

Smartio

C104 PCI Series

**Smart 4 Port Serial Board
for PCI bus**

Nov. 1998 (1st Edition)
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The followings are the services we provide.

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address: support@moxa.com.tw

FTP site for free driver update

address: [ftp.moxa.com](ftp://ftp.moxa.com) or [ftp.moxa.com.tw](ftp://ftp.moxa.com.tw)

user ID: ftp

password: your_email_address

World Wide Web (WWW) Site for product info.

address: www.moxa.com or www.moxa.com.tw

WWW Site for this User's Manual Update in PDF format.

address: www.moxa.com/mac/support/document/document.htm
or www.moxa.com.tw/mac/support/document/document.htm

WWW Site for Technical Support and FAQ.

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or www.moxa.com.tw/mac/support

Manual Organization

This manual is composed of six chapters and one appendix. This manual is written for installers, system administrators and software programmers.

If you are a first-time installer and system administrator, we recommend you to go through the whole manual except chapter 4.

If you are a software programmer, you may refer to chapter 4, “Serial Programming Tools”.

If you need cable wiring information, please see the “Connection Cable and Cable Wiring” chapter.

If you encounter any problem during the installation, please refer to the “Troubleshooting” chapter.

Chapter 1 Introduction

Overview and features of the *Smartio* C104 PCI Series boards, list of items and overall installation guide.

Chapter 2 Hardware Installation

Hardware installation for the *Smartio* C104 PCI Series boards and connection cable.

Chapter 3 Software Installation

Software installation, configuration, driver installation, driver update and removal for various operating systems: Windows NT and Windows 95/98.

Chapter 4 Serial Programming Tools

Short description of the programming tools, *PComm*, under Windows NT and Windows 95/98.

Chapter 5 Connection Cable and Cable Wiring

Description of the RS-232 cable wiring for the cable and DB37 connector.

Chapter 6 Troubleshooting

Common problems and possible answers for the *Smartio* C104 PCI Series boards.

Appendix

Specification, PCI, UART.

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Chapter 1 Introduction

1.1 Overview

Smartio - The Smart Multiport Async Solution

The term *Smartio* stands for smart multiport serial I/O solution. The *Smartio C104 PCI Series boards, including C104H/PCI and C104HS/PCI*, are designed for 32-bit PCI bus with “**Plug and Play**” feature. They offer 4 **RS-232** serial ports for connecting terminals, modems, printers, scanners, cash registers, bar code readers, keypads, numeric displays, electrical weighing machines, data acquisition equipment and many other serial devices to the PC and its compatible systems. With a well-designed and fine-tuned device driver, the *Smartio* boards make full use of the 32 byte Tx/Rx FIFO and on-chip H/W flow control, so that they can transfer data without loss even at high speed such as 921.6 Kbps. They offer a reliable and high performance solution for serial multiport communications.

Board Applications

The board is suitable for many applications. Here are a few:

- 1 Internet/Intranet Connection
- 1 Remote Access Application
- 1 Multi-user Application
- 1 Industrial Automation
- 1 Office Automation
- 1 Telecommunication
- 1 PC-based (vending) Machine or Kiosk System
- 1 Point-of-Sale (POS) System

PCI Solution

The board complies with PCI Spec. 2.1 and has neither switch nor jumper. The hardware configuration for the IRQ and Memory addresses is automatically assigned by the PCI BIOS. Hence, you must plug the board before installing the software driver. For more PCI information, consult “Technical Reference” in the Appendix.

Surge Protection

To prevent the boards from damage caused by lightning or high potential voltage, **TVSS** (Transient Voltage Surge Suppressor) technologies are introduced in some connection options to protect the multiport controller. This is critical to harsh environment such as factory, severe weather such as lightning, or other high interference situations.

Operating System Support

Support for Windows NT and Windows 95/98 with user-friendly installation, configuration and performance.

MOXA Serial Comm Tool

For application development, MOXA provides an easy-to-use serial communication library (*PComm*) under Windows NT and Windows 95/98. You can use this library to develop your own applications using Visual Basic, Visual C++, Borland Delphi, etc. Utilities, such as diagnostic, monitor, terminal emulation, etc., are included for debugging or monitoring the communication status or terminal emulation, or even file transferring.

1.2 Features

The *Smartio* C104 PCI Series consists of members as follows,

| | |
|-------------------|---|
| C104H/PCI | 4 RS-232 ports, high speed TI550C UART |
| C104HS/PCI | 4 RS-232 ports, surge protection, TI550C UART |

- √ Support PCI, Plug and play, no switch, no jumper
- √ Reliability»High speed TI550C Communication Controllers with on-chip hardware flow control guarantees no data loss
- √ Compact size design, half-size
- √ Surge protection (C104HS/PCI)
- √ Easy installation»32-bit PCI bus with Plug and Play capability
- √ Powerful Serial Comm tool»*PComm*
- √ Popular OS support»Windows NT, Windows 95/98

| | C104 PCI Series |
|---------------|-----------------|
| Windows NT | ✓ |
| Windows 95/98 | ✓ |

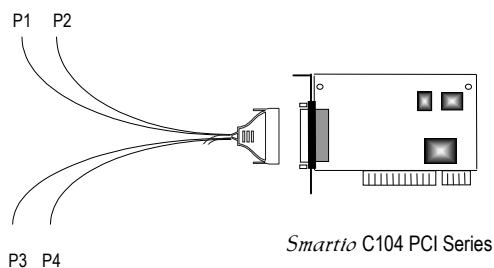
✓: Driver supported by Moxa and shipped with product

Note: Download the newest drivers from the MOXA FTP service

1.3 Check List

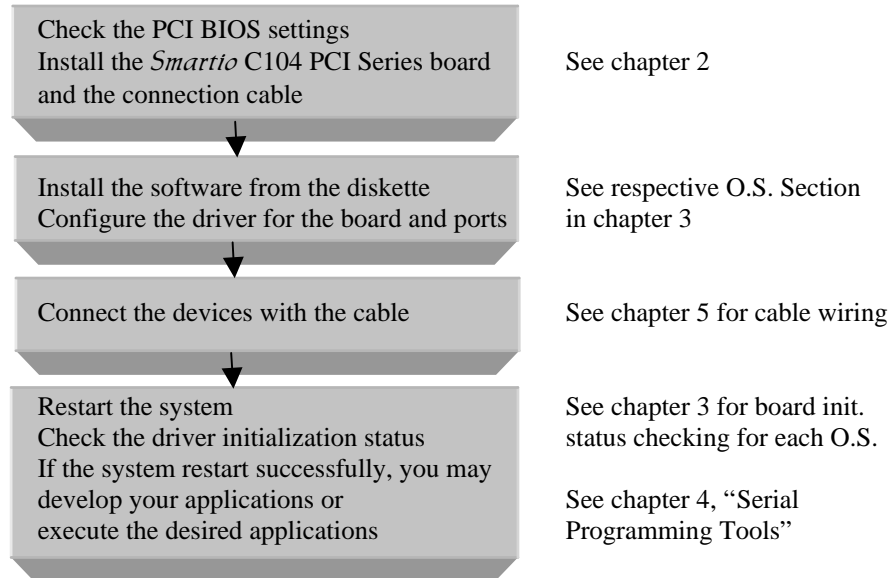
Upon unpacking the *Smartio* C104 PCI Series, you should find the following items in the package:

- √ *Smartio* C104 PCI Series 4 port serial board
- √ Device driver diskettes:
 - 1 Windows NT and Windows 95/98 Version 1.1 or above»ë1
 - 1 *PComm Lite* Version 2.0 or above»ë1
- √ *Smartio* C104 PCI Series User's Manual (This manual)
- √ Connection cable DB37 to DB25»ë4



1.4 Installation Guide

This section gives a brief summary of how to install the *Smartio* C104 PCI Series under each supported operating system. The installation is simple and involves the following stages:



Chapter 2 Hardware Installation

The installation of the *Smartio* C104 PCI Series consists of hardware and software installation. The respective sections of the operating systems in the next chapter deal with the software installation. The hardware installation is detailed in this chapter.

