

# Introduction & Specifications of Hi-Speed USB Dual Ports Industrial I/O Adapter

- USB to Dual RS-422/485 Adapter (USB-2COMi-M)
- USB to Dual Opto-isolated RS-422/485 Adapter (USB-2COMi-SI-M)
  - with optical isolation (2000V)
  - with surge protection (25KV ESD) on all signal lines to prevent interference, to protect system and minimize down time

**Note: The USB-2COMi-M and USB-2COMi-SI-M must work in USB self power mode (5V 500mA).**

## Introduction

The USB Industrial I/O 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 Industrial I/O Adapter instantly adds 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 Industrial I/O 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-422 / 485 port functions as native Windows COM port, and is compatible with Windows serial communication applications.

The USB Industrial I/O Adapter provides instant connectivity to RS-422/485 communication device 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 solution for applications requiring single node or multi-drop communications over short and long distance.

## Optical Isolation & Surge Protection (USB-2COMi-SI-M)

Optical isolation and surge protection are available to this product USB-2COMi-SI-M.

Each RS-422/485 port is individually optically isolated with 2000 Volt DC optical isolation. The optical isolation protects your PC or notebook from spikes and surges on the RS-422/485 network, by converting the electrical pulse into an optical signal and then changing it back into an electrical pulse. Your computer is well protected, since the surges and spikes cannot cross the optical link.

Each RS-422/485 port is individually protected by surge protector to withstand electrostatic discharge and power surges up to 25KV ESD. Surge suppression on all signals prevent from damages caused by lightning or high voltage.

## Specifications & Features

### USB to Dual RS-422/485 Adapter (USB-2COMi-M)

- Adds dual high speed RS-422 / 485 ports via USB connection
- 384 byte receive buffer
- 128 byte transmit buffer for high speed data throughput
- Requires no IRQ, DMA, I/O port
- Data rates: 300 bps to 1M bps
- Serial Connector: DB-9 male connector and 5 pins terminal block.
- Auto transmit buffer control for 2-wire RS-485 half-duplex operation
- Termination and Bias resistors installed on-board.
- 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
- Virtual COM port drivers available for Windows 98, SE, ME, 2000, XP &2003.

### USB to Dual Opto-isolated RS-422/485 Adapter (USB-2COMi-SI-M)

- Adds dual high speed RS-422 / 485 ports via USB connection
- Each RS-422/485 port is individually optically isolated with 2000 Volt DC optical isolation.
- Each RS-422/485 port is individually protected by surge protector to withstand electrostatic discharge and power surges up to 25KV ESD.
- 384 byte receive buffer
- 128 byte transmit buffer for high speed data throughput
- Requires no IRQ, DMA, I/O port
- Data rates: 300 bps to 1M bps
- Serial Connector: DB-9 male connector and 5 pins terminal block.
- Auto transmit buffer control for 2-wire RS-485 half-duplex operation
- Termination and Bias resistors installed on-board.
- 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
- Virtual COM port drivers available for Windows 98, SE, ME, 2000, XP &2003.

## Input Power

- USB Self Power (500mA, 5V).

## Hardware Installation

Outside the unit, there are two 3-pin DIP switches which are set to select the mode of operation. You will need to set the switch settings to RS-422 mode, or RS-485 mode, as per the requirements of your application. After setting of switches, then plug the adapter to USB port to start driver installation. The RS-422 & RS-485 Mode Block Configuration Settings are listed as follows.

## RS-422 & RS-485 Mode Block Configuration

### SW1 (PORT1), SW2 (PORT2)

	Operation Mode	S1	S2	S3
<b>RS-422</b>	4 wire with handshaking	ON	ON	ON
<b>RS-485</b>	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

Inside the unit, there are two 7x2 (14 pin) header blocks which are jumpered to enable Tx, Rx, CTS 120 Ohm termination resistors and RX, Tx 750 Ohm 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:

### JP2(PORT1), JP3(PORT2), For Termination and Biasing Option Configuration

Jumper	Function
1-2	Tx+/- Termination of 120 Ohm. This jumper should always be populated for RS485 half-Duplex mode.
3-4	Pull-up Tx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Tx+.
5-6	Pull-down Tx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Tx-.
7-8	Rx+/- Termination of 120 Ohm. This jumper should always be populated for RS-422 and RS485 Full-Duplex mode.
9-10	Pull-up Rx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Rx+.
11-12	Pull-down Rx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Rx-.
13-14	CTS Termination of 120 Ohm. This jumper 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-2COMi-M and USB-2COMi-SI-M provide 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 enabled by default.

## **Driver Installation**

### **Windows 2000/XP/2003 Driver Installation**

You need to have administrator privileges to install any new drivers under Windows XP/2003/2000. To install the driver or update the configuration please log onto Windows as "Administrator" or ask your system administrator to install the USB industrial I/O adapter and driver.

