USB TO RS232/485/422/TTL

From Waveshare Wiki
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Overview

USB TO RS232/485/422/TTL



(https://www.waveshare.com/usb-to-rs232-485-422-ttl.htm)

FT232RNL RS232 RS485 RS422 TTL
RS232, RS422, RS485

Introduction

USB TO RS232/485/422/TTL, an industrial-grade isolated converter, adopts the original FT232RNL, built-in protection circuits including power isolation, ADI magnetical isolation and TVS, and with aluminum alloy case design. USB TO RS232/485/422/TTL is easy to operate and features an automatic transmission and reception conversion with zero delays. Also, it features various advantages, such as fast communication speed, stability, reliability, and safety, and can be applied to various industrial control devices or applications with high communication requirements.

Feature

- Adopt original FT232RNL chip, fast communicating, stable and reliable, better compatibility.
- Supports multiple communication interface conversion: USB to RS232, USB to RS485, USB to RS422, USB to TTL.
- Onboard unibody power supply isolation, provides stable isolated voltage and needs no extra power supply for the isolated terminal.
- Onboard unibody digital isolation, allows signal isolation, high reliability, strong anti-interference, and low power consumption.
- Onboard TVS (Transient Voltage Suppressor), effectively suppresses surge voltage and transient spike voltage in the circuit, lightning proof & ESD protection.
- Onboard self-recovery fuse and protection diodes, ensure the current/voltage stable outputs, provides over-current/over-voltage proof, and improve shock resistance.
- Fully automatic transceiver circuit with no delay, ensures the USB port communicates with different interfaces fastly and stably, without interfering with each other.
- Onboard TTL serial 3.3V/5V voltage translator, config the TTL level via a switch.
- 3x LEDs for indicating the power and transceiver status.
- High-quality USB-B and RS232 connectors, smoothly plug/pull.

- Industrial grade metal case, supports wall-mount and rail-mount installations, solid and beautiful, easy to install.

Parameters

PRODUCT TYPE	Industrial Grade Digital Isolated Converter	
USB	Operating voltage	5V
	Connector	USB-B
	Protection	200mA self-recovery fuse, isolated output
RS232	Connector	DB9 male
	Protection	TVS diode, surge protection & ESD protection
	Transmission mode	Point-to-point
	Baud rate	300bps ~ 921600bps
RS485/422	Connector	Screw terminal
	Direction control	Hardware automatic control
	Protection	600W lightning-proof and surge-suppress, 15KV ESD protection (reserved two 120R balancing resistors, enabled/disabled via jumper)
	Transmission mode	Point-to-multipoints (485 mode: up to 32 nodes, it is recommended to use repeaters for 16 nodes or more; 422 mode: up to 256 nodes, it is recommended to use repeaters for 16 nodes or more)
	Baud rate	300bps ~ 2Mbps
TTL (UART)	Operating voltage	3.3V / 5V
	Connector	Screw terminal
	Pins	TXD, RXD, GND, 5V/3.3V
	Protection	Clamp protection diode, over-voltage/negative-voltage proof, shock resistance
	Transmission mode	Point-to-point
	Baud rate	300 bps ~ 2Mbps
INDICATORS	PWR	Red power indicator, light up when there is a USB connection and voltage is detected
	TXD	TX indicator, light up when the USB port sends data
	RXD	RX indicator, light up when the device ports send data back
OPERATING ENVIRONMENT	Temperature	-15 ~ 70℃
	Humidity	5% ~ 95%RH
OPERATING SYSTEM	Mac, Linux, Android, Windows 11 / 10 / 8.1 / 8 / 7	

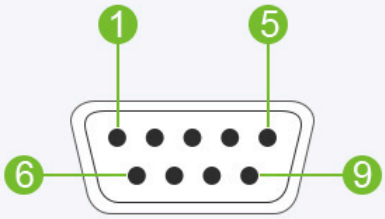
Interface Introduction



(/wiki/File:USB_TO_RS232_485_422_TTL03.JPG)



(/wiki/File:USB_TO_RS232_485_422_TTL04.JPG)



RS232 pinout

RS232 pinout	
DB9 Male (PIN)	Description
2	Receiving data (RXD)
3	Sending data (TXD)
5	Ground GND
1,4,6,7,8,9	N/C

(/wiki/File:USB_TO_RS232_485_422_TT06.JPG)

