

SPECIFICATIONS

General	
Bus	PCI Express; Single-Lane (×1)
Chipset	EXAR XR17V354
Interface	RS-422/485
Plug & Play	Supported
IRQ & IO Address	Assigned by system BIOS

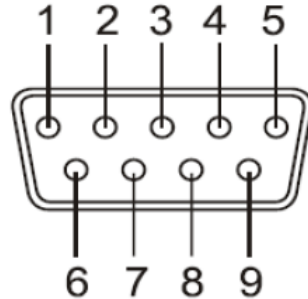
PCIe-400i	
No. of Ports	Four
RS-422 Signals	TxD-, TxD+, RxD+, RxD-, GND, RTS-, RTS+, CTS+, CTS-
RS-485 Signals	TxD-, TxD+, RxD+, RxD- (4 wire), Data-, Data+ (2 wire)
Max. Bitrates	921.6kbps
Serial Configuration	Data bits: 5, 6, 7, 8 Parity: None, Odd, Even, Mark, Space Stop bits: 1, 1.5, 2
UART FIFO Buffer Size	Each port with 256 bytes FIFO for transmit & receive
Connectors	One DB37 female connector
Protection	15kV ESD protection and 600W surge protection for all serial signals
Mechanical	PCIe-400i with standard height bracket

PCIe-400i-SI	
No. of Ports	Four, with isolation
RS-422 Signals	TxD-, TxD+, RxD+, RxD-, GND, RTS-, RTS+, CTS+, CTS-
RS-485 Signals	TxD-, TxD+, RxD+, RxD- (4 wire), Data-, Data+ (2 wire)
Max. Bitrates	921.6kbps
Serial Configuration	Data bits: 5, 6, 7, 8 Parity: None, Odd, Even, Mark, Space Stop bits: 1, 1.5, 2
UART FIFO Buffer Size	Each port with 256 bytes FIFO for transmit & receive
Connectors	One DB37 female connector
Protection	15kV ESD protection and 600W surge protection for all serial signals 3000V DC optical isolation for all serial signals
Mechanical	PCIe-400i-SI with standard height bracket

Environment	
Operating Temperature	0°C to 60°C
Storage Temperature	-40°C to 85°C
Humidity	0 to 80% RH. Noncondensing
Safety Approvals	CE, FCC

PIN-OUT INFORMATION

The following are the connector pin-out for PCIe-400i & PCIe-400i-SI PCI Express serial I/O card.



DB9 Male connector pin numbers

RS-422 Pin-out for DB9 Connector

Pin Number	Pin Type	Description
1	Output	TxD-: Transmit Data, negative polarity
2	Output	TxD+: Transmit Data, positive polarity
3	Input	RxD+: Receive Data, positive polarity
4	Input	RxD-: Receive Data, negative polarity
5	Ground	GND: Signal Ground
6	Output	RTS-: Request to Send, negative polarity
7	Output	RTS+: Request to Send, positive polarity
8	Input	CTS+: Clear to Send, positive polarity
9	Input	CTS-: Clear to Send, negative polarity

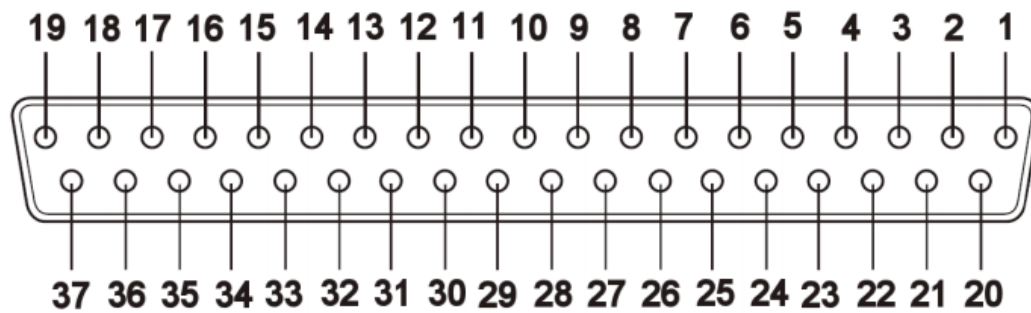
RS-485 Full Duplex (4 wire) Mode Pin-out for DB9 Connector

Pin Number	Pin Type	Description
1	Output	TxD-: Transmit Data, negative polarity
2	Output	TxD+: Transmit Data, positive polarity
3	Input	RxD+: Receive Data, positive polarity
4	Input	RxD-: Receive Data, negative polarity
5	Ground	GND: Signal Ground

RS-485 Half Duplex (2 wire) Mode Pin-out for DB9 Connector

Pin Number	Pin Type	Description
1	Output/ Input	Data-: Transmit/Receive Data, negative polarity
2	Output/ Input	Data+: Transmit/Receive Data, positive polarity
5	Ground	GND: Signal Ground

