USB-8COMi-RM USER'S MANUAL

2024 Edition

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INTRODUCTION

The USB to Octal Serial Adapter is designed to make serial port expansion quick and simple. Connecting to a USB port on your computer or USB hub, the USB Serial Adapter instantly adds eight RS-232/422/485 multi-electrical interface serial communication ports to your system. By taking advantage of the USB bus, the USB Serial Adapter makes it easier than ever to add 8 serial ports and serial devices to your system with easy plug-and-play and hot plug features. Adapting the new technology, the serial port expansion now takes the new bus with easy and convenient connectivity.

Plugging the USB Octal Serial Adapter to the USB port, the adapter is automatically detected and installed. There are no IRQ & COM port conflicts, since the port doesn't require any additional IRQ, DMA, memory as resources on the system. The RS-232, or RS-422/485, port functions as native Windows COM port, and it is compatible with Windows serial communication applications. Each port is individually configurable. The adapter is designed with external switches to set RS-232, RS-422 or RS-485 ports and different operation modes conveniently. There is no need to open the chassis to set the ports.

The USB Serial Adapter provides instant connectivity to RS-232, or RS-422/485, communication devices for factory automation equipment, multi-drop data collection devices, barcode readers, time clocks, scales, data entry terminals, ATMs and serial communication in harsh environment. The USB to Serial Adapter is suitable for remote access, retail and industrial application, data collection and other applications requiring high speed RS-232, or RS-422/485, communication ports.

SPECIFICATIONS & FEATURES

- Adds octal high speed RS-232/ 422 / 485 serial ports via USB connection.
- 2k bytes receive and transmit buffer for high speed data throughput
- Requires no IRQ, DMA, I/O port
- RS-232 max bitrates up to 1Mbps
- RS-422/485 max bitrates up to 10Mbps
- Auto transmit buffer control for 2-wire RS-485 half-duplex operation
- Termination resistors installed on-board
- RS-232 data signals: DCD, RxD, TxD, DTR, GND, DSR, RTS, CTS
- RS-422 data signals: Tx-, Tx+, Rx+, Rx-, GND
- RS-485 data signals: Tx-, Tx+, Rx+, Rx- (4-wire), and data-, data+ (2-wire)
- Monitor LEDs of TxD, RxD indicating port status
- Easy operating mode configuration and setting
- AC 100V – 240V input
- Virtual COM port drivers provided for Windows 11, 10, 8.1, 8, 7, Vista, 2012, 2008, 2003, XP

HARDWARE INSTALLATION

Outside the unit, there is a 4-pin DIP switch used to select the mode of operation. You will need to set the switch settings to RS-232 mode, RS-422 mode, or RS-485 mode, as per the requirements of your application.

After setting the switches, plug in the adapter to a USB port to start driver installation. The RS-232 & RS-422 & RS-485 mode block configuration settings are listed as follows.

RS-232 & RS-422 & RS-485 MODE BLOCK CONFIGURATION

SW (External DIP Switch) for Mode Setting

	Operation Mode	S1	S2	S3	S4
RS-232	Standard RS-232 Mode	OFF	ON	ON	ON
RS-422	4-wire with Handshaking	ON	ON	ON	ON
RS-485	Full-Duplex (4-wire)	ON	OFF	ON	ON
	Half-Duplex (2-wire) – with Echo	ON	OFF	OFF	ON
	Half-Duplex (2-wire) – without Echo	ON	OFF	OFF	OFF

S1~S8: Termination and Biasing Option Configuration

Inside the unit, there are eight 7-pin dip switch (S1~S8) which enable Tx, Rx, CTS 120Ω termination resistors and Rx, Tx 750Ω biasing resistor. You will need to open up the case and set the jumper setting for RS-422 mode, or RS-485 mode, as per the requirements of your application. Settings are listed as follows:

Switch	Function
1	Tx+/- termination of 120Ω. This switch should always be populated for RS-485.
2	Pull-up Tx+ to VCC by 750Ω bias resistor. This switch should be populated for pull-up Tx+.
3	Pull-down Tx- to GND by 750Ω bias resistor. This switch should be populated for pull-down Tx-.
4	Rx+/- termination of 120Ω. This switch should always be populated for RS-232/422/485 full-duplex mode.
5	Pull-up Rx+ to VCC by 750Ω bias resistor. This switch should be populated for pull-up Rx+.
6	Pull-down Rx- to GND by 750Ω bias resistor. This switch should be populated for pull-down Rx-
7	CTS termination of 120 Ohm. This switch should always be populated for RS-422 mode.

