CP-132U Series User's Manual

Industrial 2-Port RS-422/485 Serial Board for Universal PCI Bus

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www.moxa.com/product

CP-132U Series User's Manual

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Technical Support Contact Information
www.moxa.com/support

Moxa Americas:
Toll-free: 1-888-669-2872
Tel: +1-714-528-6777
Fax: +1-714-528-6778

Moxa China (Shanghai office):
Toll-free: 800-820-5036
Tel: +86-21-5258-9955
Fax: +86-10-6872-3958

Moxa Europe:
Tel: +49-89-3 70 03 99-0
Fax: +49-89-3 70 03 99-99

Moxa Asia-Pacific:
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231

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Introduction

Moxa's CP-132UL series Universal PCI serial board meets the new slot standard for expansion boards, and works with both 3.3V and 5V PCI slots. The board has eight independent 422/485 serial ports for connecting data acquisition equipment and other serial devices to a PC.

The following topics are covered in this chapter:

- **Overview**
- **Applications**
- **Features**
- **Package Checklist**
- **Installation Flowchart**

Overview

Smartio—The Smart Multiport Async Solution

CP-132U Series is one of the newest members of Moxa's well-known **Smartio** series of multiport serial boards, in which Smartio stands for Smart Multiport serial I/O solution. The 2-port 422/485 CP-132U board is designed for the plug-and-play 32-bit PCI bus, and is an economical solution for connecting terminals, modems, printers, scanners, cash registers, bar code readers, keypads, numeric displays, electronic scales, data acquisition equipment, and many other serial devices for the PC and compatible systems. The Smartio device driver makes full use of the 128 byte Tx/Rx FIFO and on-chip H/W and S/W flow control. Your applications will be capable of transmitting data without loss at speeds as high as 921.6 Kbps, providing a reliable, high performance solution for multiport serial communications.

PCI Solution

The CP-132U series board complies with PCI Spec. 2.1. The serial transmission mode (RS-422, 2-wire RS-485, or 4-wire RS-485) for each port is set with onboard switches, but the ports' transmission parameters are configured after the board is installed. The IRQ and I/O addresses are assigned automatically by the PCI BIOS. For this reason, the board MUST be plugged into the computer before installing the driver. For more PCI information, refer to the "Technical Reference" appendix.

Surge Protection

The CP-132U series board comes with built-in 15 KV ESD surge protection to prevent damage to the board from lightning or high potential voltage. The surge protection feature makes the CP-132U board suitable for industrial, factory-type applications, and for use with applications that are subject to severe weather conditions.

ADDC™ (Automatic Data Direction Control) for RS-485

To make 2-wire RS-485 half-duplex connections easier to manage, ADDC™ (Automatic Data Direction Control) intelligence is built into the CP-132U series board, eliminating the need for software interference. This means that Windows applications can be set up to manage RS-485 ports without writing additional code to control the half-duplex protocol.

Operating System Support

The CP-132U series board is compatible with all major industrial platforms, including Windows 2000/XP/2003, Windows NT, Windows 95/98/Me, DOS, and Linux. Moxa device drivers are provided for smoother installation, configuration, and performance. In this manual, we give installation details for Windows 2003/XP, Windows 2000, Windows NT, Windows 95/98, DOS, Linux, and SCO.

Visit Moxa's website at www.moxa.com to download the latest drivers and user's manuals for all of Moxa's products.

Universal PCI

The 32/64-bit PCI local bus specification requires that PCI hardware be compatible with both 3.3V and 5V connector types. Moxa's universal PCI cards can be plugged into 3.3V or 5V, and 32-bit or 64-bit slots.

Moxa Serial Comm Tool

For application development, Moxa provides an easy-to-use serial communication library called PComm that runs under Windows NT/2000/XP/2003/95/98. Use this library to develop your own applications with Visual Basic, Visual C++, Borland Delphi, etc. Utilities, such as Data Scope, Monitor, Terminal Emulator, and Diagnostics are included to make it easier to debug, monitor communication status, provide terminal emulation, and transfer files.

Applications

The CP-132U series board is suitable for many different applications, including:

- Internet/Intranet Connections
- Remote Access
- Multi-user Applications
- Industrial Automation
- Office Automation
- Telecommunications
- PC-based Vending Machines and Kiosks
- POS (Point-of-Sale) Systems

Features

The CP-132UL Series includes the following products:

CP-132UL V2	2 RS-422/485 ports, Universal PCI interface with embedded Surge Protection (16 KV ESD)
CP-132UL-I V2	2 RS-422/485 ports, Universal PCI interface with embedded Surge Protection and Isolation Protection (16 KV ESD, 2 KV Isolation)

The CP-132U series board has the following outstanding features:

- **2** independent 422/RS-485 serial ports
- Supports Universal PCI
- Data flow LED display onboard
- Moxa UART with 128-byte FIFO driver
- 50 bps to 921.6 Kbps transmission speed
- Supports both 4-wire and 2-wire RS-485
- 2-wire RS-485 data control with ADDC™
- Embedded 15 KV ESD surge protection
- Drivers for all major industrial platforms—Windows 2000/XP/2003, Windows NT, Windows 95/98, Windows XP Embedded, Linux, FreeBSD, SCO

