Multiport Serial Card

MSC-102B / MSC-102B-SI
Installation Guide

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AAXEON TECHNOLOGIES, INC.
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Contents

1.   Introduction

Congratulation on your purchasing this high performance RS-422/485 multiport serial PCI card. The card is high speed PCI bus based and plug-and-play compliant. It works at 2-wire (with Auto Transceiver Turn Around feature, ATTA™) and 4-wire configuration. Its UARTs are fully 16C950 (128-byte FIFO) featured and compatible with most of the serial devices available from the market.

Features:

- ✓ Fully PCI Bus Specifications 2.2 and Power Management 1.0 compliant
- ✓ 128-byte on-chip FIFO and arbitrary trigger levels and interrupts, and automatic hardware/software flow control
- ✓ Up to 921.6 Kbps baud rate, over 700 Kbps data throughput
- ✓ 5,6,7,8,9-bits data framing
- ✓ Precise RS-485 ATTA™ (Auto Transceiver Turn Around) feature to disable the line driver by hardware
- ✓ Supports echo mode to help software determining unexpected bus collisions
- ✓ Universal PCI compatible with 3.3/5V PCI and PCI-X buses
- ✓ Optional 15KV ESD surge and optical isolation protection models are available
- ✓ Supports Win98/Me, NT, Windows 2000 and XP,2003, and Linux

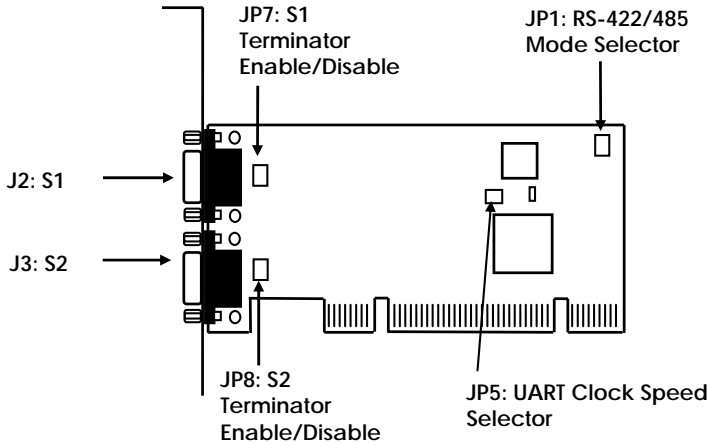aaxeon®

2. Package Check List

Before installing the RS-422/485 multiport serial PCI card to your computer, please make sure the following accessories are well packed in the box :

- ☐ Multiport serial PCI Card x 1
- ☐ Optional Octopus-Cable (only for 4-port and 8-port models)
- ☐ Driver CD × 1
- ☐ Installation Guide × 1

(Mark the check box to help you check it)

3. Board Layouts and Connectors

3.1 2S with DB9 Male Connectors

JP7: S1
Terminator
Enable/Disable

JP1: RS-422/485
Mode Selector

J2: S1

J3: S2

JP8: S2
Terminator
Enable/Disable

JP5: UART Clock Speed
Selector

3.1.1 JP5: UART Input Clock Speed Selector

LOW HI

UART Input Clock Speed = 1.8432MHZ, the maximum baud rate is 115.2Kbps (Default)

LOW HI

UART Input Clock Speed = 14.7456MHZ, the maximum baud rate is 926.1Kbps. In this setting, **you need go to Windows' COM port Properties to detect this input clock automatically and fit this clock value (see the software setup for more details)**

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3.1.2   JP1: RS-422/485 Mode Selector

485	⊙⊙ ◯	422
RTS	◯ ⊙⊙	AUTO
ECHO	◯ ⊙⊙	NO_ECHO
LOOP	◯ ⊙⊙	NO_LOOP

Mode Settings for both S1 and S2 (JP1):

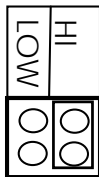| Jumper Name	Jumper Positions	Mode and Termination Resistor Setting
485/422	**485** **(Default)**	2-wire RS-485 mode
	422	4-wire RS-422 mode
RTS/AUTO	RTS	RS-485 Transmitter Buffer Enable is Controlled by RTS (active high)
	AUTO **(Default)**	RS-485 Transmitter Buffer is controlled automatically by ATTA^{TM} hardware circuit
ECHO/NO_ECHO	ECHO	Transmitting data will be echoed back
	NO_ECHO **(Default)**	No echo data
LOOP/NO_LOOP	LOOP	RTS will be connected to CTS
	NO_LOOP **(Default)**	RTS and CTS operate normally

■ Please note that if the mode were set at "422" mode, the other settings (AUTO, ECHO and LOOP settings) will take no effect.

