

# Introduction & Specifications of Hi-Speed VScom USB-to-Industrial Quad RS-422/485 Adapter

- **USB to Quad Opto-isolated RS-422/485 Adapter (USB-4COMi-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
- **USB to Quad RS-422/485 Adapter (USB-4COMi-M)**

## Introduction

The USB to Industrial Quad 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 to Industrial Quad RS-422/485 Adapter instantly adds four industrial communication ports to your system. By taking advantage of the USB bus, the USB Industrial Quad RS-422/485 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 to Industrial Quad RS-422/485 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 ports function as native Windows COM ports, and all the ports are compatible with Windows serial communication applications.

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

## Optical Isolation & Surge Protection (Only USB-4COMi-SI-M provides this function)

Optical isolation and surge protection are available to this product USB-4COMi-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 Quad Opto-isolated RS-422/485 Adapter (USB-4COMi-SI-M)

- Adds quad 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: four DB-9 male connectors
- 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
- Self-powered. Power adapter of 5V, 1.6 Amp included
- Virtual COM port drivers available for Windows Vista, 2003, XP, 2000, ME, 9x.

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## Power Supply

This 4-port RS-422/485 Adapter is provided with an external switching power adapter in the package.

## Hardware Installation

Outside the unit, there are four 4-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 and connecting power supply to the adapter, you 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), SW3 (PORT3), SW4 (PORT4)

	Operation Mode	S1	S2	S3	S4
<b>RS-422</b>	4 wire with handshaking	ON	ON	OFF	OFF
<b>RS-485</b>	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 , a 120 Ohm termination resistor of TxD (S4 is ON ) is required in a RS485 Half Duplex configuration. Otherwise it is rarely used.

Inside the unit, there are four 6x2 (8pin) header blocks which are jumpered to enable 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.

## JP5(PORT1), JP6(PORT2), JP7(PORT3), JP8(PORT4) for Termination and Biasing Option Configuration

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 and RS485 Full-Duplex 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 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-4COMi-M and USB-4COMi-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. Rx-Termination is inside the box, because you hardly ever need to change it. Tx-Termination is used in Half-Duplex modes. In this situation data is sent *and* received via Tx+/- lines. Therefore Tx-Termination is done via DIP-Switch (see S4 above).

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

You need to have administrator privileges to install any new drivers under Windows 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 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.*

Please proceed with the following steps to install the driver:

1. Insert the "USB to Serial Driver and Utility" CD into your CD-ROM.
2. The "USB to Serial Driver and Utility CD" dialog box appears.
3. Under "Driver Installation", double click "Windows Vista, 2003, XP, 2000 driver" to install the device driver.
4. If your Windows is 64-bit, you need to select "Windows (64-bit) Vista, 2003, XP driver" for driver installation.
5. After the message "FTDI CDM drivers have been successfully installed" appears, click "finish" to complete the driver installation.
6. Plug in the USB Serial device to the USB port of your computer. Windows will finish installing the driver files.

### 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 installed as a "USB Serial Port (COMx)" attached to "USB Serial Converter (A/B)".

## 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.

## Uninstalling Windows Vista/2003/XP/2000 Drivers

To uninstall the Windows Vista/2003/XP/2K drivers:

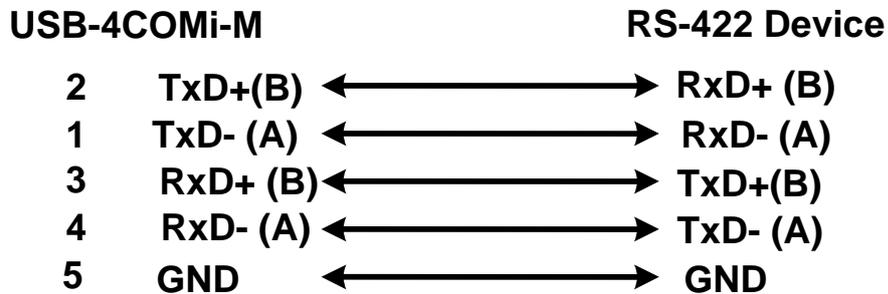
- Remove the USB serial device from the USB Port or Hub.
- Go to the Control Panel.
- Open the Add or Remove program.
- Select "FTDI USB Serial Converter Driver".
- Click "Change/Remove".
- Select "Continue" to delete the drivers.
- Select "Finish".
- Reboot the computer to complete the driver uninstall.