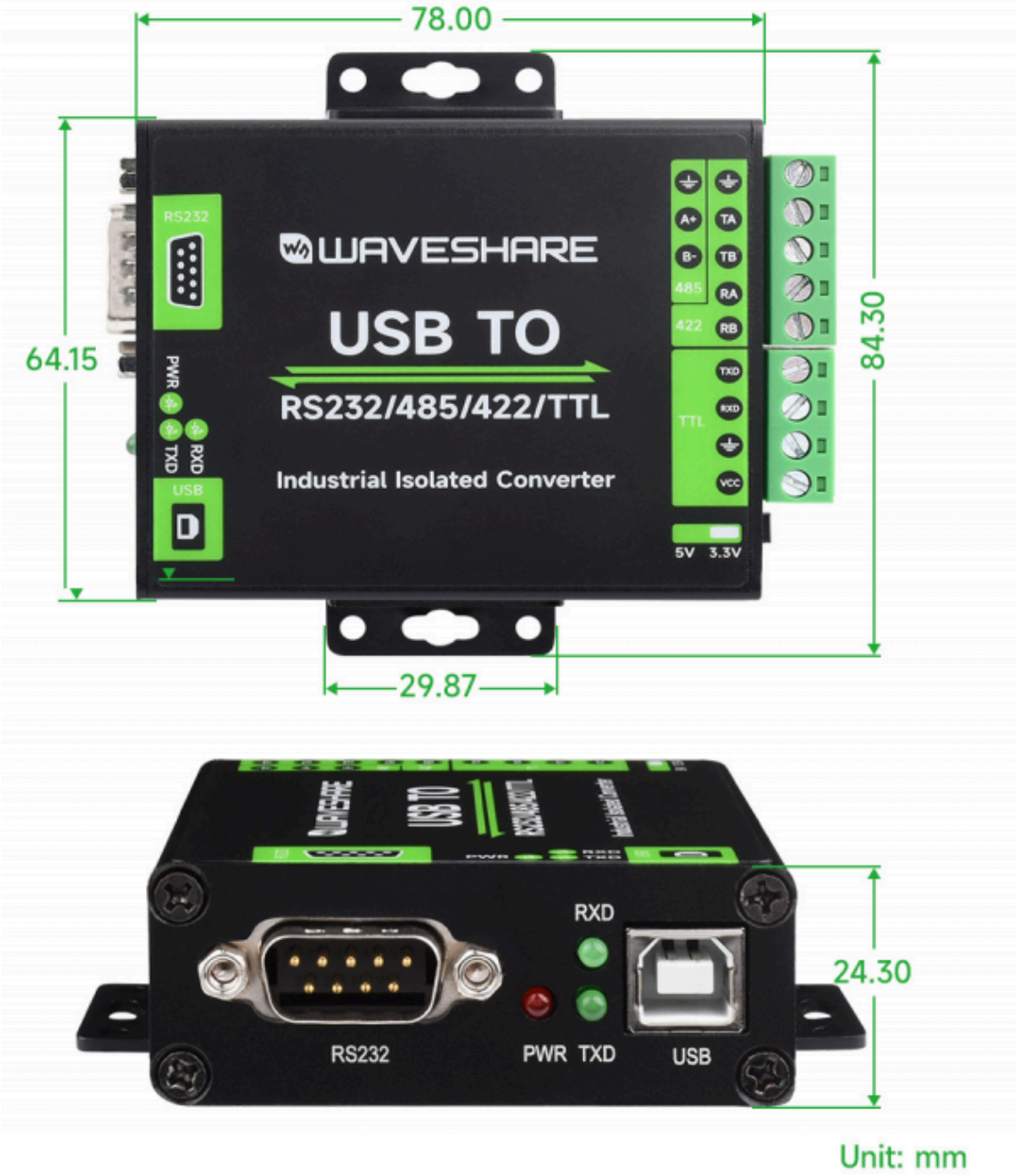


RS485/422 Pinout	
Screw Terminal (PIN)	Description
PE	485/422 signal ground
TA	RS422 send differential signal positive RS485 differential signal positive A+
TB	RS422 send differential signal negative RS485 differential signal negative B-
RA	RS422 receive differential signal positive
RB	RS422 receive differential signal negative

TTL (UART) Pinout	
Screw Terminal (PIN)	Description
TXD	TTL transmit data pin, connect to MCU.RXD
RXD	TTL receive data pin, connect to MCU.TXD

(/wiki/File:USB_TO_RS232_485_422_TTL05.JPG)

Dimensions


78.00
64.15
84.30
29.87
RS232
WAVESHARE
USB TO
RS232/485/422/TTL
Industrial Isolated Converter
PWR
TXD
RXD
USB
A+
B-
485
422
TA
TB
RA
RB
TTL
TXD
RXD
VCC
5V 3.3V
RXD
24.30
RS232
PWR TXD
USB
Unit: mm

(/wiki/File:USB_TO_RS232_485_422_TTL06.png)

Matching Resistor



(/wiki/File:USB_TO_RS232_485_422_TTL07.png)

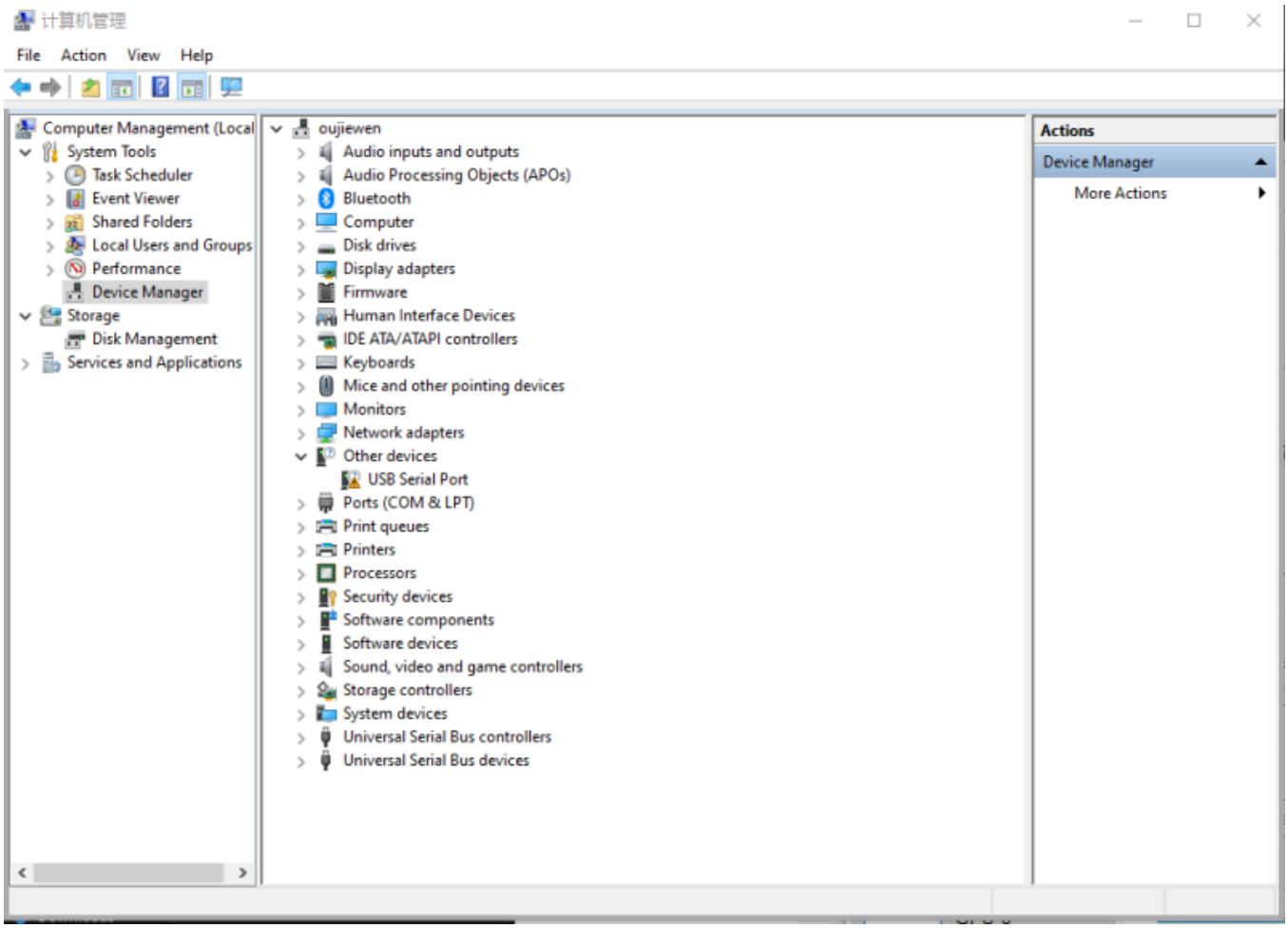
Note: The RS422 and RS485 interfaces of USB TO RS232/485/422/TTL also have a built-in 120R enable resistor, which is enabled by default, and the user can disassemble the case to modify the settings as needed.

