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WAVESHARE FT232RNL USB TTL Interface Converter

WAVESHARE FT232RNL USB TTL Interface Converter User Guide

Contents

WAVESHARE FT232RNL USB TTL Interface Converter

Product Information

Specifications

- **Product Type:** Industrial-grade digital isolated converter
- **USB:** Operating voltage Connector 5V USB-B
- **RS232:** Connector DB9 male, Baud rate 300bps ~ 3Mbps
- **RS485/422:** Point-to-multipoints, Baud rate 300bps ~ 3Mbps
- **TTL (UART):** Transmission Point-to-point mode, Baud rate 300 bps ~ 3Mbps
- **Operating Environment:** Temperature -15 ~ 70, Humidity 5% ~ 95%RH
- **Operating System:** Mac, Linux, Android, Windows 11/10/8.1/8/7

Product Usage Instructions

Interface Introduction
The USB TO RS232/485/422/TTL converter comes with the following interfaces:

- **USB:** Connect to your computer using the USB-B connector.
- **RS232:** Use the DB9 male connector for RS232 communication.
- **RS485/422:** Utilize the screw terminal for RS485/422 communication.
- **TTL (UART):** Connect to TTL devices using the pins provided.

Software Installation
To install the USB driver for the converter:

1. Download the driver wizard from the official website or WIKI.
2. Run the driver wizard and follow the on-screen instructions to install the driver.

Hardware Test

Test environment: PC with Windows OS. Connect the converter to the computer and check the device manager for proper installation.

FAQ

- **How do I modify the settings for the RS422 and RS485 interfaces?**

  To modify the settings, disassemble the case and locate the yellow jumper cap at the red frame. You can enable/disable the built-in 120R resistor as needed.

- **What operating systems are compatible with the USB TO RS232/485/422/TTL converter?**

  The converter is compatible with Mac, Linux, Android, and Windows operating systems including Windows 11/10/8.1/8/7.

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 shell design. USB TO RS232/485/422/TTL is easy to operate and features an automatic transmission and reception conversion with zero delays. Also, it has the characteristics of fast communication speed, stability, reliability, safety, etc., and can be applied to various industrial control devices or applications with high communication requirements.

USB TO RS232/485/422/TTL

- FT232RNL RS232 RS485 RS422 TTL RS232, RS422, RS485

Feature

- Adopt the original FT232RNL chip, fast, stable, and reliable, with 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 antiinterference, 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, provide over-current/over-voltage proof, and improve shock resistance.
- A 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 ~ 3Mbps
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 ~ 3Mbps
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 ~ 3Mbps
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°C
	Humidity	5% ~ 95%RH
OPERATING SYSTEM		Mac, Linux, Android, Windows 11 / 10 / 8.1 / 8 / 7

Interface Introduction

RS232 Port

Indicators

USB & Power Supply

RS485/RS422
Screw Terminal

TTL Level Selection

TTL (UART) Screw Terminal

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
GND	Connect to GND
VCC	5V / 3.3V power supply output, configurable via 5V/3.3V level switch
5V/3.3V level switch	TTL level selection