■ The Echo mode is useful for the application program to detect if the RS-485 bus were in a collision. If the echoed data was not equal to the transmitted data, then the bus was in a collision.

■ If you want to set the RS-485 transceiver to "AUTO" mode, you have to go to Windows Device Manager to turn on this option as well. You only need to do it once and the Windows will keep the settings afterward. Please note that

S1 and S2 have its own setting. You need to go to each port to turn on both settings.

3.1.3   S1,S2 Connector Pin Assignments
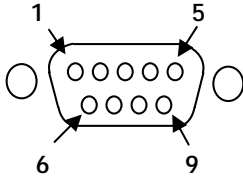
9 Pins	Signal
1	TXD- (DATA-)
2	TXD+ (DATA+)
3	RXD+
4	RXD-
5	GND
6	RTS-
7	RTS+
8	CTS+
9	CTS-

3.1.4   S1,S2 Terminator Settings
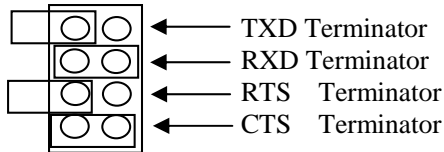
TXD Terminator
RXD Terminator
RTS   Terminator
CTS   Terminator

S1 Terminator Settings (JP7):

Jumper Name	Jumper Settings	Termination Resistor Setting
JP7 (TXD)	IN	TXD Terminator Enabled
	OUT (Default)	TXD Terminator Disabled
JP7 (RXD)	**IN (Default)**	RXD Terminator Enabled
	OUT	RXD Terminator Disabled
JP7 (RTS)	IN	RTS Terminator Enabled
	OUT (Default)	RTS Terminator Disabled
JP7 (CTS)	**IN (Default)**	CTS Terminator Enabled
	OUT	CTS Terminator Disabled

Note: **IN :**   Jumper Installed

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OUT :   Jumper Not Installed

S2 Terminator Settings (JP8):

Jumper Name	Jumper Settings	Termination Resistor Setting
JP8 (TXD)	IN	TXD Terminator Enabled
	OUT (Default)	TXD Terminator Disabled
JP8 (RXD)	**IN (Default)**	RXD Terminator Enabled
	OUT	RXD Terminator Disabled
JP8 (RTS)	IN	RTS Terminator Enabled
	OUT (Default)	RTS Terminator Disabled
JP8 (CTS)	**IN (Default)**	CTS Terminator Enabled
	OUT	CTS Terminator Disabled

Note: **IN :**   Jumper Installed
          OUT :   Jumper Not Installed

3.2   2S with Terminal Block Connectors

JP7: S1 Terminator Enable/Disable

JP1: RS-422/485 Mode Selector

J2: S1

J3: S2

JP8: S2 Terminator Enable/Disable

JP5: UART Clock Speed Selector
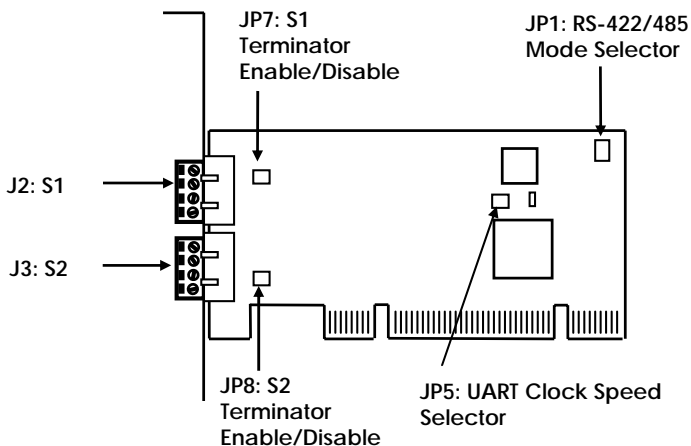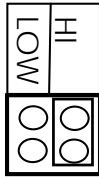
3.2.1 JP5: UART Input Clock Speed Selector
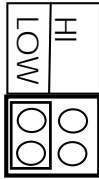
UART Input Clock Speed = 1.8432MHZ, the maximum baud rate is 115.2Kbps (Default)