Pin-out of DB37 Female Connector for Four RS-422/485 Ports



DB37 Female connector pin numbers

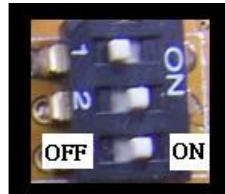
Pin	RS-422 Mode	RS-485 "4W" Mode	RS-485 "2W" Mode
1	.NC.		
2	TxD-(3)	TxD-(3)	Data-(3)
3	Ground	Ground	Ground
4	CTS+(3)		
5	TxD+(3)	TxD+(3)	Data+(3)
6	CTS-(4)		
7	RxD-(4)	RxD-(4)	
8	RTS-(4)		
9	RTS+(4)		
10	RxD+(4)	RxD+(4)	
11	TxD-(2)	TxD-(2)	Data-(2)
12	Ground	Ground	Ground
13	CTS+(2)		
14	TxD+(2)	TxD+(2)	Data+(2)
15	CTS-(1)		
16	RxD-(1)	RxD-(1)	
17	RTS-(1)		
18	RTS+(1)		
19	RxD+(1)	RxD+(1)	
20	CTS-(3)		
21	RxD-(3)	RxD-(3)	
22	RTS-(3)		
23	RTS+(3)		
24	RxD+(3)	RxD+(3)	
25	TxD-(4)	TxD-(4)	Data-(4)
26	Ground	Ground	Ground
27	CTS+(4)		
28	TxD+(4)	TxD+(4)	Data+(4)
29	CTS-(2)		

30	RxD-(2)	RxD-(2)	
31	RTS-(2)		
32	RTS+(2)		
33	RxD+(2)	RxD+(2)	
34	TxD-(1)	TxD-(1)	Data-(1)
35	Ground	Ground	Ground
36	CTS-(1)		
37	TxD+(1)	TxD+(1)	Data+(1)

HARDWARE AND SOFTWARE SETTINGS

Selecting the Operation Mode

There are four 3-pin DIP switches, SW1, SW2, SW3 and SW4, on PCIe-400i and PCIe-400i-SI cards. The DIP switches are used 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. The RS-422 & RS-485 mode block configuration settings are listed as follows.



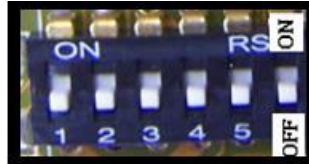
SW1, SW2, SW3, SW4 for Mode Setting

Operation Mode		1	2	3
RS-422	4 wire with Handshaking	ON	ON	ON
	Full Duplex (4 wire)	OFF	ON	ON
RS-485	Half Duplex (2 wire) – with Echo	OFF	OFF	ON
	Half Duplex (2 wire) – without Echo	OFF	OFF	OFF

Note: When PCIe-400i and PCIe-400i-SI are working in RS-485 operation mode, you need to enable the automatic direction control of the RS-485 transceiver buffer by setting the driver configuration (refer to page 11).

Enabling Termination and Biasing Resistors

There are four 6-pin DIP switches, S1, S2, S3 and S4, on PCIe-400i and PCIe-400i-SI cards. The DIP switches are used to enable TxD, RxD 120 Ω termination resistors and TxD, RxD 750 Ω biasing resistors. You will need to set the DIP switches for termination and biasing resistors as per the requirements of your application. Settings are listed as follows:

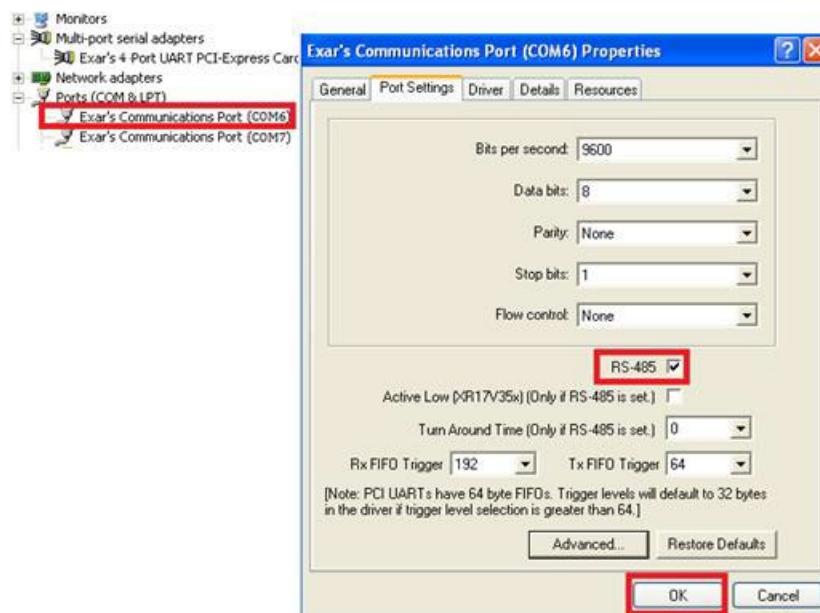


DIP Switch	Function	Remark
S1/S2/S3/S4 Pin 1 ON	Enable TxD+ biasing resistor	Pull-up TxD+ with 750 Ω resistor
S1/S2/S3/S4 Pin 2 ON	Enable TxD+/TxD- termination resistor	120 Ω termination resistor
S1/S2/S3/S4 Pin 3 ON	Enable TxD- biasing resistor	Pull-down TxD- with 750 Ω resistor
S1/S2/S3/S4 Pin 4 ON	Enable RxD+ biasing resistor	Pull-up RxD+ with 750 Ω resistor
S1/S2/S3/S4 Pin 5 ON	Enable RxD+/RxD- termination resistor	120 Ω termination resistor
S1/S2/S3/S4 Pin 6 ON	Enable RxD- biasing resistor	Pull-down RxD- with 750 Ω resistor

Enabling Automatic Direction Control in RS-485 Mode

When PCIe-400i or PCIe-400i-SI is working in RS-485 operation mode, you need to enable the automatic direction control of the RS-485 transceiver buffer by setting the driver configuration.

1. Double click on “Exar’s Communications Port (COMx)” under Device Manager to enter “Exar’s Communications Port (COMx) Properties”. Check “RS-485” and click “OK” to enable the automatic direction control of the transceiver buffer in RS-485 operation mode.