The no-switch-no-jumper *Smartio* C104 PCI Series board's hardware configuration for IRQ number and I/O addresses is automatically assigned by the PCI BIOS. Hence, it is a must to have the board plugged first before installing the software driver. After this, simply install the control board into the PC and then connect the connection cable.

2.1 Installing the *Smartio* C104 PCI Series board

Step 1: Power off the PC.

| |
|---|
| Warning! Make sure your system is switched off before you start installing any board. If you don't, you may risk damaging your system and the board. |
|---|

Step 2: Remove the PC's cover.

Step 3: Remove the slot cover bracket if present.

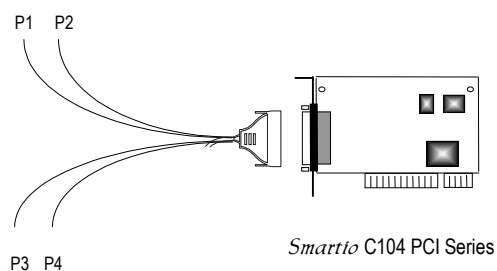
Step 4: Plug the *Smartio* C104 PCI Series control board firmly into a free 32-bit PCI slot.

Step 5: Fasten the holding screw to fix the control board in place.

Step 6: Replace the system cover.

2.2 Connecting the Fan-out Cable

Step 7: Connect the connection cable.



Step 8: Power on the PC and the BIOS will automatically set the IRQ and I/O address.

Note ! Each board must occupy one unique IRQ and four 8-byte I/O addresses, which are assigned automatically by the PCI BIOS. However, you can select a free IRQ number manually via the PC's BIOS setup for the PCI slot, but normally this method is not available for the I/O address. The possible IRQ numbers are 2, 3, 4, 5, 7, 10, 11, 12, and 15. The possible I/O addresses are from 0x0000 to 0xFFFF.

Step 9: Proceed with the software installation detailed in the next chapter, "Software Installation".

Chapter 3 Software Installation

In this chapter, the software driver installation, configuration and driver update/removal procedures are described for various operating systems, including Windows NT and Windows 95/98. Before proceeding with the software installation, complete the hardware installation detailed in previous chapter.

However, if it is necessary for you to develop your own applications, please refer to the next chapter, “Serial Programming Tools”, for serial programming issues.

3.1 Windows NT

Windows NT supports up to **256** serial ports, from **COM1** to **COM256**. To fully integrate the advanced features of Windows NT, multi-process and multi-thread, pure 32-bit Windows NT device drivers are developed for the *Smartio* C104 PCI Series and other MOXA multiport boards. The drivers conform to Win32 COMM API standard.

If you install the driver for the first time, please go directly to the section 3.1.1 “Installing the Driver”.

If you have already installed the driver and want to re-configure the board and port, please refer to the section 3.1.2, “Configuring the Port”.

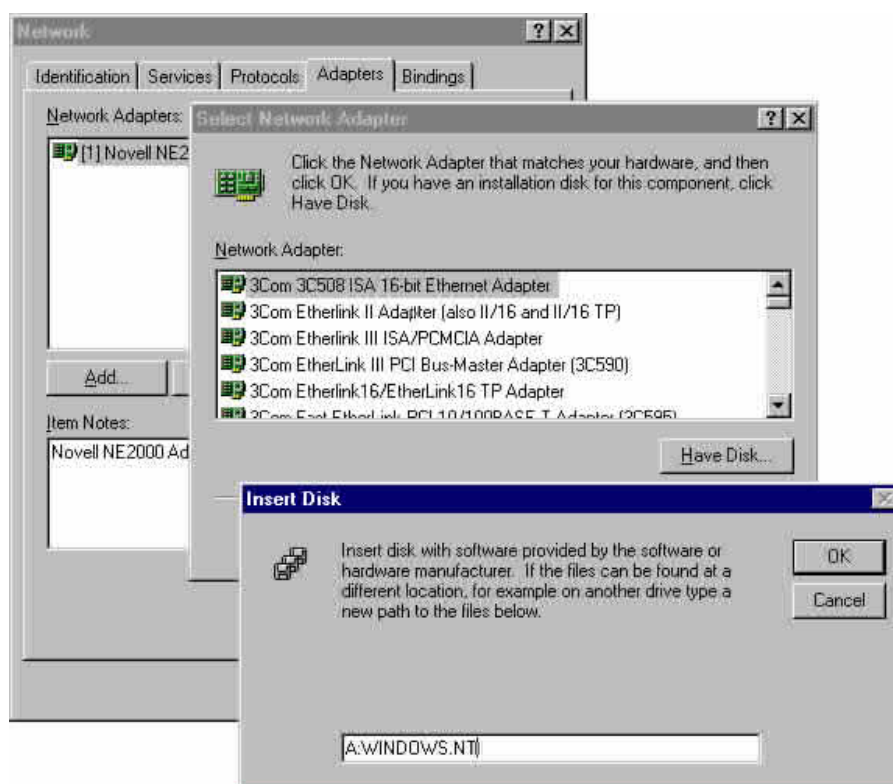
If you have already installed the driver and want to add or delete boards, please refer to the section 3.1.3, “Adding/Removing the Board”.

If you want to update or even remove the driver, please go to the section 3.1.4, “Updating the Driver”, or the section 3.1.5, “Removing the Driver”.

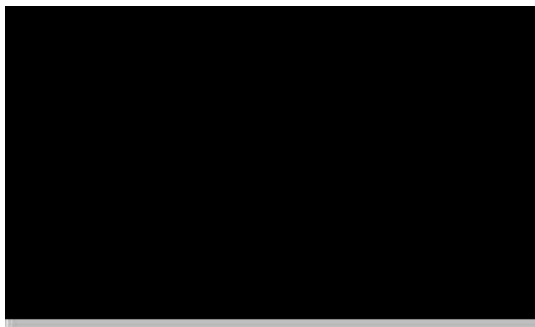
3.1.1 Installing the Driver

Following is the procedure for installing the *Smartio* C104 PCI Series driver **for the first time** under Windows NT 3.51/4.0. Make sure the board(s) has(have) already been plugged in the system PCI slot(s).

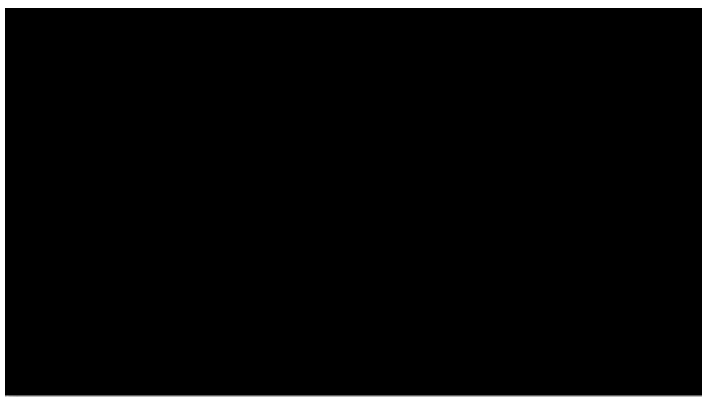
1. Please log in NT as **Administrator**.
2. Open the [**Control Panel**], click on the [**Network**] icon and select the [**Adapters**] tab.
3. Click on the [**Add**] button, then the [**Have Disk...**] button in “Select Network Adapter”.
4. Specify the exact path of the driver diskette, **A:\WINDOWS.NT**. Then click [**OK**].