UART Input Clock Speed = 14.7456MHZ, the maximum baud rate is 926.1Kbps. In this setting, **you need go to Windows' COM port Properties to detect this input clock automatically and fit this clock value (see the software setup for more details)**

3.2.2 JP1: RS-422/485 Mode Selector

485		422
RTS		AUTO
ECHO		NO_ECHO
LOOP		NO_LOOP

Mode Settings for both S1 and S2 (JP1):

Jumper Name	Jumper Positions	Mode and Termination Resistor Setting
485/422	**485** **(Default)**	2-wire RS-485 mode
	422	4-wire RS-422 mode
RTS/AUTO	RTS	RS-485 Transmitter Buffer Enable is Controlled by RTS (active high)
	AUTO **(Default)**	RS-485 Transmitter Buffer is controlled automatically by ATTA™ hardware circuit

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ECHO/NO_ECHO	ECHO	Transmitting data will be echoed back
	NO_ECHO **(Default)**	No echo data
LOOP/NO_LOOP	LOOP	RTS will be connected to CTS
	NO_LOOP **(Default)**	RTS and CTS operate normally

- Please note that if the mode were set at "422" mode, the other settings (AUTO, ECHO and LOOP settings) will take no effect.

- The Echo mode is useful for the application program to detect if the RS-485 bus were in a collision. If the echoed data was not equal to the transmitted data, then the bus was in a collision.

- If you want to set the RS-485 transceiver to "AUTO" mode, you have to go to Windows Device Manager to turn on this option as well. You only need to do it once and the Windows will keep the settings afterward. Please note that S1 and S2 have its own setting. You need to go to each port to turn on both settings.

3.2.3   S1,S2 Terminal Block Connectors Pin Assignments

```
1 →
2 →
3 →
4 →
```
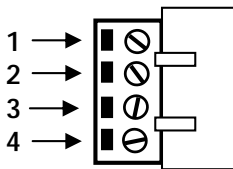
```
4 Pins    Signal
   1      TXD+ (DATA+)
   2      TXD- (DATA-)
   3      RXD+
   4      RXD-
```

3.2.4   S1,S2 Terminator Settings

TXD Terminator
RXD Terminator

S1 Terminator Settings (JP7):

Jumper Name	Jumper Settings	Termination Resistor Setting
JP7 (TXD)	IN	TXD Terminator Enabled
	OUT **(Default)**	TXD Terminator Disabled
JP7 (RXD)	**IN** **(Default)**	RXD Terminator Enabled
	OUT	RXD Terminator Disabled

Note:

IN : Jumper Installed

OUT : Jumper Not Installed

S2 Terminator Settings (JP8):

Jumper Name	Jumper Settings	Termination Resistor Setting
JP8 (TXD)	IN	TXD Terminator Enabled
	OUT **(Default)**	TXD Terminator Disabled
JP8 (RXD)	**IN** **(Default)**	RXD Terminator Enabled
	OUT	RXD Terminator Disabled

Note:

IN : Jumper Installed

OUT : Jumper Not Installed

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4. Installing the RS-422/485 PCI Card

1. Turn the system power OFF before installation!

2. Use static electricity discharge precautions.

3. Remove the chassis cover from your computer

4. Locate an unused PCI slot (typically white or ivory) and remove the corresponding slot cover from computer chassis.

5. Plug the RS-422/485 PCI card to the unused PCI expansion slot and attached the I/O card bracket to the computer chassis screw.