Package Checklist

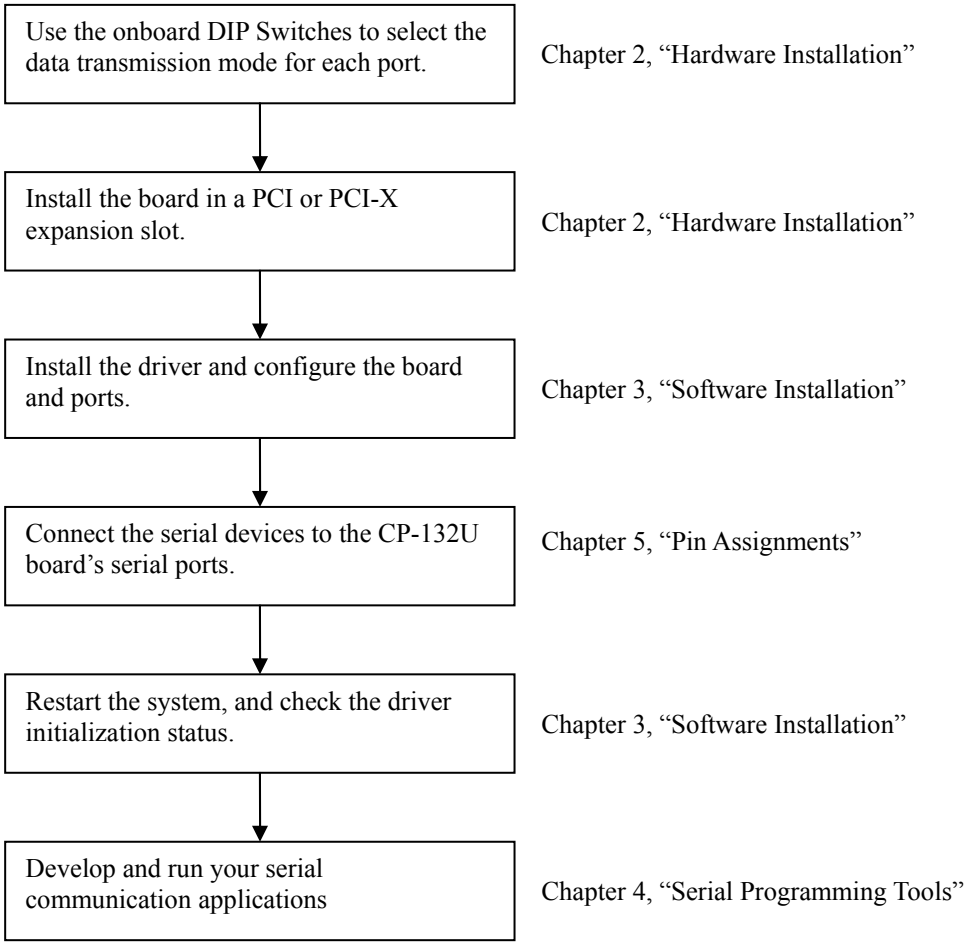
The following items are included in the CP-132U package:

- CP-132U 2-port serial board
- Documentation and Software CD-ROM
- Quick Installation Guide

NOTE: *Notify your sales representative if any of the above items are missing or damaged.*

Installation Flowchart

The following flowchart gives a brief summary of the procedure you should follow to install the CP-132U series board and which chapters to refer to for more detailed information:



2

Hardware Installation

The CP-132U series hardware installation procedure is described in this chapter. Since the CP-132U series board's IRQ number and I/O addresses are assigned automatically by the PCI BIOS, the board MUST be plugged in before installing the driver.

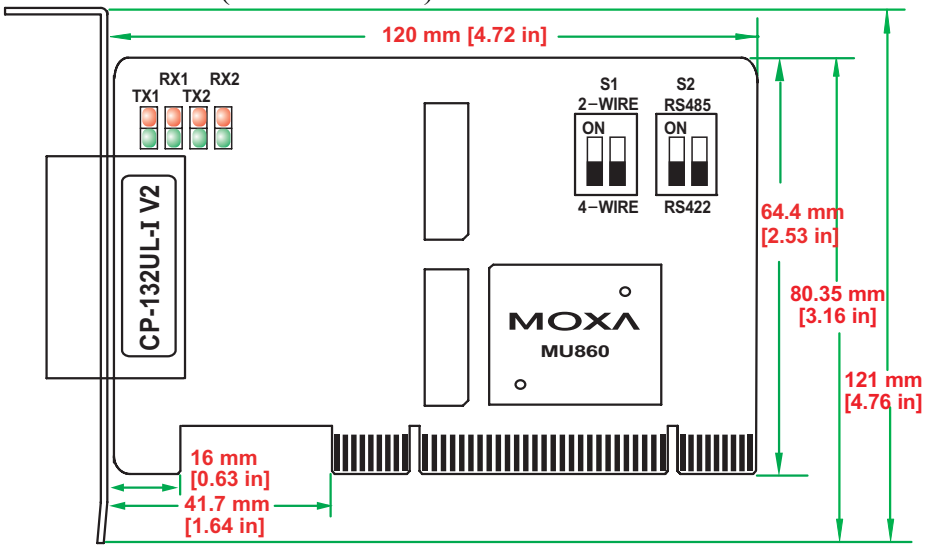
The following topics are covered in this chapter:

- **CP-132U Series Block Diagram**
- **DIP Switch Settings**
- **Plugging the Board into an Expansion Slot**

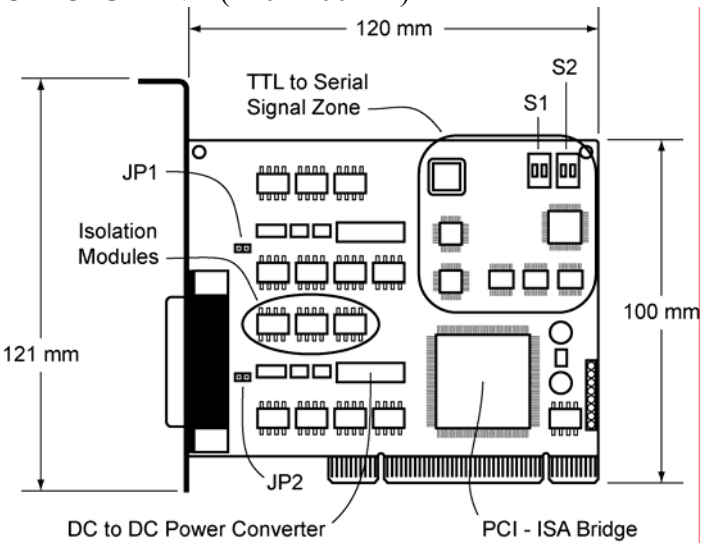
CP-132U Series Block Diagram

CP-132U Series boards' IRQ number and I/O address are assigned automatically by the PCI BIOS. This means that the board MUST be plugged in first before installing the driver.