5. Select “**MOXA Smartio/Industio PCI series multiport board**” in the “Select OEM Option” dialog box, and click [OK] to start the installation.



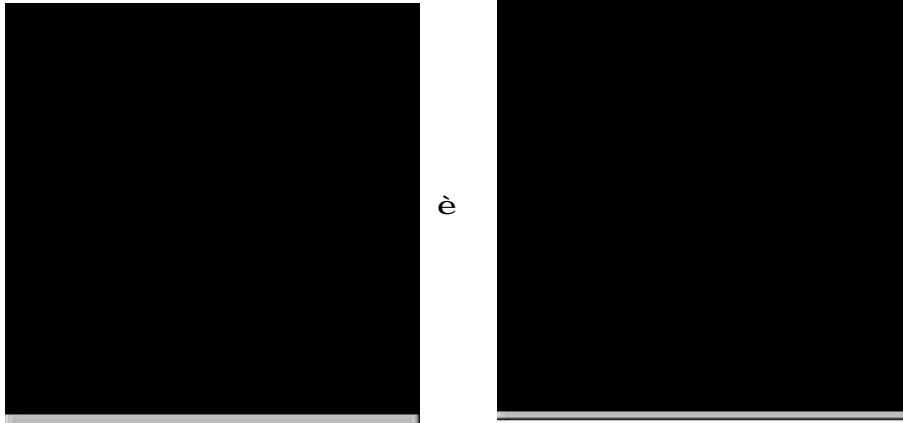
6. The “**MOXA Configuration Panel**” dialog box appears.



In the “**MOXA Configuration Panel**” dialog box, only the boards physically plugged and detected, **whether configured or not**, will be displayed. For configured boards, the COM number field is **defined**. For newly installed boards, including boards that switch to different PCI slots or PC main board systems, the COM number field is **undefined**.

You have to set up all the ports of the board with the desired “**COM number**”. Specify the COM number of the first port in the “**Port Number**” field and the subsequent ports are mapped to continuous COM numbers. For instance, if the first port is mapped to COM3, then the second port is sequentially mapped to COM4.

Click [**Properties**] to bring up the “**Port Setting**” dialog box to setup the selected board with the correct “**COM Number**”.

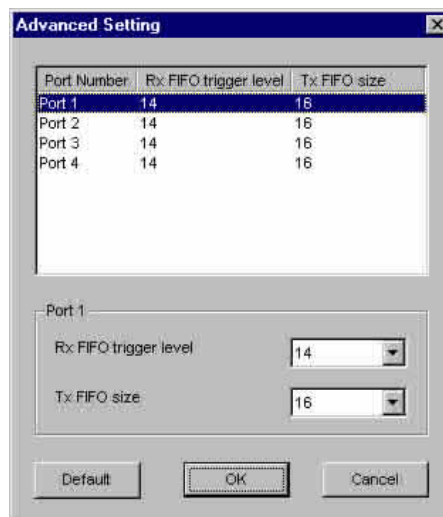


In this panel, you may:

- 1 Click [**OK**] to confirm the configuration changes you made.
- 1 Click [**Cancel**] to leave the dialog box with the configuration unchanged.

In the “Port Setting” dialog box, you may click on the [**Advanced**] button to configure the “**Rx FIFO trigger level**” and “**Tx FIFO size**” advanced features, for each port, for particular performance requirements.

Note ! You may skip the following settings and go directly to **Step 7** if you do not require any particular performance tuning for the driver.



In the “Advanced Setting” dialog box, you may customize the driver with the following two features:

- 1 **Rx FIFO trigger level**
Rx FIFO trigger levels, at 1, 4, 8 or 14 bytes, are available, and the default value is 14 bytes.
 - 1 **Tx FIFO size**
Tx FIFO sizes from 1 to 16 bytes are available, and the default value is 16 bytes.
7. Click [OK] on all the dialog boxes to finish the configuration and exit the “**MOXA Configuration Panel**” dialog box.
 8. When the configuration is done, click [OK] in the “Network” dialog box.
 9. **Restart Windows NT.** The latest configuration will not take effect unless the system restarts.

Note! Double check if all the *Smartio* C104 PCI Series components – the control board and the external 1X4 cable – are connected and fastened tightly to make sure that the system and the driver start successfully.

10. Once the system restarts, you may check the event log issued by the MOXA driver to see if the ports of the board are initialized successfully.
 - 1 Enter the [Administrative] group, click on the [Event Viewer] icon and select [Log] and [System] to check a message similar to “**MOXA C104 PCI, with serial ports COM3 to COM6, has been enabled**” for each configured board.
 - 1 If an error message similar to “**Cannot find any configured MOXA C104 PCI board!**” appears, refer to the “Troubleshooting” chapter for solutions.

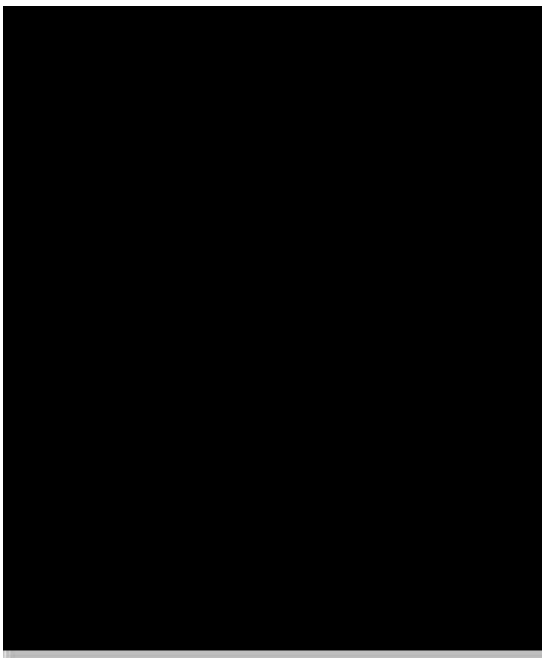
| |
|---|
| <p>Note ! Once the board and the driver are installed and the driver restarts successfully, you can start to develop applications with the <i>PComm</i> library (See “Serial Programming Tools”) or the Microsoft Win32 API. You can also execute any ready-made applications, such as <i>PComm</i> utility Terminal emulator (See “Serial Programming Tools”) or HyperTerminal to transmit/receive data, as well as Remote Access Service to provide dial-up networking capabilities.</p> |
|---|

3.1.2 Configuring the Port

If you already have installed the driver and want to re-configure the ports, please follow this procedure.

1. In the [Control Panel], click on the [Network] icon and select the [Adapters] tab.

2. Select “**MOXA Smartio/Industio PCI Series Adapter**” in “Network Adapters”.



3. Click on the [**Properties**] button to open the “**Smartio/Industio PCI Series Boards Configuration**” dialog box. Please see steps 6-10 in the previous section, “Installing Driver”, for more details.

3.1.3 Adding/Removing the Board

Following is the procedure to add/remove *Smartio* C104 PCI Series boards after a first time installation. Note that **the presence of the board(s) is(are) required for adding/removing boards.**

1. Power off the system.
2. Plug/unplug the boards in the system.
3. Power on the system.
4. Run the software configuration to setup the boards, as shown in the previous section.