Note: Sometimes, when operating in RS-422 or RS-485, it is necessary to configure termination and biasing of the data transmission lines. Generally, this must be done in the cabling, since this depends on the installation of connections. Before applying the option, check your cable specification for proper impedance matching.

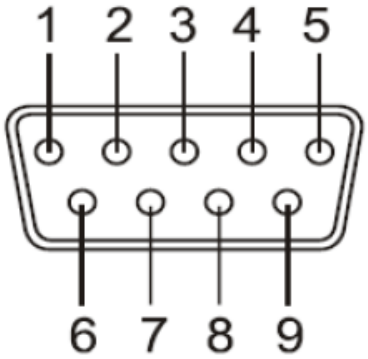
Biasing of data lines must only occur at a single point anywhere in the cabling. USB-8COMi-RM provides biasing for ease of installation. If your cabling already provides biasing, please be sure to disable this inside the unit.

Termination must not be installed in the middle of the cable. It is only permitted at both ends. Since a computer controlled serial port is almost always at one end of the cable, termination is disabled by default.

SERIAL PORT CONNECTOR PINOUT

RS-232 Mode Pinout of 9-pin D-sub Connector

The RS-232 serial ports are configured as data terminal equipment (DTE), with a 9-pin D-sub connector. Pin assignments are according to TIA/EIA-574, which formally defines the assignments for a COM port that are found on many personal computers.



DB9 Male connector pin numbers

Pin Number	Pin Type		Description
1	Input	DCD	Data Carrier Detect
2	Input	RxD	Receive Data
3	Output	TxD	Transmit Data
4	Output	DTR	Data Terminal Ready
5	Ground	GND	Signal Ground
6	Input	DSR	Data Set Ready
7	Output	RTS	Request to Send
8	Input	CTS	Clear to Send

RS-232 pinout for DB-9 connector

RS-422 Mode Pinout

Pin Number	Pin Type	Description	
1	Output	TxD-	Transmit Data, negative polarity
2	Output	TxD+	Transmit Data, positive polarity
3	Input	RxD+	Receive Data, positive polarity
4	Input	RxD-	Receive Data, negative polarity
5	Ground	GND	Signal Ground

RS-422 pinout for DB-9 connector

RS-485 Full-Duplex Mode Pinout

Pin Number	Pin Type	Description	
1	Output	TxD-	Transmit Data, negative polarity
2	Output	TxD+	Transmit Data, positive polarity
3	Input	RxD+	Receive Data, positive polarity
4	Input	RxD-	Receive Data, negative polarity
5	Ground	GND	Signal Ground

RS-485 full-duplex pinout for DB-9 connector

RS-485 Half-Duplex Mode Pinout

Pin Number	Pin Type	Description	
1	Output/Input	Data-	Transmit/Receive Data, negative polarity
2	Output/Input	Data+	Transmit/Receive Data, positive polarity
5	Ground	GND	Signal Ground

RS-485 half-duplex pinout for DB-9 connector

PROPER WIRING FOR RS-422/485 OPERATION

This section will provide proper wiring information about RS-422 and RS-485 data communication. It is necessary to have the basic knowledge in order to avoid or find errors in data transmission. Failures in cabling are responsible for the vast majority of transmission problems.