2. Repeat the steps above for other COM ports to enable automatic direction control for all ports.

WIRING INFORMATION FOR RS-422/485

This section will provide proper wiring information about RS-422 and RS-485 data communication. It is necessary to have the basic knowledge to avoid or find errors in data transmission. Failures in cabling are responsible for the vast majority of transmission problems.

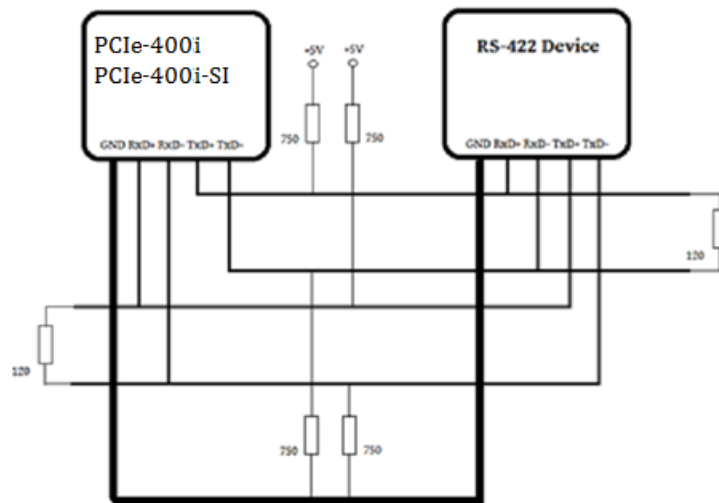
RS-422 and RS-485 Transmission Technique

RS-422 and RS-485 use the same balanced transmission method. Signals are not transmitted as voltage on a single wire like in RS-232. Instead, two wires are used; when one carries high voltage, the other one carries low voltage. The signal is defined by the difference in voltage between those two wires. This hardens the transmission against noise. Usually, twisted pair cables are used, which further reduces the sensitivity to noise.

To make sure the signals meet the common voltage range, the GND of sender and receiver must be connected. To ensure the signals are in the valid voltage range so that the differential voltage can be correctly sensed by the receiver, the GND lines of the transmitter and receiver must be connected.

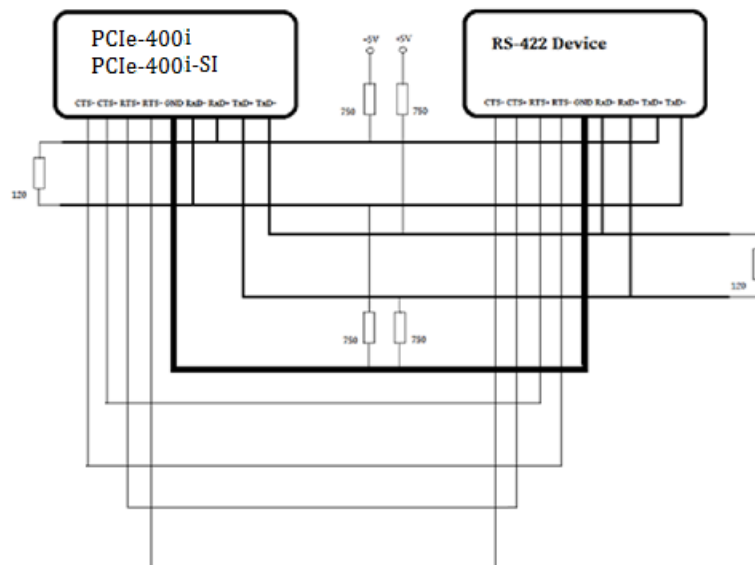
RS-422 without Handshaking Signals Connected

The following diagram shows RS-422 without handshaking signals connected.

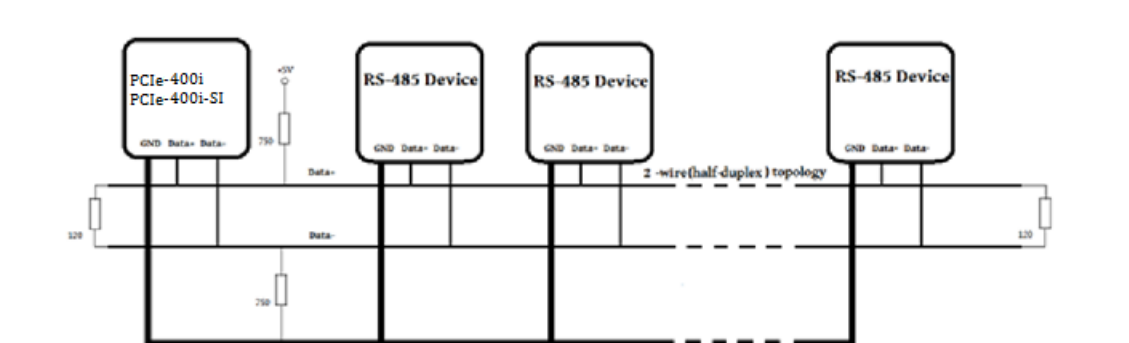


RS-422 with Handshaking Signals Connected

The following diagram shows RS-422 with handshaking signals connected.



RS-422 requires dedicated wire pairs for transmit and receive. The transmit wires are used to send data to as many as 10 receivers, as stated in the specifications of RS-422. Since the PCIe-400i and PCIe-400i-SI use RS-485 Line Driver technology, up to 32 receivers are possible.