Modification method: modify the yellow jumper cap at the red frame.

Software Installation

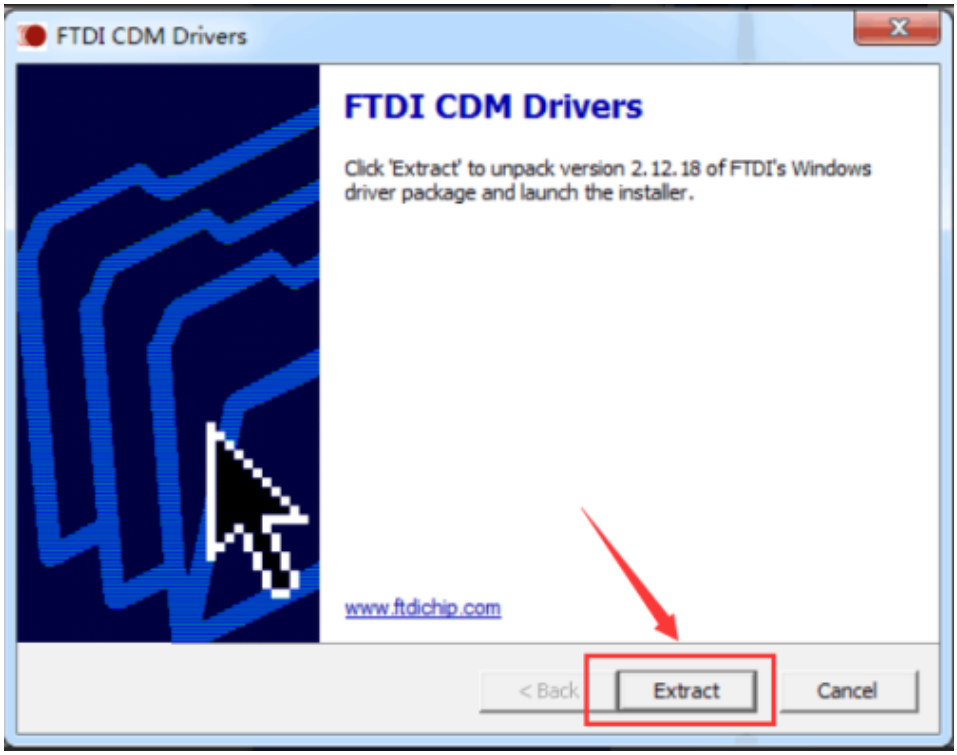
USB Driver Installation

- The first method: download the driver wizard from the Internet, and automatically detect and install the driver.
- The second method: manually install the driver (the following uses WIN7 installation as an example).
- Connect the device to the computer via a USB cable, and check the device manager, the serial port number has a yellow exclamation mark, indicating that the driver is not installed.



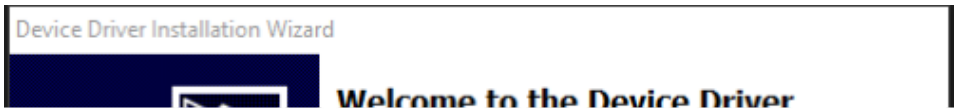
(/wiki/File:USB_TO_RS4852-2.png)

- You can download the software installation package on the official website WIKI.



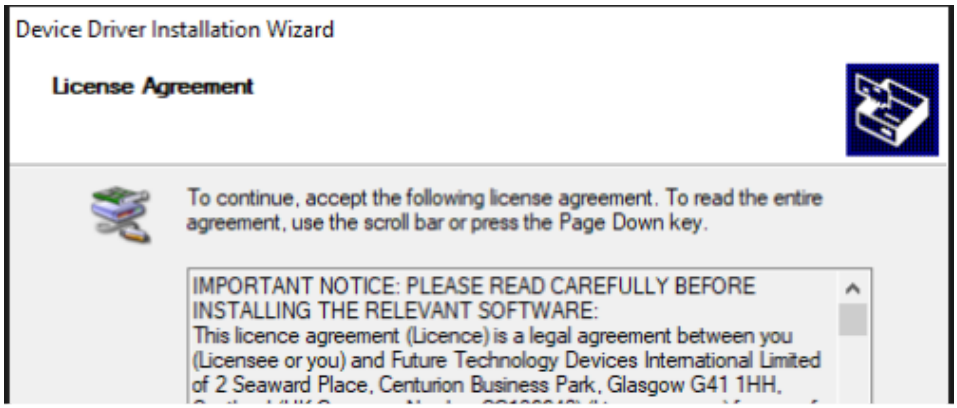
(/wiki/File:USB_TO_RS485-4.png)

- Click Extract:



(/wiki/File:USB_TO_RS4825-5.png)

- Click Next:



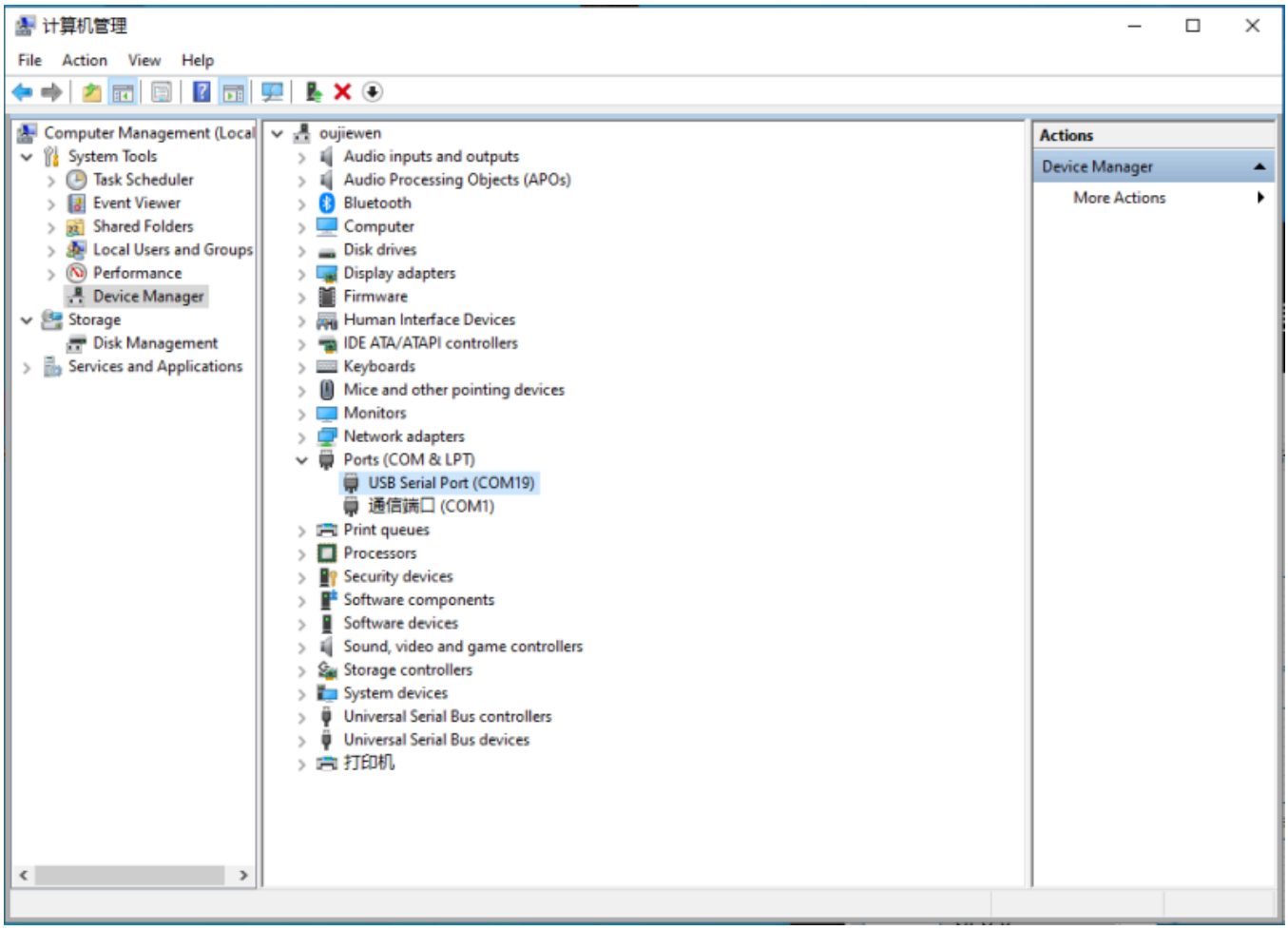
(/wiki/File:USB_TO_RS4852-6.png)

- Check I accept this agreement (A), and then click Next:



(/wiki/File:USB_TO_RS4852-8.png)

- Click Finish, and check the computer device manager at this time, you can see that the port number is already available for normal use.



(/wiki/File:USB_TO_RS4852-9.png)

Hardware Test

Test environment: PC (Windows operating system)

Accessories required for testing:

- USB TO RS232 485 422 TTL x2
- Several DuPont wires
- USB-A male to USB-B male cable

- DB9 female-to-female cable

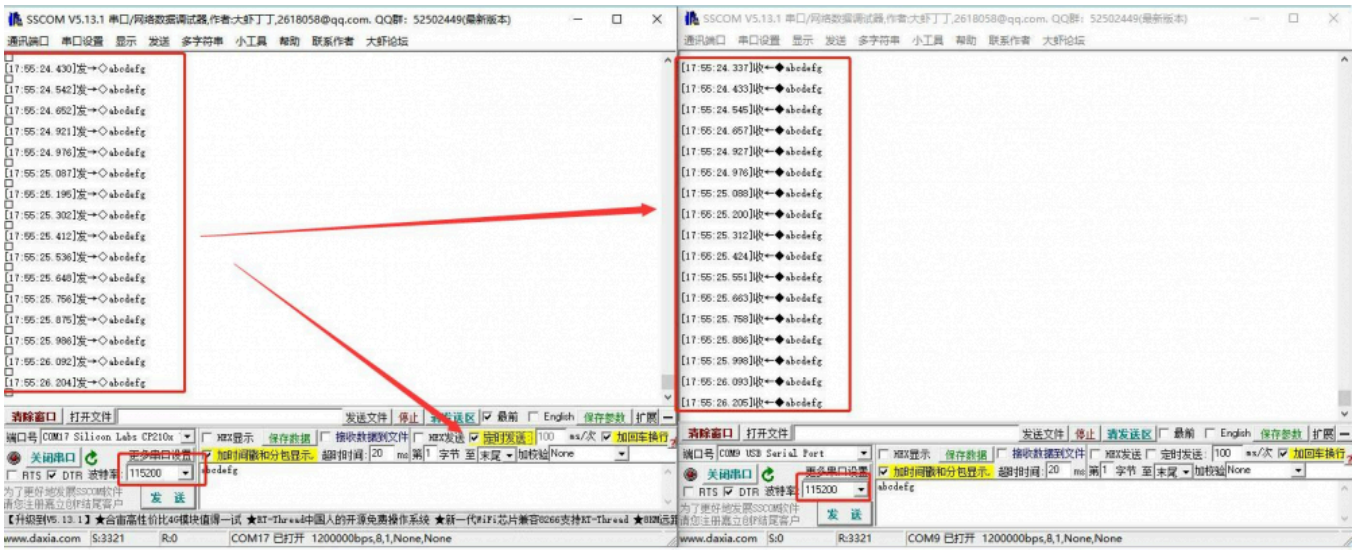
Test USB to RS485 communication

1. Connect the hardware as shown below:

(/wiki/File:USB_TO_RS232_485_422_TTL08.png)