Dimensions

Matching Resistor

- **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.
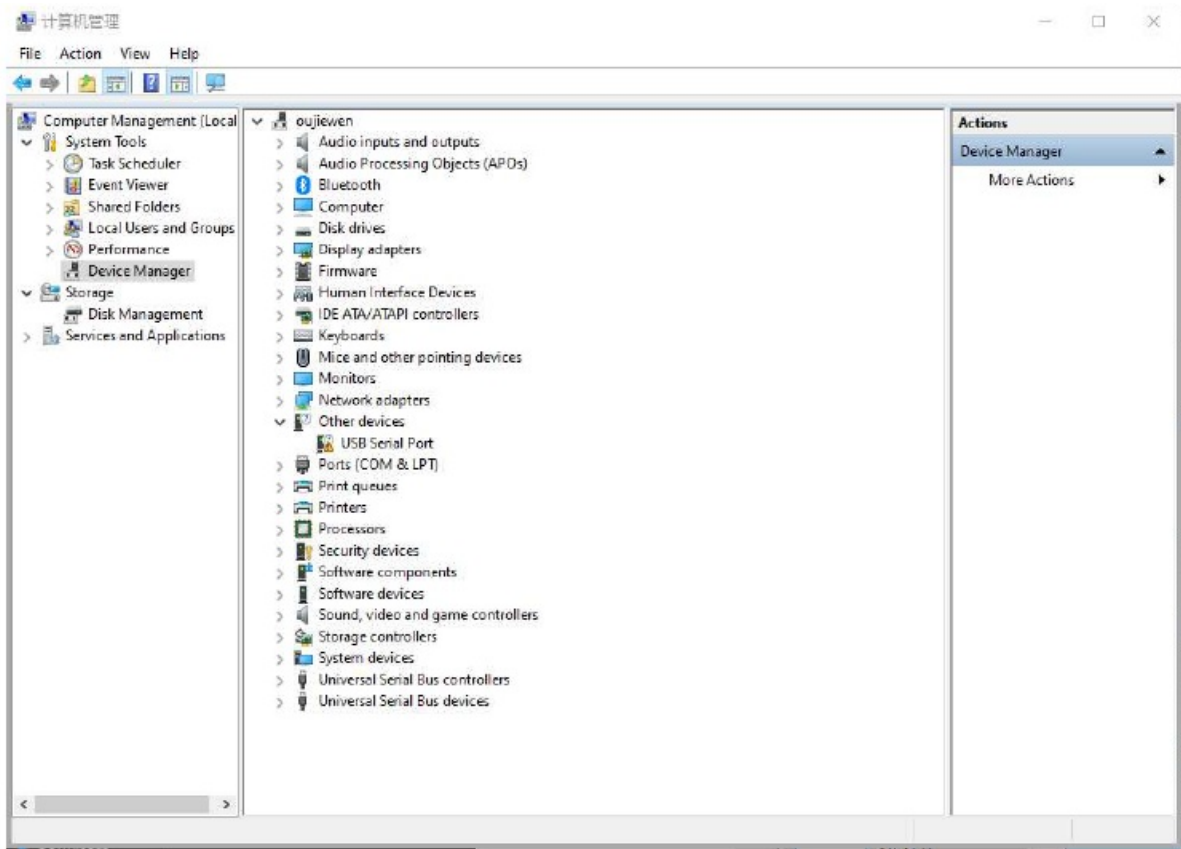
- You can download the software installation package on the official website WIKI.
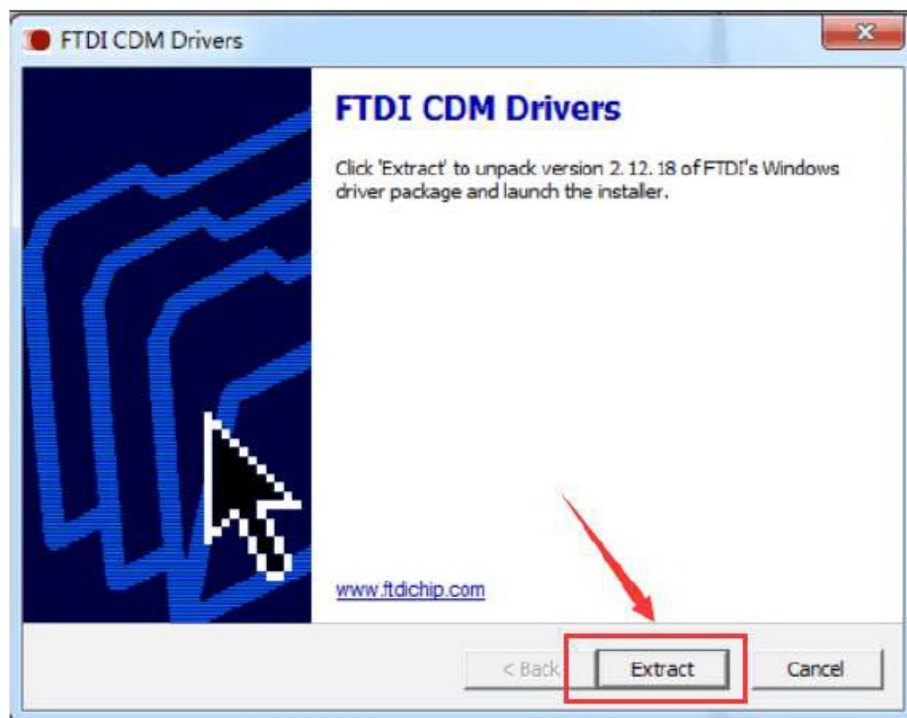
- Click Extract:
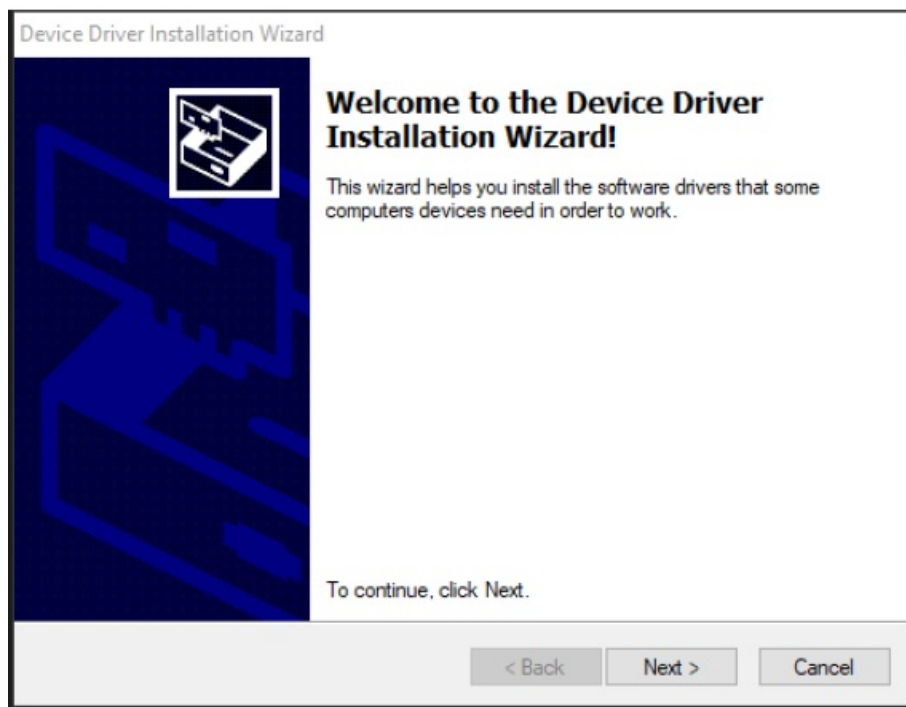
- Click Next:
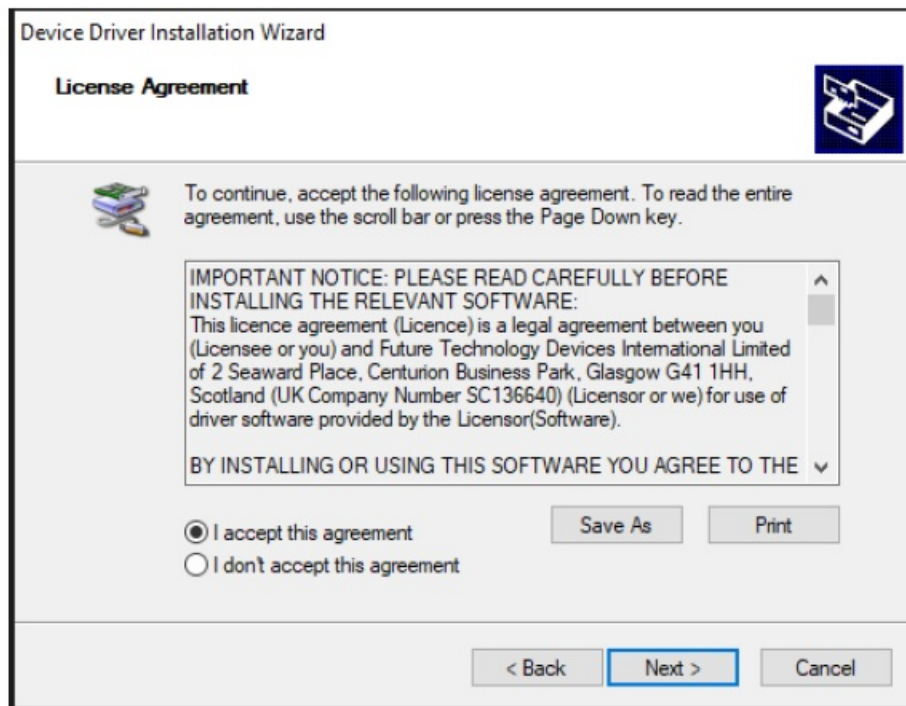
