waveshare USB TO TTL (D) Serial Adapter Cable

waveshare Industrial USB to TTL Serial Adapter Cable User Manual

Model: USB TO TTL (D) Serial Adapter Cable

Your guide to setting up and operating your waveshare USB to TTL Serial Adapter Cable.

1. Product Overview

The waveshare Industrial USB to TTL Serial Adapter Cable is a robust converter designed for data communication between a PC or other devices and TTL logic level devices such as microcontrollers and sensors. It features an original FT232RNL chip for stable and compatible high-speed communication.

Image 1: The waveshare Industrial USB to TTL Serial Adapter Cable, showcasing its USB connector and the multi-colored jumper wires for TTL connections.

This adapter supports 3.3V/5V voltage level switching, includes built-in self-recovery fuse, ESD, and IO protection diode circuits, ensuring reliable and safe operation. Its compact design makes it ideal for serial port debugging of industrial equipment and direct connection to devices like the Raspberry Pi 5.

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Video 1: An official overview of the Waveshare USB-TTL Converter, highlighting its features and applications.

2. Setup Instructions

The waveshare USB to TTL Serial Adapter Cable is designed for plug-and-play compatibility with various operating systems including Windows 7/8/8.1/10/11, Mac, Linux, and Android. Drivers for the FT232RNL chip are typically installed automatically by your operating system. If not, they can be downloaded from the FTDI website.

2.1. Connecting to Raspberry Pi 5

This adapter is suitable for UART debugging on Raspberry Pi devices. You can connect it using two primary methods:

- **Via SH1.0 3PIN cable:** Connect to the Raspberry Pi 5 UART Debug Connector.
- **Via Separated 4PIN Header:** Connect to the Raspberry Pi 40PIN GPIO UART Interface.