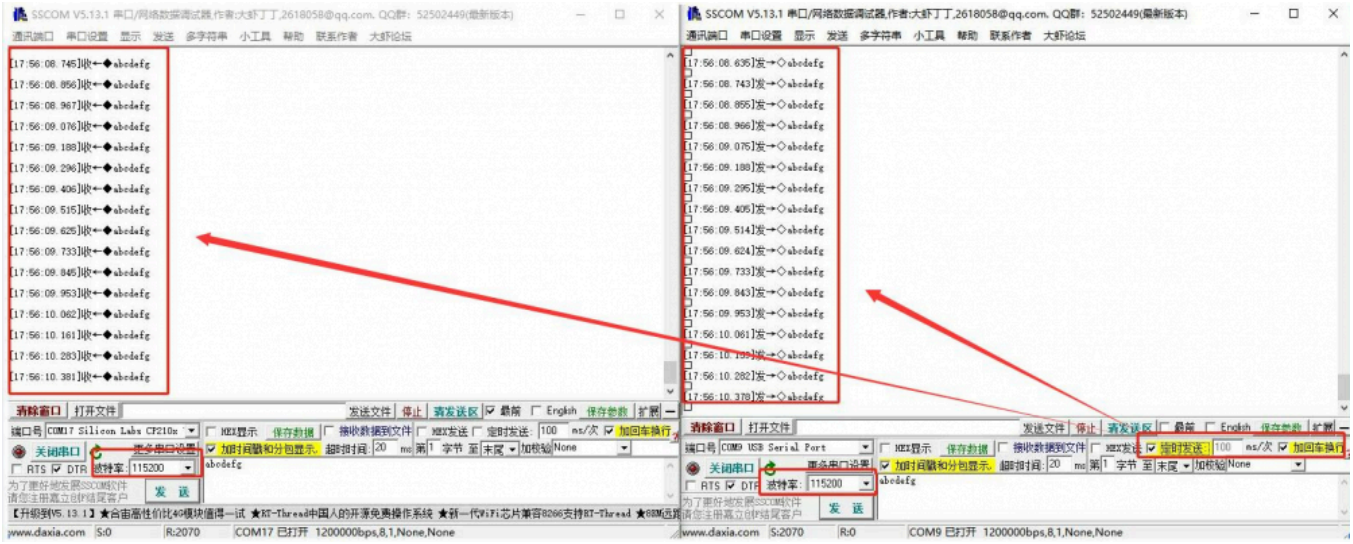
2. Open two sscom software windows, open the corresponding serial port number, set the baud rate to 115200bps, enter the box "abcdefg", then open the serial port to test sending and receiving: (the same method as the RS232 test).

First, check the scheduled sending on the left window, and the time can be set to 100ms/time to see if it is sent to the right window normally, there will be no packet loss or garbled characters, and if it is normal, turn off the scheduled sending, as shown in the figure below:



(/wiki/File:USB_TO_RS232_485_422_TTL09.png)

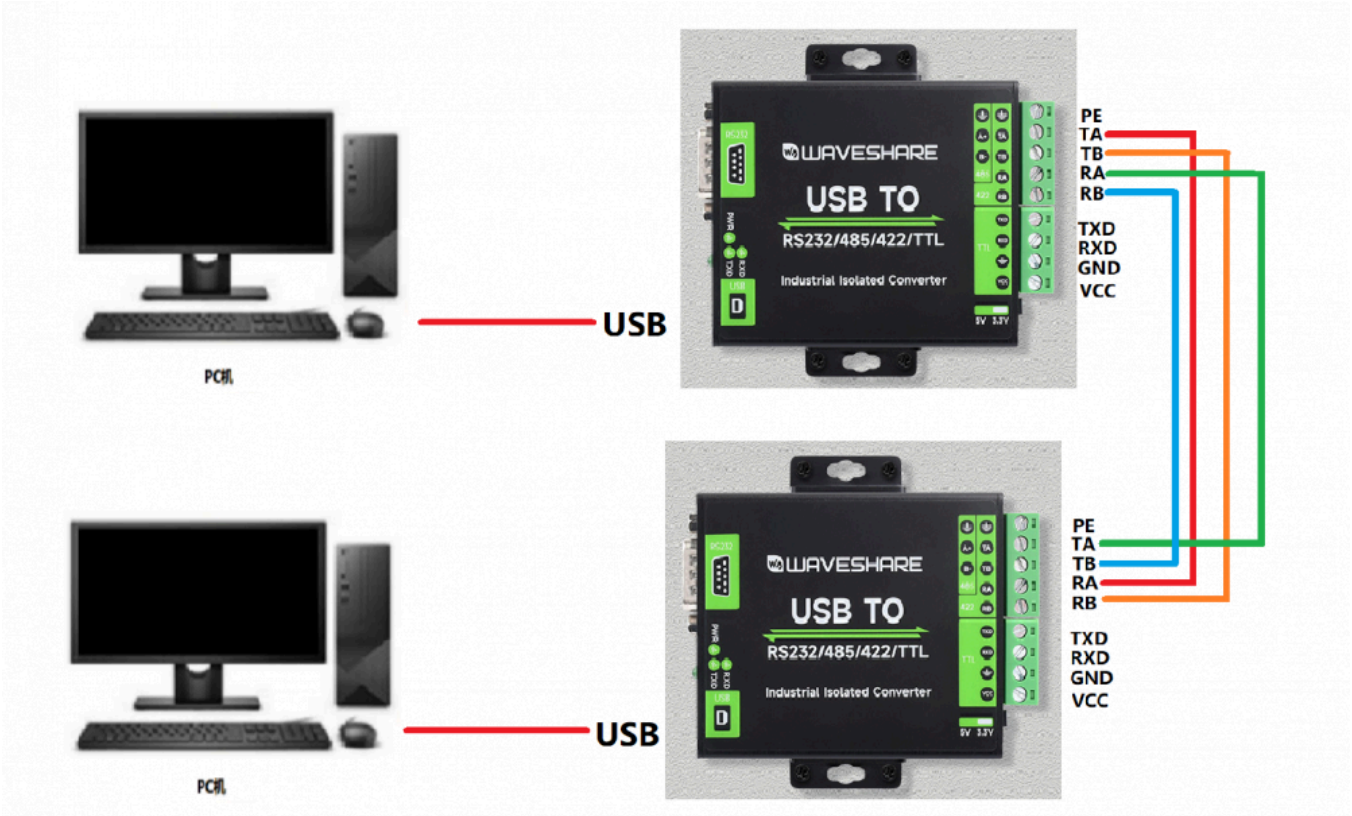
3. Then check the timing sending in the right window, and the time can be set to 100ms/time to see if it is sent to the left window normally, there will be no packet loss or garbled characters, and if it is normal, turn off timing sending, as shown in the figure below:



(/wiki/File:USB_TO_RS232_485_422_TTL10.png)

Test USB To RS422 Communication

1. Connect the hardware as shown below:



(/wiki/File:USB_TO_RS232_485_422_TTL11.png)

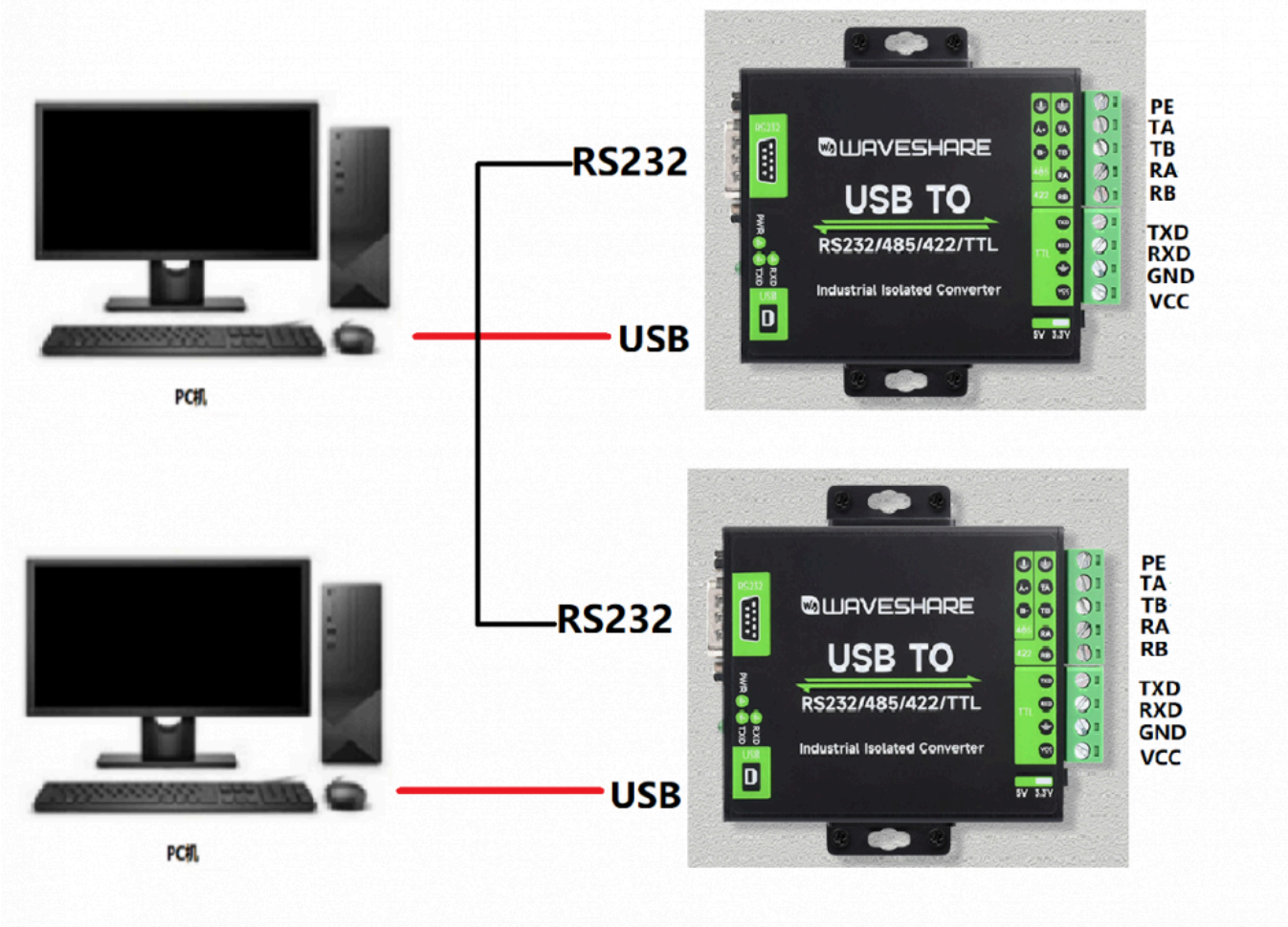
Note: The RS485 interface of this product also has a built-in 120R enabling resistor, which is turned on by default. Users can disassemble the case to modify the settings according to their needs. If signal isolation is required, PE can also be connected to the ground.

- Open two SSCOM windows on the computer, open the corresponding port number, set the same baud rate, and click "Send" at regular intervals to receive and send normally. The test results are shown in the figure below:

(/wiki/File:USB_TO_RS232_485_422_TTL12.png)

