coolgear

USB to Serial RS-422/RS-485 Industrial Single Port Adapter

w/FTDI

Model Number: *USB-COMi-TB*

Installation Guide

Coolgear, Inc.

Version: 1.0

Date: 04/22/2024

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Revision History

Revision	Date	Comments
1.0	04/22/2024	First Release

1. Introduction

Thank you for purchasing Coolgear's USB to Serial RS-422/RS-485 Industrial Single Port Adapter. The USB-COMi-TB USB-to-Industrial Single RS-422/485 Adapter is designed to make industrial communication port expansion quick and simple. Connecting to a USB port on your computer or USB hub, the USB-COMi-TB 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-422 or RS-485 device 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-TB 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-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-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-422/485 serial port by connecting to a USB port
- ✔ Serial operation mode can be easily changed by sliding open the upper case
- ✔ Robust and compact plastic housing
- ✔ Powered by USB port, no external power adapter required
- ✔ LEDs indicate TxD and RxD for easy port monitoring and diagnosis
- ✔ Installs as a standard Windows COM port
- ✔ Automatic transmit and receive control for 2-wire RS-485 half-duplex mode
- ✔ Built-in termination and biasing
- ✔ Serial port protected with 15KV ESD protection
- ✔ Non-standard baud rates supported
- ✔ Easy plug and play installation and RS-422/485 device connection
- ✔ High speed serial port with baud rate up to 3Mbps
- ✔ 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

Inside the unit, there is one 3-pin DIP switch which is set to select the mode of operation. You will need to open up the upper case (see below) and set the switch settings to RS-422 mode, or RS-485 mode, as per the requirements of your application. After setting the switches, you then plug the adapter to the USB port to start driver installation. The RS-422 & RS-485 Mode Block Configuration Settings are listed as follows.

Push down the upper case and slide it to open

RS-422 & RS-485 Mode Block Configuration
SW (External DIP Switch) for Mode Setting

	Operation Mode	S1	S2	S3
RS-422	4 wire with Handshaking	ON	ON	ON
RS-485	Full Duplex (4 wire)	OFF	ON	ON
	Half Duplex (2 wire) - with Echo	OFF	OFF	ON
	Half Duplex (2 wire) - without Echo	OFF	OFF	OFF
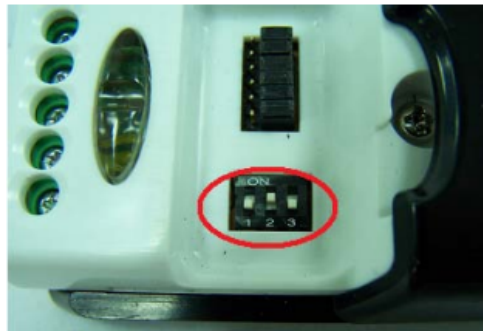
3-pin DIP switch for operating mode selection

Inside the unit, there are 6x3 (18-pin) header block which are jumpered to enable Tx, Rx, 120 Ohm termination resistors and Rx, Tx 750 Ohm biasing resistors. 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: 6x3 (18-pin) Header Block for Termination and Biasing Option Configuration

6x3 (18-pin) Header Block for Termination and Biasing Option Configuration

Jumper	Function
1-2 enable 2-3 disable	Tx+/- Termination of 120 Ohm. This jumper should always be populated for RS485 half-Duplex mode.
4-5 enable 5-6 disable	Pull-up Tx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Tx+.
7-8 enable 8-9 disable	Pull-down Tx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Tx-.
10-11 enable 11-12 disable	Rx+/- Termination of 120 Ohm. This jumper should always be populated for RS-422/485 full-duplex mode.
13-14 enable 14-15 disable	Pull-up Rx+ to VCC by 750 Ohm BIAS resistor. This jumper should be populated for pull-up Rx+
16-17 enable 17-18 disable	Pull-up Rx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Rx+.
19-20 enable 20-21 disable	Pull-down Rx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Rx

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-TB provides biasing for ease of installation. Please be sure to disable this inside the unit, if your cabling already provides biasing.