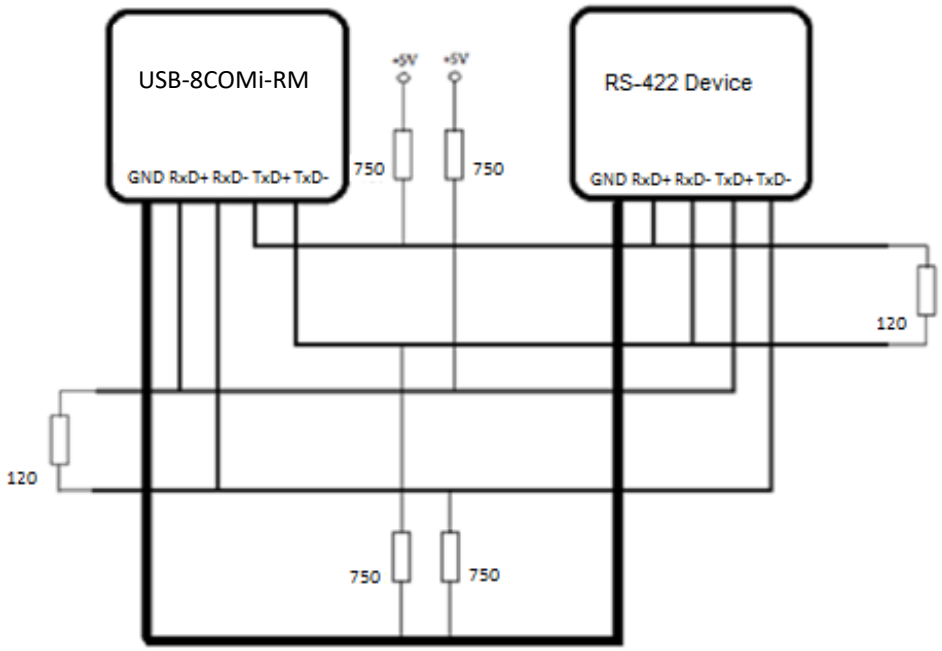
RS-422 & RS-485 Transmission Technique

The RS-422 and RS-485 use the same balanced transmission method. Signals are not transmitted as voltage on a single wire, like in RS-232. Instead, two wires are used; when one carries high voltage, the other one carries low voltage. The signal is defined by the difference in voltage between those two wires. This hardens the transmission against noise. Usually twisted pair cables are used, which further reduces the sensitivity for noise.

To make sure the signals meet the common voltage range, the GND of sender and receiver must be connected somehow. To ensure the signals are in the valid voltage range and the differential voltage can be correctly sensed by the receiver, the GND lines of the transmitter and receiver must be connected.

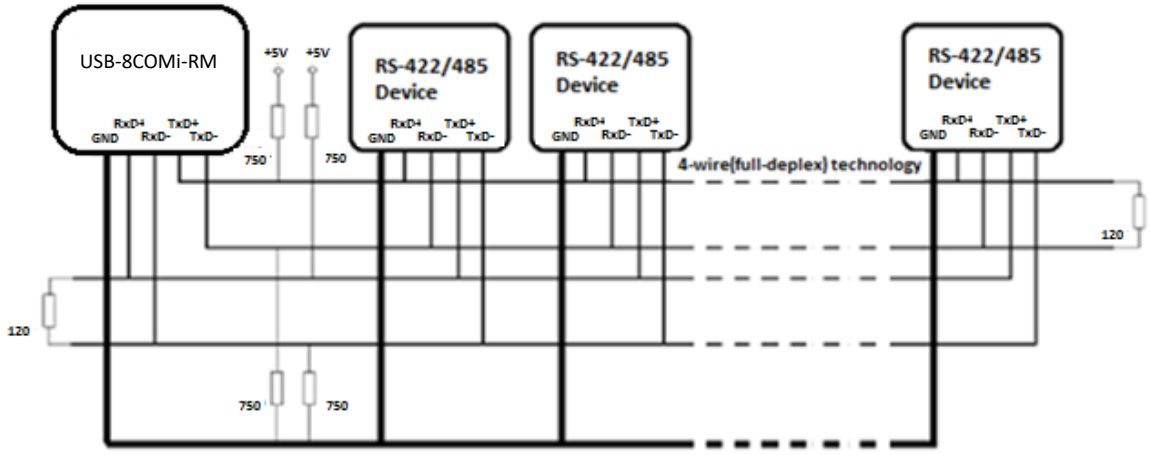
RS-422 Signals Connected

The following diagram shows how RS-422 signals are connected.