Test USB To RS232 Communication

1. Connect the hardware as shown below:

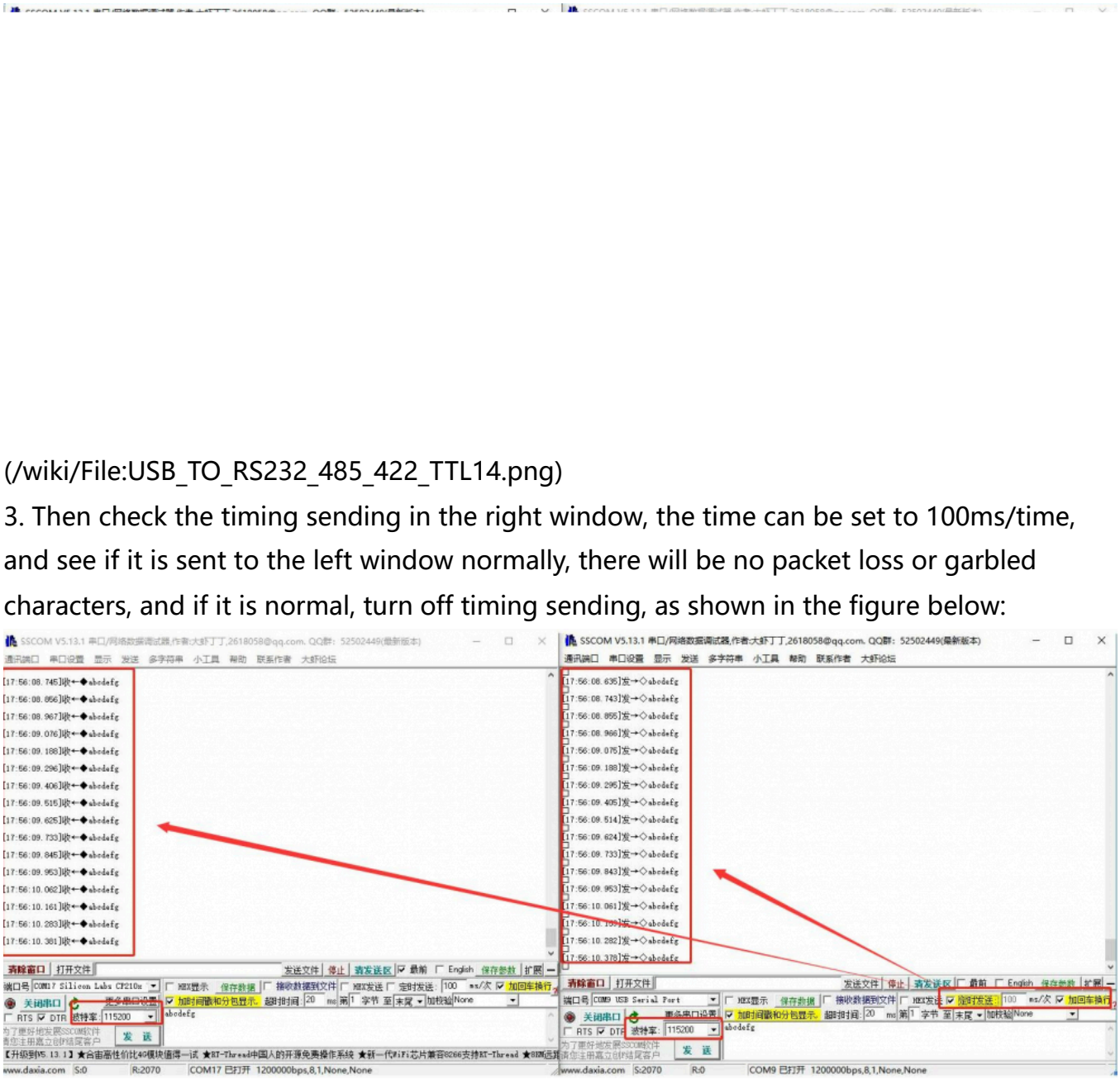


(/wiki/File:USB_TO_RS232_485_422_TTL13.png)

2. Open two sscom software windows, open the corresponding serial port number, set the baud rate to 115200bps, enter the box "abcdefg", and then open the serial port to perform the sending and receiving test:

First, check the scheduled sending on the left window, and the time can be set to 100ms/time to see if it is sent to the right window normally, there will be no packet loss or garbled characters, and if it is normal, turn off the scheduled sending, as shown in the figure

below:



(/wiki/File:USB_TO_RS232_485_422_TTL14.png)

3. Then check the timing sending in the right window, the time can be set to 100ms/time, and see if it is sent to the left window normally, there will be no packet loss or garbled characters, and if it is normal, turn off timing sending, as shown in the figure below:

(/wiki/File:USB_TO_RS232_485_422_TTL15.png)

Test USB To TTL Communication

1. Connect the hardware as shown in the figure below:

(/wiki/File:USB_TO_RS232_485_422_TTL20.png)

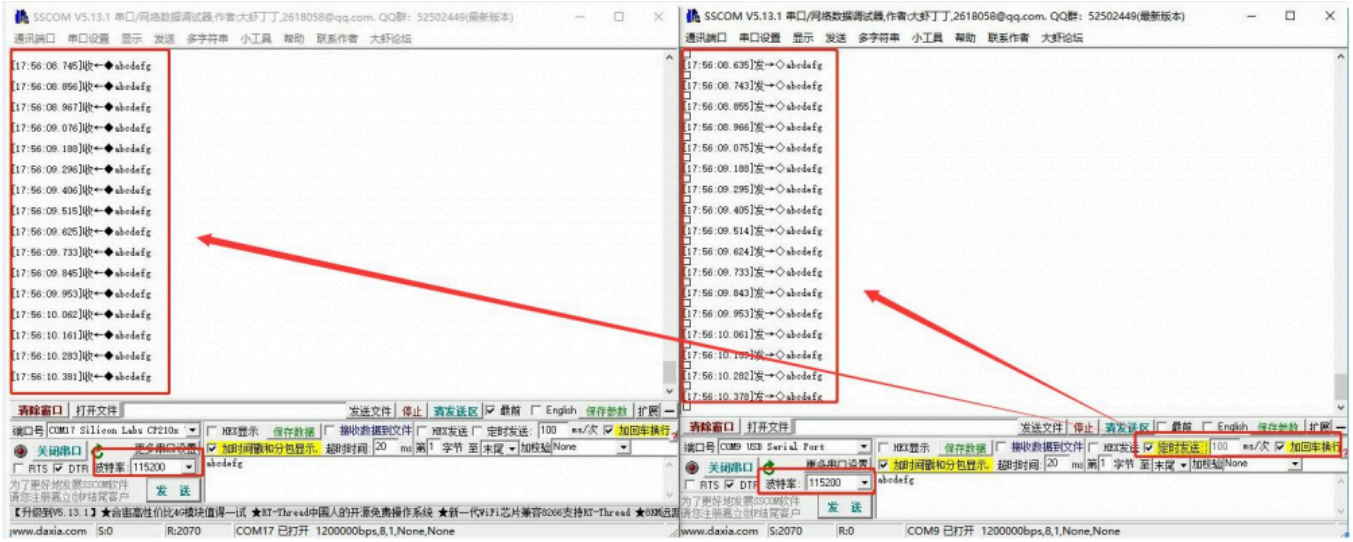
2. Open two sscom software windows, open the corresponding serial port number, set the baud rate to 115200bps, enter the box "abcdefg", then open the serial port, and perform the sending and receiving test: (the same method as the RS232 test.)

