

USB Industrial I/O Adapter

The USB Industrial I/O Adapters consist of the following models:

- USB to Single RS-422/485 Adapter (USB-COMi)
- USB to Single RS-422/485 Adapter
- with optical isolation and surge protection (USB-COMi-SI)
- USB to Dual RS-422/485 Adapter (USB-2COMi)
- USB to Dual RS-422/485 Adapter
- with optical isolation and surge protection (USB-2COMi-SI)
- USB to Quad RS-422/485 Adapter (USB-4COMi)
- USB to Quad RS-422/485 Adapter
- with optical isolation and surge protection (USB-4COMi-SI)

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 serial 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

Optical isolation and surge protection are available to 3 models :

- USB-COMi-SI USB to Single RS-422/485 Adapter
- USB-2COMi-SI USB to Dual RS-422/485 Adapter
- USB-4COMi-SI USB to Quad RS-422/485 Adapter

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.

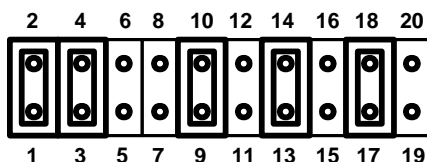
Power Supply

- The single port versions, USB-COMi & USB-COMi-SI, are powered by the USB port. No external power supply is needed.
- The dual & quad port versions require an external power adapter. The USB-2COMi, USB-2COMi-SI, USB-4COMi, USB-4COMi-SI are provided with an external power adapter in the package. You need to plug the power adapter to the power source first before driver installation.

Hardware Installation

Inside the unit, there is a 10 x 2 (20 pin) header block which is jumpered to select the mode of operation. You will need to open up the plastics covers and set the jumper settings to RS-422 mode or RS-485 mode as per the requirements of your application. After the setting of jumpers 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.

Example jumper block setting (RS-422 mode)



RS-422 Mode Block Configuration

Jumper	Function
1-2	TxD / RxD Termination of 120 Ohm. This jumper should always be populated for RS-422.
3-4	CTS/ RTS Termination of 120 Ohm. This jumper should always be populated for RS-422.
9-10	TxD Driver Always On. As RS-422 is full duplex point to point, the transmitter should always be enabled.
13-14	RxD Always Enabled. As RS-422 is full duplex point to point, the receiver should always be enabled.
17-18	Enable CTS Handshaking. This setting allows the data flow to be controlled using CTS/RTS handshaking if required by the application.

Note : all other positions = no jumper populated.

RS-485 Mode Block Configuration

Jumper	Function
1-2	TxD / RxD Termination of 120 Ohm. This jumper should only be populated at each end of the cable to meet RS-485 termination requirements.
5-6 7-8	TxD / RxD Single Pair (half duplex for RS485). Populate both these jumpers.
11-12	Enable TxD Driver only when transmitting. This is required by RS485 as multiple devices can transmit over the same twisted pair. When a RS-485 is not transmitting, it's transmitter must be turned off to allow other devices to communicate over the same wires.
EITHER 13-14 OR 15 - 16	RxD Always Enabled. In this mode characters transmitted by the RS485 device will also be received by the same device. These echoed characters are usually stripped out by the application software. Transmit Data Echo Suppression Mode. In this mode characters transmitted by the RS485 device will NOT be received by the same device. In this mode there is no need for the application software to strip out the transmitted data from the received data as it is handled by the hardware.
19-20	CTS Always Enabled. As there is no hardware handshaking in RS-485 , CTS should be permanently enabled to allow unrestricted flow of data. If handshaking is required for RS-485 it can be done using X-On / X-Off handshaking protocol.

Note : all other positions = no jumper populated.

Driver Installation

Windows 98 / SE/ ME Driver Installation

1. Plug in the USB connector 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:\Win98\USB_Driver\USB-COM" where "D" is the location of your CD-ROM.
6. Windows driver file searches for the device "USB-COM Serial Adapter"
7. Click "Next" to continue.
8. Windows has finished installing the software. Click "Finish" to complete installation.

Note: The "Add New Hardware Wizard" will appear again if you are installing USB Multiple Serial Ports Version, e.g. USB-2COM/i or USB-4COM/i. You need to repeat the installation procedures one more time for Dual- port version, and three more times for Quad-port version.

Check Installation

You can now verify the installation has completely 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.

Windows 2000 Driver Installation

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

Please proceed with the following steps to install the driver:

1. Plug in the USB connector 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:\Win2000\USB_Driver\USB-COM" where "D" is the location of your CD-ROM.
6. Windows driver file searches for the device "USB-COM Serial Adapter"
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 "Found New Hardware Wizard" will appear again if you are installing USB Multiple Serial Ports Version, e.g. USB-2COM/i or USB-4COM/i. You need to repeat the installation procedures one more time for Dual- port version, and three more times for Quad-port version.

Check Installation

You can now verify the installation has completely 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".

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 9x Drivers

To uninstall the Windows 9x drivers :

- Insert the provided CD-ROM
- Double click "My Computer"
- Select "D:\", where "D" is the location of your CD-ROM
- Double click "Win98" or "WinME"
- Double click "USB_Drivers"
- Double click "USB-COM"
- Double click "Ftdiunin"
- Select "OK" to delete the drivers.
- Select "Finish".
- Reboot the computer to complete the driver uninstall.