6. **If your card's connectors are terminal blocks, please install the terminal blocks from the outside of the computer. (Since the terminal blocks are bigger than the rear PCI panel, you need install the card first, then the terminal block connectors).**

7. Put the chassis cover back on the computer.

8. Turn ON the power of your computer and peripherals.

9. Proceed with Software Driver Installation.

5. Installing Drivers

The RS-422/485 PCI card is plug-and-play so the driver installation is quite straightforward. Please "Browse" to the correct path on the Driver CD when Windows asking for the driver's location.

5.1 Windows 98, ME, 2000, XP, 2003

When Windows start-up, OS will display Found New Hardware Wizard. Click 〝 **Next** 〞 to continue.

1. Insert Driver CD into the CD/DVD-ROM drive（for example D：），select 〝 **Search for a suitable driver for my device (Recommended)** 〞and click 〝 **Next** 〞.

2. Select〝 **Specify a location** 〞then click〝 **Next** 〞to continue, click 〝 **Browse** 〞 to specify the driver's location.

    D:\IO\OXFORD

3. Click〝 **Next** 〞to continue, and click〝 **Finish** 〞to complete the installation.
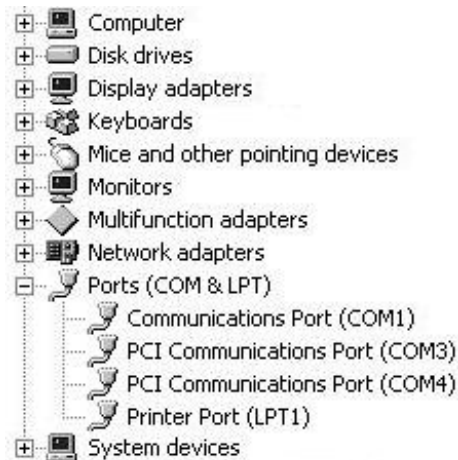
5.2 Windows NT 4.0

Since the Windows NT is not plug and play, you need to double click the following icon in the D:\IO\OXFORD\WinNT4 folder or run the **Install_serial.exe** in the same folder.

6.   Set RS-485 in 2-wire (Half Duplex) Mode

To enable your card to work in the RS-485 2-wire mode, please follow the following steps:

1.   Set the Mode Jumpers (JP1) to "485" and "AUTO" as mentioned in the above sections.

2.   Proceed with the following settings in Windows

   ● Right click on **"My Computer"** and choose **"properties"** **(Win98,ME) or "Manage" (Win2000,XP)**

   ● Choose " **Device Manager** " and double click " **Ports** ".

   ● You will see the **"PCI Communications Port（COM3、 COM4）"** provided by your card.

```
├ 🖳 Computer
├ 💿 Disk drives
├ 🖳 Display adapters
├ ⌨ Keyboards
├ 🖰 Mice and other pointing devices
├ 🖳 Monitors
├ ◆ Multifunction adapters
├ 🖧 Network adapters
└ ⌨ Ports (COM & LPT)
     ├ ⌨ Communications Port (COM1)
     ├ ⌨ PCI Communications Port (COM3)
     ├ ⌨ PCI Communications Port (COM4)
     └ ⌨ Printer Port (LPT1)
├ 🖳 System devices
```

   ●

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- Double click on 〝**PCI Communications Port (COM3)** 〞

  or 〝**PCI Communications Port (COM4)**〞 then select

  〝 **Settings** 〞

6.1 Windows 2000, XP

- Go the the COM3′s properties and set the mode to "**RS422/485**"

