



Single Port RS-232 USB to Serial Adapter w/Optical Isolation & Surge Protection

Model Number: *USBG-COMi-M*

Installation Guide

Coolgear, Inc.

Version: 1.0

Date: 04/16/2024



Table of Contents

1. Introduction	2
2. Hardware Installation	3
3. RS-232 & RS-422 & RS-485 MODE BLOCK CONFIGURATION	4
4. SERIAL PORT CONNECTOR PINOUT	6
5. PROPER WIRING FOR RS-422/485 OPERATION	10
6. INSTALLING WINDOWS DRIVER	12
7. PRE-INSTALLING WINDOWS DRIVER	13
8. UNINSTALLING WINDOWS DRIVER	15
9. Specifications	17

Revision History

Revision	Date	Comments
1.0	04/16/2024	First Release

1. Introduction

Thank you for purchasing Coolgear’s Single Port RS-232 USB to Serial Adapter. The USB-COMi-M USB-to-Industrial Single RS-232/422/485 Adapter is designed to make industrial communication port expansion quick and simple. Connecting to an USB port on your computer or USB hub, the USB-COMi-M instantly adds an industrial communication port to your system. By taking advantage of the USB bus, the USB Industrial I/O Adapter makes it easier than ever to add RS-232, RS-422 or RS-485 devices to your system with easy plug-and-play and hot plug features. Adapting the new technology, the industrial I/O communication port expansion now takes the new bus with easy and convenient connectivity.

Plugging the USB-COMi-M 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-232/422/485 port functions as native Windows COM port, and it is compatible with Windows serial communication applications.

The USB Industrial I/O Adapter provides instant connectivity to RS-232/422/485 communication devices for factory automation equipment, multi-drop data collection devices, barcode readers, time clocks, scales, data entry terminals, PC to PC long distance communications and serial communication in harsh environments. The USB Industrial I/O provides industrial solutions for applications requiring single node or multi-drop communications over short and long distance.

Features:

- ✓ Adds a high speed RS-232/422/485 serial port via USB connection
- ✓ 512 byte 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 3Mbps
- ✓ Connector: one DB9 male connector one 6-pin terminal block connector
- ✓ 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, RI
- ✓ RS-422 data signals: Tx-, Tx+, Rx+, Rx-, GND, RTS-, RTS+, CTS+, CTS-
- ✓ RS-485 data signals: Tx-, Tx+, Rx+, Rx- (4-wire), and data-, data+ (2-wire)
- ✓ Monitor LEDs of TxD, RxD indicating port status
- ✓ Supports power output of DC 5V 150mA, through pin 5 of terminal block connector, for external devices requiring power
- ✓ Easy operating mode configuration and setting
- ✓ Supports Windows XP to 11, Server 2000 to Server 2022 (WHQL certified)
- ✓ Supports Linux Kernel 3.0 and above
- ✓ Supports Mac OS X 10.3 and above, driver signed by Apple

2. Hardware Installation

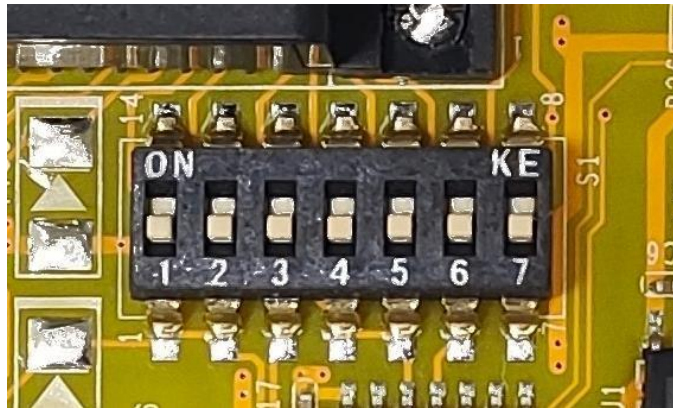


3. RS-232 & RS-422 & RS-485 MODE BLOCK CONFIGURATION

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: Termination and Biasing Option Configuration



Inside the unit, there is a switch which enables Tx, Rx, CTS 120Ω termination resistors and Rx, Tx 750Ω biasing resistors. You will need to open the case and set the switch for RS-422 mode, or RS-485 mode, as per the requirements of your application. Settings are listed as follows:

Turn the switch to the ON position to enable the setting.