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
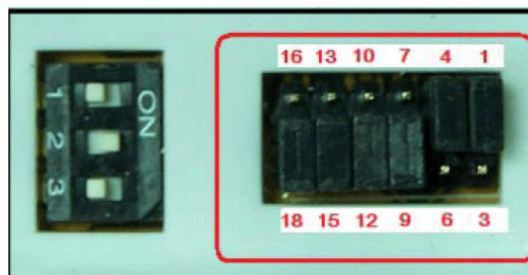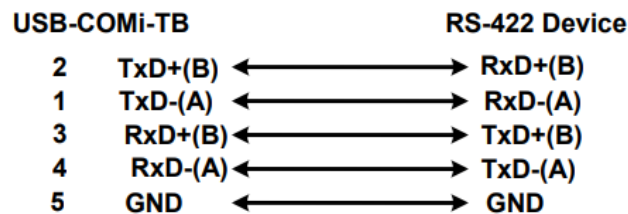
RS-422 Signal Pin-outs of Terminal Block

Pin 1	Tx- (A)
Pin 2	Tx+(B)
Pin 3	Rx+(B)
Pin 4	Rx-(A)
Pin 5	GND

RS-422 Signal Wiring

- ### Point- to -Point 4 Wire Full Duplex


```
USB-COMi-TB                      RS-422 Device
2   TxD+(B)  <----------->  RxD+(B)
1   TxD-(A)  <----------->  RxD-(A)
3   RxD+(B)  <----------->  TxD+(B)
4   RxD-(A)  <----------->  TxD-(A)
5   GND      <----------->  GND
```

RS-485 4 Wire (Full duplex) Signal Pin-outs of Terminal Block

Pin 1	Tx- (A)
Pin 2	Tx+(B)
Pin 3	Rx+(B)
Pin 4	Rx-(A)
Pin 5	GND

RS-485 2 Wire (Half duplex) Signal Pin-outs of Terminal Block

Pin 1	Tx- (A)
Pin 2	Tx+(B)
Pin 3	Rx+(B)

RS-485 Signal Wiring

● Point-to-Point 4 Wire Full Duplex

USB-COMi-TB			RS-485 Device
2	Tx+(B)	←→	Rx+ (B)
1	Tx- (A)	←→	Rx- (A)
3	Rx+ (B)	←→	Tx+(B)
4	Rx- (A)	←→	Tx- (A)
5	GND	←→	GND
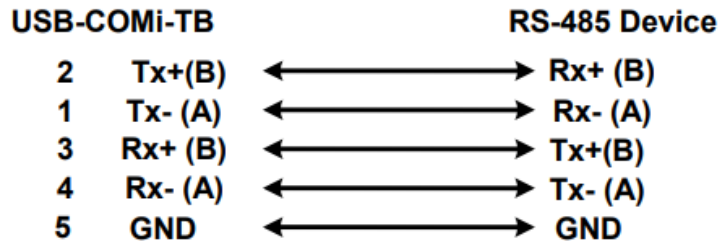
Multidrop RS-485 2-Wire Half-duplex

USB-COMi-TB		RS-485 Device
2	Data+(B)	Data+(B)
1	Data- (A)	Data- (A)
5	GND	GND

RS-485 Device x
Data+(B)
Data- (A)
GND
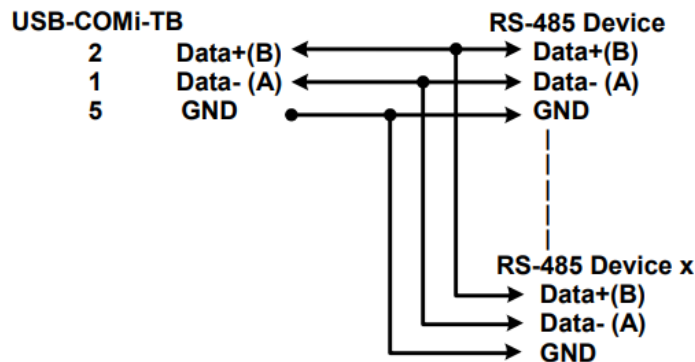
3. Windows 11/10/8/8.1/7/Vista/2003/XP/2000 Driver Installation

