Installation Guide of Hi-Speed USB to Industrial I/O Adapter

Introduction of USB-COMi-SI-M

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 an industrial multi-electrical interface serial 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 serial device 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 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 it is compatible with Windows serial communication applications. Each port is individually configurable.

The USB to 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, ATMs and serial communication in harsh environment. The USB to Industrial I/O Adapter provides industrial solution requiring single node or multi-drop communications over short and long distance.

Optical Isolation & Surge Protection

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

The RS-422/485 port is 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.

The RS-422/485 port is 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 lighting or high voltage.

Specifications & Features

- **Adds a high speed RS-422 / 485 serial port via USB connection.**
- **384 byte receive buffer.**
- **128 byte transmit buffer for high speed data throughput.**

- **The RS-422/485 port is optical isolated with 2000 Volt DC optical isolation.**
- **The RS-422/485 port is protected by surge protection to withstand electrostatic discharge and power surges up to 25KV ESD.**
- **Requires no IRQ, DMA, I/O port.**
- **Data rates: 300 bps to 921.6K bps.**
- **Serial Connector: one DB-9 male connector, and one 6-pin Terminal Block**
- **Auto transmit buffer control for 2-wire RS-485 half-duplex operation.**
- **Termination 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.**
- **External 4-pin dip switch to set RS-422, or RS-485 modes**
- **Virtual COM port drivers provided for Windows 2003, XP, 2000, 9x, SE, ME**

Input Power

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

Hardware Installation

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

After the setting of DIP switch, you then plug the adapter to USB port to start driver installation. The Mode Block Configuration Settings are listed as follows

SW (External DIP Switch)

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

Note : In the most common situation , an 120 Ohm termination resistor of TxD (S4 is ON) is required in RS485 Half Duplex configuration. Otherwise it is rarely used.

JP1 For Termination and Biasing Option Configuration

Inside the unit, there is one 2 x 6 (12 pin) header blocks which are jumpered to enable Rx, CTS 120 Ohm termination resistors and Tx, Rx 750 Ohm BIASing resistor.

You will need to open up the metal 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:

Jumper	Function
1-2	Pull-up Tx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Tx+.
3-4	Pull-down Tx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Tx- .
5-6	Rx Termination of 120 Ohm. This jumper should always be populated for RS-422 mode.
7-8	Pull-up Rx+ to VCC by 750 Ohm Bias resistor. This jumper should be populated for pull-up Rx+
9-10	Pull-down Rx- to GND by 750 Ohm Bias resistor. This jumper should be populated for pull-down Rx- .
11-12	CTS Termination of 120 Ohm. This jumper should 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.

Windows XP / 2003 / 2000 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 driver.

Please proceed with the following steps to install the driver:

1. **Plug in the USB connector (type-B) into the USB port on the Adapter, and connect the USB connector(type-A) 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 (recommended) ", 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.**

Windows 98 / SE/ ME Driver Installation

1. **Plug in the USB connector (type-B) into the USB port on the Adapter, and connect the USB connector (type-A) 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. Click "Finish" to complete installation.**

Check Installation in Windows XP/2003/2000

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-Select View -Device by connection).

The device should have installed as a "USB Serial Port (COMx)" attached to "USB High Speed Serial Converter".

Check Installation in Windows 98

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)" attached to "USB High Speed Serial Converter".

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"**
- **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 XP/2000/2003/9x/SE/ME Drivers

To uninstall the Windows XP/2000/2003/9x/SE/ME drivers :

- **Remove the device from the USB Port or Hub**
- **Go to the Control Panel, and open the “Add or Remove program”**
- **Select “FTDI USB Serial Converter Driver”, and click “Change/Remove”**
- **Select “Continue to delete the drivers”. Select “Finish” to complete.**
- **Reboot the computer to complete the driver uninstall**

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

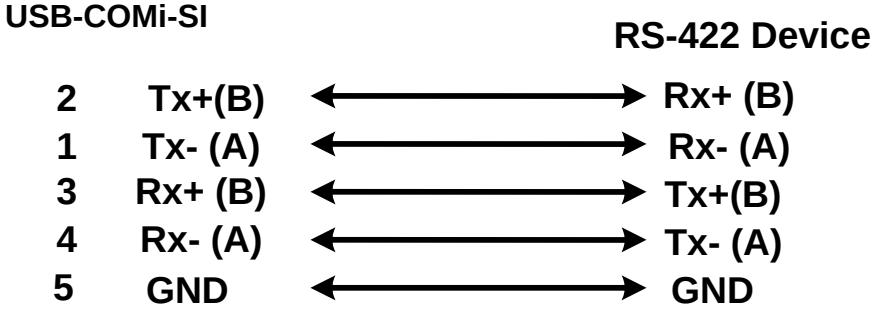
Pin 1	Tx- (A)
Pin 2	Tx+(B)
Pin 3	Rx+(B)
Pin 4	Rx- (A)
Pin 5	GND
Pin 6	RTS- (A)
Pin 7	RTS+(B)
Pin 8	CTS+(B)
Pin 9	CTS- (A)