CP-132UL-I V2 (120 x 64.5 mm)



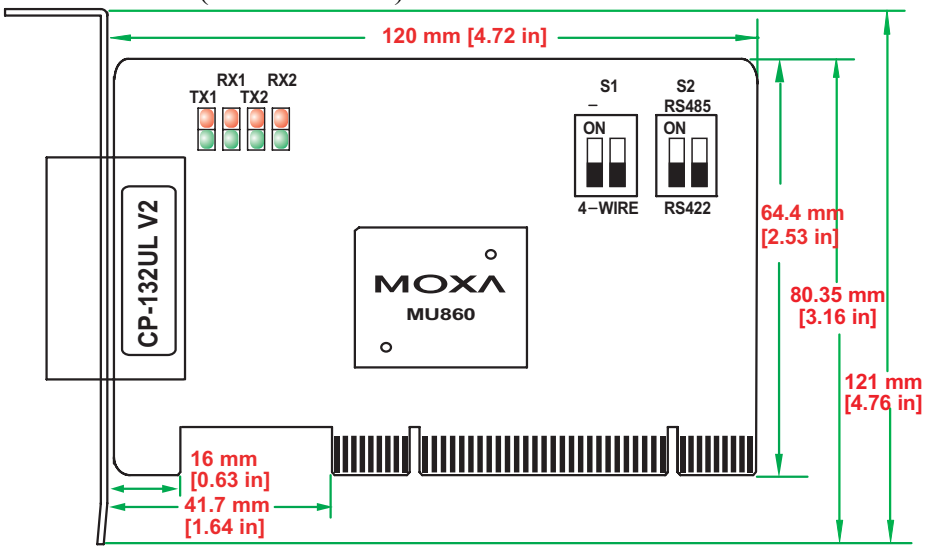
CP-132UL-I V1 (120 x100mm)



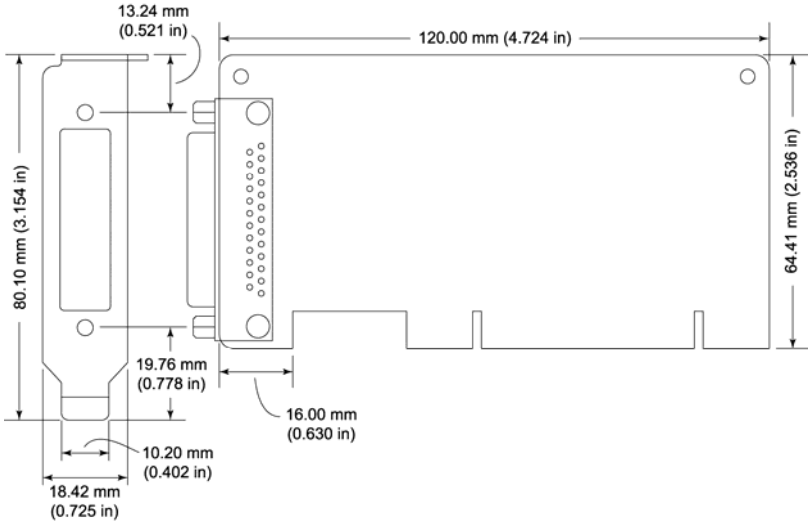
NOTE: Use JP1/2 to activate the Termination Resistors for ports 1/2.

Open Termination Resistor is NOT active
Short Termination Resistor is ACTIVE

CP-132UL V2 (120 x 64.5mm)



CP-132U V1 (120 x64.5mm)

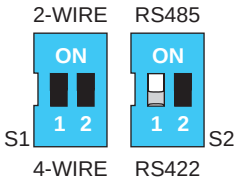
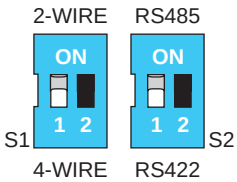
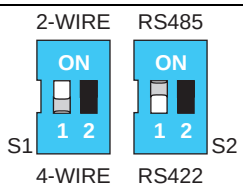


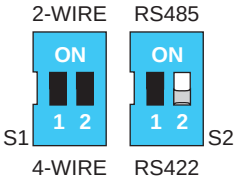
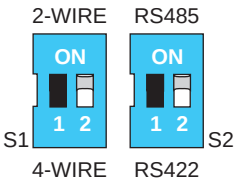
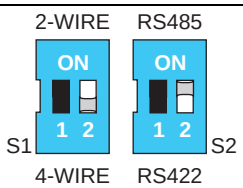
CP-132UL Series boards have four onboard DIP Switches, referred to below as S1-1, S1-2, S2-1, and S2-2, that allow the user to choose one of three serial interfaces—RS-422, RS-485 (2-wire), RS-485 (4-wire)—for each of the two ports. Note that S2-1 and S2-2 select between RS-422 and RS-485, and S1-1 and S1-2 select between 2-wire and 4-wire RS-485 (S1 is only active when S2 is set to ON).

The figures on the following page show you how to use the switches to select one of the three serial interfaces for each of the board's two ports.

DIP Switch Settings

Refer to the figures on the following two pages to see how to select between RS-422, RS-485 (2-wire), and RS-485 (4-wire).

DIP Switch Settings	Port 1		
	S1-1	S2-1	
RS-422	—	OFF	
RS-485 (2-wire)	ON	ON	
RS-485 (4-wire)	OFF	ON	

DIP Switch Settings	Port 2		
	S1-2	S2-2	
RS-422	—	OFF	
RS-485 (2-wire)	ON	ON	
RS-485 (4-wire)	OFF	ON	

Plugging the Board into an Expansion Slot

Since the CP-132U series board's IRQ number and I/O address are automatically assigned by the PCI BIOS, the board MUST be plugged into one of the computer's expansion slots before installing the driver.

Step 1: Power off the PC.

WARNING

To avoid damaging your system and board, make sure your computer is turned off before installing any serial board.

Step 2: Remove the PC's cover.

Step 3: Remove the slot cover bracket if there is one.

Step 4: Use the onboard DIP Switches to set the transmission mode for each port (see the previous section for details).

Step 5: Plug the CP-132U board firmly into a free 32-bit PCI slot.

Step 6: Fasten the holding screw to fix the control board in place.

Step 7: Replace the PC's cover.

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

NOTE Moxa PCI and Universal PCI boards must be assigned unique IRQ and I/O addresses. Both addresses are assigned automatically by the PCI BIOS.

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

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Software Installation

In this chapter, installation, configuration, and update/removal procedures for the driver are given for Windows (2003/XP, 2000, 98/95, NT), DOS, Linux, and SCO. Before proceeding with the software installation, complete the hardware installation discussed in the previous chapter, "Hardware Installation."

Refer to the next chapter, "Serial Programming Tools," for information about developing your own serial programming applications. Note that up to 4 CP-132U boards can be installed in one system, provided sufficient I/O address and IRQ number resources are available.

Windows 2000/XP/2003, Windows XP Embedded, Windows NT, Windows 95/98, DOS, FreeBSD, Linux, and SCO drivers can be downloaded from the Moxa website.