You need to have administrator privileges to install any new drivers under Windows 11/ 10/ 8.1/8/ 7/ Vista/ 2003/ XP/2000. To install the driver or update the configuration please log onto Windows as "Administrator" or ask your system administrator to install the USB-COM driver.
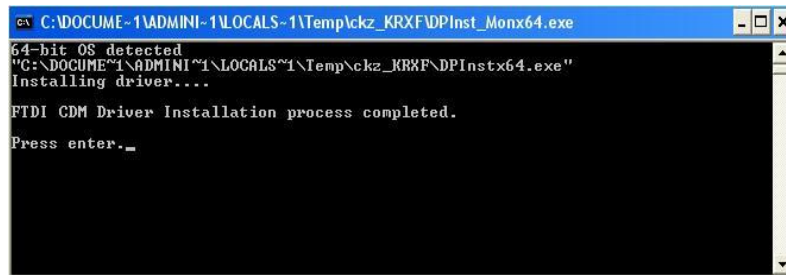
You need to install the driver first, prior to hardware installation. Do not connect the USB-to-Serial Adapter to the USB port of your computer, before you finish driver installation.

If your product came with an installation CD -

Please proceed with the following steps to install the driver:
1. Insert the "USB COM Series Driver and Utility" CD into your CD-ROM.
2. The "USB COM Series Driver and Utility CD" dialog box appears.

3. Under "Driver Installation", double click "Windows 11,10,8.1,8, 7, Vista, 2003, XP, 2000 driver" to install the device driver.

4. The USB COM install program will auto-detect the OS type and install the driver automatically. (Note: in Windows 7 or Vista OS you will find another dialog box, please click on "OK" to confirm the drivers install program).

5. After the message "FTDI CDM Driver installation process completed" appears, press "Enter" to complete the driver installation.

6. Plug in the USB to Serial Adapter to the USB port of your computer. Windows will finish installing the driver files.

If your product did not come with an installation CD, download the drivers for the product available at: https://www.coolgear.com/files/FTDI-Latest.zip

1. Download and extract the FTDI-Latest folder to your desktop or another appropriate location
2. Navigate to the appropriate folder corresponding to your OS
3. Run the setup executable (.exe) to complete the guided installation.

4. Mac OS Driver Installation

** Notice : Mac OS has pre-installed VCP drivers depending on OS version, go to the "Check installation" section and confirm the device is not already functioning before proceeding with these steps.

1. Download the FTDI-Latest file package from https://www.coolgear.com/files/FTDI-Latest.zip.
2. Open the archive and navigate to FTDI-Latest/MacOS and select the appropriate folder corresponding to your OS version, extract the contents of the folder to your desktop or another location.
3a. If you are using one of the versions with a .dmg file, run the .dmg and follow the installation instructions
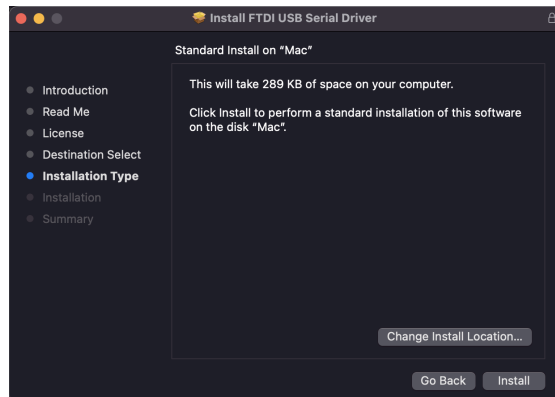
3b. If you are using the 10.15 - 12 version, the file is a ".app" file. This file needs to be moved into the mac's /Applications folder. Once moved, run the .app file from the folder. You will see a window like the one below.
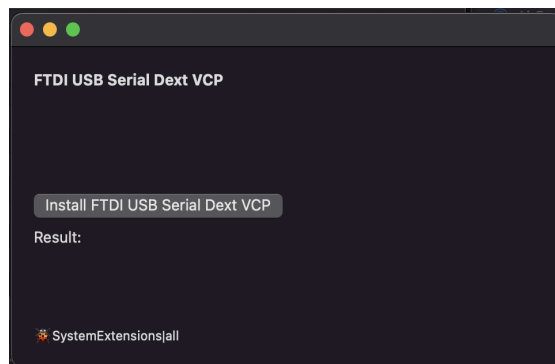
4. Click on "Install FTDI USB Serial Dext VCP" You will see a dialog box appear like the one below. Click on "Open Security Preferences"
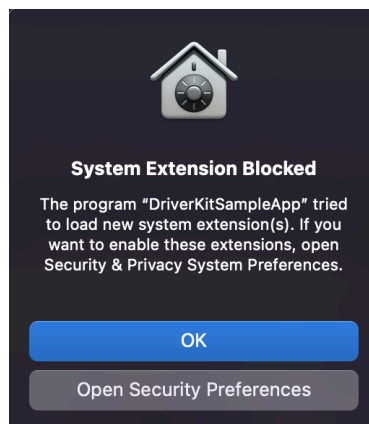
5. You will need to unlock the settings to make changes, and then click on "Allow" to allow the program to install the necessary system extension. Once completed, you should see the installer report a "Succeeded" message. Restart your computer, and the drivers are now installed and you may use your adapter.
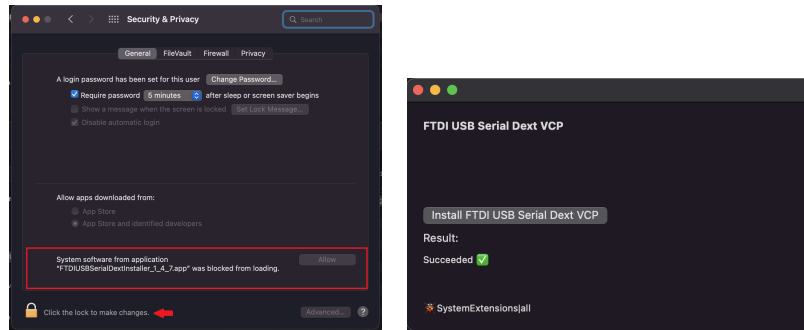