- Choose RS485 buffer enable to **"Active High"**

- Set the other port (e.g. COM4) by the same procedures mentioned.
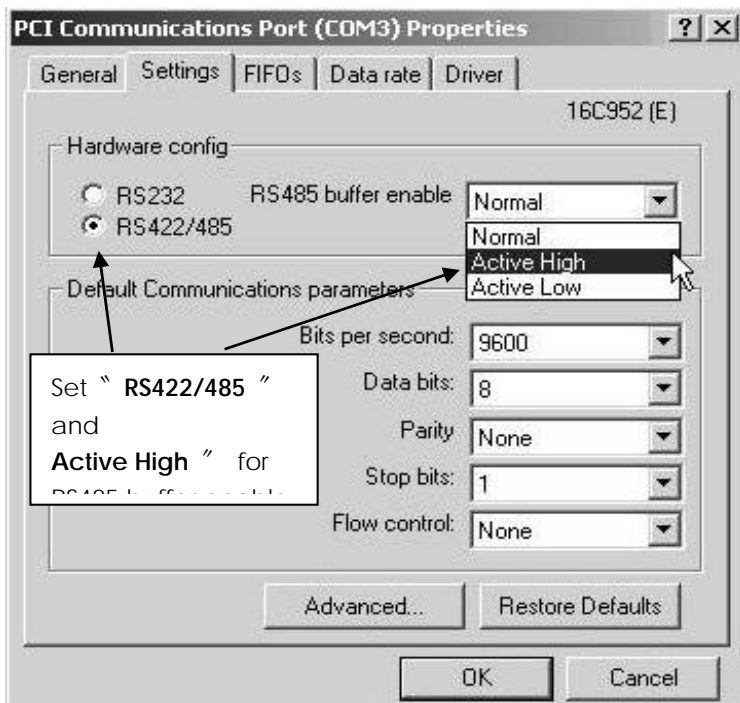
6.2   Windows 98, ME

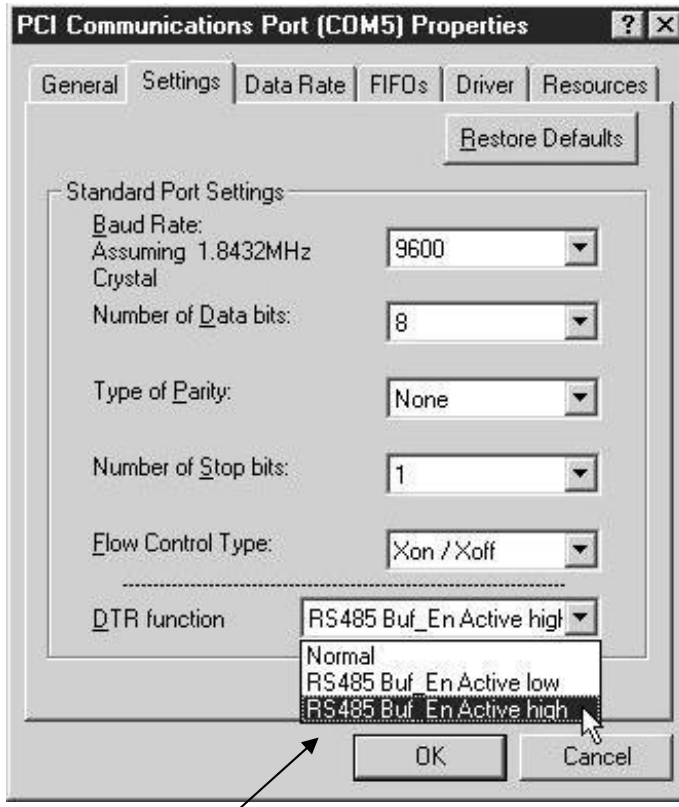- In this examples, if the first port is COM5 and the second port is COM6, go to the COM5's "**properties**" and select **"RS485 Buf En Active high"** for the DTR function

- Repeat the mentioned procedures to set the other port (e.g. COM6)