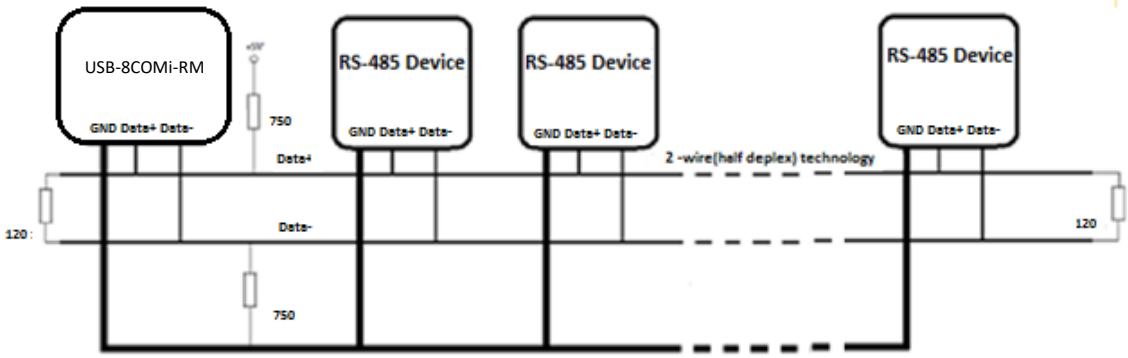
RS-422 & RS-485 4-wire Scheme

The RS-422 requires dedicated wire pairs for transmit and receive. The transmit wires are used to send data to as many as 10 receivers, as stated in the specifications of RS-422. Since the USB-to-Industrial Single RS-232/422/485 Adapter uses the RS-485's line driver technology, up to 32 receivers are possible. The following diagram shows RS-422 and RS-485 4-wire scheme:



RS-485 2-wire Scheme

The following diagram shows RS-485 2-wire scheme:



INSTALLING WINDOWS DRIVER

In most cases, the Windows driver of the USB-to-Industrial Single RS-232/422/485 Adapter will be installed automatically.

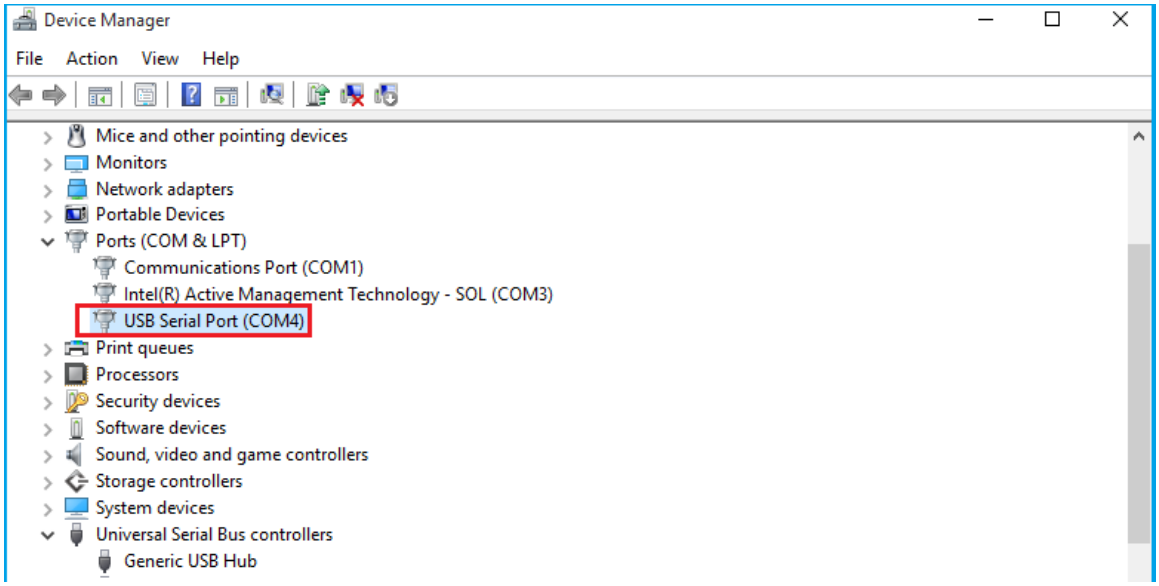
Installing in Windows 11, 10, 8.1, 8, 7, Server 2012 and 2008 R2

Connect your computer to Internet and plug USB-to-Industrial Single RS-232/422/485 Adapter to the USB port. The driver will be installed automatically via Internet.