- Check I accept this agreement (A), and then click Next:
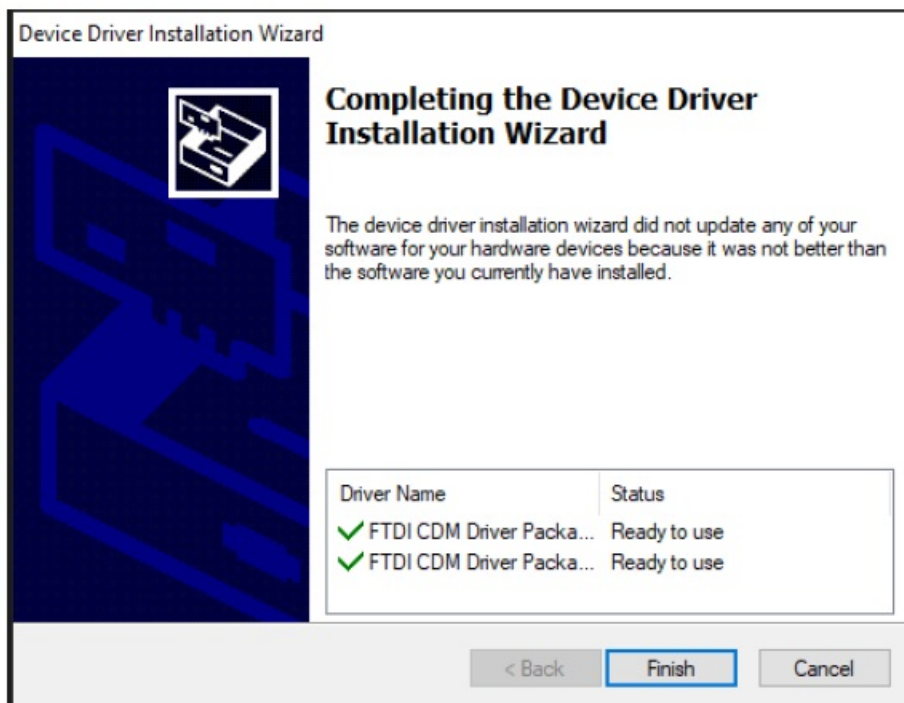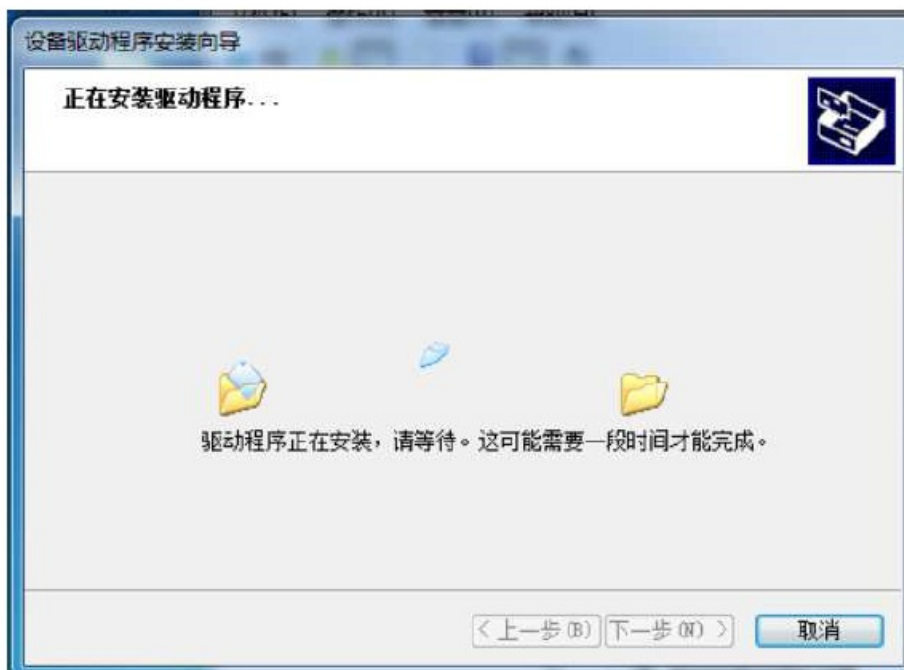
- Click Finish, and check the computer device manager at this time, you can see that the port number is already available for normal use.
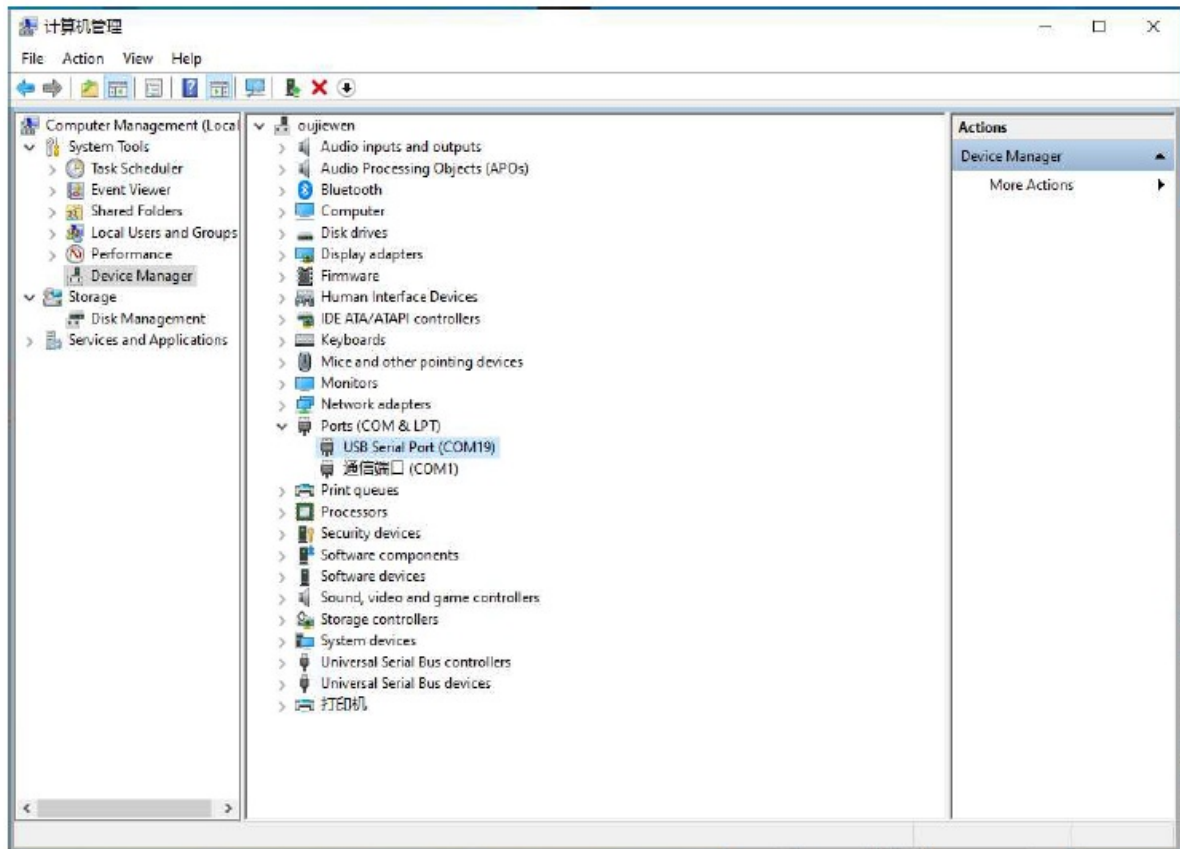
Hardware Test