5. Check Installation

You can now verify the installation has been completed successfully by looking under Device Manager of the System Properties screen. (Go there by Start-Setting- Control Panel-System Properties-Hardware-Device Manager.

The device should have been installed as a "USB Serial Port (COMx)" attached to "USB Serial Converter (A/B or A/B/C/D)".
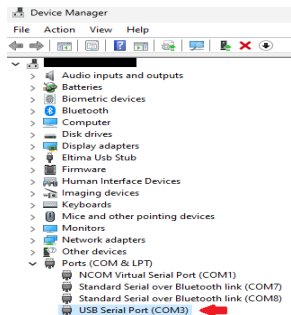
Mac Specific : Open "System Report" and navigate to the "USB" section of the tree. You should see a device labeled as "FT***" or "USB UART" with the manufacturer"FTDI ". This is your serial adapter, if it appears here, the device is installed and should function normally.
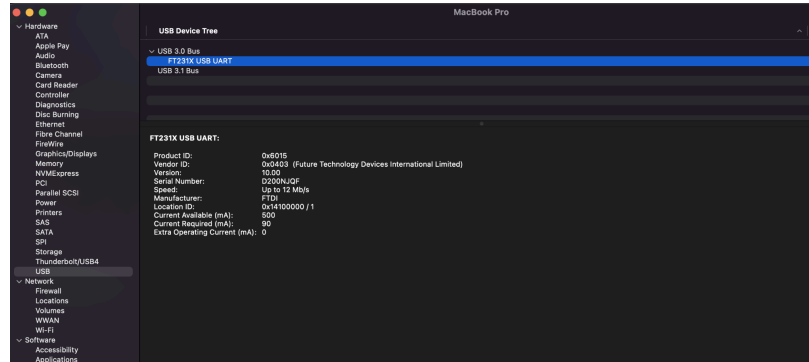
6. Change COM Port Properties & COM Port Number

This feature is particularly useful for programs, such as HyperTerminal, which only work with COM1 through COM4. Please ensure that you do not change the COM Port Number already in use.

To change the virtual COM port properties:

● Select the "USB Serial Port"
● Click "Properties".
● Select "Port Setting" and "Advanced".
● Click the drop down arrow on COM Port Number and scroll to the required COM port. Select "OK".
● Return to the Device Manager Screen. You will see that the USB Serial Port installation has been changed to the new COM Port Number.