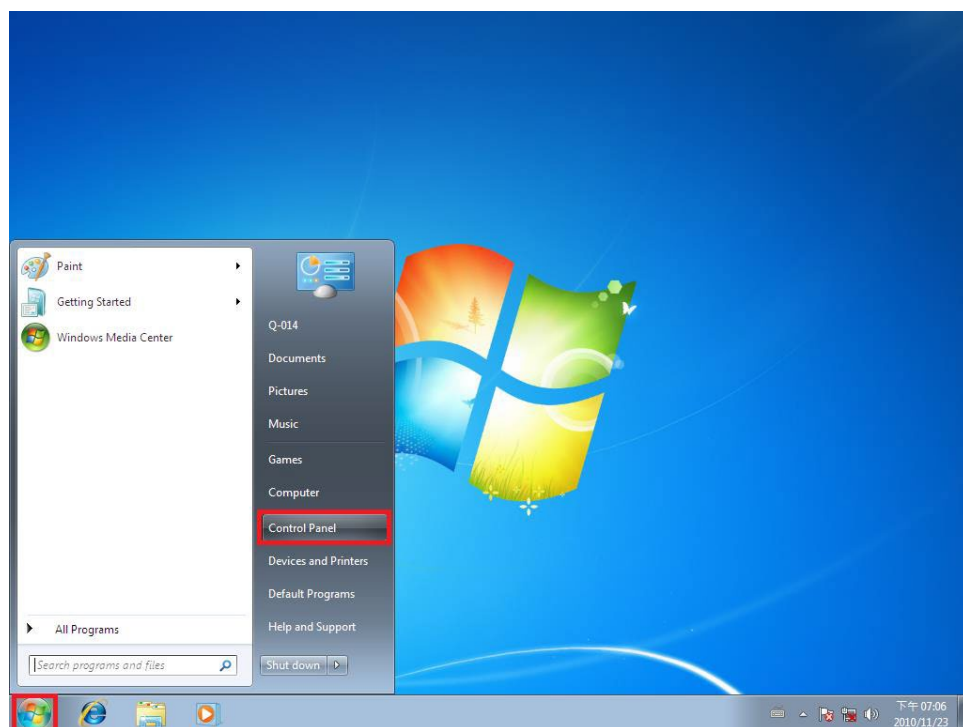


INSTALLATION

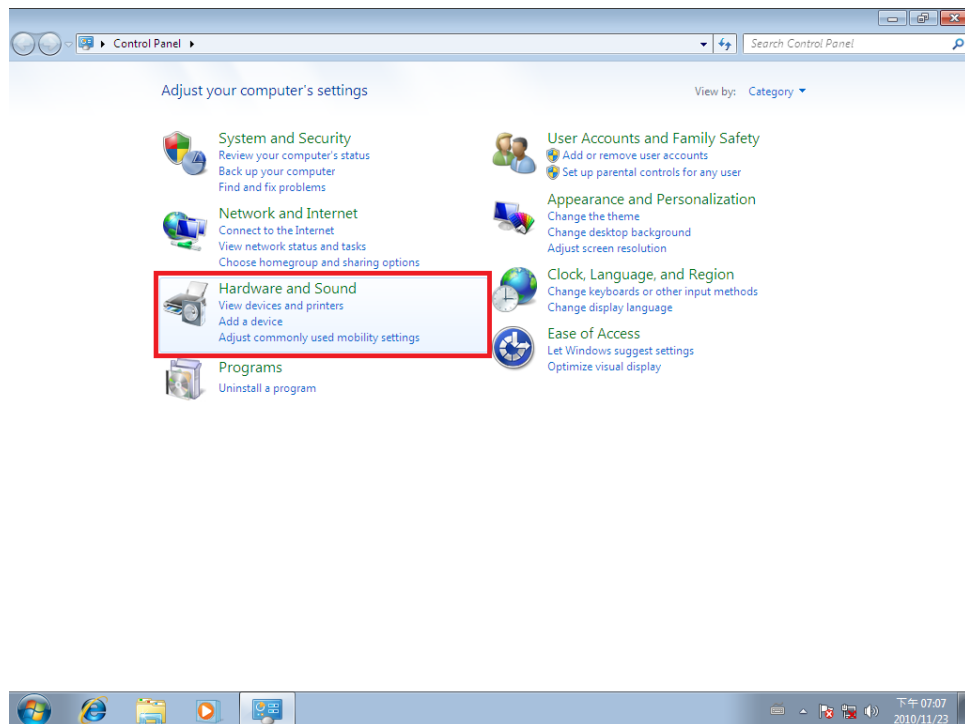
Windows 8.1/8/7 32-bit & 64-bit Drivers Installation

To install the Windows driver from Device Manager for PCI Express 4-port industrial serial I/O card, please follow the steps below:

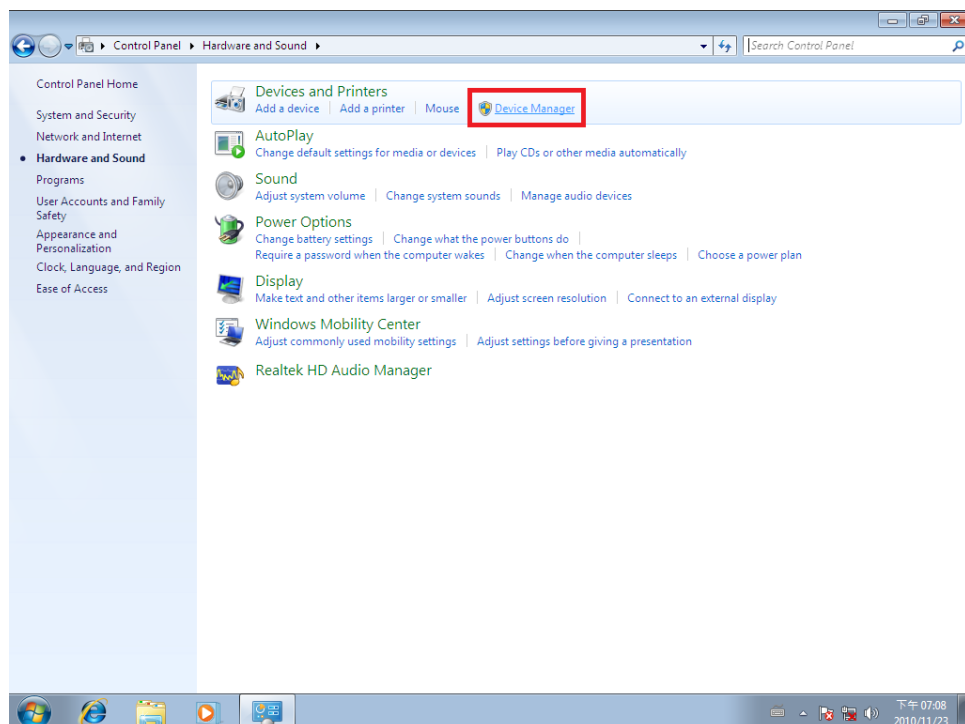
1. Switch off the computer.
2. Insert PCI Express industrial serial I/O card into a free PCI Express Bus slot.
3. Switch on the computer and start Windows OS.
4. Windows OS will automatically detect the PCI Express I/O Card.
5. Press “START” button and select “Control Panel”.



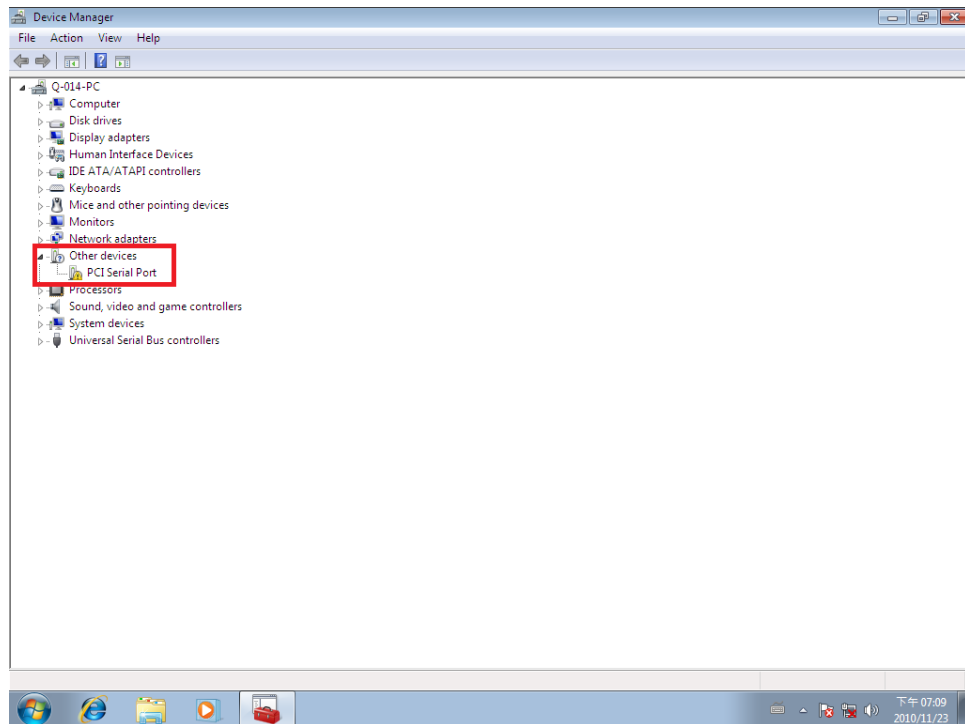
6. Select “Hardware and Sound”.



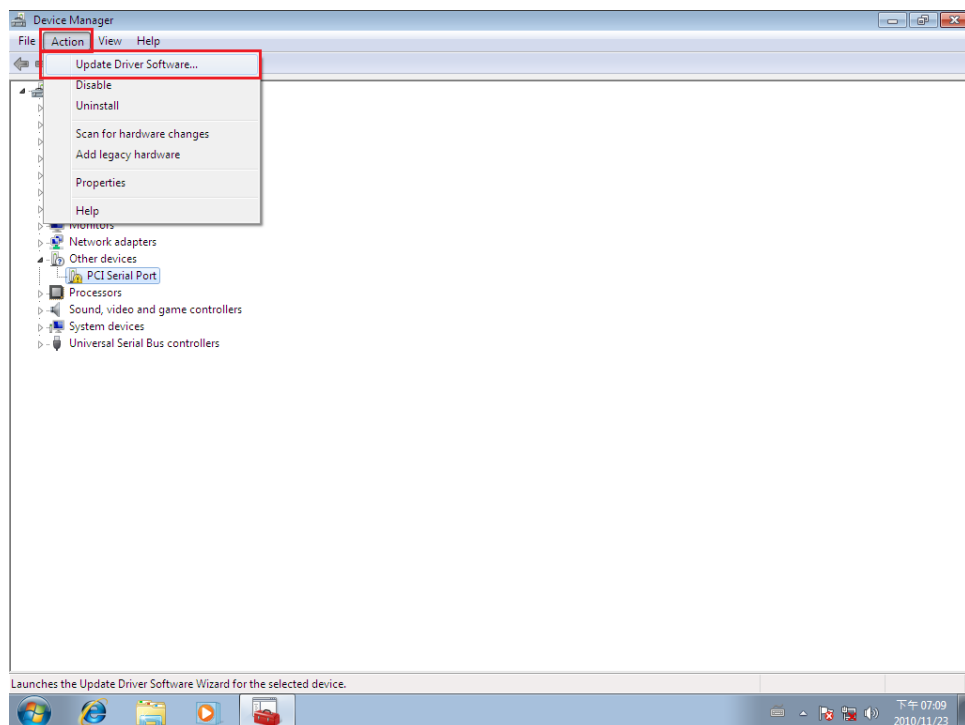
7. Select “Device Manager”.