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
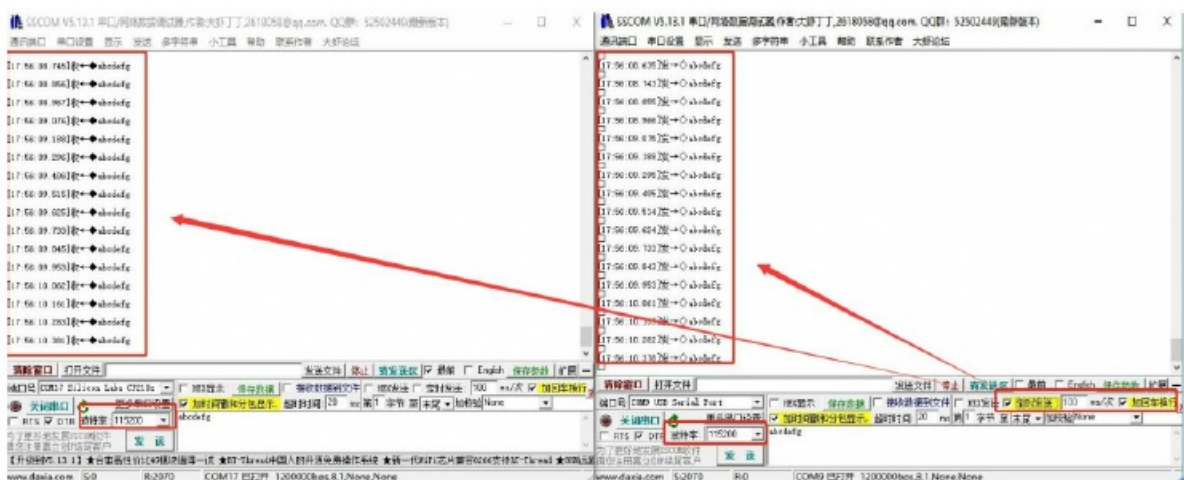- DB9 female-to-female cable