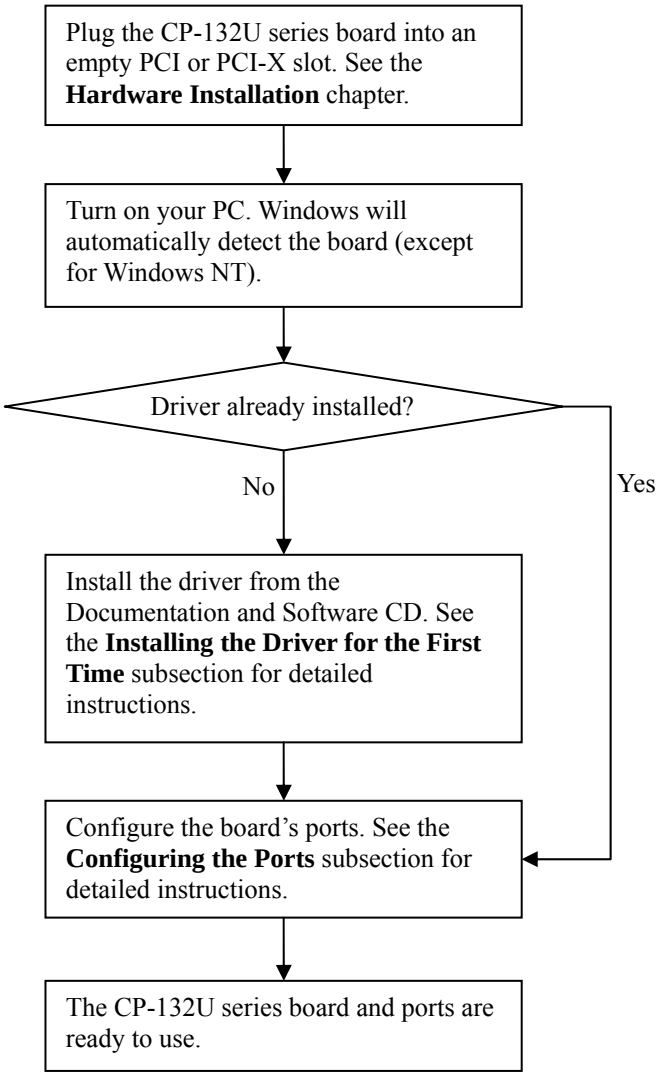
The following topics are covered in this chapter:

Windows Drivers

Moxa provides drivers that allow you to use the following serial board products under Windows 2003/XP/2000, Windows XP Embedded, Windows 98/95, and Windows NT.

- **Universal PCI Boards:** CP-168U, CP-104UL, CP-104JU, CP-134U, CP-134U-I, CP-132UL, CP-132UL-I V2(CP-132U-I V1)
- **PCI Boards:** C168H/PCI, C104H/PCI, C104HS/PCI, CP-114, CP-114I, CP-114S, CP-114IS, CP-132, CP-132I, CP-132S, CP-132IS
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS, CI-134, CI-134I, CI-134IS, CI-132, CI-132I, CI-132IS
- **cPCI Boards:** CT-114I

The overall procedure for installing the Windows drivers for the CP-132U series boards is summarized in the flowchart at the right. Note that except for Windows NT, a newly installed board will be detected automatically by the Windows OS when it boots up.



Windows 2003/XP

In this section, we describe the installation procedure for Windows XP. The installation procedure for Windows 2003 is similar.

Windows 2003/XP support up to 256 serial ports, from COM1 to COM256. In order to utilize fully Windows 2003/XP's multi-process/multi-thread advanced features, pure 32-bit Windows 2003/XP device drivers were developed for Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

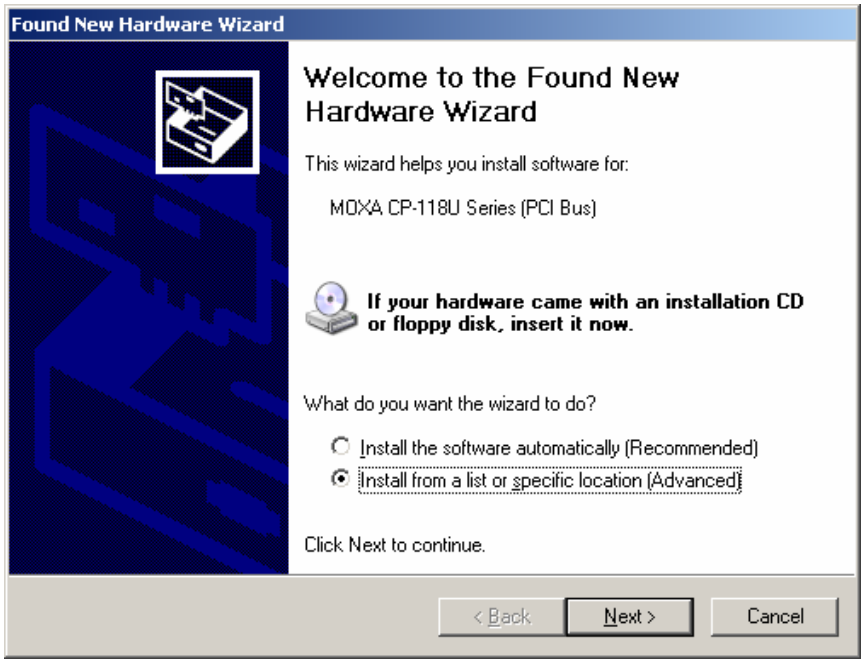
Installing the Driver

The following procedure shows how to install the CP-132U driver for the first time under Windows XP. First, make sure the board or boards have already been plugged into the system's PCI or PCI-X slot(s).

NOTE If you have already installed a CP-132U or other Moxa Smartio/Industio board in your computer, and you install additional boards, Windows 2003/XP will automatically detect and install the new board(s) the next time you boot up the computer. In this case, proceed directly to the next section, "Configuring the Ports," to configure the ports' serial transmission parameters.