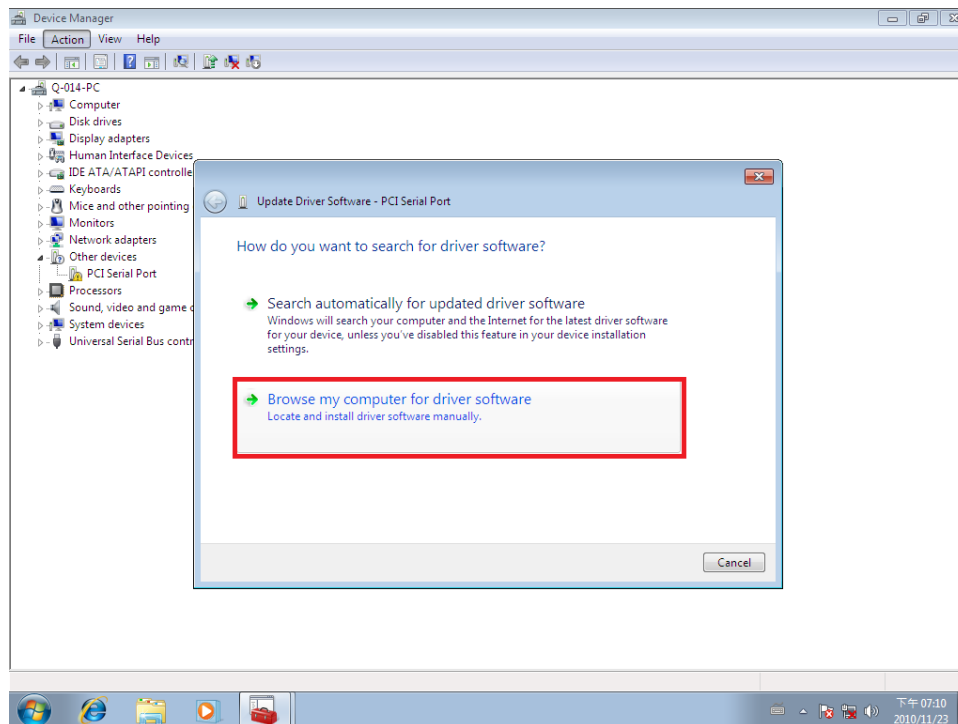
8. Under “Device Manager” of the system properties, you can find “PCI Serial Port” attached to “Other devices”. Select “PCI Serial Port”.



9. Select “Action” and execute “Update Driver Software”.

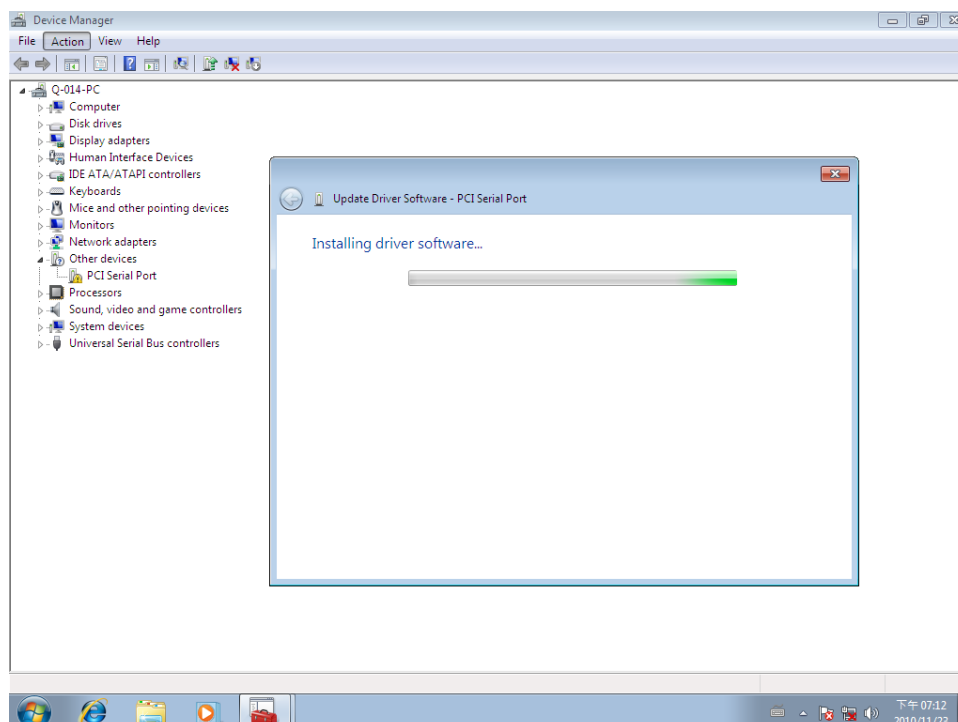


10. Click “Browse my computer for driver software”.

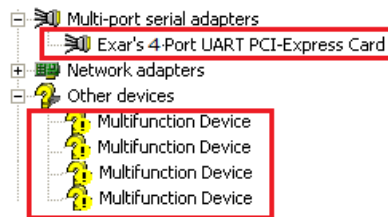


11. Insert the driver CD into the CD-ROM or DVD-ROM drive.

12. Select the directory "\\PCIe Drivers\\x86" for 32 bits Windows OS ("\\PCIe Drivers\\x64 for 64 bits Windows OS") as the target. Click on "OK", and on "Next" to install driver.