Test USB to RS485 communication

1. Connect the hardware as shown below:
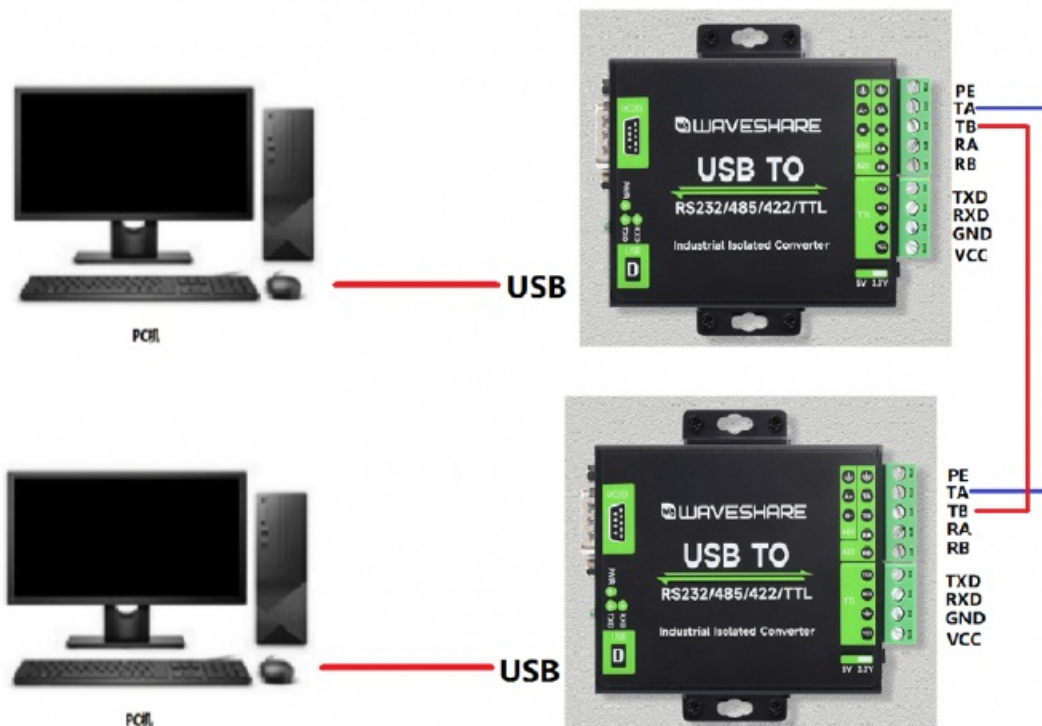
2. Open two sscom software windows, open the corresponding serial port number, set the baud rate to 115200bps, enter the box "abcdefg", then open the serial port to test sending and receiving: (the same method as the RS232 test). First, check the scheduled sending on the left window, and the time can 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:
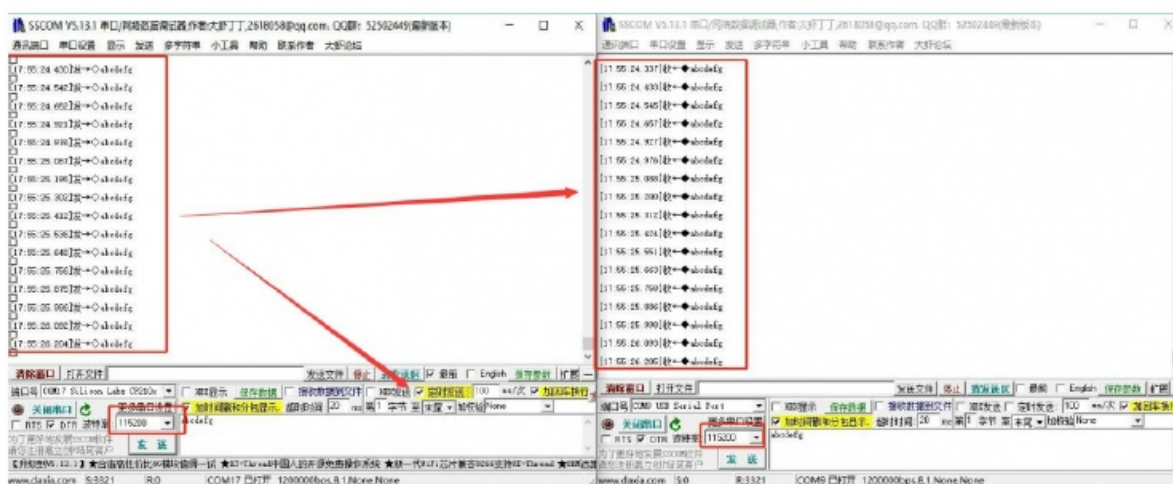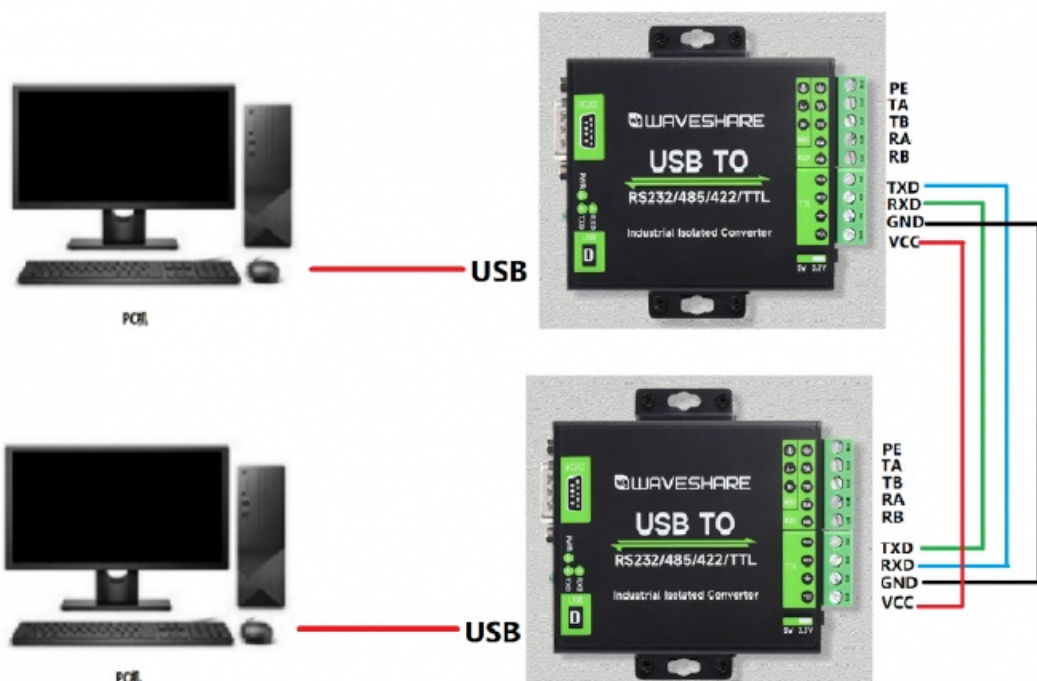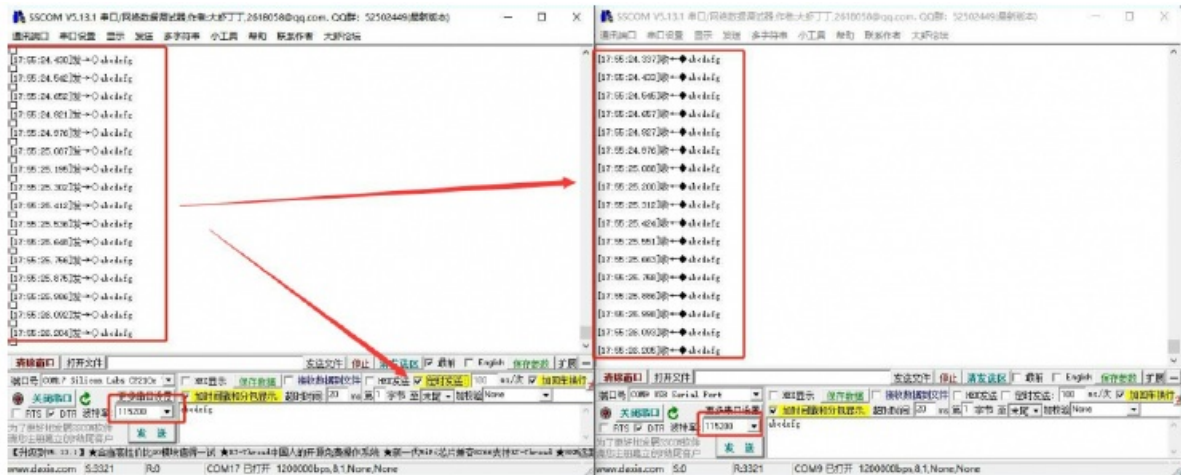