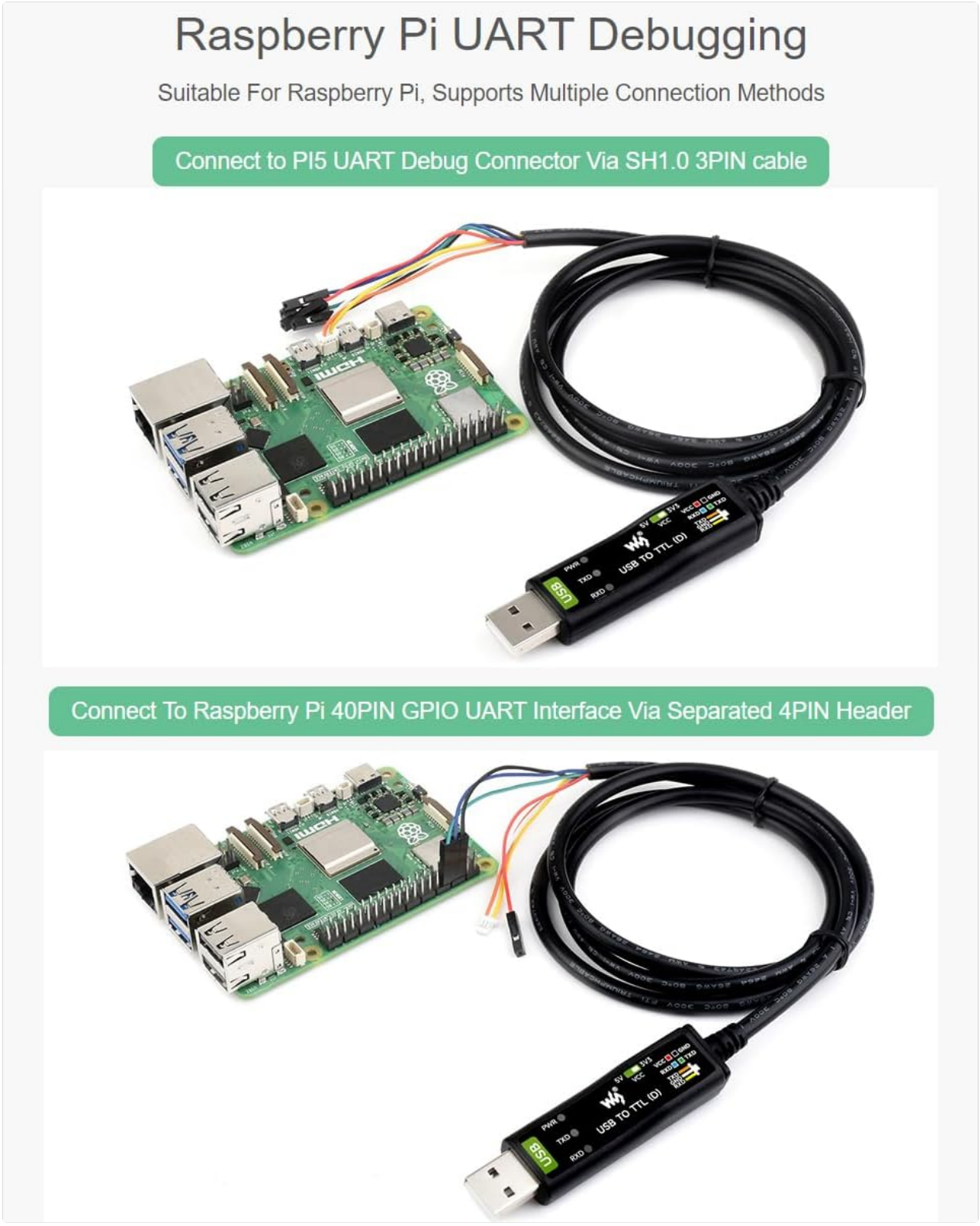
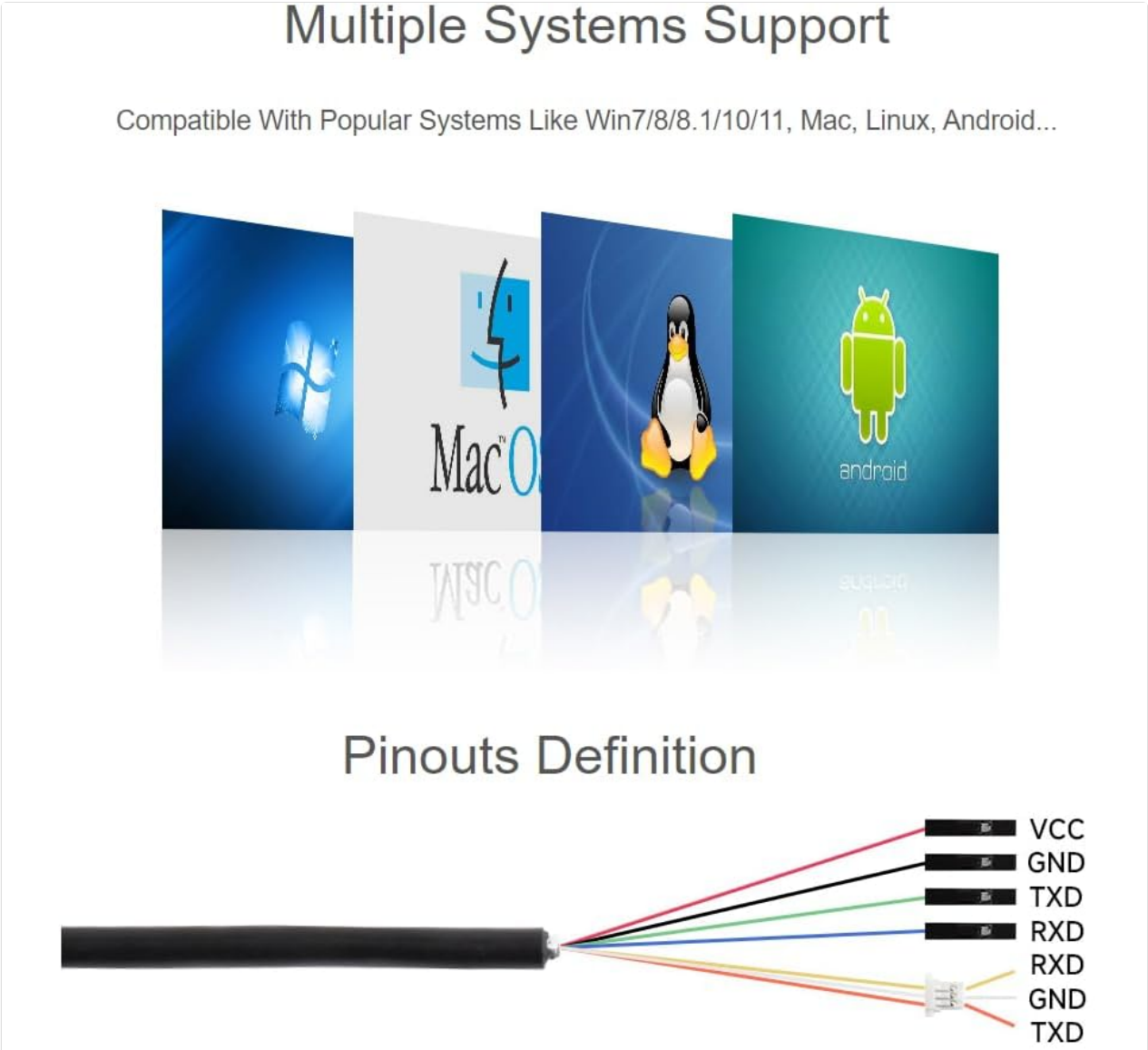


Image 2: Visual guide demonstrating two methods for connecting the USB to TTL adapter to a Raspberry Pi 5 for UART debugging.