RS-422 Signal Pin-outs of Terminal Block (TB1)

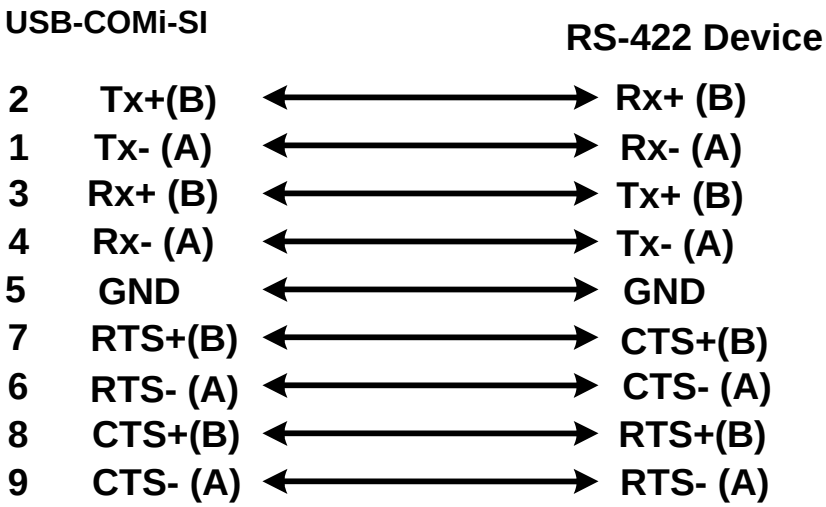
Pin 1	Tx- (A)
Pin 2	Tx+(B)
Pin 3	Rx+(B)
Pin 4	Rx-(A)
Pin 5	GND
Pin 6	GND

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)

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

RS-485 4 Wire (Full duplex) Signal Pin-outs of Terminal Block (TB1)

Pin 1	**Tx- (A)**
Pin 2	**Tx+(B)**
Pin 3	**Rx+(B)**
Pin 4	**Rx-(A)**
Pin 5	**GND**
Pin 6	**GND**

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

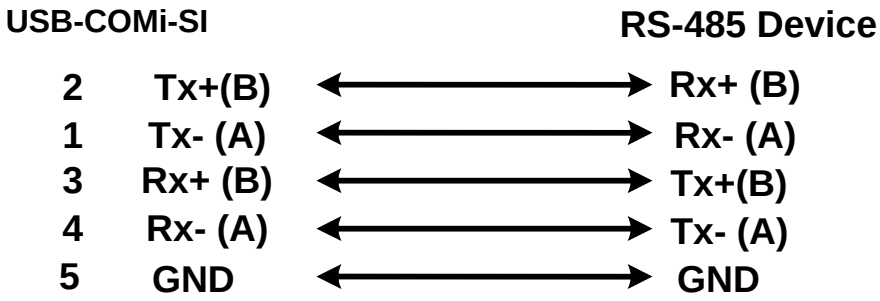
Pin 1	**Data- (A)**
Pin 2	**Data+(B)**
Pin 5	**GND**

RS-485 2 Wire (Half duplex) Signal Pin-outs of Terminal Block (TB1)

Pin 1	**Data- (A)**
Pin 2	**Data+(B)**
Pin 5	**GND**
Pin 6	**GND**

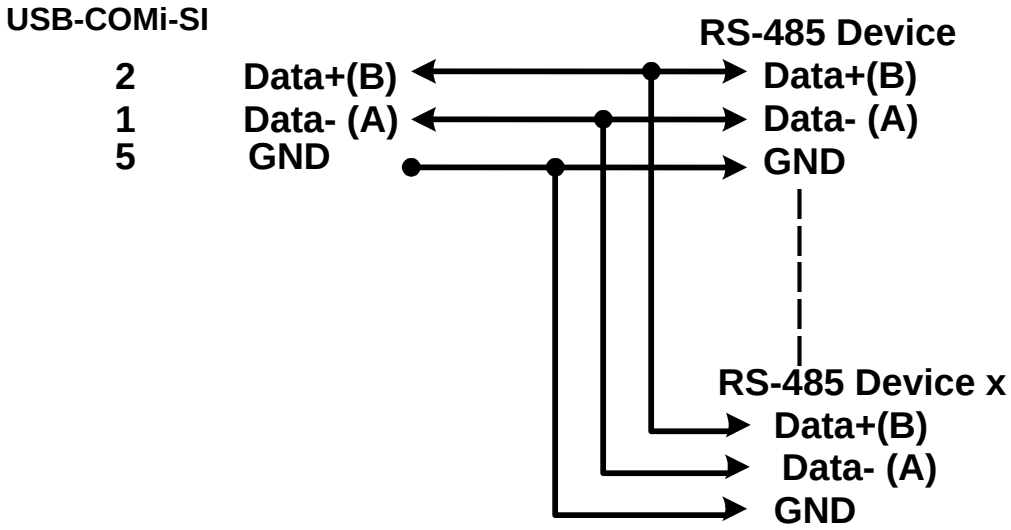
RS-485 Signal Wiring

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



RS-485 Signal Wiring

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



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