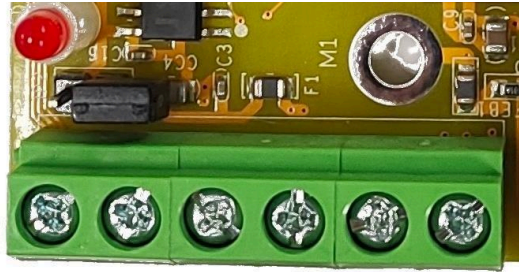
S1	Function
Position 1	Tx+/- termination of 120Ω. For RS-485, always set this position.
Position 2	Pull-up Tx+ to VCC by 750Ω bias resistor. Set this switch position for pull-up Tx+.
Position 3	Pull-down Tx- to GND by 750Ω bias resistor. Set this switch position for pull-down Tx-.
Position 4	Rx+/- termination of 120Ω. For RS-232/422/485 full-duplex mode, always set this position.
Position 5	Pull-up Rx+ to VCC by 750Ω bias resistor. Set this switch position for pull-up Rx+.
Position 6	Pull-down Rx- to GND by 750Ω bias resistor. Set this switch position for pull-down Rx-.
Position 7	CTS termination of 120 Ohm. For RS-422 mode, always set this position.

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-COMi-M 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.

JP2: Enabling the +5V 150mA Power for an External Device



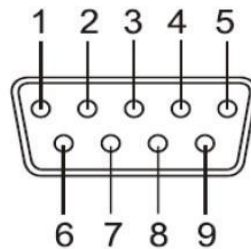
The USB-COMi-M provides a unique feature of supplying power output of 5V/150mA through pin 5 of the terminal block connector to serial devices requiring power. By default, this feature is disabled; you need to open the metal case and close the jumper (JP2) to enable 5V 150mA power.

S1	Function
Close	Enable the DB9 pin 1 and pin 5 to support a 5V 150mA power for an external device
Open	Disable the 5V 100mA power (default)

4. SERIAL PORT CONNECTOR PINOUT

RS-232 Mode Pinout of 9-pin D-sub Connector (CN2)

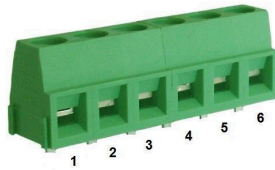
The RS-232 serial ports are configured as data terminal equipment (DTE), with a 9-pin Dsub connector. Pin assignments are according to TIA/EIA-574, which formally defines the assignments for a COM port that are found on many personal computers.



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
9	Input	RI	Ring Indicator

RS-232 Mode Pinout of 9-pin Terminal Block (TB1)



Terminal block 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	+5v	Data Terminal Ready
5	Power	GND	DC+5V 150mA
6	Ground	GND	Signal Ground

RS-232 pinout for 6-pin terminal block 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
6	Output	RTS-	Request to Send, negative polarity
7	Output	RTS+	Request to Send, positive polarity
8	Input	CTS+	Clear to Send, positive polarity
9	Input	CTS-	Clear to Send, negative polarity

RS-422 pinout for DB-9 connector

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	Power	+5v	DC+5V 150mA
6	Ground	GND	Signal Ground

RS-422 pinout for 6-pin terminal block 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

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	Power	+5v	DC+5V 150mA
6	Ground	GND	Signal Ground

RS-422 full-duplex pinout for 6-pin terminal block connector

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

Pin Number	Pin Type	Description	
1	Output/Input	TxD-	Transmit/Receive Data, negative polarity
2	Output/Input	TxD+	Transmit/Receive Data, positive polarity
5	Power	+5v	DC+5V 150mA
6	Ground	GND	Signal Ground

RS-485 half-duplex pinout for 6-pin terminal block connector

5. 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.