Uninstalling Windows 2000 Drivers

To uninstall the Windows 2000 drivers :

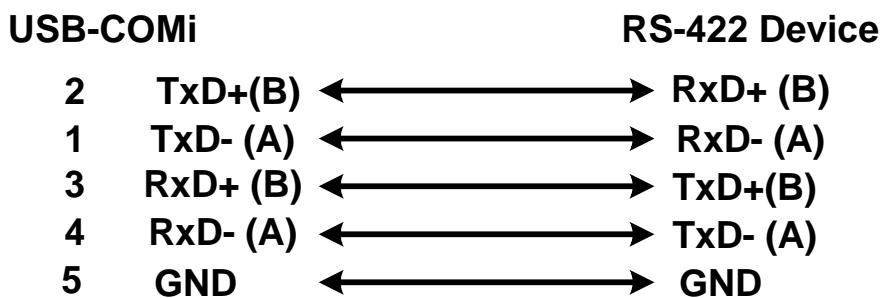
- Insert the provided CD-ROM
- Double click "My Computer"
- Select "D:\", where "D" is the location of your CD-ROM
- Double click "Win2000"
- Double click "USB_Drivers"
- Double click "USB-COM"
- Double click "Ftdiun2K"
- Select "OK" to delete the drivers.
- Select "Finish".
- Reboot the computer to complete the driver uninstall.

Signal Pin-outs of DB-9 Male

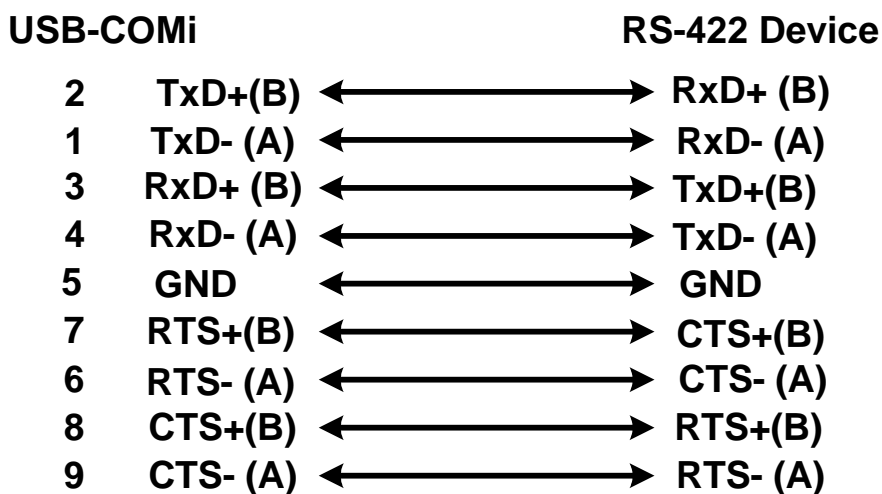
Pin 1	TxD- (A)
Pin 2	TxD+(B)
Pin 3	RxD+(B)
Pin 4	RxD-(A)
Pin 5	GND
Pin 6	RTS- (A)
Pin 7	RTS+(B)
Pin 8	CTS+(B)
Pin 9	CTS- (A)

RS-422 Signal Wiring

- Point-to-Point 4 Wire Full Duplex



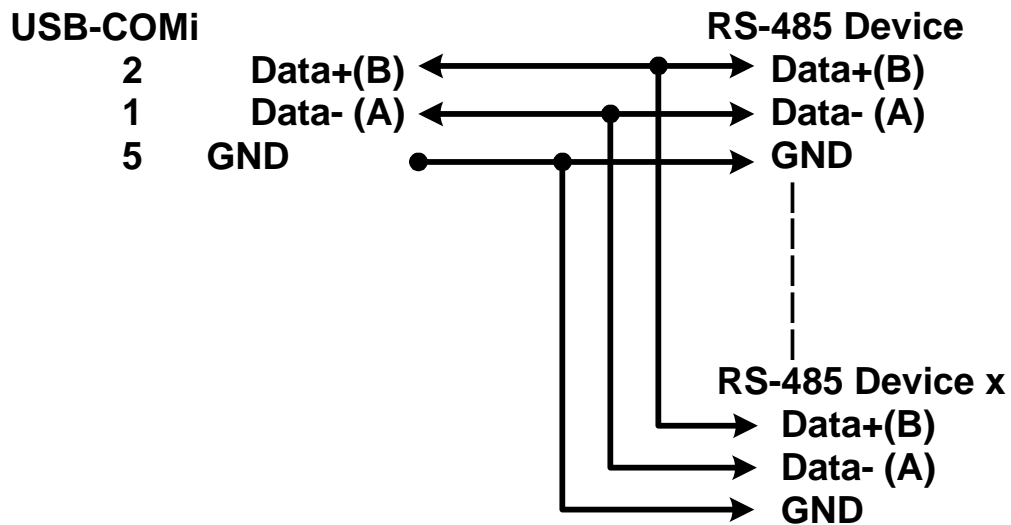
- RS-422 with Handshaking



RS-485 Signal Pin-outs of DB-9 Male

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

RS-485 Signal Wiring



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

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