waveshare WAV_17286

waveshare USB to RS232/485 Serial Converter Adapter User Manual

Model: WAV_17286

1. Introduction

This manual provides instructions for the waveshare USB to RS232/485 Serial Converter Adapter. This non-isolated converter facilitates communication between a USB host and RS232 or RS485 devices. It integrates an original FT232RNL chip for enhanced stability and compatibility, along with built-in protection features such as a self-recovering fuse and TVS protection circuit. The device is designed for reliable and safe data transmission.

2. Key Features

- **Original FT232RNL Chip:** Ensures stable and compatible serial communication.
- **Integrated Protection:** Features a built-in self-recovering fuse and TVS (Transient Voltage Suppressor) protection circuit for surge and anti-electrostatic capabilities.
- **RS232/RS485 Communication Switching:** Easily switch between RS232 and RS485 modes via an onboard switch.
- **120Ω Terminal Resistor:** Onboard 120Ω balancing resistor for the RS485 interface, configurable via a switch.
- **LED Indicators:** Three LEDs (PWR, TXD, RXD) provide visual status for power and data transmission/reception.
- **Multi-OS Compatibility:** Supports Mac, Linux, Android, and Windows (11/10/8.1/8/7) operating systems.
- **Compact Design:** Housed in an ABS protection case, offering portability and ease of use.

Figure 2.1: Overview of the converter's key features, including the FT232RNL chip, TVS protection, and multi-OS compatibility.

3. Package Contents

Verify that all items listed below are included in your package:

- USB TO RS232/485 Converter x1
- USB-A male to female cable x1
- Screwdriver x1

Figure 3.1: Contents of the product package.

4. Product Overview and Interface

The waveshare USB to RS232/485 Serial Converter Adapter features clearly labeled components for easy identification and use.

① 120Ω resistor switch	enable or disable RS485 terminal 120Ω resistor
② RS232/485 switch	for switching RS232 for RS485 communication
③ RX_ B:	RS232 receive data / RS485 differential signal negative B-
④ TX_ A:	RS232 transmit data / RS485 differential signal positive A+
⑤ GND:	RS232/485 signal ground

Figure 4.1: Labeled diagram of the USB to RS232/485 converter.

1. **120Ω Resistor Switch:** Used to enable or disable the RS485 terminal 120Ω resistor.
2. **RS232/485 Switch:** Toggles between RS232 and RS485 communication modes.
3. **RX_B:** RS232 receive data / RS485 differential signal negative B-.
4. **TX_A:** RS232 transmit data / RS485 differential signal positive A+.
5. **GND:** RS232/RS485 signal ground.

The device also includes LED indicators:

- **PWR (Red):** Lights up when USB connection is established and voltage is detected.
- **TXD (Green):** Lights up when the USB port sends data.
- **RXD (Blue):** Lights up when the device port receives data.

5. Specifications

Category	Parameter	Value
Product Type	Converter Type	USB To RS232 or USB To RS485
	Host Port	USB
	Device Port	RS232/RS485
USB Interface	Operating Voltage	5V
	Connector	Type-A male

Category	Parameter	Value
	Protection	200mA self-recovery fuse
	Transmission Distance	About 5m
RS232 Interface	Connector	Screw terminal
	Transmission Distance	About 15m
	Transmission Mode	Point-to-point
	Baud Rate	300bps ~ 921600bps
RS485 Interface	Connector	Screw terminal
	Direction Control	Hardware automatic control
	Protection	TVS diode, surge protection & ESD protection (onboard 120R balancing resistor)
	Transmission Distance	About 1.2km (low rate)
	Transmission Mode	Point-to-multipoints (up to 32 nodes, repeaters recommended for 16+ nodes)
	Baud Rate	300bps ~ 921600bps
Operating Environment	Temperature	-15℃ ~ 70℃
	Humidity	5%RH ~ 95%RH
Operating System	Compatibility	Mac, Linux, Android, Windows 11 / 10 / 8.1 / 8 / 7

