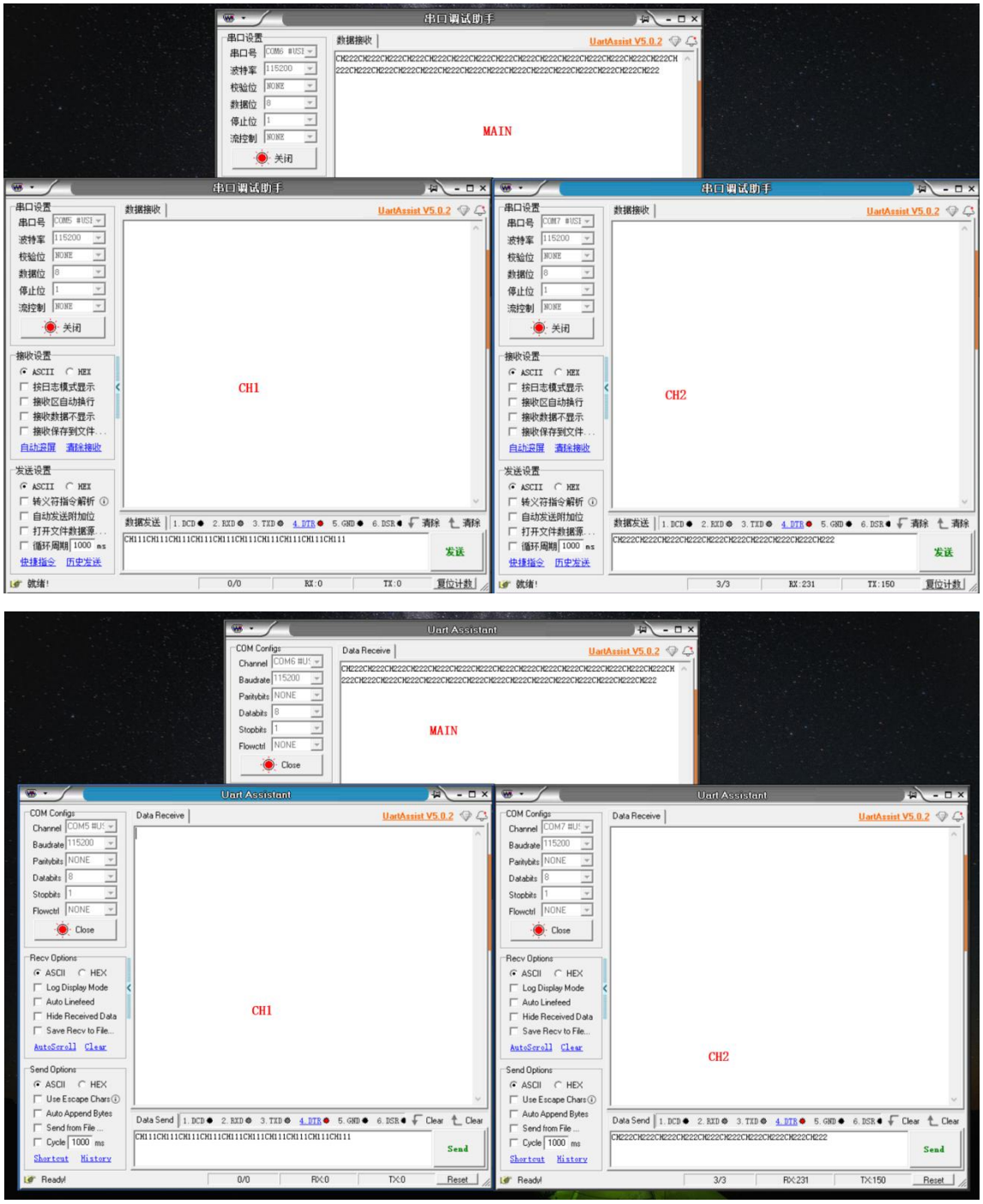
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3、CH2 sends data, host receives it.