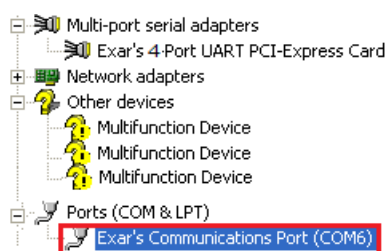
13. After driver installation is done successfully, you will find “Exar’s 4-port UART PCI-Express Card” and four instances of “Multifunction Device” under Device Manager.



14. Select the first “Multifunction Device”.

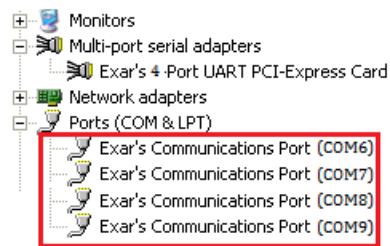


15. Select “Action” and execute “Update Driver Software”.
16. Click “Browse my computer for driver software” again.
17. Select the directory “\\PCIe Drivers\\x86” for 32 bits Windows OS (“\\PCIe Drivers\\x64 for 64 bits Windows OS”) as the target. Click on “OK”, and on “Next” to install COM port driver.
18. After COM port driver installation is done successfully, you can find the first “Exar’s Communications Port (COMx)” under “Ports (COM & LPT)” in Device Manager.



19. Select the next “Multifunction Device” and repeat steps 15~17 to install all of the COM port drivers.

20. After all COM port driver installations are done successfully, you will find four “Exar’s Communications Port (COMx)” under “Ports (COM & LPT)” in Device Manager.

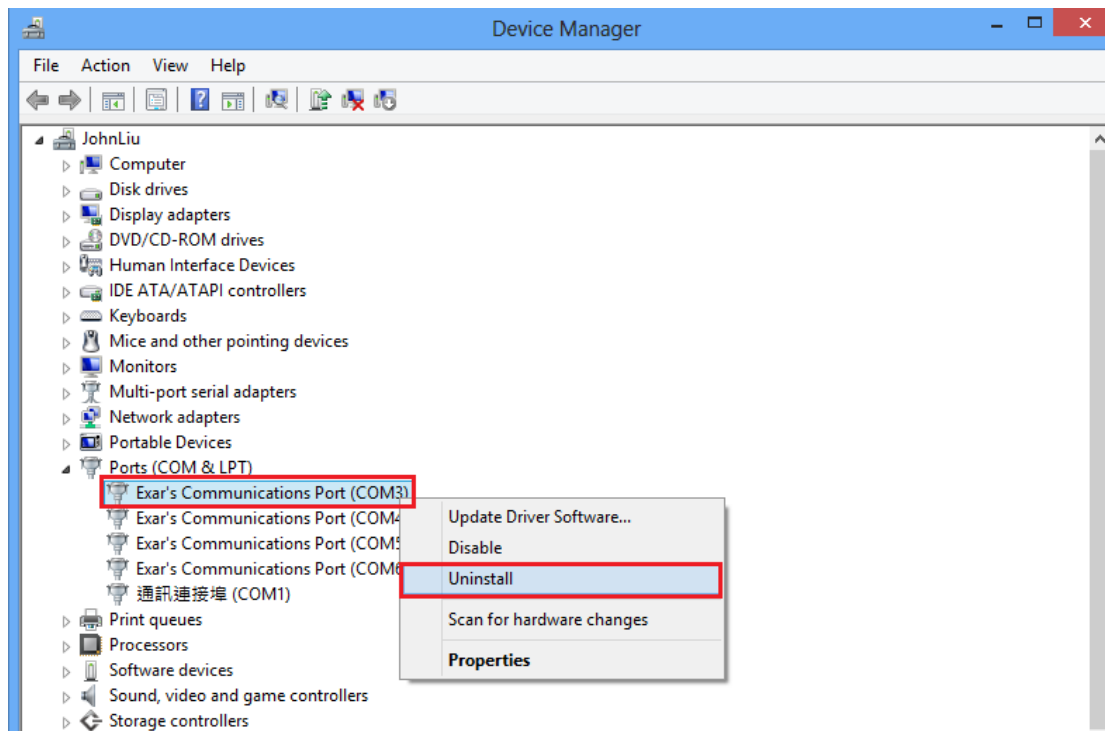


21. Restart computer to complete installation.

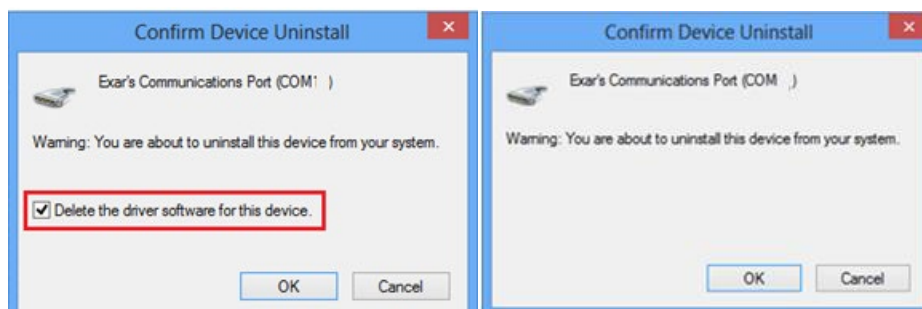
UNINSTALLING WINDOWS DRIVERS

To uninstall the Windows driver from Device Manager for PCI Express 4-port serial I/O card, please follow the steps below:

1. Right click on “Exar’s Communications Port (COMx)” under Device Manager and select “Uninstall” to start Exar’s Communications Port (COMx) driver uninstall.