# 7. Uninstalling Windows 7/8/8.1/10/11 Drivers

1. The USB to Serial Devices must be connected to the PC.
2. Right click on the windows icon / start button
3. Click on "Device Manager" in the menu
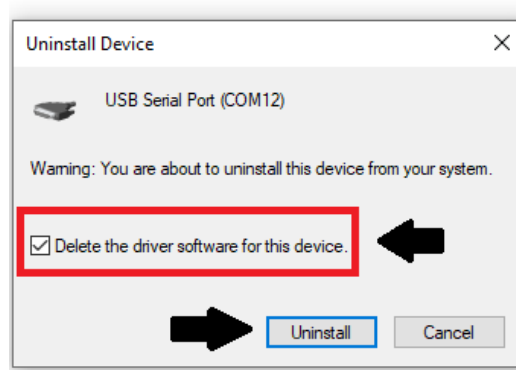4. **Alternative method – Search "Device Manager" in the start menu / search bar and open Device Manager
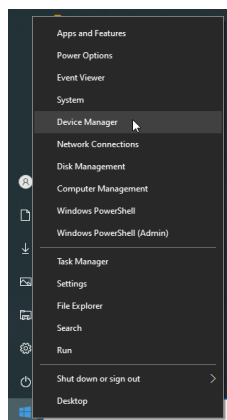
5. Locate your device under the "Ports (COM & LTP)" section of device manager.
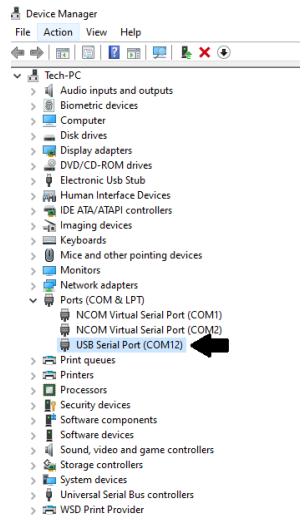
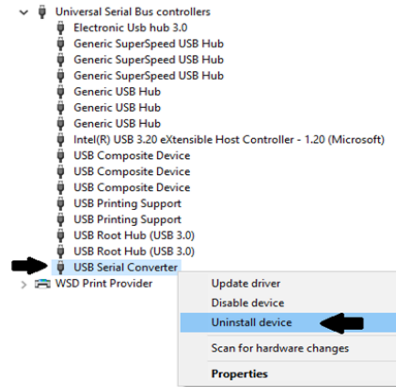6. Right click on the device, and select "Uninstall Device"
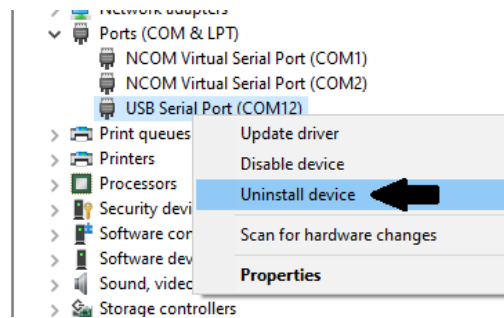
7. Select "Delete the driver software for this device" in the Uninstall prompt, and click "Uninstall"
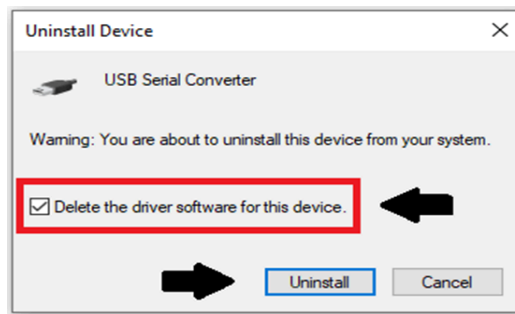

Note : If you have more than one USB Serial Port installed in your PC, you need to repeat steps 5-7 to delete the driver software for each port.

8. Locate your device under the "Universal Serial Bus Controllers" section of device manager

9. Right click on the device, and select "Uninstall Device"

10. Select "Delete the driver software for this device" in the Uninstall prompt, and click "Uninstall"

8. 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	• 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-232RS-422/485
Number of Ports	1
Connector	5-pin terminal block
Max Speed	Data transfer rates from 300 baud to 3 Mbaud
RS-422 Signals	TxD-, TxD+, RxD+, RxD-, GND
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 (5V) connector No external power needed

Mechanical

Casing	Plastic, ABS

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

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Safety	
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.