2.2. Pinout Definition and Voltage Level Switching

The adapter features a TTL serial port with a 3.3V/5V level translation circuit, allowing you to switch the communication level as needed for your target device. The pinouts are clearly defined:

- **VCC:** 3.3V or 5V output, configured by a switch on the adapter.
- **GND:** Ground connection.
- **TXD:** Transmit Data. Connects to the MCU.RXD (signal direction: MCU.RX <-- FT232 <-- PC.TX).
- **RXD:** Receive Data. Connects to the MCU.TXD (signal direction: MCU.TX --> FT232 --> PC.RX).



VCC	3.3V or 5V output, configured by switch
GND	Ground
TXD	Connecting to MCU.RXD (signal direction: MCU.RX < < FT232 < < PC.TX)
RXD	Connecting to MCU.TXD (signal direction: MCU.TX > > FT232 > > PC.RX)

Image 3: Detailed diagram illustrating the pinout definitions (VCC, GND, TXD, RXD) and the 3.3V/5V operating level switch on the adapter.

3. Operating the Device

Once connected to your computer's USB port and your target device, the adapter will begin operation. The onboard LED indicators provide visual feedback on the device's status.

3.1. LED Indicators

The adapter features three LED indicators for easy monitoring of its operating status:

- **PWR (Power Indicator):** Turns on when there is a USB connection and voltage is detected.

- **TXD (Transmit Indicator):** Turns on while the USB port is sending data.
- **RXD (Receive Indicator):** Turns on while the device port is sending data back.

Image 4: Close-up view of the adapter highlighting the PWR, TXD, and RXD LED indicators, along with the 3.3V/5V operating level switch.

Image 5: The waveshare USB to TTL adapter connected to a laptop, demonstrating a typical usage scenario.

4. Maintenance

The waveshare USB to TTL Serial Adapter Cable features a robust plastic case with a sandblasting process finish, designed for long-lasting durability. To ensure optimal performance and longevity:

- Keep the device clean and free from dust and debris.
- Avoid exposing the device to extreme temperatures or moisture.
- Handle the cable and connectors gently to prevent damage.

5. Troubleshooting

If you encounter issues with your USB to TTL Serial Adapter Cable, consider the following:

- **No Power Indicator (PWR LED off):** Ensure the USB cable is securely connected to both the computer and the adapter. Try a different USB port or computer.
- **No Data Transmission (TXD/RXD LEDs not blinking):** Verify that the TXD and RXD pins are correctly connected to your target device's RXD and TXD pins, respectively. Check the voltage level switch (3.3V/5V) to ensure it matches your device's requirements. Confirm that the drivers are correctly installed on your operating system.
- **Connection Issues:** Ensure your target device is powered on and functioning correctly. Check for any

loose connections in the jumper wires.

For persistent issues, please refer to the 'Warranty and Support' section for technical assistance.

6. Technical Specifications

Below are the detailed specifications for the waveshare Industrial USB to TTL Serial Adapter Cable:

Specifications

PRODUCT CATEGORY	Industrial USB TO TTL serial cable
CHIP SCHEME	FTDI original FT232RNL
HOST PORT	USB
DATA RATE	300bps ~ 3Mbps
DEVICE PORT	UART
USB PORT	Connector: USB-A
	Protection: self-recovery fuse, ESD protection
UART PORT	Connector: separated 4pin female header + SH1.0 3PIN fool-proof connector
	Protection: IO protection diode
INDICATOR	PWR: power indicator, turns on when there is USB connection and voltage is detected
	TXD: TX indicator, turns on while the USB port is sending data
	RXD: RX indicator, turns on while the device port is sending data back
CABLE	Black, PVC sheath, total length 1m

Outline Dimensions

Image 6: A table detailing the product specifications, including chip scheme, data rate, and port types.

Feature	Detail

Feature	Detail
Brand	waveshare
Model Name	USB TO TTL (D) Serial Adapter Cable
Connector Type	USB
Cable Type	USB
Compatible Devices	Personal Computer, Microcontrollers, Sensors, Raspberry Pi 5
Special Feature	High Speed, 3.3V/5V Voltage Level Switching, FT232RNL Chip, Self-recovery Fuse, ESD Protection, IO Protection
Recommended Uses	Serial Port Debugging for Raspberry Pi and Industrial Equipments
Color	Black
Connector Gender	Male-to-Female
Number of Pins	4
Maximum Voltage	5 Volts
Outer Material	Plastic
Item Weight	2.11 ounces (0.06 Kilograms)
Package Dimensions	6.26 x 4.33 x 1.26 inches
ASIN	B0CYGL421W
UPC	788046388596
Date First Available	March 19, 2024

6.1. Outline Dimensions

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Outline Dimensions

Image 7: Diagram showing the outline dimensions of the USB to TTL adapter in millimeters.

7. Warranty and Support

waveshare provides technical support for this product. If you encounter any problems or have questions regarding the setup, operation, or functionality of your Industrial USB to TTL Serial Adapter Cable, please contact waveshare customer service directly. Please have your product model and purchase information ready when contacting support.