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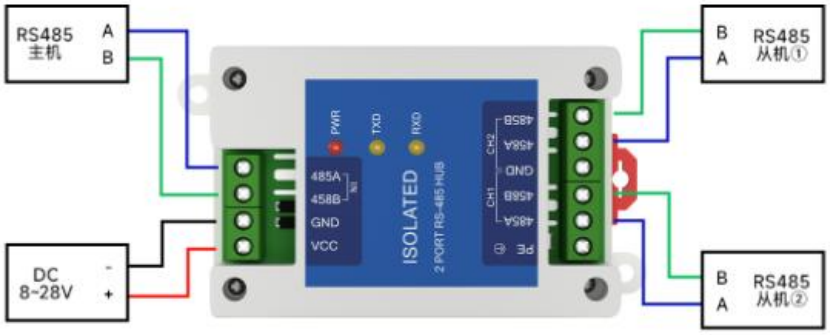


Note: The baud rates of both communicating parties must be consistent, and the slave device cannot send data to the master device simultaneously.

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Chapter 3 Connection diagram



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Chapter 4 Wiring Precautions

4.1 RS485 bus wiring specifications

1. Use the standard RS485 bus wiring method, commonly known as the daisy-chain connection method, and avoid the star connection method as much as possible.

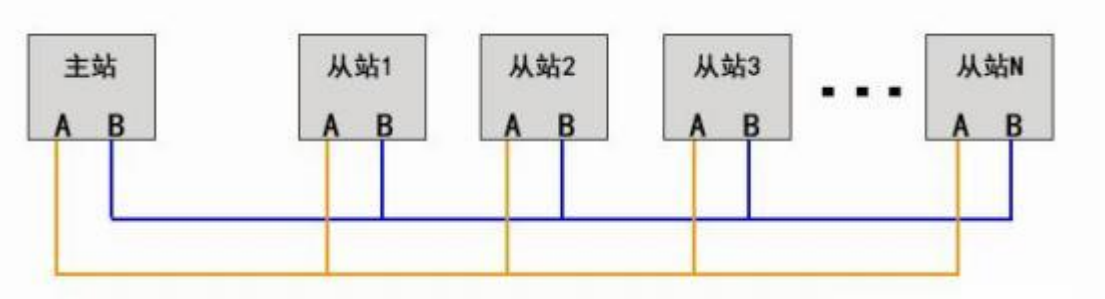
2. Use 2-core shielded twisted pair cable, with a bus length not exceeding 1200 meters, no more than 32 devices connected to the bus, and branch line lengths not exceeding 10 meters.

3. Communication lines should be kept as far away from interference sources as possible. Communication lines should be run through low-voltage wells and should not run parallel to high-voltage or radio frequency signal lines. If they must run parallel to each other, the distance should not exceed 0.5 meters.

4.2 RS485 wiring precautions

1. The maximum communication distance of the 485 communication standard is 1200 meters, but in actual applications, this distance is not reached. Moreover, the higher the baud rate, the shorter the communication distance. Generally, if the communication distance exceeds 500 meters, a 485 signal repeater needs to be added.

2. When there are many devices connected to the bus, in order to avoid signal reflection, a 120-ohm matching resistor should be connected in parallel between the communication ports A and B of the farthest device.



3The shield of the communication line should be connected to the ground wire, which is the earth, not the negative terminal of the power supply.

Wire Selection Recommendation Table

wiring distance	wire
Less than 200 meters	2*0.5mm² shielded twisted pair cable
200-500 meters	2*0.75mm two-core shielded twisted pair cable
Greater than 500 meters	2*1.0 Two-core shielded twisted pair cable

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Revision History

Version	Revision Date	Revision Notes	maintainer
1.0	2024-4-20	Initial version	LYL
1.1	2024-8-2	Correct pin definitions	LYL
1.2	2024-12-25	New Models	LYL
1.3	2025-06-27	Modify the dimension drawing	ZYD

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