## RS-422 Signal Pin-outs of DB-9 Male

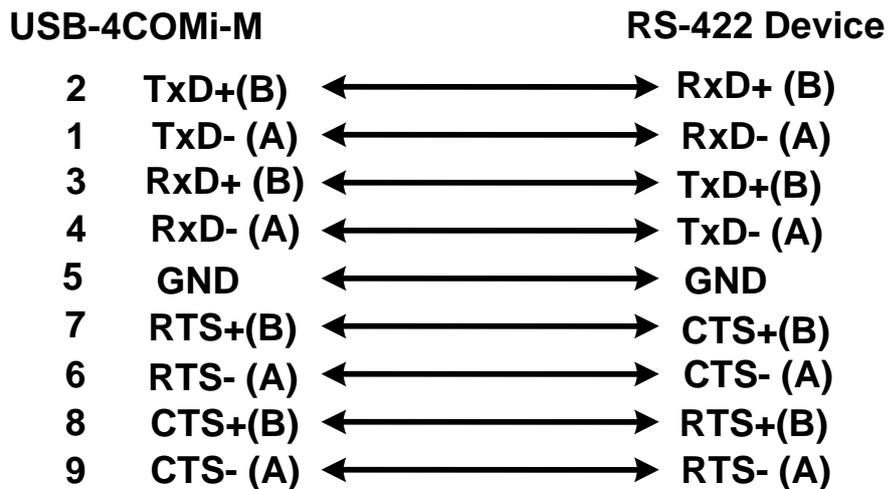
Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND
Pin 6	RTS- (A)
Pin 7	RTS+(B)
Pin 8	CTS+(B)
Pin 9	CTS- (A)

## 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 Connector

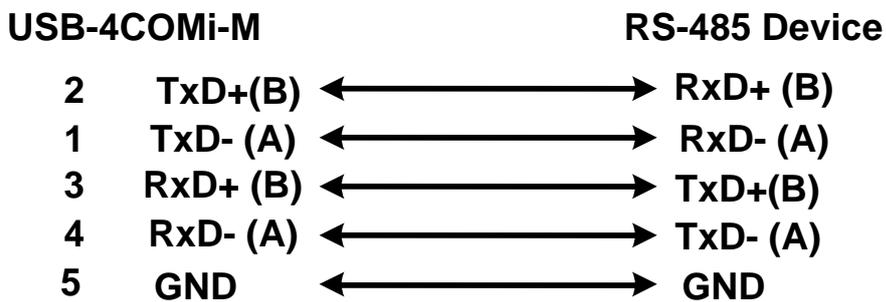
Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND

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

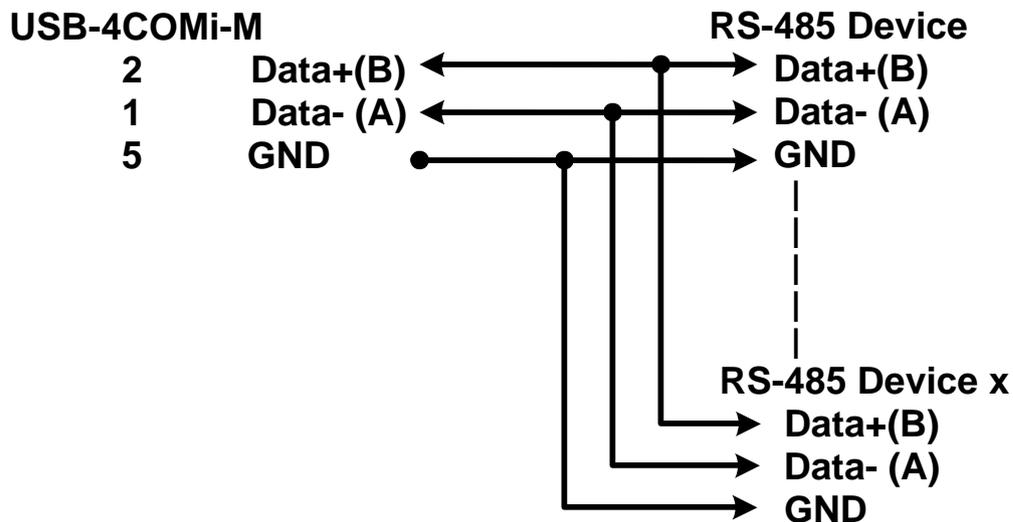
Pin 1	Data- (A)
Pin 2	Data+(B)
Pin 5	GND

## RS-485 Signal Wiring

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



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



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