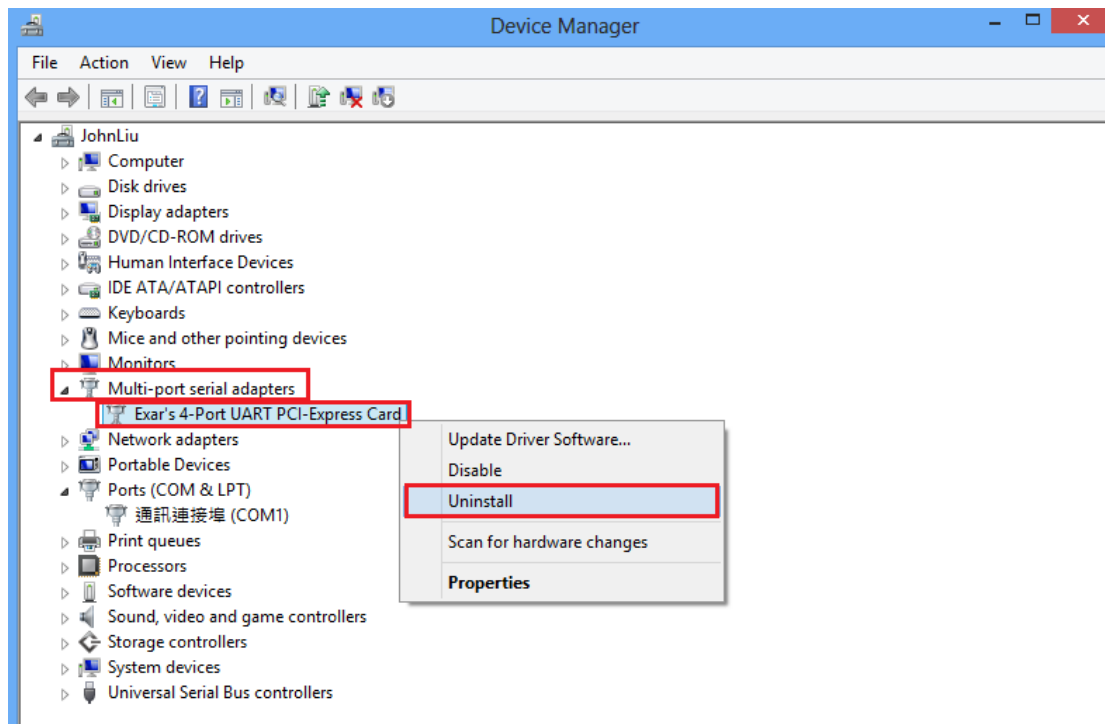


2. Under the “Confirm Device Uninstall” window, check “Delete the driver software for this device.” Click “OK” to uninstall the software driver. If there is no “Delete the driver software for this device” checkbox, just click “OK” to uninstall the software driver.

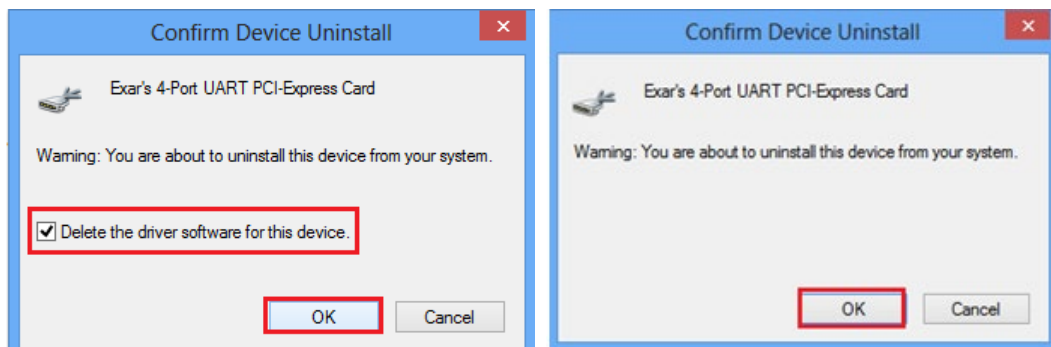


3. Right click on the remaining “Exar’s Communications Port (COMx)” drivers and repeat steps 1 and 2 to uninstall all Exar’s Communications Port drivers.

- Right click on “Exar’s 4-port UART PCI-Express Card” under Device Manager and select “Uninstall” to start uninstalling “Exar’s 4-port UART PCI-Express Card” software driver.



- Under the “Confirm Device Uninstall” window, check “Delete the driver software for this device.” Click “OK” to uninstall the software driver. If there is no “Delete the driver software for this device.” message, just click “OK” to uninstall the software driver.



- If you installed more than one PCI Express 4-port serial I/O cards in your system, please right click on the other “Exar’s 4-port UART PCI-Express Card” drivers and repeat steps 4~5 to uninstall all PCI Express 4-port serial I/O cards software drivers.