3.1.4 Updating the Driver

To update the driver for the *Smartio* C104 PCI Series board, simply remove the driver, as described in the next section, and then reinstall it as detailed in the “**Installing the Driver**” section.

3.1.5 Removing the Driver

To remove the driver for the *Smartio* C104 PCI Series board,

1. Open the [Control Panel], click on the [Network] icon, and select the [Adapters] tab.
2. Select “**MOXA Smartio/Industio PCI Series Adapter**” in the adapter list, then click on the [Remove] button and the [OK] button to remove the driver.
3. Restart the system to activate the new configuration.

3.2 Windows 95/98

Windows 95/98 supports up to **128** serial ports, from **COM1** to **COM128**. To fully integrate the advanced features of Windows 95, multi-process and multi-thread, pure 32-bit Windows 95 virtual device port drivers (VxD) compliant with communication drivers (VCOMM) are developed for the *Smartio* C104 PCI Series and other MOXA multiport boards. The drivers conform to the Win32 COMM API standard.

If you install the driver for the first time, or you want to add more boards, please go directly to section 3.2.1, “Installing the Driver”.

If you have already installed the driver and want to re-configure the board, please refer to section 3.2.2, “COM Port Mapping”.

If you want to update the driver, please go to section 3.2.3, “Updating the Driver”.

If you want to remove the driver, please go to the section 3.2.4, “Removing the PCI Board”.

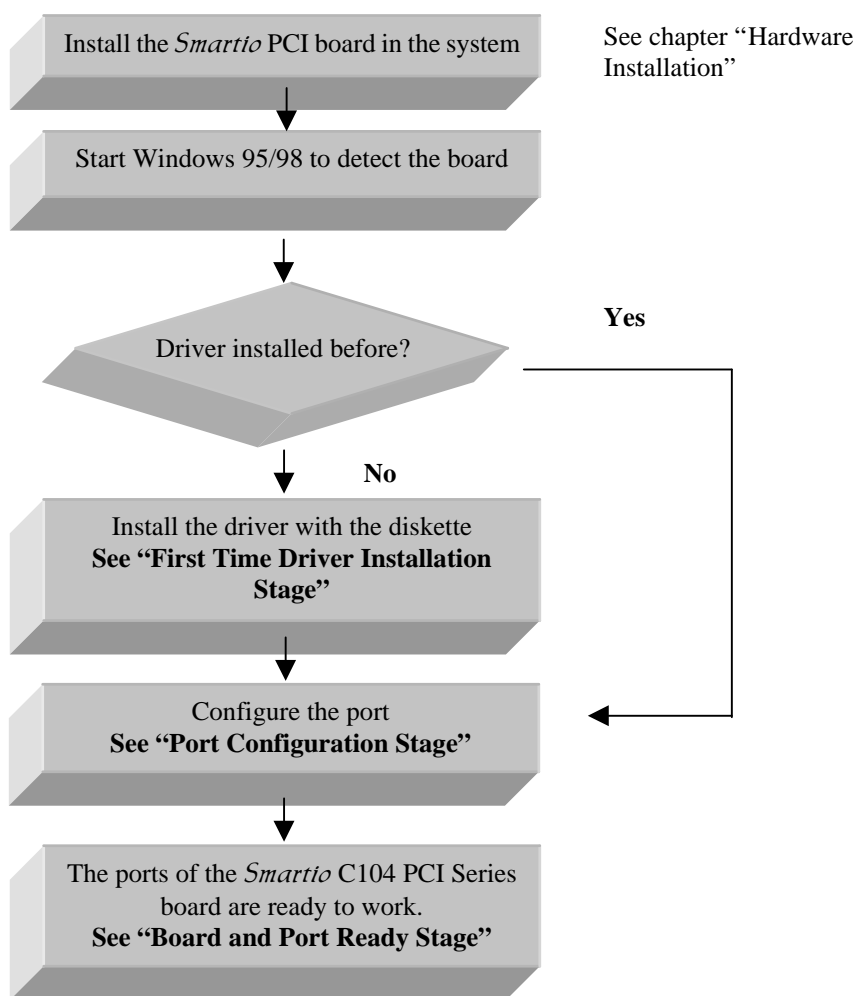
3.2.1 Installing the Driver

If you install for the first time, or you want to add more boards, this section is for you.

You can easily plug the *Smartio* C104 PCI Series board and work right away with very little installation efforts under Windows 95/98, which supports **Plug and Play** capability. Windows 95/98 will automatically detect the presence of the newly plugged board and prompt you to install the software driver the first time. In this case, you need the driver diskette.

Up to 4 *Smartio* C104 PCI Series boards can be installed together as long as the I/O addresses and IRQ number resources are sufficient and available in a system.

The following flow chart illustrates the driver installation stages of the *Smartio* C104 PCI Series boards. Each stage is detailed later.



First Time Driver Installation Stage

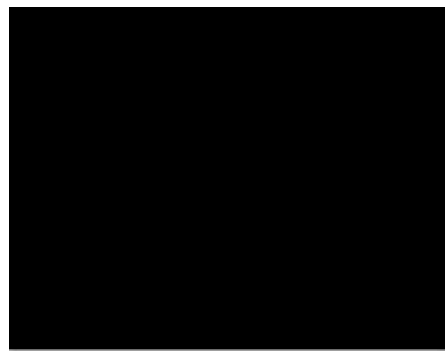
This stage presents the steps for installing the driver for the very first time with the first *Smartio* C104 PCI Series board. The installation of the *Smartio* C104 PCI Series board for Windows 95 and Windows 98 **differs slightly** and will be described in two columns. **Follow the steps in the left or right column for Windows 95 or 98, respectively.**

1. Upon detecting **the first new *Smartio* C104 PCI Series board**, Windows 95/98 will automatically show a **“New hardware found”** message box, and then display the following dialog box. Click on the [Next>] button.

Windows 95



2. Click on the [Other Locations] button.

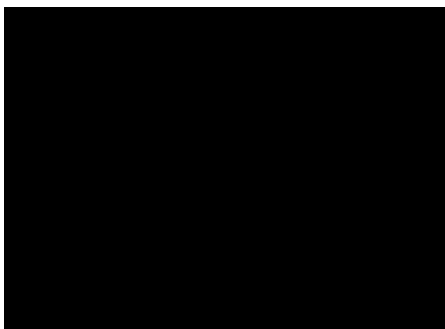


2. Select “Display a list...” and click [Next>].



Windows 98

3. Type “A:\Windows.95” in the Location field, and click [OK]. The system will start reading the files from the diskette.



3. Select “Other Devices” and click [Next>].



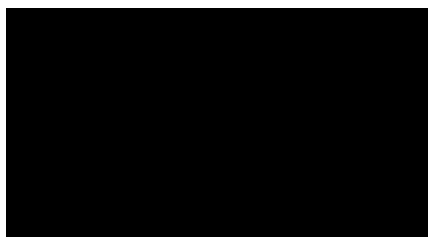
4. Click on the [Finish] button.



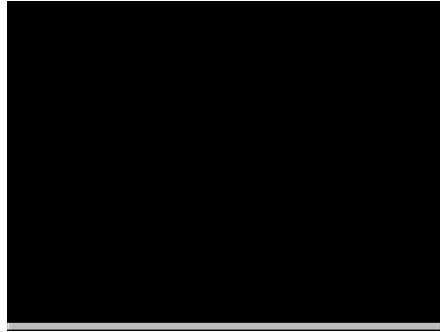
4. Click on the [Have Disk] button.