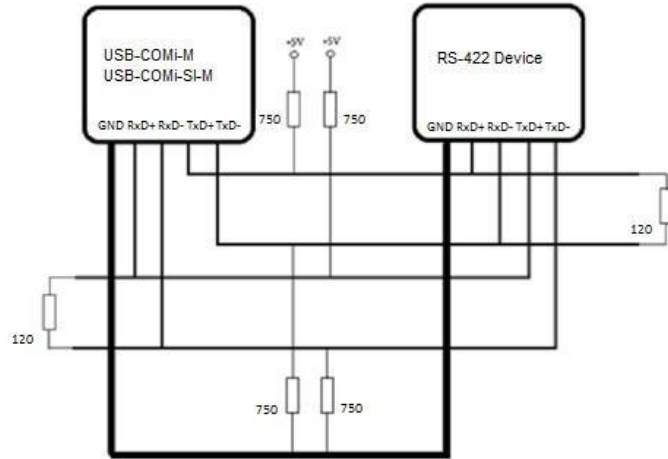
RS-422 & RS-485 Transmission Technique

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.

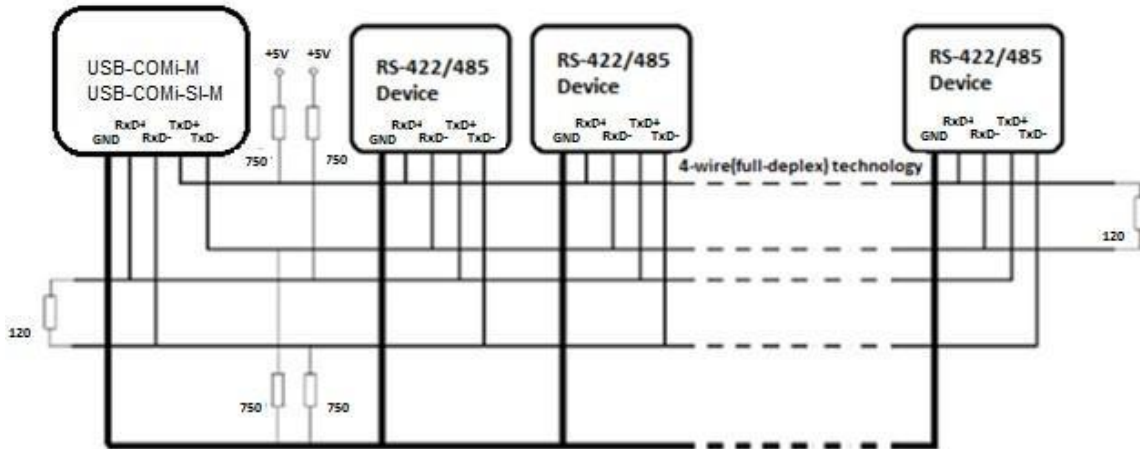
RS-422 Signals Connected

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



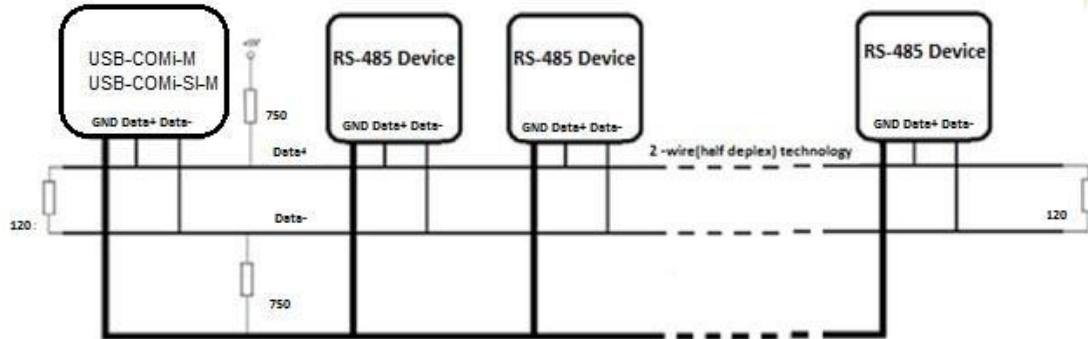
RS-422 & RS-485 4-wire Scheme

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 RS485 4-wire scheme:



RS-485 2-wire Scheme

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



6. INSTALLING WINDOWS DRIVER

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

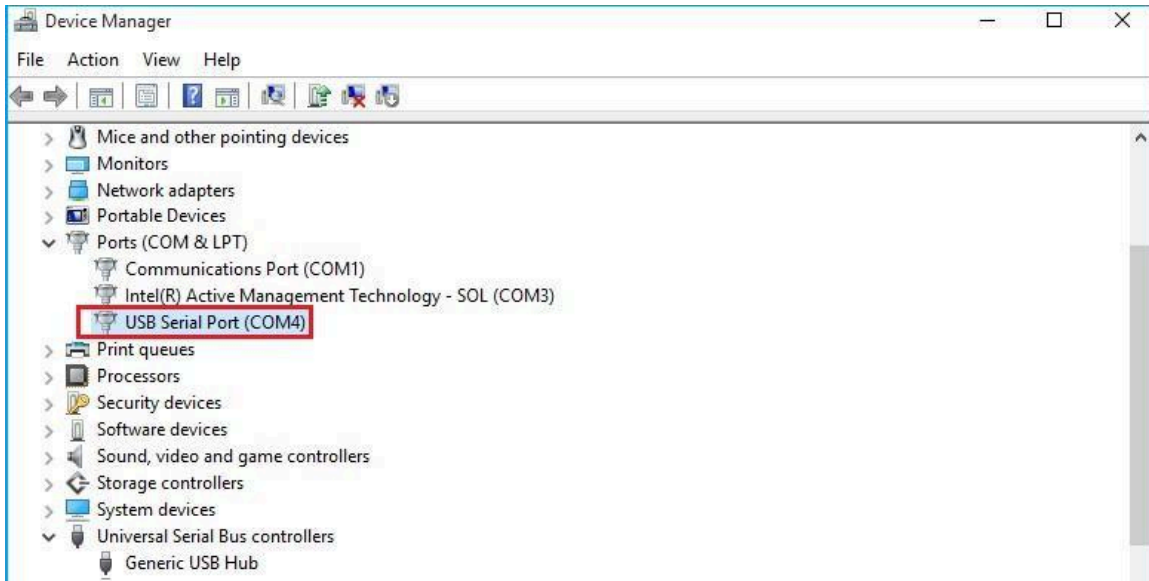
Installing in Windows 10, 8.1, 8, 7, Server 2012 and 2008 R2

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

Installing in Windows XP, Vista, Server 2003 and 2008

Connect your computer to the 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 the 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.

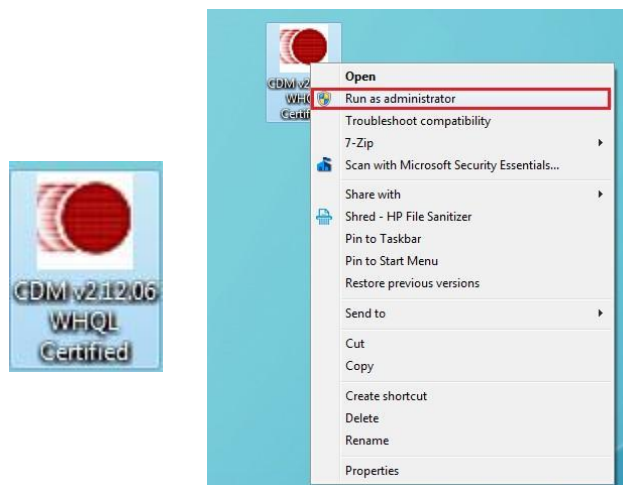


7. PRE-INSTALLING WINDOWS DRIVER

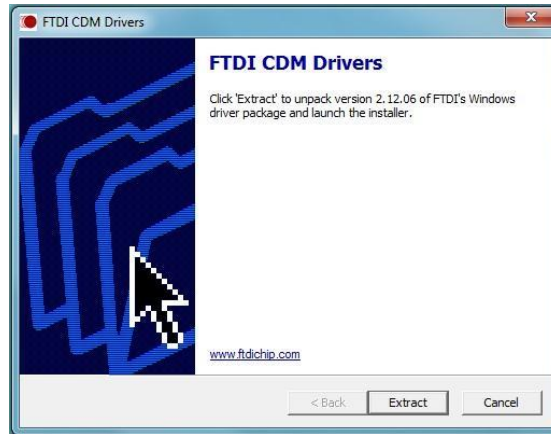
The Windows driver is also available as a setup program (CDMvX. XX. XX WHQL Certified.exe) to pre-install Windows driver into your PC. Run the pre-install setup program before plugging the USB-to-Industrial Single RS-232/422/485 Adapter into the PC. You can download the setup program (CDMvX. XX. XX WHQL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