3. Then check the timing sending in the right window, and the time can be set to 100ms/time to see if it is sent to the left window normally, there will be no packet loss or garbled characters, and if it is normal, turn off timing sending, as shown in the figure below:
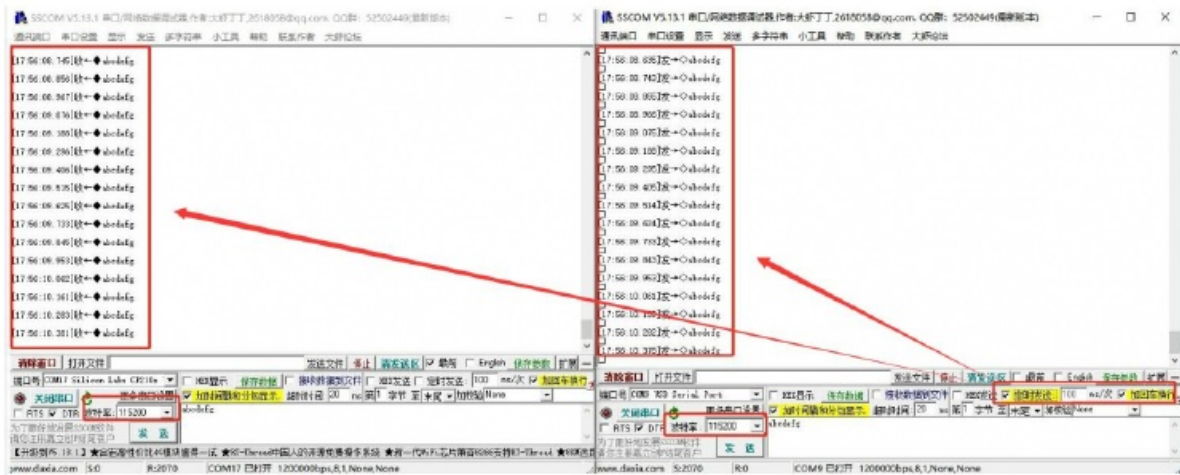
Test USB To RS422 Communication

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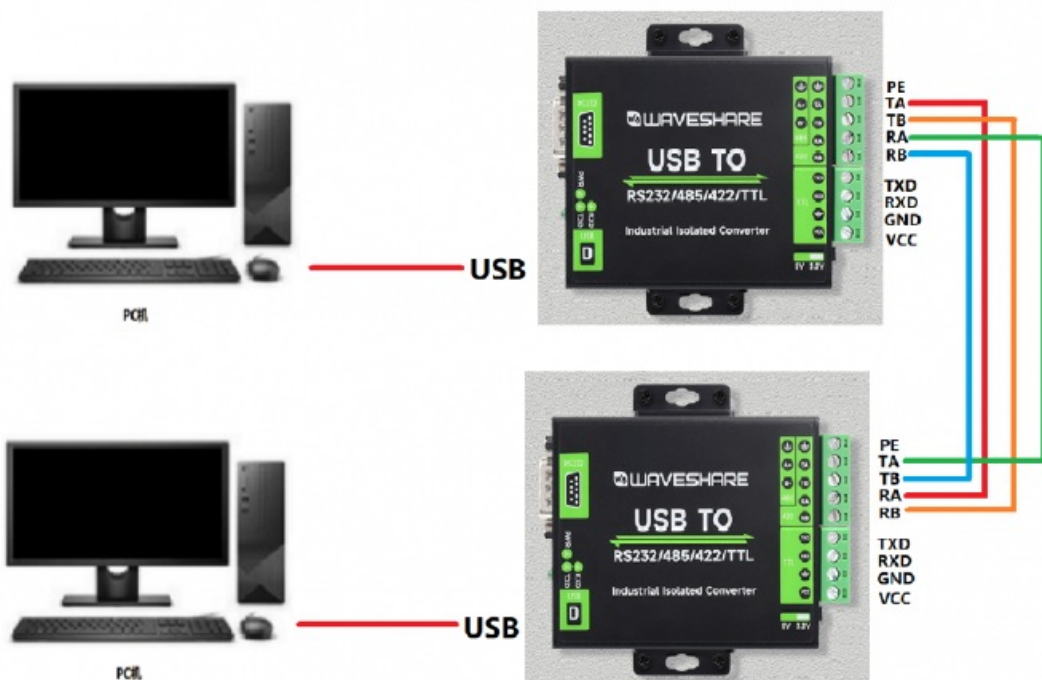
Note:
The RS485 interface of this product also has a built-in 120R enabling resistor, which is turned on by default. Users can disassemble the case to modify the settings according to their needs. If signal isolation is required, PE can also be connected to the ground.