PCI Communications Port (COM5) Properties   ? ×

| General | Settings | Data Rate | FIFOs | Driver | Resources |

Restore Defaults

Standard Port Settings

Baud Rate:
Assuming 1.8432MHz Crystal   9600 ▼

Number of Data bits: 8 ▼

Type of Parity: None ▼

Number of Stop bits: 1 ▼

Flow Control Type: Xon / Xoff ▼

DTR function   RS485 Buf_En Active high ▼

    Normal
    RS485 Buf_En Active low
    RS485 Buf_En Active high

OK   Cancel

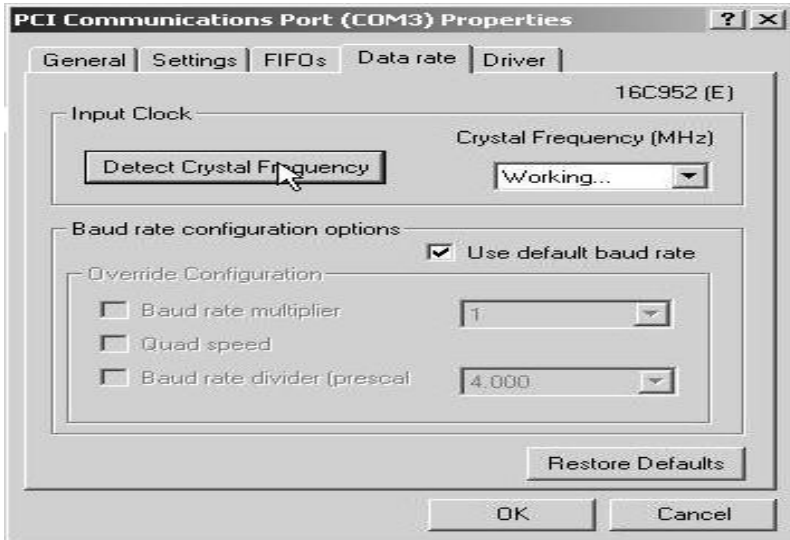Select " **RS485 Buf_En Active high** " for DTR function

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7. Set High Baud Rate

The RS-422/485 card was shipped at the low baud rate (115.2Kbps maximum). To set to high baud rate to 921.6Kbps maximum, 2 steps are required:

● Change the UART input clock jumper (JP5) to **"HI"**

● Go to the COM port's settings of Windows' Device Manager to let it detect the clock speed automatically

## 7.1 Windows 2000, XP

● Set the JP5 to "HI"
● In the Windows COM port properties as the following figure, select 〝 **Data rate** 〞and click on 〝 **Detect Crystal Frequency**〞
● The 〝 **Crystal Frequency** 〞 settings will be set to 〝**14.7456MHZ** 〝, then click 〝**OK**〞
● The settings will be saved by Windows. You don't need to configure it again whenever you restart the system

```
PCI Communications Port (COM3) Properties        ? X

General | Settings | FIFOs | Data rate | Driver |

                                        16C952 (E)
  Input Clock
                              Crystal Frequency (MHz)
    Detect Crystal Frequency      Working...    ▼

  Baud rate configuration options
                          ☑ Use default baud rate
    Override Configuration
      ☐ Baud rate multiplier        1          ▼
      ☐ Quad speed
      ☐ Baud rate divider (prescal   4.000       ▼

                              Restore Defaults

                          OK          Cancel
```

7.2   Windows 98/ME

- Set the JP5 to "HI"
- In the Windows COM port properties as the following figure, select " **Data rate** " and click on " **Automatic Crystal Detection** "
- The " **Crystal Frequency** "   settings will be set to "**14.7456MHZ** ", then click   "**OK**"
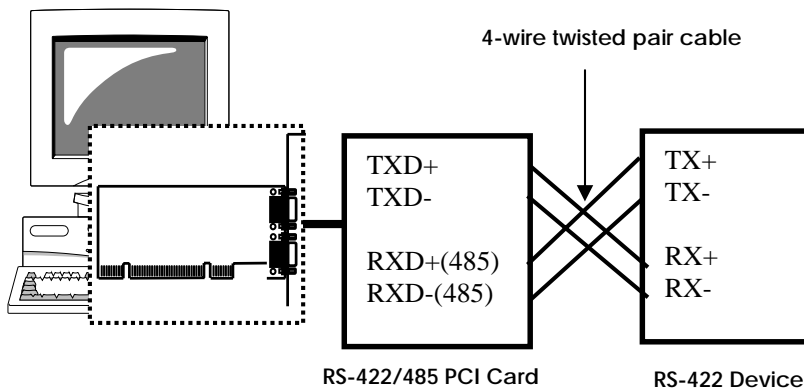- The settings will be saved by Windows. You don't need to configure it again whenever you restart the system