Specifications		
PRODUCT TYPE	USB to RS232/485 converter	
HOST PORT	USB	
DEVICE PORT	RS232/485	
USB	Operating voltage	5V
	Connector	Type-A male
	Protection	200mA self-recovery fuse
	Transmission distance	About 5m
RS232	Connector	Screw terminal
	Transmission distance	About 15m
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RS485	Connector	Screw terminal
	Direction control	Hardware automatic control
	Protection	TVS diode, surge protection & ESD protection (onboard 120R balancing resistor)
	Transmission distance	About 1.2km(low rate)
	Transmission mode	Point-to-multipoints (up to 32 nodes, it is recommended to use repeaters for 16 nodes or more)
	Baud rate	300bps ~ 921600bps
LED INDICATORS	PWR	Red power indicator, lights up when there is USB connection and voltage is detected
	TXD	Green TX indicator, lights up when the USB port sends data
	RXD	Blue RX indicator, lights up when the device port sends data back
OPERATING ENVIRONMENT	Temperature	-15°C ~ 70°C
	Humidity	5%RH ~ 95%RH
OPERATING SYSTEM	Mac, Linux, Android, Windows 11 / 10 / 8.1 / 8 / 7	

Figure 5.1: Comprehensive technical specifications of the converter.

6. Driver Installation

The waveshare USB to RS232/485 Serial Converter Adapter utilizes the FT232RNL chip, which often has drivers automatically installed by modern operating systems.

- **Windows:** For Windows 10/11, drivers are typically installed automatically upon connecting the device to a USB port. For older Windows versions (7/8/8.1), or if automatic installation fails, drivers may need to be downloaded from the FTDI website or the waveshare product page.
- **Mac/Linux/Android:** These operating systems generally include built-in support for FTDI devices, and the converter should function without manual driver installation.

Refer to the official waveshare product page or FTDI website for the latest driver downloads and installation guides if manual intervention is required.

7. Setup and Connection

Follow these steps to connect and configure your waveshare USB to RS232/485 Serial Converter Adapter.

7.1 General Connection

1. Connect the USB-A male end of the converter directly to an available USB port on your computer. Alternatively, use the provided USB-A male to female cable for extended reach.
2. Observe the **PWR** LED indicator on the converter. It should light up red, indicating power is supplied.

7.2 RS485 Connection

To establish an RS485 communication link:

1. Ensure the RS232/485 switch on the converter is set to the**RS485** position.
2. Connect the RS485 device to the screw terminals of the converter:
   - Connect the RS485 A+ line of your device to the**TX_A** terminal on the converter.
   - Connect the RS485 B- line of your device to the**RX_B** terminal on the converter.
   - Connect the ground (GND) of your device to the**GND** terminal on the converter.
3. If your RS485 network requires a terminal resistor, set the**120Ω resistor switch** to the ON position.