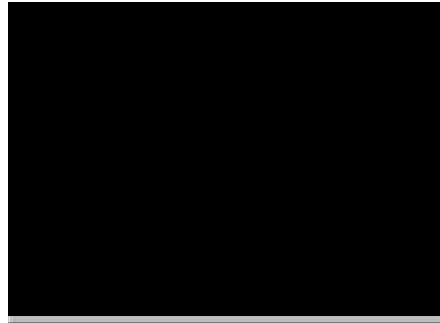
5. Type “A:\Windows.95” and click [OK]. The system will start reading the files from the diskette.



6. Click [Next>].

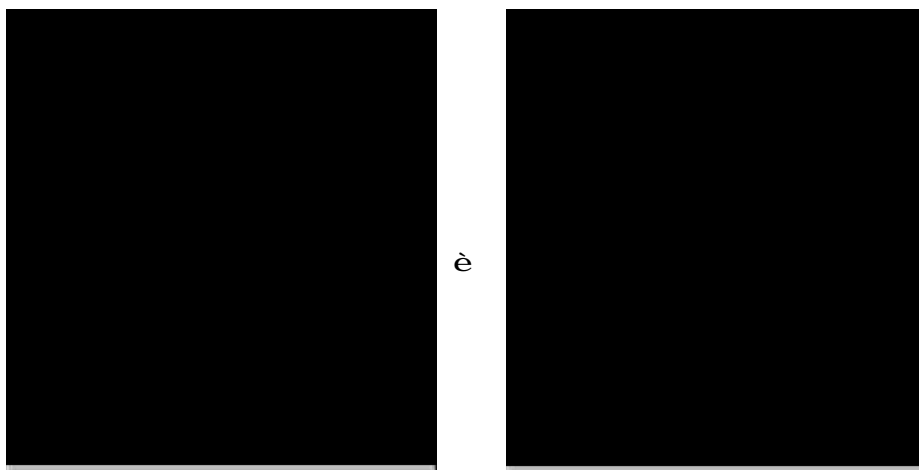


7. Click [Next>].



Port Configuration Stage

This stage displays the “**MOXA C104 PCI Series Installation**” dialog box for the port configuration. Here you can map the MOXA ports to the system COM numbers.



In the “**C104 PCI Series Installation**” dialog box, the COM number field of the newly installed board is **undefined**. You have to set up all the ports of the board with the desired “**COM Number**”. Specify the COM number of the first port in the “**C104 PCI Series Port 1**” field and the subsequent ports are mapped to continuous COM numbers. For instance, if the first port is mapped to COM3, then the second port is sequentially mapped to COM4.

Click [**OK**].

Board and Port Ready Stage

Click [OK] for all the dialog boxes to finish the configuration and exit the “MOXA Ports Installation” dialog box.

In this last stage, you will complete the driver installation.

Windows 95

After the port installation, you can **immediately** use the COM ports of the *Smartio* C104 PCI Series board **without restarting Windows 95**.

Windows 98

After the port installation, click on the [Finish] button. Now you can **immediately** use the COM ports of the *Smartio* C104 PCI Series board **without restarting Windows98**.





Once the installation is finished, error conditions of the board, **if any**, are displayed on the screen. Otherwise, everything should be fine.

If an error message similar to “C104 PCI Series(BusNo=x, DevNo=x, Starting COM=x) interrupt number is invalid!” appears, consult the “Troubleshooting” chapter.

Note ! Up to now, the driver installation of the *Smartio* C104 PCI Series is complete and successful, including the board and port configuration. However, if changes of the board and port configuration are needed, please refer to the next section, “Configuring the Board and Port”, for more configuration details.

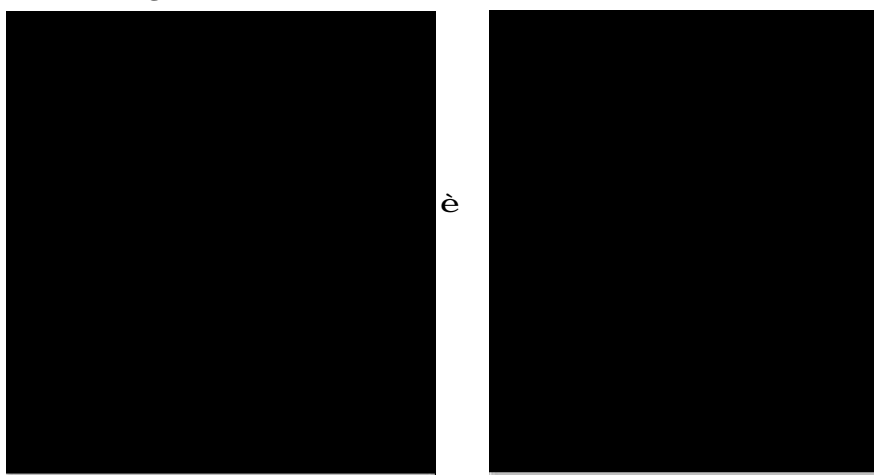
Note! Once the board and the driver are installed and the driver restarts successfully, you can start to develop applications with the *PComm* library (See “Serial Programming Tools”) or the Microsoft Win32 API. You can also execute any ready-made applications, such as *PComm* utility Terminal emulator (See “Serial Programming Tools”) or HyperTerminal to transmit/receive data, as well as Remote Access Service to provide dial-up networking capabilities.

-  If multiple boards are installed at the same time, the same scenario applies for the next boards, except that no driver diskette is asked anymore.
-  Similarly, if you want to add more boards and the driver has been installed before, simply plug the *Smartio* C104 PCI Series board and Windows 95/98 will automatically detect and install the required driver.

3.2.2 COM Port Mapping

If you already have installed the driver and want to re-configure the COM number for the ports under Windows 95/98, follow this procedure.

1. Open the [Control Panel], click on the [System] icon, select the [Device Manager] tab, and then [Moxa Smartio/Industio PCI series multiport board]. Select the desired C104 PCI Series board entry, click on the [Properties] button and select the [Ports Configuration] tab.

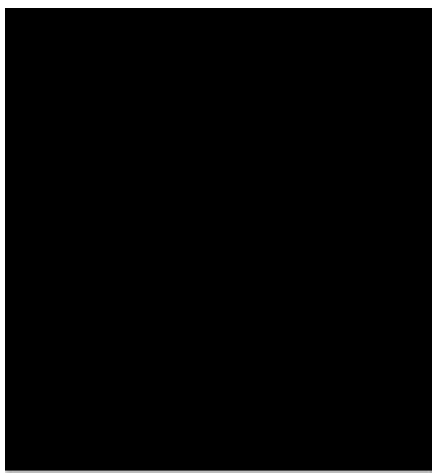


2. Assign the desired COM number for the *Smartio* C104 PCI Series port mapping.
3. Restart the system to activate the latest configuration.

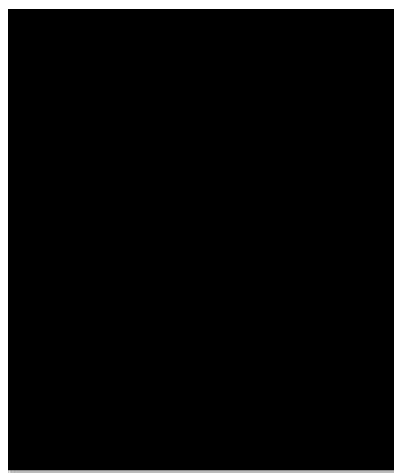
3.2.3 Updating the Driver

This section explains how to update the driver.