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

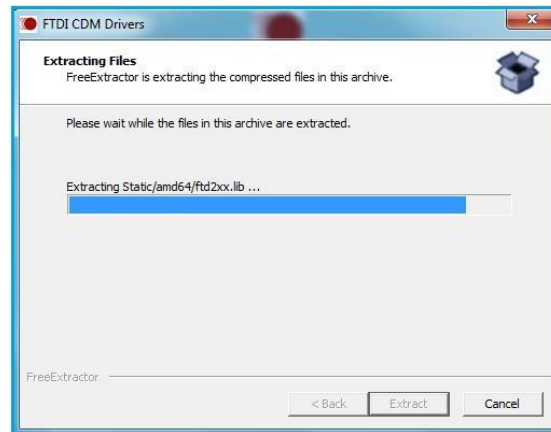
After downloading the driver setup program right click it and select “Run as administrator”



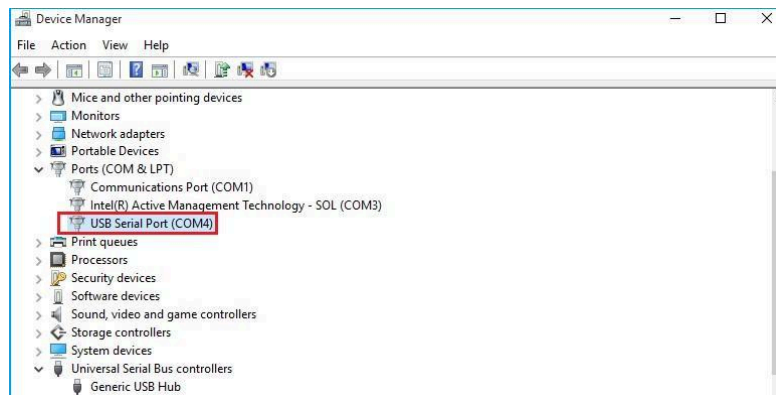
Press the “Extract” button



The driver will now be automatically install



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.



8. 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 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 allow 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-COMi-M, 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.



9. Specifications

USB Bus

Compliance	USB 2.0 Full Speed, USB 1.1 compliant
Speed	12Mbps, full-speed USB
Connector	USB Type B
Fifo	256 bytes transmit 128 bytes receive
Operating Systems	<ul style="list-style-type: none"> • Supports Windows XP to 11, Server 2000 to Server 2022 (WHQL certified) • Supports Linux Kernel 3.0 and above • Supports Mac OS X 10.3 and above, driver signed by Apple
Installation	The driver is already installed (Linux), or automatically downloading and installing device drivers after Device connection (Windows).

Serial Interface

Interface	RS-232
Number of Ports	1
Connector	DB9 male
Max Speed	RS-232: up to 1Mbps RS-422/485: up to 3Mbps
RS-232 Signals	DCD, RxD, TxD, DTR, GND, DSR, RTS, CTS, RI
RS-422 Signals	TxD-, TxD+, RxD+, RxD-, GND, RTS-, RTS+, CTS+, CTS-
Protection	25kV ESD protection for all signals 2000V DC optical isolation for all signals

RS-485 Signals (4 wire)	TxD-, TxD+, RxD+, RxD-, GND
RS-485 Signals (2 wire)	Data-, Data+, GND
Protection	15kV ESD protection for all signals

Serial Communication Parameters

Data Bits	7,8
Parity	None, Even, Odd, Mark, Space
Stop Bit	1,2
Flow Control	Hardware (RTS, CTS), XON/XOFF

Power

Power Input	Power supplied via USB connector No external power needed
-------------	--

Mechanical

Casing	SECC metal chassis suitable for DIN rail mounting
--------	---

Environmental

Operating Temperature	0°C to 55°C (32°F to 131°F)
Storage Temperature	-20°C to 75°C (-4°F to 167°F)
Operating Humidity	5% to 95% RH
Safety Approvals	CE, FCC

Contact Us:

Coolgear Inc.

5120 110th Avenue North

Clearwater, Florida 33760 U.S.A.