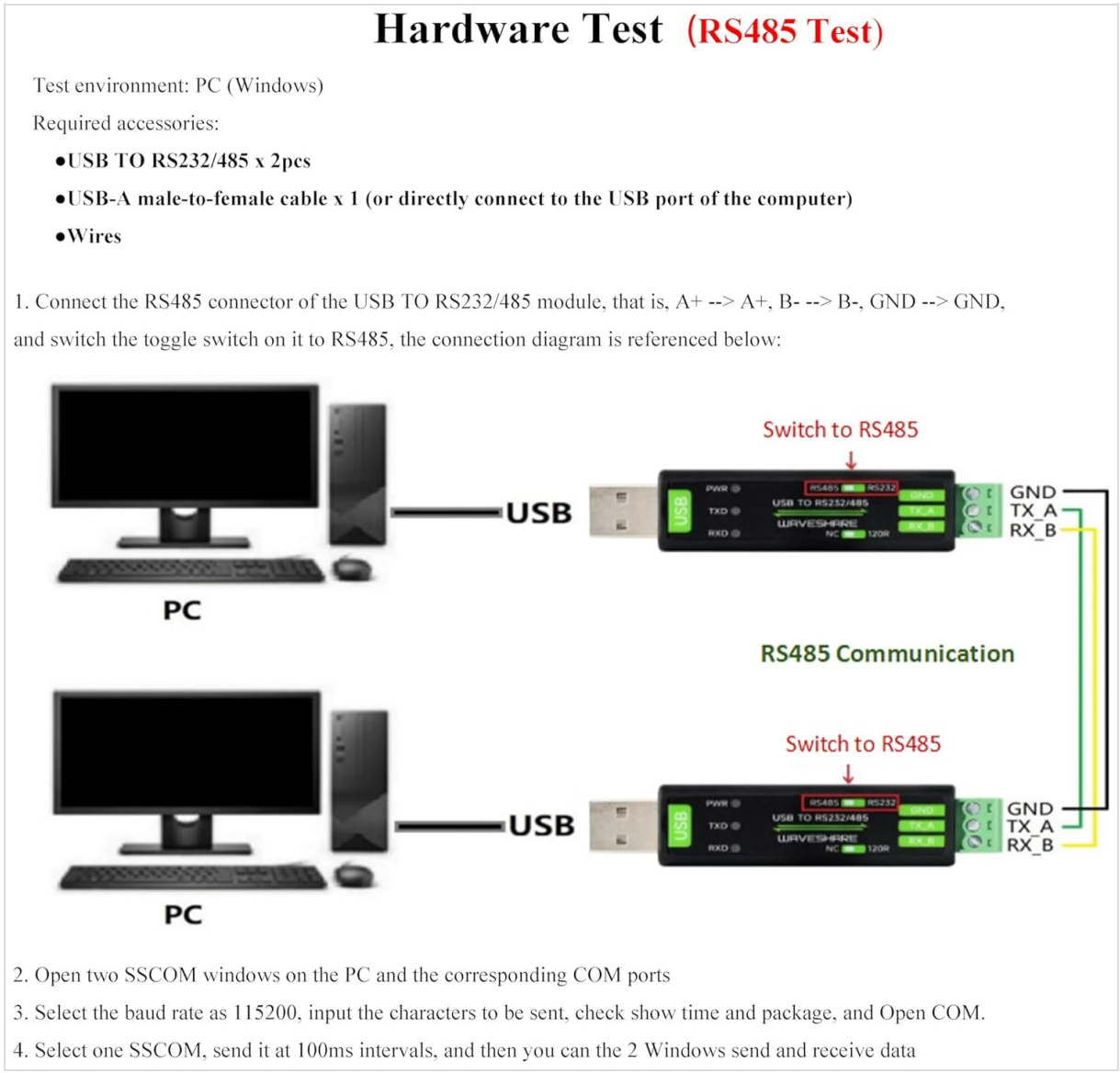

Figure 7.1: RS485 connection diagram.

7.3 RS232 Connection

To establish an RS232 communication link:

1. Ensure the RS232/485 switch on the converter is set to the**RS232** position.
2. Connect the RS232 device to the screw terminals of the converter. Note that RS232 connections typically involve a crossover:
    - Connect the RS232 TX (Transmit) line of your device to the**RX_B** terminal on the converter.
    - Connect the RS232 RX (Receive) line of your device to the**TX_A** terminal on the converter.
    - Connect the ground (GND) of your device to the**GND** terminal on the converter.