3. Check the scheduled sending on the left window first, and the time can be set to 100ms/time to see if it is sent to the right window normally, there will be no packet loss or garbled characters, and if it is normal, turn off the scheduled sending, as shown in the figure below:

(/wiki/File:USB_TO_RS232_485_422_TTL21.png)

4. Then check the timing sending on the right window, the time can be set to 100ms/time, and check whether it is sent to the left window normally, there will be no packet loss or

garbled characters, and if it is normal, turn off timing sending, as shown in the figure below:



(/wiki/File:USB_TO_RS232_485_422_TTL22.png)

Resource

Software

- VCP Driver (or download from FTDI official website (https://ftdichip.com/drivers/vcp-drivers/)):
  - FT232 Driver-Windows-32bit (https://files.waveshare.com/upload/2/2c/FT232_Driver_32.zip)
  - FT232 Driver-Windows-64bit (https://files.waveshare.com/upload/f/f3/FT232_Driver_64.zip)
  - MAC FT232 Driver-MAC-64bit (https://files.waveshare.com/upload/6/6e/MAC_FT232_Driver_D2XX1.4.24.7z)
- Sscom Windows (https://files.waveshare.com/upload/5/5f/Sscom.7z)
- Sscom Android (https://files.waveshare.com/upload/2/21/Sscom_Android.zip)
- Putty (https://files.waveshare.com/upload/5/56/Putty.zip)

Datasheet

- FT232R (https://files.waveshare.com/upload/b/b5/FT232R.pdf)
- SP481E SP485E (https://files.waveshare.com/upload/b/b3/SP481E_SP485E.pdf)

FAQ

Question: What should I do if there are issues with short-distance RS485 communication in which I'm receiving extra 0s or garbled data?

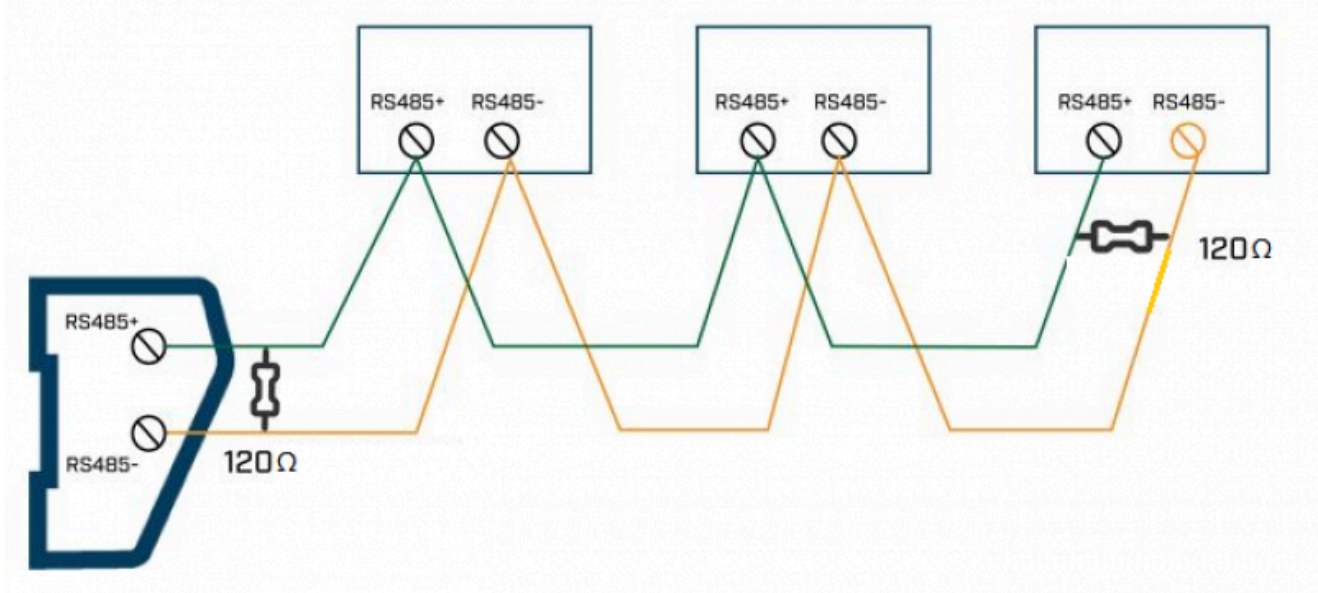
Answer:

- In general, the short-distance communication can be removed from RS422/RS485's two 120Ω terminal, and connect jumper caps to NC.



(/wiki/File:USB_TO_RS232_faq.png)

- When multiple devices connect to the RS485 serial bus over a long distance, in general, we add 120Ω matching resistors to the first and last devices on the RS485 bus.



(/wiki/File:USB_TO_RS232_faq2.png)

Question: How can I confirm that the module's functions are normal?

Answer:

RS232, RS422, and TTL are full-duplex communication, you can choose a loopback test to confirm the module function, the following RS422 as an example test:

(/wiki/File:USB_TO_RS232_faq3.png)



(/wiki/File:USB_TO_RS232_faq4.png)

Question: What interface conversion is supported?

Answer:

- Support USB to RS232, RS485, RS422 or TTL;
- Does not support RS232, RS485, TTL RS422 to USB at the same time.
- RS232, RS485, RS422 and TTL can not be inter-converted.

Question: What is the (max) power consumption?

Answer:



(/wiki/File:USB_TO_RS232-23996.png)

Support

Technical Support

If you need technical support or have any feedback/review, please click the **Submit Now** button to submit a ticket, Our support team will check and reply to you within 1 to 2 working days. Please be patient as we make every effort to help you to resolve the issue.
Working Time: 9 AM - 6 PM GMT+8 (Monday to Friday)

Submit Now (https://service.waveshare.com/)

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