Toll Free: 1 888-688-2188

Local: 1 727-209-1300

Fax: 1 727-209-1302

Safety

- Read the entire Installation Guide before implementing this product for your application. This guide contains important information about electrical connections that must be followed for safe and proper operation.
- Inspect the product closely for visual defects before putting it to use.
- Keep away from areas where moisture builds, this product contains electrical components that can be damaged by moisture build up, this can adversely affect your equipment connected to it.
- Do not disassemble the product. Handling the product's internal components can expose it to ESD (Electro-Static Discharge) hazards that can affect the function of the device.
- If this product is not functioning properly, email our support team at support@coolgear.com.

USB CHARGING & CONNECTIVITY EXPERTS

Within Every Great Machine

For over 20 years our rugged, off-the-shelf USB hubs, chargers, and serial products are ready to go for your next project. Based in the US, Coolgear has successfully engineered and deployed millions of connectivity solutions into industrial, medical, automotive, commercial, and aerospace industries.

We understand the importance of reliability, build quality, & consider all our customers' applications as critical, wanting to ensure long-lasting event-free integrations.

Compliance Statement

View compliance within the product's respective Technical Data Sheet, found on the product's online listing.

Technical Support

When you reach out to Coolgear support, you'll find yourself in the hands of a solution-oriented and knowledgeable expert ready to answer whatever question you throw at them. If you ever need help with your product, visit coolgear.com/support for support tickets, downloads, and other support resources. For the latest drivers, please visit coolgear.com/download.

Product Standard Warranty

One (1) Year Warranty from Date of Purchase Invoice. Coolgear will repair or replace any Product determined to be defective and which has been returned, at your risk and expense, to Coolgear. Where Coolgear determines in its sole judgment that repair or replacement of such Product is not reasonable, Coolgear will keep the non-conforming Product and refund to you the amount you paid for such Product. Returned Products shall be subject to the balance of the Warranty Period otherwise applicable. Any reconditioned parts used by Coolgear shall be subject to all the same provisions as otherwise applicable to new parts. THE FOREGOING DESCRIBES COOLGEAR'S SOLE LIABILITY, AND YOUR SOLE REMEDY, FOR ANY BREACH OF WARRANTY. IF YOU DO NOT AGREE WITH THE TERMS OF THIS LIMITED WARRANTY, YOU MUST RETURN THE PRODUCTS UNUSED AND IN THEIR ORIGINAL CONTAINERS TO YOUR ORIGIN OF PURCHASE.

Limitation of Liability

This Limited Warranty does not cover: (i) defects or damages resulting from natural causes, casualty, accident, misuse or abuse, neglect, alterations, service or repair by other than Coolgear, including without limitation by you; (ii) improper installation or de-installation, operation or maintenance, improper connections with peripherals or other causes not arising out of defects in the materials or workmanship of Products; (iii) any Product for which the warranty sticker has been removed, modified or defaced; (iv) normal wear and tear; (v) damage to or loss of repaired or replaced Products during shipping by Coolgear except when such damage or loss is caused by poor or inadequate packaging by Coolgear; or (vi) Products purchased outside the United States. UNDER NO CIRCUMSTANCES WILL COOLGEAR BE LIABLE FOR ANY LOSS OF USE, INTERRUPTION OF BUSINESS OR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND (INCLUDING LOST PROFITS) REGARDLESS OF THE FORM OF ACTION WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT PRODUCT LIABILITY OR OTHERWISE, EVEN IF COOLGEAR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE TOTAL LIABILITY OF COOLGEAR HEREUNDER EXCEED THE GREATER OF \$50.00 OR THE AMOUNT YOU ACTUALLY PAID FOR THE PRODUCT GIVING RISE TO SUCH LIABILITY, REGARDLESS OF THE CAUSE OF ACTION, IN CONTRACT, TORT, STRICT LIABILITY OR OTHERWISE. NOT ALL JURISDICTIONS ALLOW SUCH LIMITATIONS OF DAMAGES SO THE FOREGOING LIMITATIONS MAY NOT APPLY TO YOU.

© 2024 Coolgear, Inc. All Rights Reserved. All products and accompanying digital documentation including images are the property and / or trademarks of Coolgear Inc. Coolgear Inc. are continuously improving upon its products. Product specifications are subject to change without notice.