1. In the [Control Panel], click on the [System] icon, and select the [Device Manager] tab. Select “Moxa Smartio/Industio PCI series multiport board”.
2. Select the “C104 PCI Series” option. Click on the [Properties] button and then select the [Device Driver] tab.
3. Click on the [Update Driver...] button. Click then on the [Have Disk...] button to type the path of the new driver and update the driver.



è



4. Restart the system to activate the new configuration.

3.2.4 Removing the PCI Board

This section explains how to remove the *Smartio* C104 PCI Series board.

To remove the *Smartio* C104 PCI Series board,

1. Open the **[Control Panel]** and click on the **[System]** icon. Select the **[Device Manager]** tab and **[Moxa Smartio/Industio PCI series multiport board]**.
2. Select the desired *Smartio* C104 PCI Series board and click on the **[Remove]** button. Click **[OK]** when asked to confirm the removal of the board.
3. Click **[Yes]** to shutdown Windows 95/98 when the system prompts you to reboot.
4. Turn off the power and **physically remove** the PCI board from the expansion slot.

Chapter 4 Serial Programming Tools

Moxa supports some easy but powerful serial programming libraries and communication troubleshooting utilities under Windows NT and Windows 95/98. You will save a lot of developing time with the MOXA Serial Programming Tools.

The following sections will detail the installation, the library and the utilities for various platforms.

PComm, the professional serial comm tool for PC, is a software package for **Windows NT and Windows 95/98**, which consists of a powerful serial communication library for easy programming in the most popular languages, useful utilities such as diagnostic, monitor and terminal emulator, illustrative sample programs and comprehensive on-line documents.

The serial communication library is useful for developing a system for data communication, remote access, data acquisition or industrial control in the Windows NT and Windows 95/98 environment, for an easier solution compared to the more complex Windows Win32 COMM API.

4.1 *PComm* Installation

To install *PComm*, run **\Setup.exe** from the diskette. Note that the *PComm* diagnostic and monitor utilities are for MOXA boards only. MOXA Windows NT or Windows 95/98 device drivers, as well as MOXA boards are required. The drivers are installed separately and detailed in the “Software Installation” chapter.

Click [**Start**] and select [**Program Files**] and the [**PComm Lite**] group to see a list of utilities and documents.

4.2 *PComm* Programming Library

The serial communication library helps you to develop programs for serial communications **for any COM port** complying with Microsoft Win32 API. It facilitates

the implementation of multi-process and multi-thread serial communication programs and hence greatly reduces developing time.

For a complete library function description and sample programs for Visual C++, Visual Basic and Delphi, please click **[Start]** and select **[Program Files]** and **[PComm Lite]** and **[PComm Lib Help]**, **[PComm Porting Notes]** or **[PComm Programming Guide]** or refer to the sample programs in the *PComm* directory.

4.3 Utilities

Following are short descriptions of each utility. For details, please see the on-line help on the diskette.

Diagnostic (for MOXA boards only)

A convenient diagnostic program that provides internal and external testing, such as IRQ, Tx/D/RxD, UART, CTS/RTS, DTR/DSR, DTR/DCD testing, etc., for the MOXA boards and ports to verify correct operations of both the software and hardware.

Click **[Start]** and select **[Program Files]** and **[PComm Lite]** and **[PComm Diagnostic]**.



Monitor (for MOXA boards under Windows NT Only)

A useful port status monitoring program that allows you to watch the selected MOXA COM ports' data transmitting/receiving throughput and communication line status which are updated and displayed on the screen at time intervals. You can also click on one of the specific displayed port in order to visualize the current communication parameters and status of that port.

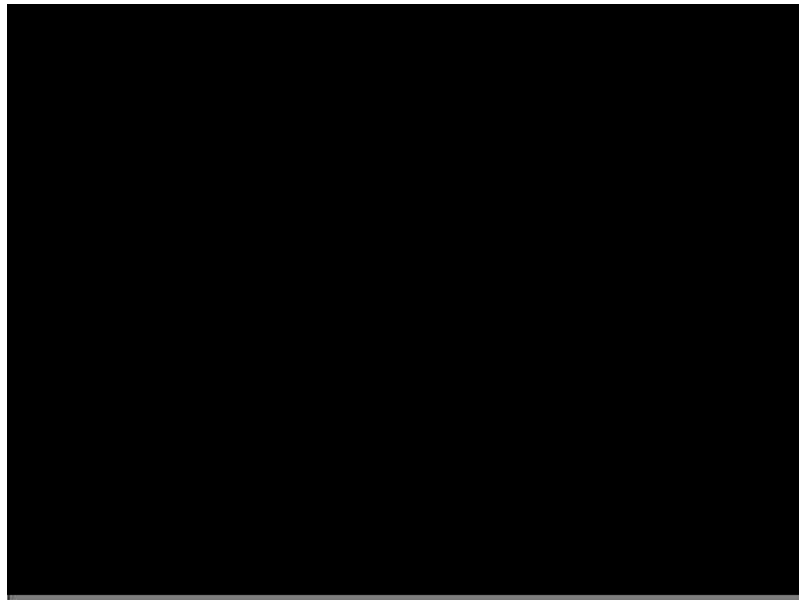
Click [Start] and select [Program Files] and [PComm Lite] and [PComm Monitor].



Terminal Emulator

The Terminal Emulator features multi-windows and supports terminal types of VT100 and ANSI. You can transfer data interactively, send pattern periodically or transfer file using ASCII, XMODEM, YMODEM, ZMODEM and KERMIT protocols.

Click [**Start**] and select [**Program Files**] and [**PComm Lite**] and [**PComm Termianl**].



Chapter 5 Connection Cable and Cable Wiring

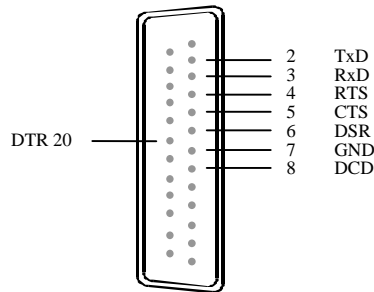
In serial data communications, the term **DTE** is for Data Terminal Equipment, like PC COM1/2, serial printers and terminals. The term **DCE** is for Data Communication Equipment, like modems.

5.1 RS-232 Cable Wiring

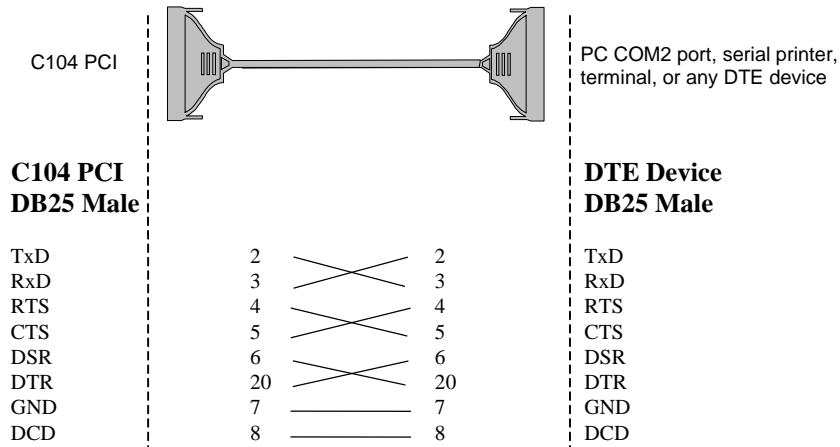
The followings are pin assignments for the **DB25** RS-232 connector.