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:
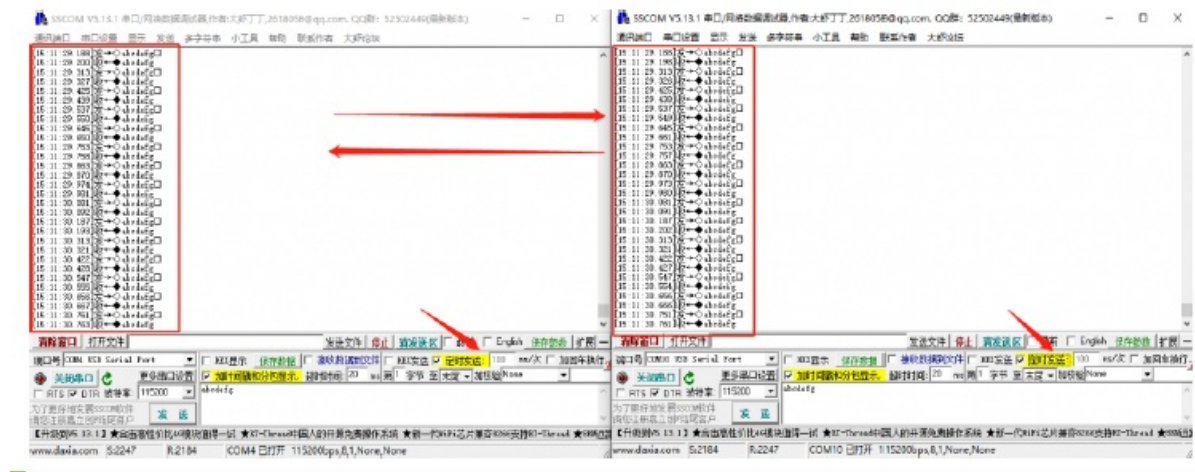
Test USB To RS232 Communication

1. Connect the hardware as shown below:
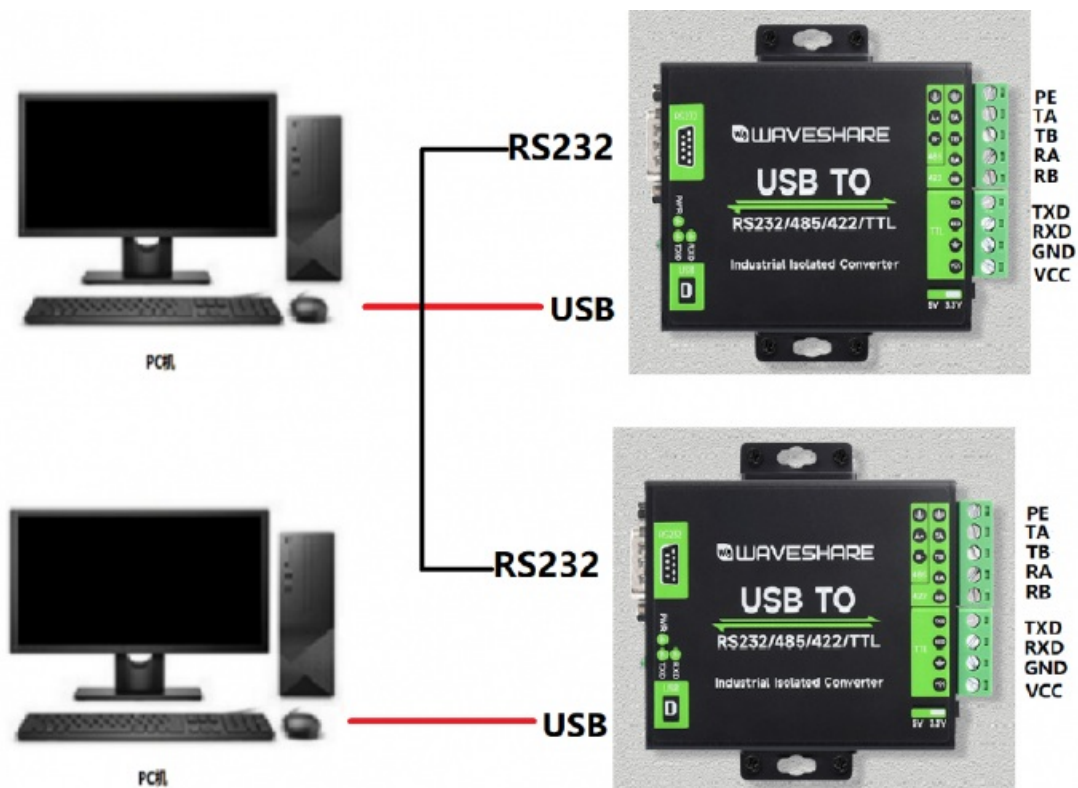
2. Open two sscom software windows, open the corresponding serial port number, set the baud rate to 115200bps, enter the box "abcdefg", and then open the serial port to perform the sending and receiving test: First, check the scheduled sending on the left window, and the time can be set to 100ms/time 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:
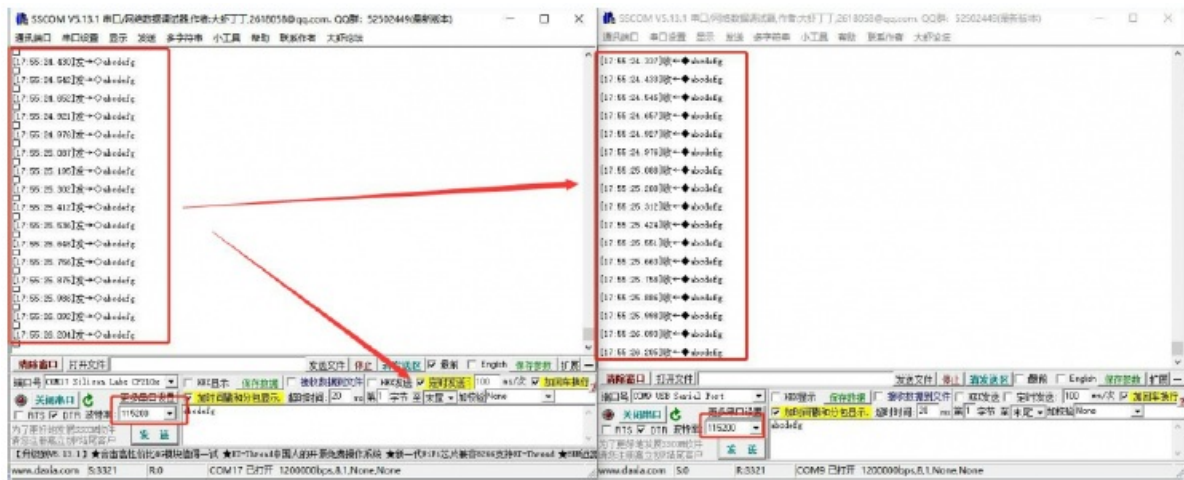
3. Then check the timing sending in the right window, the time can be set to 100ms/time, and see if it is sent to the left window normally, there will be no packet loss or garbled characters, and if it is normal, turn off timing sending, as shown in the figure below:

Test USB To TTL Communication

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

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:

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:
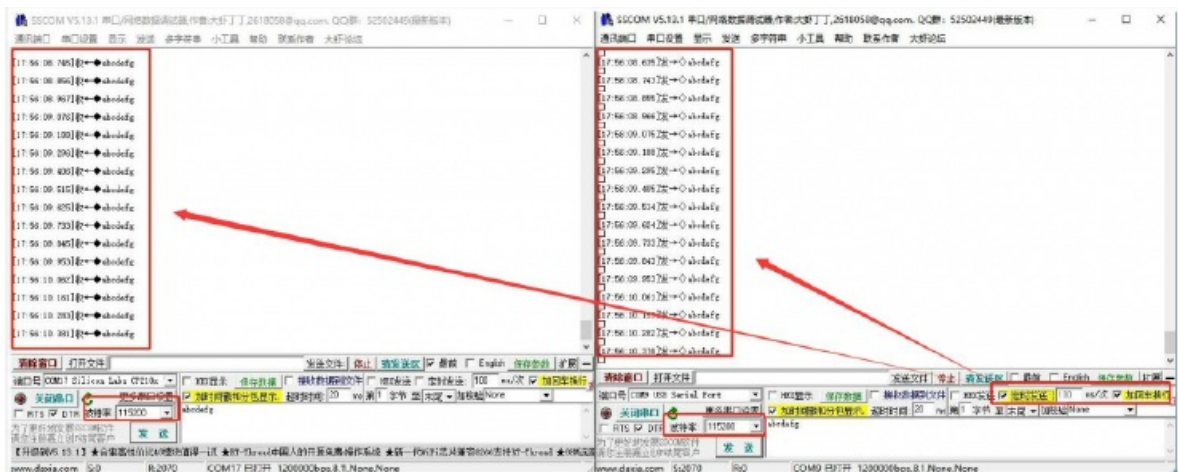
Resource

Software

- VCP Driver (or download from **FTDI official website**):
    - **FT232 Driver-Windows-32bit**
    - **FT232 Driver-Windows-64bit**
    - **MAC FT232 Driver-MAC-64bit**
- **Sscom Windows**
- **Sscom Android**
- **Putty.zip**

Datasheet

- **FT232R.pdf**
- **SP481E SP485E.pdf**

Support

If you require technical support, please go to the page and open a ticket.

Documents / **Resources**

References

- 🔴 **VCP Drivers - FTDI**
- 🌐 **File:USB TO RS232 422 TTl.jpg - Waveshare Wiki**
- 🌐 **File:USB TO RS232 485 422 TTL03.JPG - Waveshare Wiki**
- 🌐 **File:USB TO RS232 485 422 TTL04.JPG - Waveshare Wiki**
- 🌐 **File:USB TO RS232 485 422 TTL05.JPG - Waveshare Wiki**
- 🌐 **File:USB TO RS232 485 422 TTL06.png - Waveshare Wiki**
- 🌐 **File:USB TO RS232 485 422 TTL07.png - Waveshare Wiki**

- [File:USB TO RS232 485 422 TTL08.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL09.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL10.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL11.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL12.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL13.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL14.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL15.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL20.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL21.png - Waveshare Wiki](#)
- [File:USB TO RS232 485 422 TTL22.png - Waveshare Wiki](#)
- [File:USB TO RS4825-5.png - Waveshare Wiki](#)
- [File:USB TO RS485-4.png - Waveshare Wiki](#)
- [File:USB TO RS485-7.png - Waveshare Wiki](#)
- [File:USB TO RS4852-2.png - Waveshare Wiki](#)
- [File:USB TO RS4852-6.png - Waveshare Wiki](#)
- [File:USB TO RS4852-8.png - Waveshare Wiki](#)
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