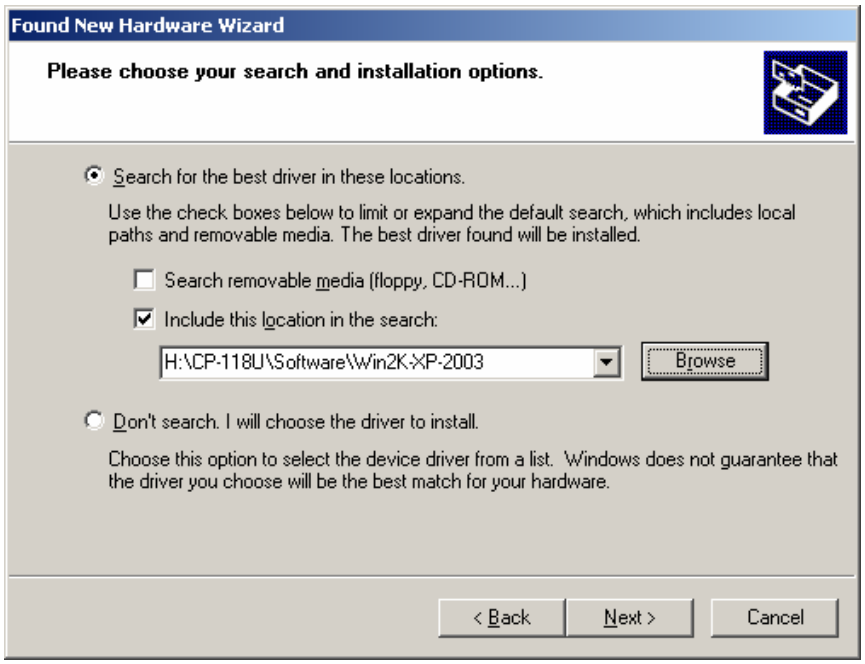
1. After plugging the board into an expansion slot and powering on your PC, Windows XP will automatically detect the new board, and the **Found New Hardware** window will open in the bottom right corner of the Windows desktop.

2. The **Welcome to the Found New Hardware Wizard** window will open automatically. Select **Install from a list or specific location (Advanced)**, and then click on **Next** to continue.

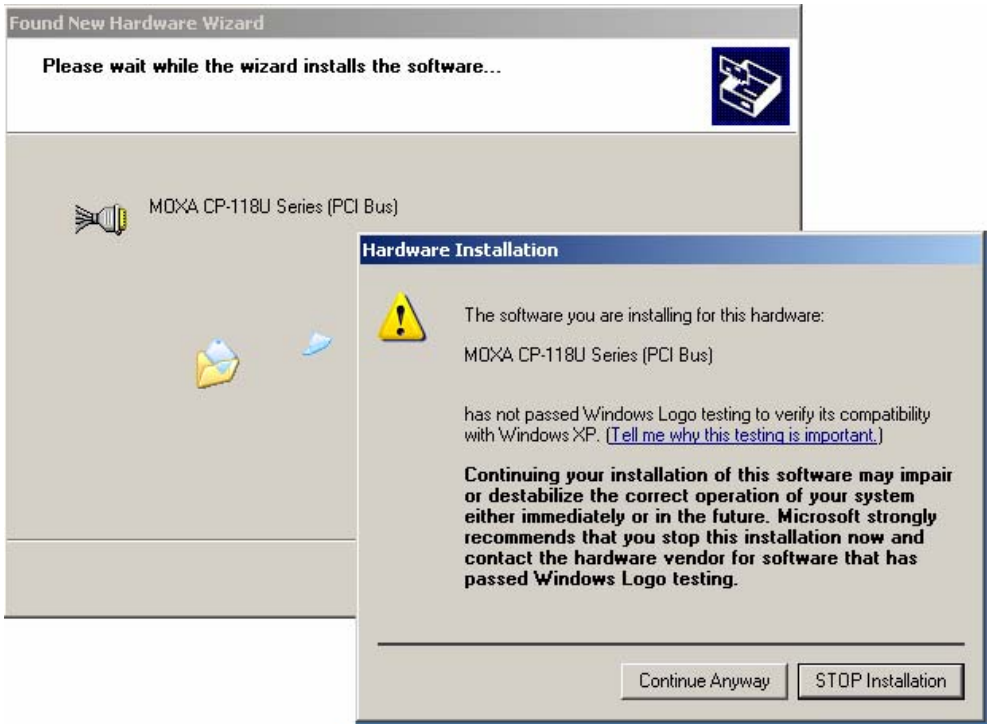


3. Select **Search for the best driver in these locations**, check **Include this location in the search**, and then click on **Browse**. Navigate to the **\CP-132U\Software\Win2K-XP-2003**

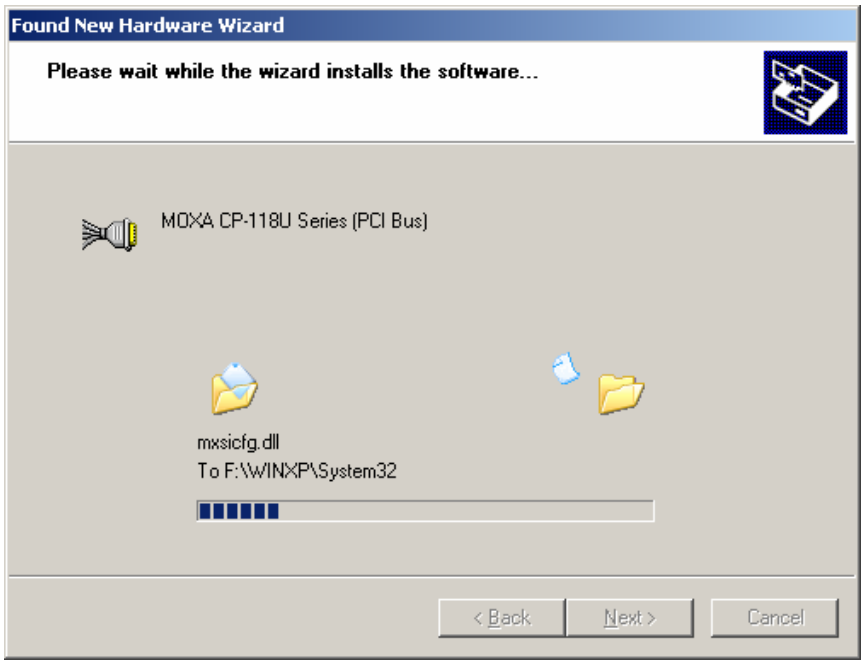
folder on the software CD, and then click on **Next** to continue.