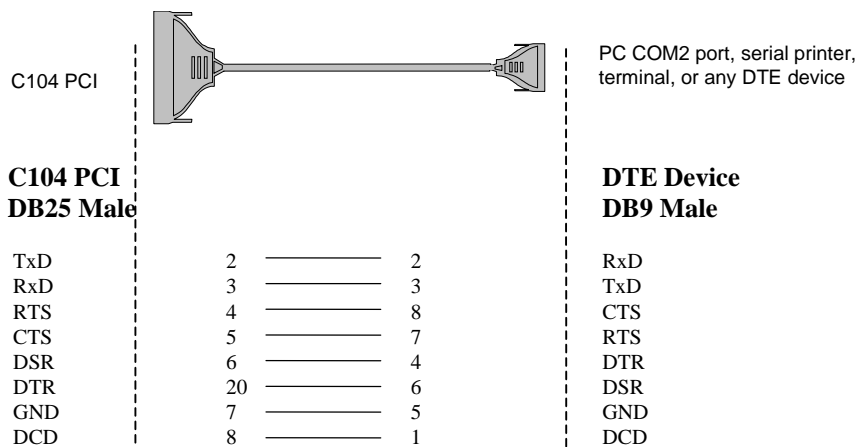
DTE, DB25 Male

| | |
|----|-----|
| 2 | TxD |
| 3 | RxD |
| 4 | RTS |
| 5 | CTS |
| 6 | DSR |
| 7 | GND |
| 8 | DCD |
| 20 | DTR |

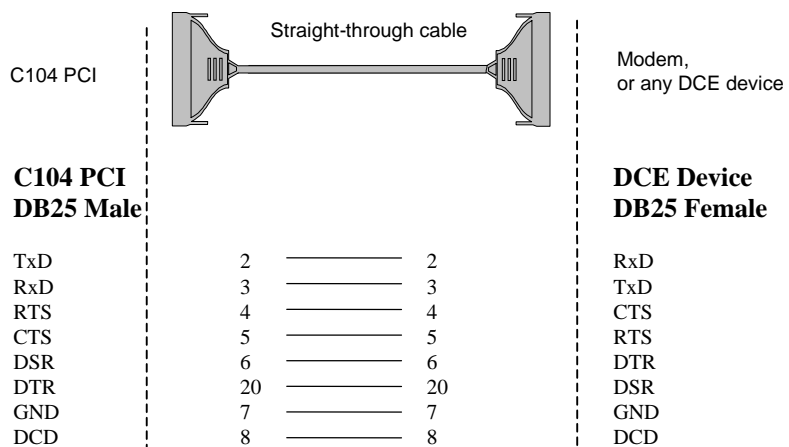


Type 1: To connect the *Smartio C104* PCI Series to a DTE device.





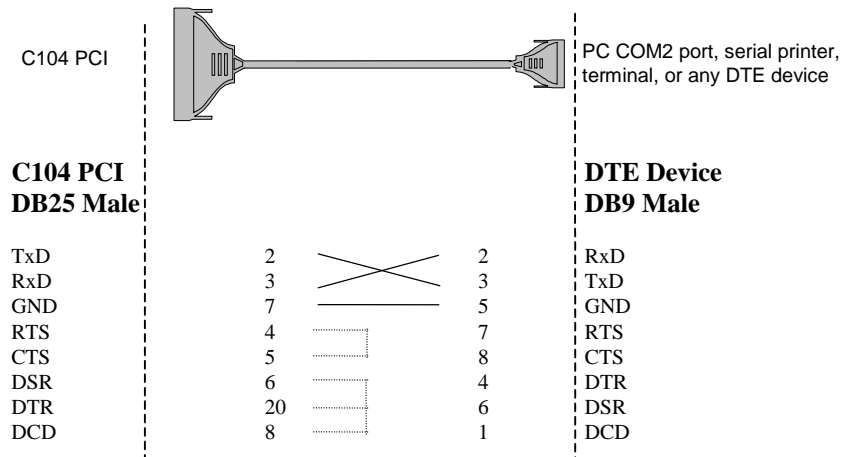
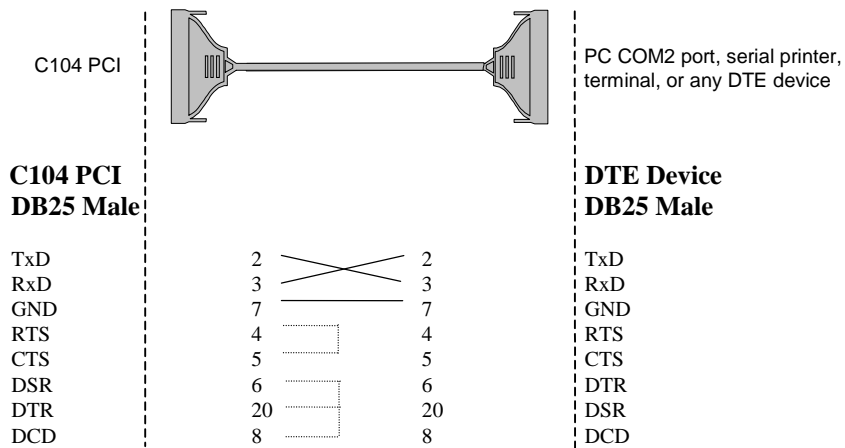
Type 2: To connect *Smartio* C104 PCI Series to a DCE device.



Type 3: To connect *Smartio* C104 PCI Series to a DTE with 3-pin wiring.

If the [Hardware flow control] feature is set to “ON”, you must loop back (or short) the RTS with CTS and the DSR with DTR, DCD on the MOXA site.

If [Hardware flow control] feature is set to “OFF”, you could just leave RTS, CTS, DSR, DTR, DCD open, ignoring the connection indicated in dash-lines.



5.2 DB37 Connector

The following lists the pin assignments of the *Smartio* C104 PCI Series DB37 connector on the bracket. With this information, you may fabricate any type of fan-out cables, such as DB37 to 4 x DB9 or DB37 to 4 x RJ45.

| Pin no. | Signal | Pin no. | Signal |
|---------|--------|---------|--------|
| 1 | | 20 | RI3 |
| 2 | DCD3 | 21 | DTR3 |
| 3 | GND | 22 | DSR3 |
| 4 | CTS3 | 23 | RTS3 |
| 5 | RxD3 | 24 | TxD3 |
| 6 | RI4 | 25 | DCD4 |
| 7 | DTR4 | 26 | GND |
| 8 | DSR4 | 27 | CTS4 |
| 9 | RTS4 | 28 | RxD4 |
| 10 | TxD4 | 29 | RI2 |
| 11 | DCD2 | 30 | DTR2 |
| 12 | GND | 31 | DSR2 |
| 13 | CTS2 | 32 | RTS2 |
| 14 | RxD2 | 33 | TxD2 |
| 15 | RI1 | 34 | DCD1 |
| 16 | DTR1 | 35 | GND |
| 17 | DSR1 | 36 | CTS1 |
| 18 | RTS1 | 37 | RxD1 |
| 19 | TxD1 | | |

Note: Make shield grounded to connector.

Chapter 6 Troubleshooting

Common *Smartio* C104 PCI Series problems and possible solutions are listed below. If you still have problems, contact your dealer or Moxa for help. Or use the “**Problem Report Form**” at the end of this manual to report problems to your dealer at once for faster technical support.