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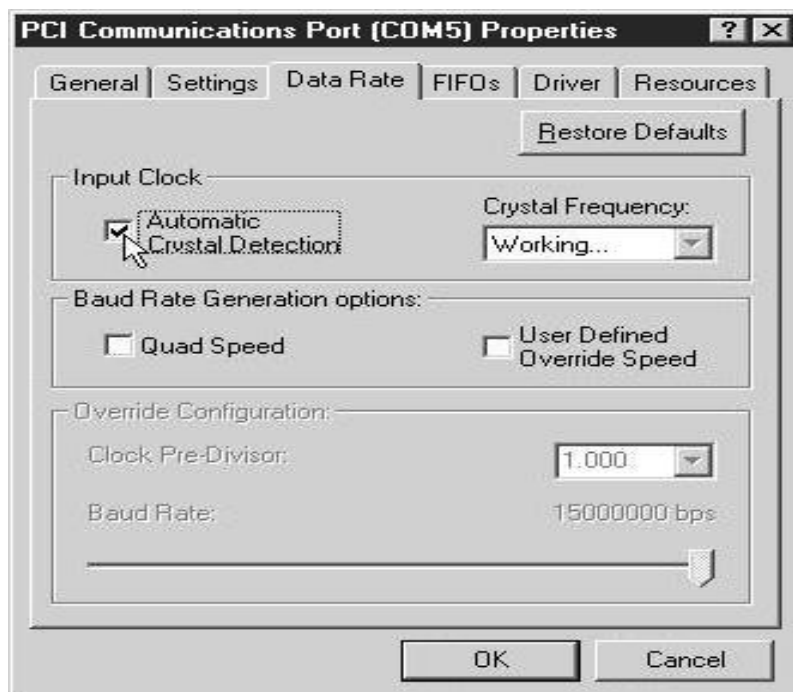
8.   Application Wiring

8.1   RS-485 (Transmitter is controlled automatically by ATTA^{TM} Hardware)
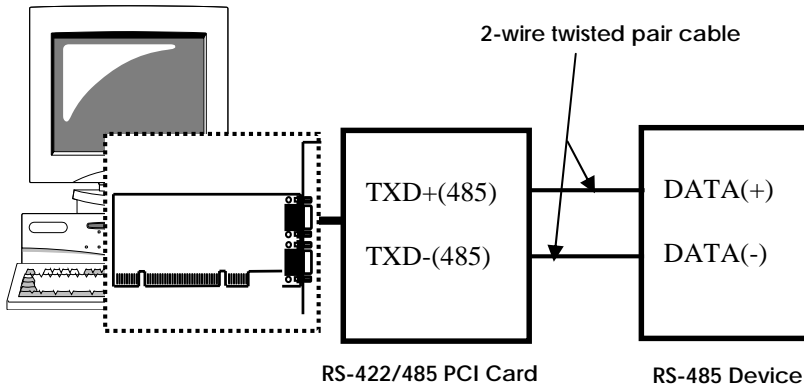
Please note that the RS-422/485 PCI Card supports optional auto echo mode. If enabled, when the data was sent to the RS-485 transmitter, the exact data will be sent back to its receiver simultaneously. The application program can use the echoed data to check if the RS-485 bus was currently in collission condition and need to be resent

8.2   RS-422 (Transmitter buffer is always enabled)

4-wire twisted pair cable

TXD+
TXD-

RXD+(485)
RXD-(485)

TX+
TX-

RX+
RX-

RS-422/485 PCI Card   **RS-422 Device**

Please note that the RS-422/485 PCI Card supports 4-wire RS-422 mode. In this mode, the data was sent and received independently. So you need to connect them with the cross-over, twisted pair cable.

For the model with DB9 connectors, it also provides two handshaking signials RTS+/RTS- and CTS+/CTS- to do the hardware flow control. In this case, the wiring will be as follows:

RS-422/485 PCI Card   **RS-422 Device**

TXD+	TXD+
TXD-	TXD-
RXD+	RXD+
RXD-	RXD-
RTS+	RTS+
RTS-	RTS-
CTS+	CTS+
CTS-	CTS-