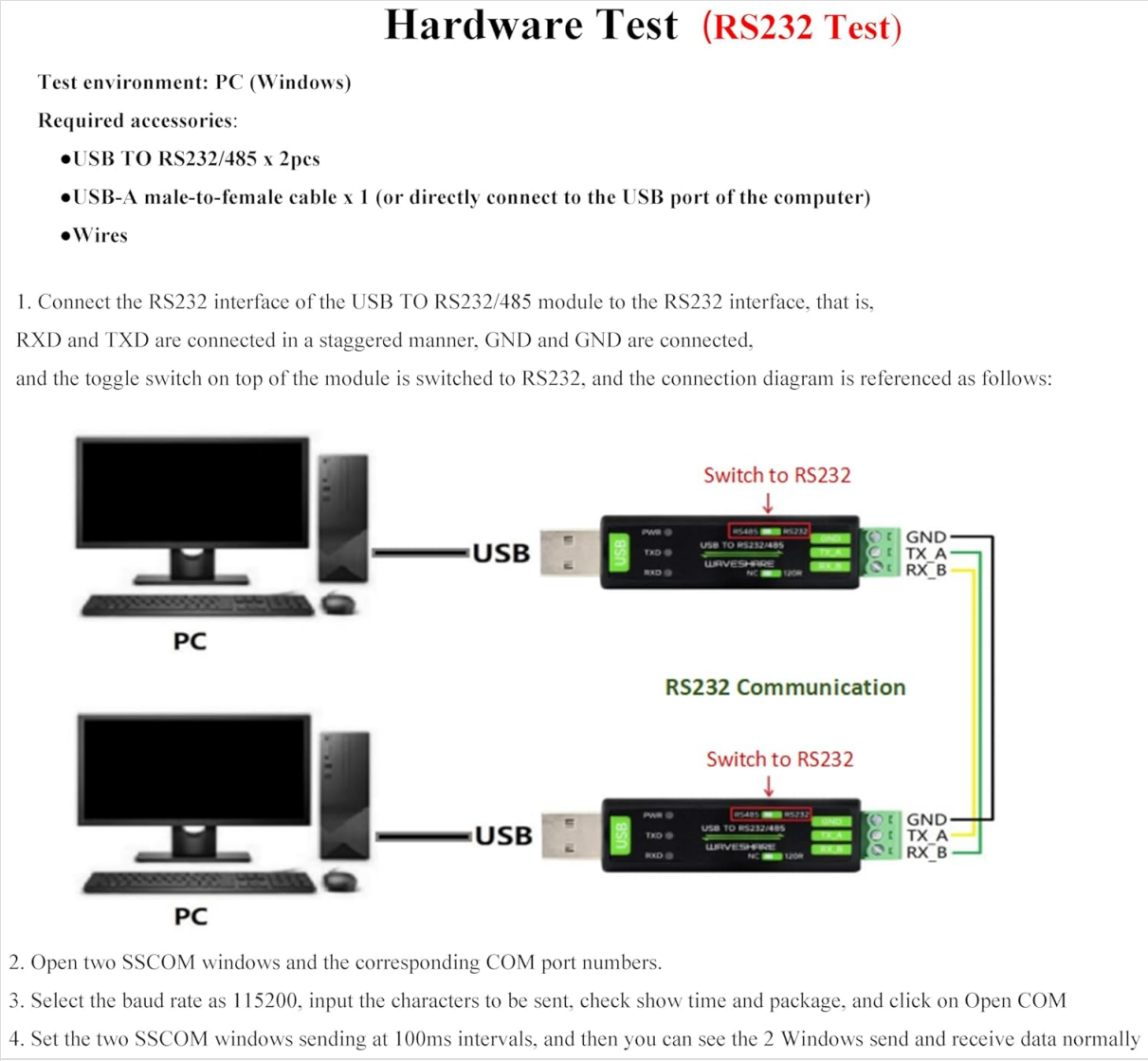

Figure 7.2: RS232 connection diagram.

8. Operation

Once connected, the converter operates by automatically managing data flow between the USB host and the selected serial interface (RS232 or RS485).

- **Data Transmission:** When data is sent from the USB host, the**TXD** (Green) LED will flash.
- **Data Reception:** When data is received by the converter from the serial device, the**RXD** (Blue) LED will flash.
- **Mode Selection:** Ensure the RS232/485 switch is correctly set for your application.
- **RS485 Termination:** For RS485 networks, correctly configure the 120Ω terminal resistor based on your network topology.

The converter provides zero-delay automatic transmission and reception conversion, simplifying serial

communication.

9. Troubleshooting

- **No Power (PWR LED off):**
  - Ensure the USB cable is securely connected to both the converter and the computer.
  - Try a different USB port on your computer.
  - Verify the USB port is functional.
- **No Data Transmission/Reception (TXD/RXD LEDs not flashing):**
  - Check the RS232/485 switch position; it must match the connected device type.
  - Verify the wiring connections to the RS232/RS485 device are correct (TX to RX, RX to TX for RS232; A+ to A+, B- to B- for RS485).
  - Confirm the baud rate and other serial port settings (data bits, parity, stop bits) on your computer match those of the connected serial device.
  - For RS485, check the 120Ω terminal resistor setting.
  - Ensure the correct COM port is selected in your software application.
  - Reinstall or update the FTDI drivers if communication issues persist.
- **Device Not Recognized by OS:**
  - Try connecting the converter to a different USB port or computer.
  - Manually install the FTDI drivers from the manufacturer's website.
  - Check Device Manager (Windows) or lsusb (Linux) to see if the device is detected.

10. Maintenance

The waveshare USB to RS232/485 Serial Converter Adapter is designed for low maintenance.

- **Cleaning:** Use a soft, dry cloth to clean the exterior of the device. Avoid using liquid cleaners or solvents.
- **Storage:** Store the converter in a cool, dry place away from direct sunlight and extreme temperatures when not in use.
- **Handling:** Avoid dropping the device or subjecting it to strong impacts.

11. Warranty and Support

For information regarding product warranty, technical support, or further assistance, please refer to the official waveshare website or contact their customer service directly. Specific warranty terms and support procedures may vary.