6.1 General Troubleshooting

1. **The MOXA PCI board cannot be detected by the MOXA driver while installing the driver.**

Hardware causes and solutions:

- a. The board is not installed or missing (absent). Please install it.
 - b. The board is not properly plugged in the system. If that is the case, re-install the board and make sure that it fits well in a 32-bit PCI slot this time. Sometimes the slot for plugging the board is bad. In this case, try other slots until you find a good one.
 - c. Your motherboard does not have a vacant IRQ for the C104 PCI Series. Please enter BIOS and make sure there are available IRQ in PCI/PnP settings.
2. **The MOXA board and driver are activated but cannot transfer (transmitting/receiving) data.**

Hardware Causes and Solutions:

- a. Check for wrong cable wiring. Refer to the “Connection Cable and Cable Wiring” chapter for precise pinouts of the connector type you are using.
- b. The cable or the board are defective. You may use other ports, cables or boards to verify. In addition, the *PComm* “Diagnostic” utility for Windows NT and Windows 95/98 is good for testing MOXA boards and port conditions. If Diagnostic reports error, replace the faulty components.

Software Causes and Solutions:

- a. *Smartio* C104 PCI Series checks the line status (CTS) before it sends data out if the RTS/CTS flow control feature is set to “Enable” in the configuration or application program. Please refer to the “Connection Cable and Cable Wiring” chapter for proper wiring. Check the line status of the suspected port using the diagnostic LED indicators on the mini tester.
- b. Perhaps the application controlling the board is not correctly written according to the corresponding API of the operating system. To verify, please run an existing and known good application or the provided utilities by Moxa. For example, under Windows NT and Windows 95/98, *Pcomm* “Terminal emulator” or “HyperTerminal” utilities are good for testing the COM ports.

6.2 Windows NT

This section is specific for troubleshooting under Windows NT. For general problems and solutions, please see the previous section, “General Troubleshooting”.

1. **After the system reboots, the error message “Another driver in the system, which did not report its resources, has already claimed the interrupt used by xxx.” appears in the Event Log.**

This indicates that the MOXA board is found, but the IRQ is conflicting with another adapter. Please make sure there is no conflict with other adapter’s IRQ. Check the PCI BIOS IRQ settings first. Make sure that an IRQ is available.

2. **After the system reboots, the error message “Cannot find any configured MOXA Smartio/Industio PCI Series board!” appears in the Event Log.**

Please make sure the PCI board is seated firmly in the expansion slot.

3. **The COM number of the *Smartio* C104 PCI Series, with device number xx, conflicts with others.**

The COM numbers of different boards happen to be the same. Try to change the COM number mappings.

4. **Windows NT system panic (blue screen).**

The possible reason is an IRQ or I/O address conflict with other ISA Bus adapters, like LAN and SCSI boards, or the system BIOS. Please refer to the corresponding problem in the previous section, “General Troubleshooting”, for solutions.

6.3 Windows 95/98

This section is specific for troubleshooting under Windows 95/98. For general problems and solutions, please see the previous section, “General Troubleshooting”.

1. The system fails to find the *Smartio C104 PCI Series board!*

- The board(s) is not plugged properly.
- The slot for plugging the board is defective.
In this case, please try other slots until you find a good one.
- The board might be defective.

2. After the system reboots, the error message “C104 PCI Series (BusNo=x, DevNo=x, Starting COM=x) interrupt number is invalid!” appears.

This indicates that the MOXA board is found, but the IRQ is conflicting with other adapter. Make sure there is no conflict with other adapter’s IRQ. Check the PCI BIOS IRQ settings and make sure an IRQ is available.

Appendix Technical Reference

A Specification

- √ Bus interface : 32-bit PCI
- √ Number of ports : 4
- √ I/O address : Assigned by PCI BIOS
- √ IRQ : Assigned by PCI BIOS
- √ Data bits : 5, 6, 7, 8
- √ Stop bits : 1, 1.5, 2
- √ Parity : None, even, odd, space, mark
- √ UART : 4»ēTI550C
- √ Speed (bps) : 50 ~ 921.6K
- √ Connectors : 4»ēDB25 male
- √ Data signals : RS-232»ēTxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- √ Surge protection : Max. 2000V (C104HS/PCI)
- √ Operating temp : 0 ~ 55 ¼[
- √ Power requirement : C104H/PCI: 86mA max. (+5V), 210mA max. (+12V), 266mA max. (-12V)
C104HS/PCI: 110mA max. (+5V), 230mA max. (+12V), 320mA max. (-12V)
- √ Dimensions : 120 mm»ē100 mm

B PCI

The 32-bit *Smartio* C104 PCI Series board complies with the PCI specifications 2.1. Hardware configuration for IRQ and I/O addresses is automatically assigned by the PCI BIOS. Hence, you must **first plug the board** before installing the software driver.

Unlike ISA slots, different PCI slots in the same PC may have different bus numbers and device numbers with respect to the PCI specifications. The same PCI board will have different system configurations if switched to a different PCI slot, which may be called **slot-sensitive** or **slot-dependent**. This may also apply to PCI slots in PC with different motherboard, which may use **different device number sets**. For example, some use 17, 18, 19, and 20 for identifying the respective PCI slots but some use 11, 12, 13 and 14.

Due to the **slot-dependency**, it is necessary to **re-configure the software driver** once the board is plugged in different PCI slots.

Up to 4 *Smartio* C104 PCI Series boards are allowed in a system. When installing multiple boards, **please note the boards' order** for distinguishing the installed boards.

C UART TI550C

The UART chip, **TI550C**, is an intelligent asynchronous controller capable of supporting one full duplex channel that simultaneously transfers data at **921.6 Kbps**. To increase the overall data throughput, special features such as on-chip FIFO and on-chip hardware flow control are used to reduce the number of interrupts to the onboard CPU and to prevent any loss of valuable data.

Problem Report Form

Smartio C104 PCI Series

| | |
|-----------------------------|--------------------|
| Customer name: _____ | |
| Company: _____ | |
| Tel: _____ | Fax: _____ |
| Email: _____ | Date: _____ |

1. **Moxa Product:** C104 PCI Series **Serial Number:** _____
2. **Moxa Driver Version:** _____
3. **Moxa Hardware Settings:** PCI slot number _____
4. **Operating System:** Windows 95 Windows 98
 Windows NT 3.51 Windows NT 4.0
 Others
5. **PC Host:** Make _____ Model _____
6. **CPU:** Speed _____MHz Make _____ Model _____
7. **BIOS:** Make _____ Version _____
8. **PCI IRQ Configuration in BIOS:**

| | | | | |
|----------|---|---|---|---|
| Slot no. | 1 | 2 | 3 | 4 |
| IRQ no | | | | |

9. **Problem Description:** Please describes the problem as clearly as possible, including the error message you see. We may have to follow your description to reproduce the problem.
 - Board not found. Board found, but can't transfer data.
 - Can transfer data, but lose data. Can transfer data, but with garbled data.
 - Others. Detailed error message description is recommended:

Return Procedure

For product repair, exchange or refund, you must:

- ✓ Provide evidence of original purchase.
- ✓ Fill out the Problem Report Form (PRF) as detailed as possible for shorter product repair time.
- ✓ Obtain a Return Merchandise Authorization (RMA) number from the sales representative or dealer.
- ✓ Carefully pack the product in an anti-static package, and send it, pre-paid, to the dealer. The RMA number should be visible on the outside of the package, and include a description of the problem along with the return address and telephone number of a technical contact.