Please proceed with the following steps to install the driver:

1. Plug in the USB connector B type into the USB port on the Adapter, and connect the USB connector on the other end of the cable to the host USB port in your computer.
2. The connection brings up "Found New Hardware Wizard".
3. Click "Next".
4. Select "Search for the best driver for my device", and click "Next".
5. Select "Specify a location" and click "Next". In the "Copy Manufacturer's file from", type "D:" where "D:" is the location of your CD-ROM.
6. Windows driver file searches for the device "USB High Speed Serial Converter".
7. Click "Next" to continue.
8. Windows has finished installing the software. Click "Finish" to complete the first part of installation.
9. The "Found New Hardware Wizard" appears again, and will complete the installation for the device "USB Serial Port".
10. Repeat step (4) to (8) to complete installation.

**Note:** The "Add New Hardware Wizard" will appear again, and the system will repeat the installation procedures one more time to install all the dual RS-422/485 ports of USB-2COMi-M and USB-2COMi-SI-M.

## Check Installation

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

The device should have installed as a "USB Serial Port (COMx)" under "Ports (COM&LPT)".

## Windows 98 / SE/ ME Driver Installation

1. Plug in the USB connector B type into the USB port on the Adapter, and connect the USB connector on the other end of the cable to the host USB port in your computer.
2. The connection brings up a "Building Driver Information Database" followed by the Add New Hardware Wizard.
3. The "Add New Hardware Wizard" searches for the new drivers for USB Serial Adapter. Click "Next".
4. Select "Search for the best driver for your device" and click "Next".
5. Select "Specify a location" and click "Next". In the "Copy Manufacturer's file from", type "D:" where "D:" is the location of your CD-ROM.
6. Windows driver file searches for the device "USB High Speed Serial Converter".
7. Click "Next" to continue.
8. Windows has finished installing the software automatically. Click "Finish" to complete installation.

## Check Installation

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

The device should have installed as a "USB Serial Port (COMx)" under " Ports (COM&LPT)" .

## 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 to one already in use.

To change the virtual COM port properties:

- Select the "USB Serial Port"
- Click "Properties".
- Select "Port Setting"
- Select "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.

## Uninstalling Windows 9x/SE/ME/2K/XP/2003 Drivers

To remove installed USB serial adapter drivers files and Windows registry information:

- Remove the device from the USB Port or Hub.
- Go to the Control Panel.
- Open the Add or Remove program.
- Select "FTDI FT2232 USB Driver".
- Click "Change/Remove".
- Select "Continue" to delete the drivers.
- Select "Finish".
- Reboot the computer to complete the driver uninstall.

## RS-422 Signal Pin-outs of DB-9 Male (CN2, CN3)

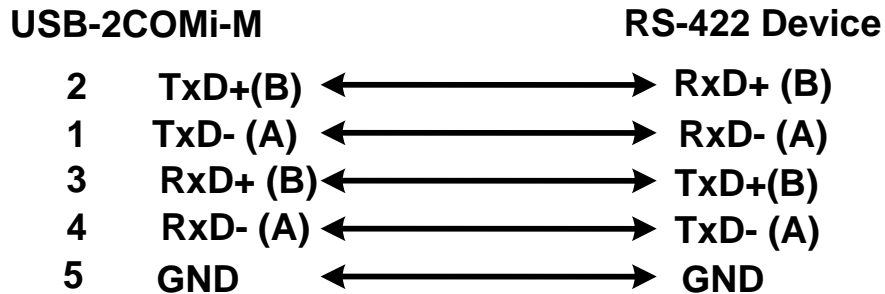
<b>Pin 1</b>	<b>TxD- (A)</b>
<b>Pin 2</b>	<b>TxD+(B)</b>
<b>Pin 3</b>	<b>RxD+(B)</b>
<b>Pin 4</b>	<b>RxD-(A)</b>
<b>Pin 5</b>	<b>GND</b>
<b>Pin 6</b>	<b>RTS- (A)</b>
<b>Pin 7</b>	<b>RTS+(B)</b>
<b>Pin 8</b>	<b>CTS+(B)</b>
<b>Pin 9</b>	<b>CTS- (A)</b>