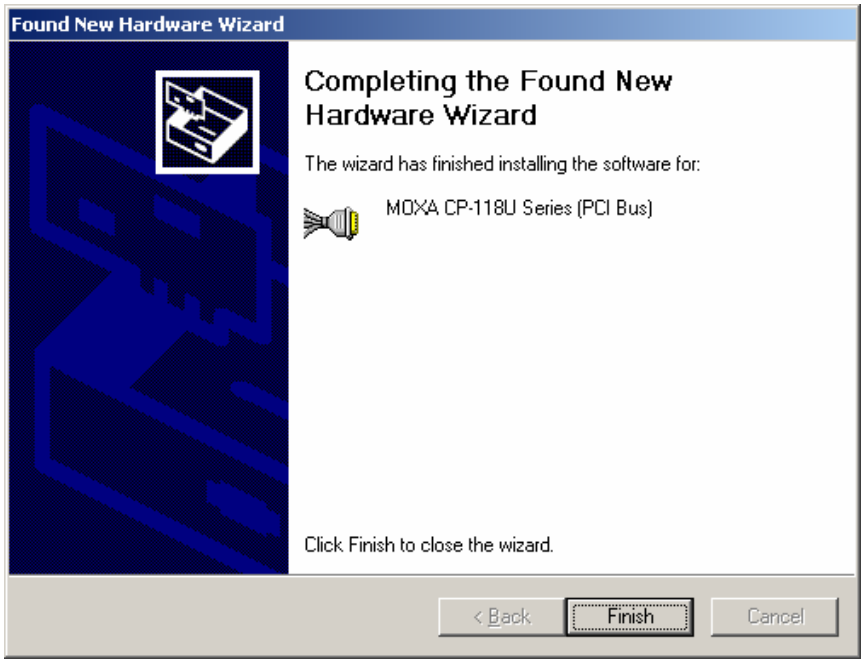
4. Wait while the installation wizard searches. The next window that opens cautions you that although this software hasn't passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click on **Continue Anyway** to proceed.



5. Wait while the driver software is installed.

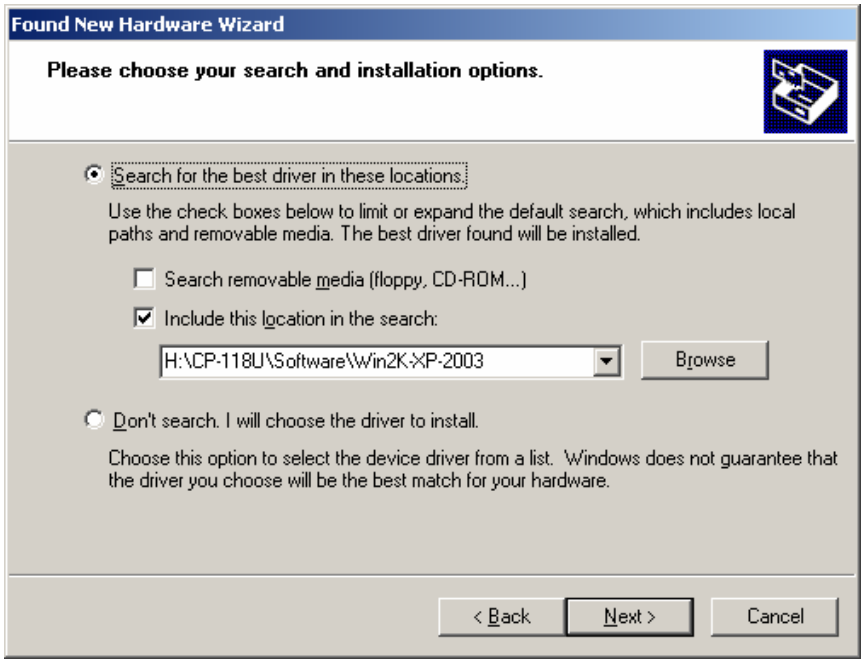


6. The next window shows the model name of the board, and indicates that Windows has completed the driver installation. Click on **Finish** to proceed with the rest of the installation procedure.

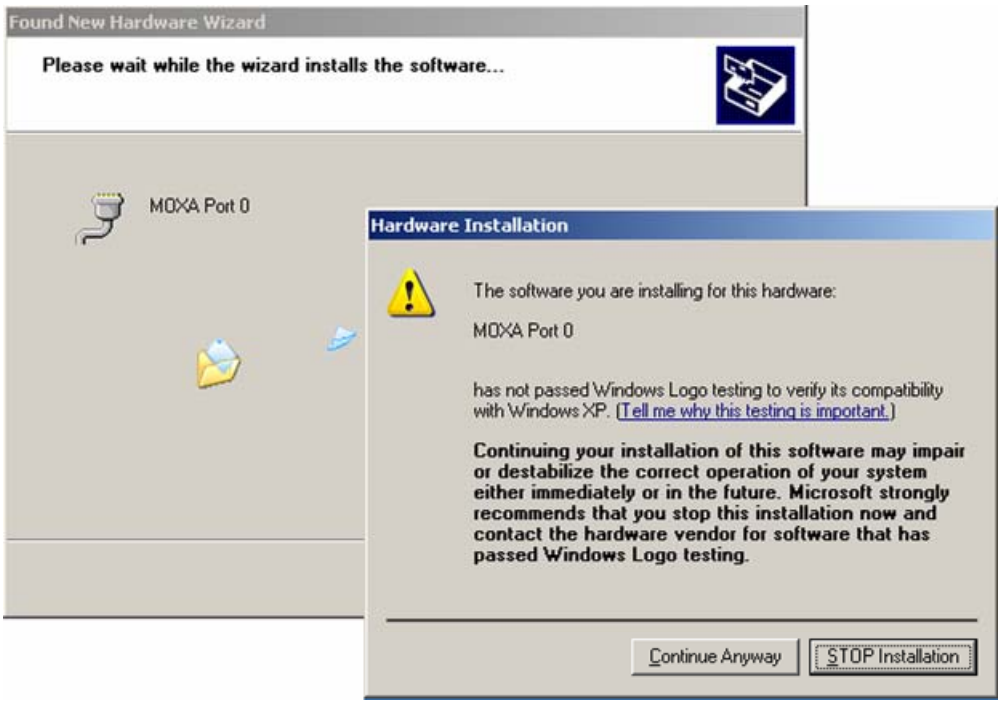


7. The **Found New Hardware Wizard** window will open to help you install the driver for Moxa Port 0. Select **Install from a list or specific location (Advanced)**, and then click on **Next** to proceed.