Installing in Windows XP, Vista, Server 2003 and 2008

Connect your computer to Internet and plug the USB-to-Industrial Single RS-232/422/485 Adapter to the USB port. When asked to install the drivers, allow your computer to search the Internet to load and install the drivers from Windows Update website automatically.

When USB-to-Industrial Single RS-232/422/485 Adapter driver installation is done, you will find “USB Serial Port (COMX)” under “Ports (COM & LPT)” of device manager.

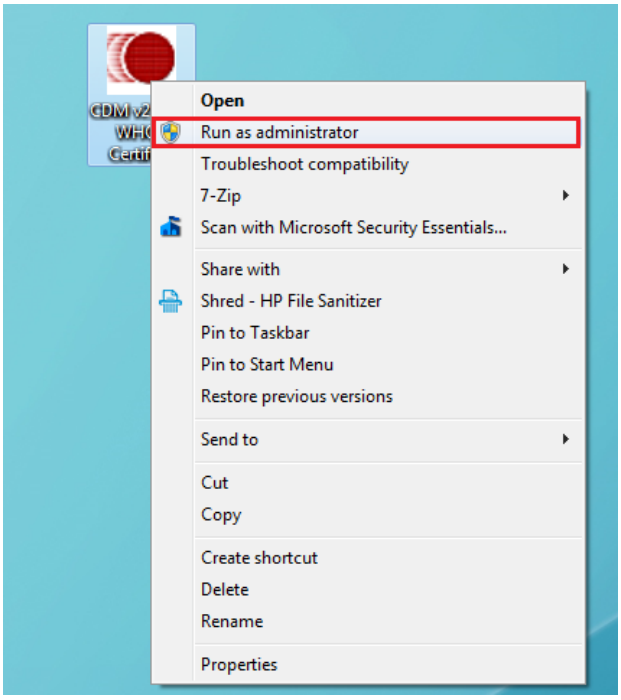


PRE-INSTALLING WINDOWS DRIVER

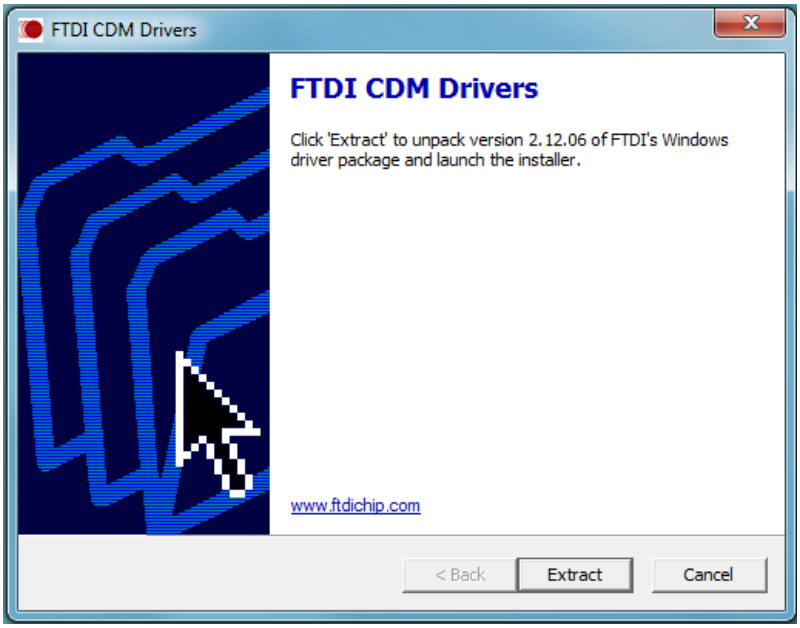
The Windows driver is also available as a setup program (CDMvX. XX. XX WHQL Certified.exe) to pre-install Windows driver into your PC. Run the pre-install setup program before plugging the USB-to-Industrial Single RS-232/422/485 Adapter into the PC. You can download the setup program (CDMvX. XX. XX WHQL Certified.exe) from:

http://www.ftdichip.com/FTDrivers.htm

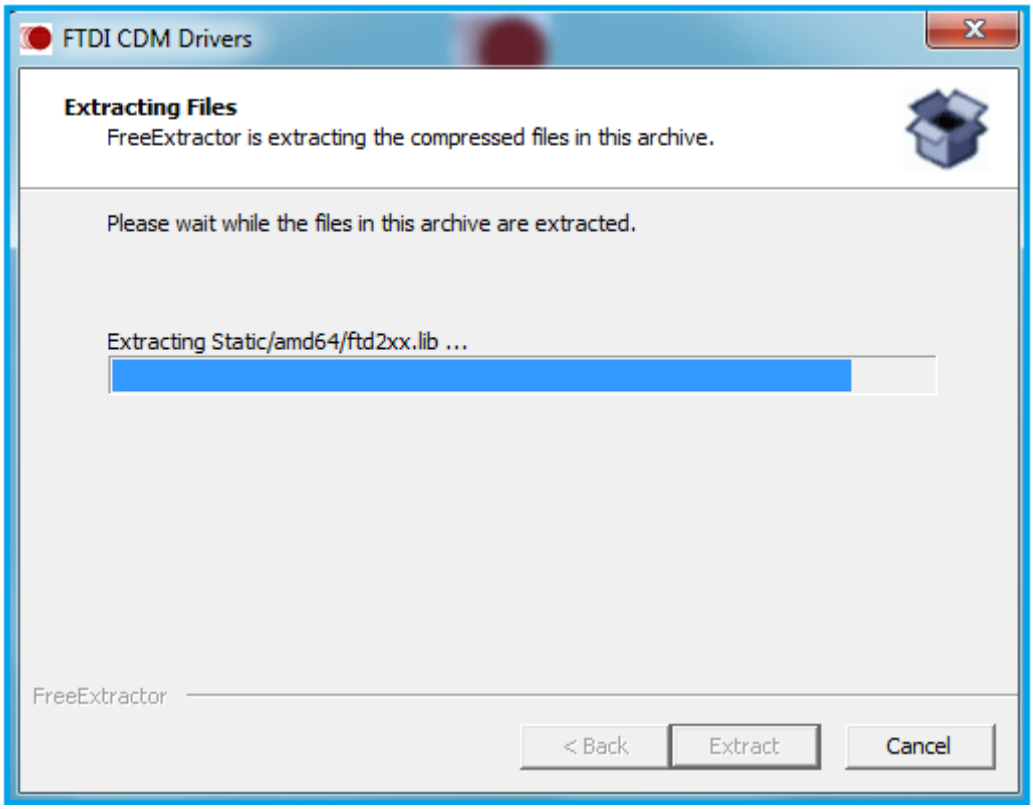
After downloading the driver setup program right click it and select “Run as administrator”