## RS-422 Signal Pin-outs of Terminal Block (TB3, TB4)

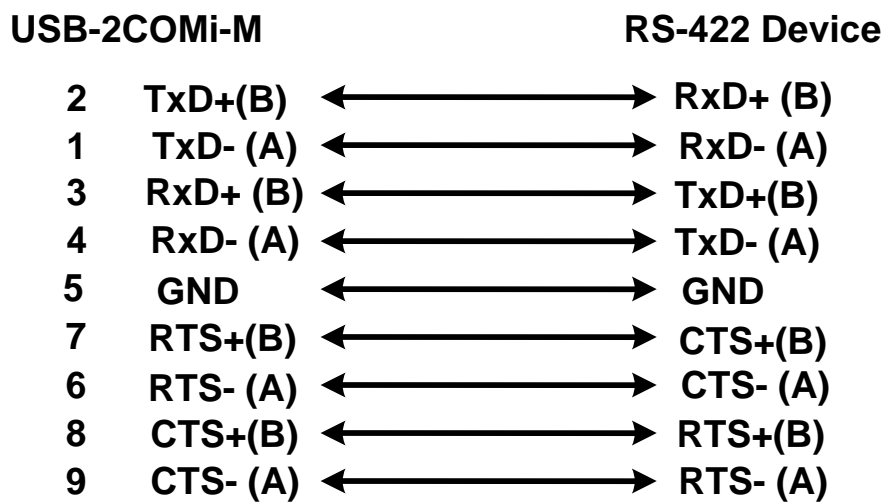
<b>Pin 1</b>	<b>TxD- (A)</b>
<b>Pin 2</b>	<b>TxD+(B)</b>
<b>Pin 3</b>	<b>RxD+(B)</b>
<b>Pin 4</b>	<b>RxD-(A)</b>
<b>Pin 5</b>	<b>GND</b>

## RS-422 Signal Wiring

- Point-to-Point 4-Wire Full Duplex



- RS-422 with Handshaking





## RS-485 4 Wire (Full duplex) Signal Pin-outs of DB-9 Male (CN2, CN3)

Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND

## RS-485 4 Wire (Full duplex) Signal Pin-outs of Terminal Block (TB3, TB4)

Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND

## RS-485 2 Wire (Half duplex) Signal Pin-outs of DB-9 Male (CN2, CN3)

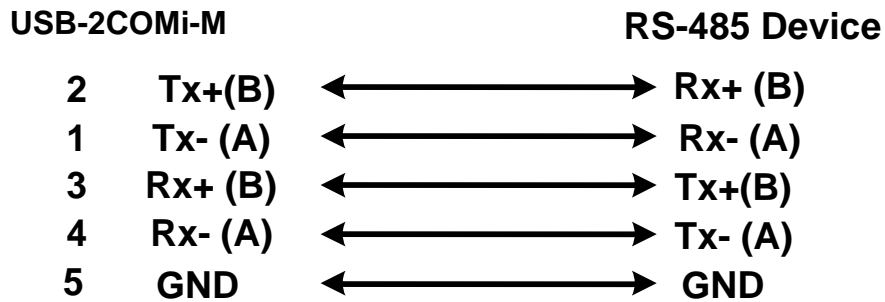
Pin 1	Data- (A)
Pin 2	Data+(B)
Pin 5	GND

## RS-485 2 Wire (Half duplex) Signal Pin-outs of Terminal Block (TB3, TB4)

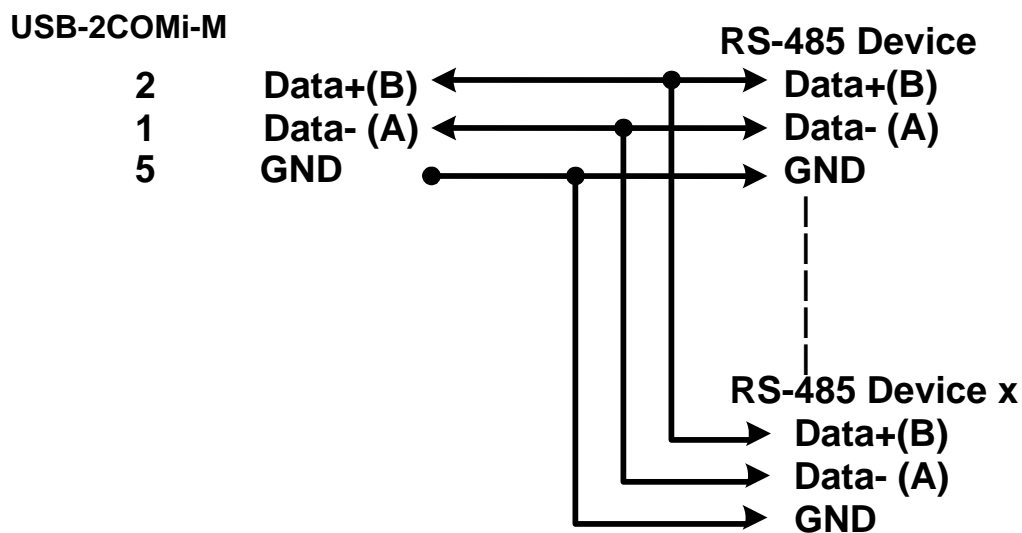
Pin 1	Data- (A)
Pin 2	Data+(B)
Pin 5	GND

## RS-485 Signal Wiring

- **Point-to-Point 4-Wire Full Duplex**



- **Multidrop RS-485 2-Wire Half-Duplex**



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