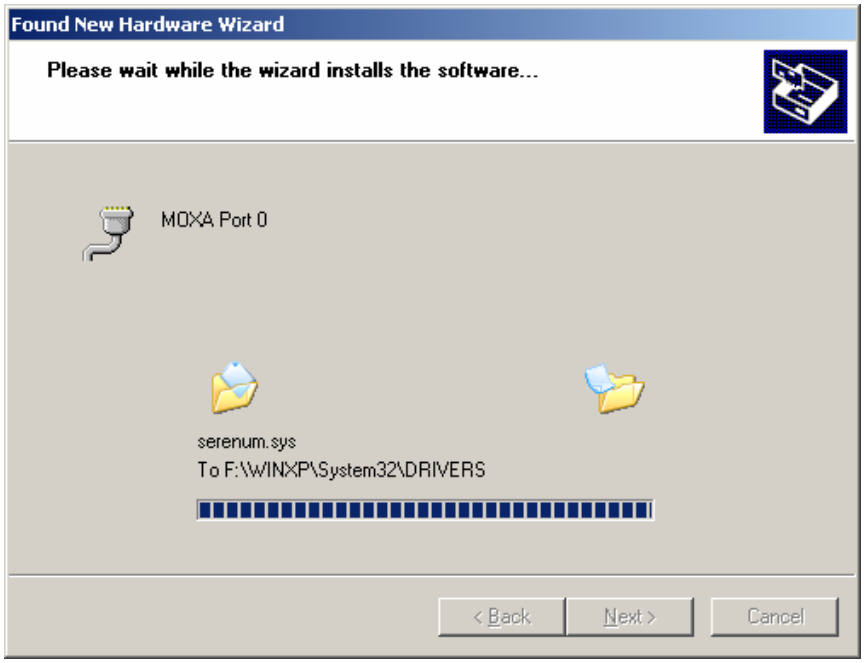
8. Select **Search for the best driver in these locations**, check **Include this location in the search**, and then click on **Browse**. If necessary, use the **Browse** button to navigate to the **CP-132U\Software\Win2K-XP-2003** folder, and then click on **Next** to proceed.



9. Wait while the installation wizard searches. The next window that opens cautions you that although this software hasn't passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click on **Continue Anyway** to proceed.



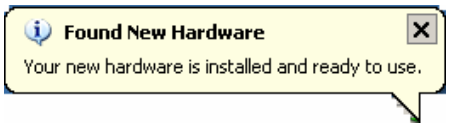
10. Wait while the wizard installs the software.



11. After all files have been copied to the system, the **Completing the Found New Hardware Wizard** window will open to indicate that it has finished installing **Port 0**. Click on **Finish** to proceed with the rest of the installation.

12. Repeat Step 7 through Step 11 for each of the remaining seven ports. The last port to be installed will be Moxa Port 7, as shown in the following figure.

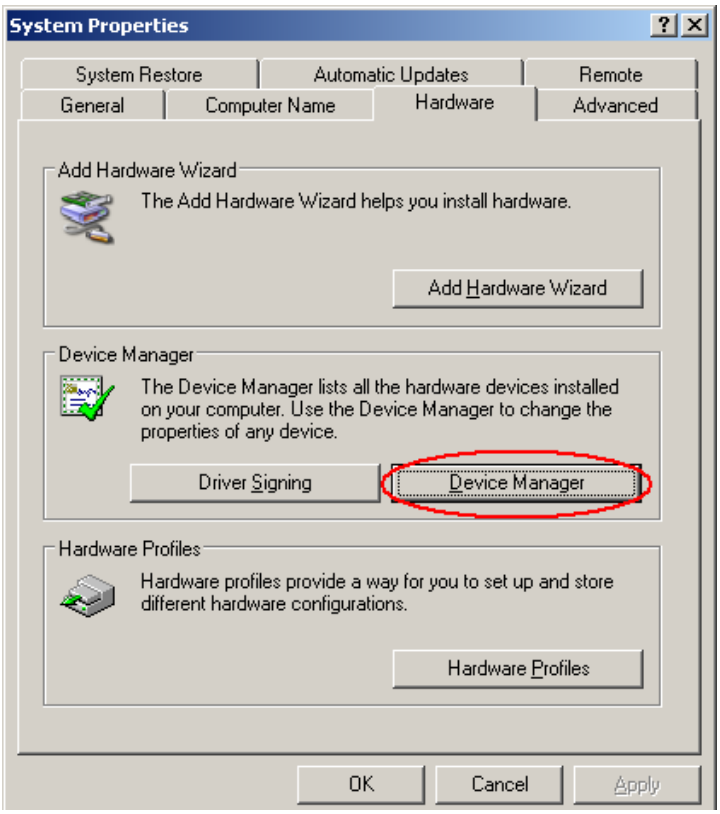
13. The **Found New Hardware** pop-up window will reappear to inform you that the hardware was installed successfully.



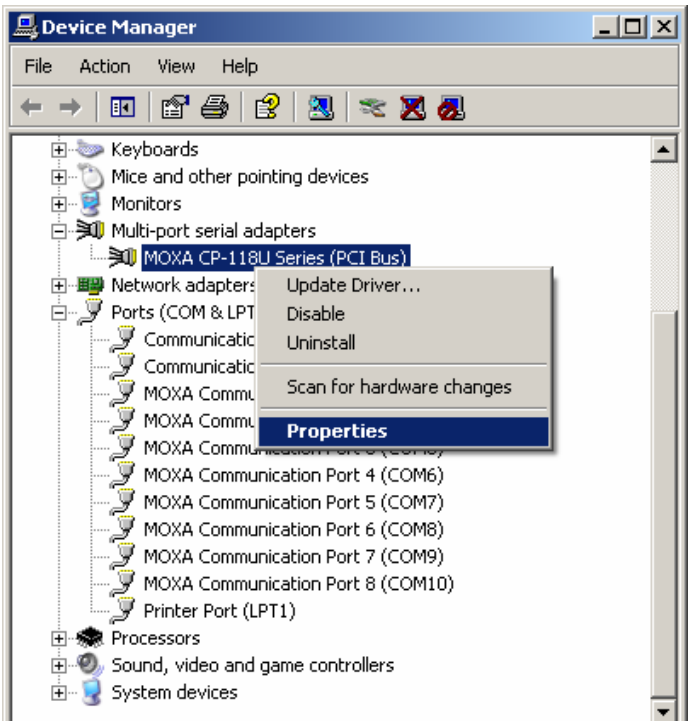
Configuring the Ports

After the driver has been installed, use Device Manager to configure the CP-132U serial ports.