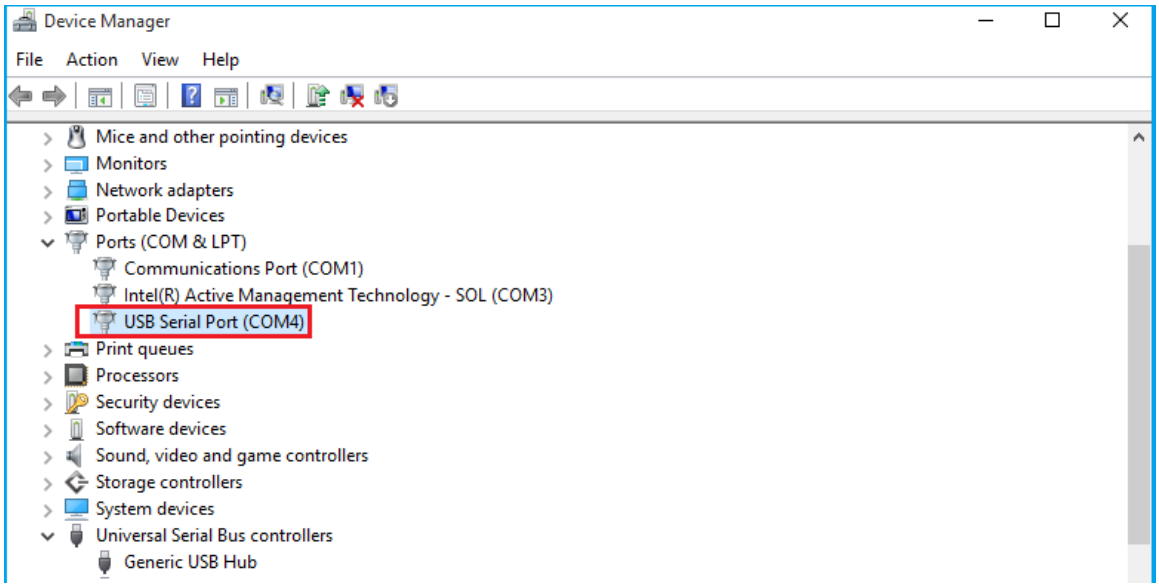
Press the “Extract” button



The driver will now be automatically installed.



Whenever the USB-to-Industrial Single RS-232/422/485 Adapter is plugged into the PC, the Windows driver will be installed and listed in device manager.



UNINSTALLING WINDOWS DRIVER

The program CDMuninstallerGUI.exe is used to remove installed drivers from the user's system and clean them from the Windows registry. You can download this program (CDMUninstaller_vX.X.zip) from:

http://www.ftdichip.com/Support/Utilities_htm#CDMUninstaller

Supported Operating Systems

The uninstaller is currently supported on the following operating systems:

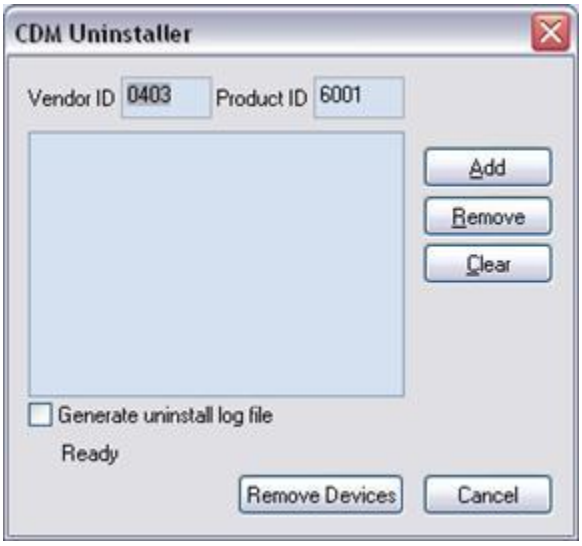
- Windows 11/10/8.1/8/7 (32 and 64-bit)
- Windows Vista (32 and 64-bit)
- Windows XP/2003 (32 and 64-bit)

Running the Application

To run the application, simply double click on the .exe file.

Removing a Driver

The figure below shows the window displayed upon running the application. The vendor ID and product ID text boxes allows the user to enter a 4-character hex value specifying the device that they wish to remove. All installed device drivers can be viewed from within the Windows device manager. The USB-to-Industrial Single RS-232/422/485 Adapter uses the FTDI default Vendor ID (0x0403). Depending on the specific model of USB-8COMi-RM, the valid Product IDs may be: 0x6001, 0x6010 or 0x6011…etc.



To remove a device, it must be added into the device window. They must all have a unique vendor ID and product ID combination. To remove the device(s) click on the '*Remove Devices*' button.

The '*Remove*' button will remove the currently selected item from the device window and the '*Clear'* button will remove all the devices from the device window.

A message box will confirm successful removal from the system and the device will be removed from the device window. To create an uninstall log file, check '*Generate uninstall log file*' prior to removing the device. This will create a text file outlining all operations that were attempted during the removal process that will be saved in the same directory as the .exe file.

Error Messages

If there are no devices specified within the device window the following message will appear. Make sure that at least one device has been specified within the window by using the '*Add'* button.

If the application is unable to find any devices matching the vendor ID and product ID when removing a device, the following message box will appear. In this situation make sure that the details that you have entered are indeed correct by checking with the windows device manager.

The Vendor ID and Product ID must be a unique combination, if an attempt is made to add the same device twice the following message box will appear.