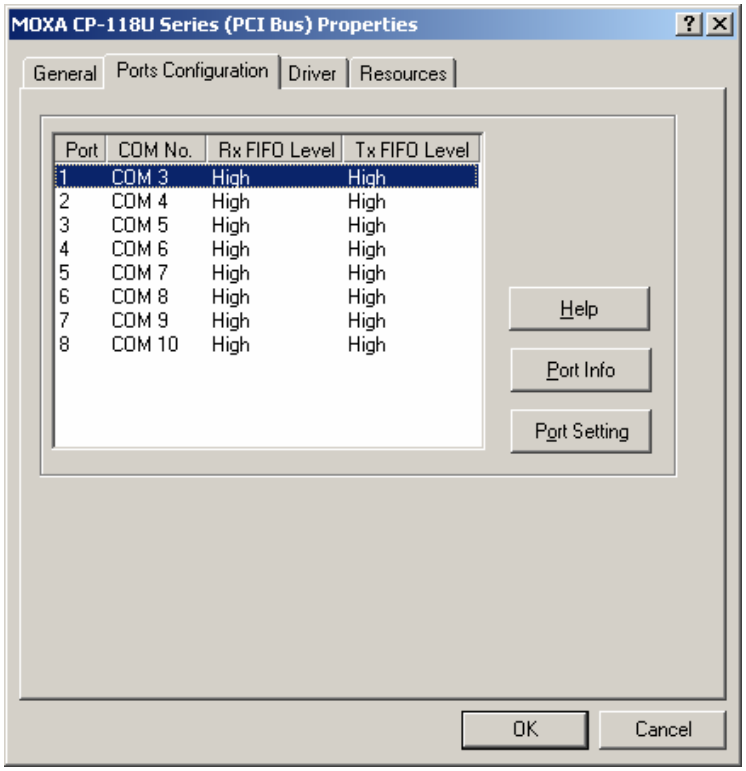
1. Click on **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click on **Device Manager**.



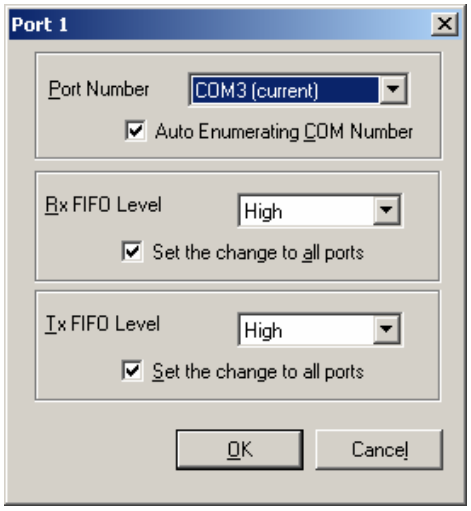
2. Expand the **Multi-port serial adapters** tab, right click on **Moxa CP-132U Series (PCI Bus)**, and then click on **Properties** to open the board's configuration panel.



3. Click on the port you would like to configure to highlight it, and then click on **Port Setting**.



4. Select a COM number for the port from the **Port Number** pull-down list.
5. Check the **Auto Enumerating COM Number** checkbox to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM 3 is assigned to Port 1, then COM 4 (if not already occupied) will be assigned to Port 2, etc.
6. Select an **Rx FIFO Trigger** from the **Rx FIFO Level** pull-down list. Rx FIFO trigger levels of **High**, **Middle**, and **Low** are available, with the default set to High (120 bytes). Check **Set the change to all ports** checkbox to apply this Rx FIFO Trigger to all ports.
7. Select a **Tx FIFO Level** from the **Tx FIFO Level** pull-down list. Tx FIFO Levels of **High**, **Middle**, and **Low** are available, with the default set to High (128 bytes). Check **Set the change to all ports** checkbox to apply the just defined Tx FIFO Size to all ports.



	CP-132U	
	Tx FIFO	Rx FIFO
High	128	120
Middle	64	60
Low	1	1

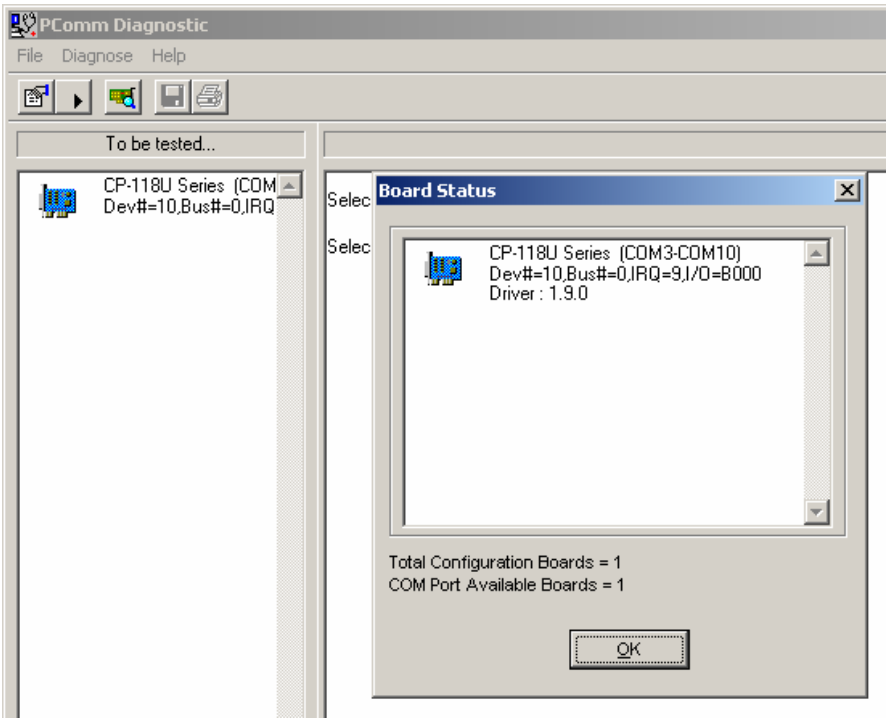
Unit: Bytes

8. Click on **OK** to save the port settings, and then click on **OK** in the **Property** window to finish the port settings procedure.

Using Moxa PComm Utility

The PComm Diagnostic program is a useful tool for checking the status of Moxa's multiport boards. The program can be used to test internal and external IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, etc. Use this program to ensure that your Moxa boards and ports are working properly.

To start the program, click on **Start → Programs → PComm Lite 2000(XP Ver 1.2) → PComm Diagnostic**.



NOTE

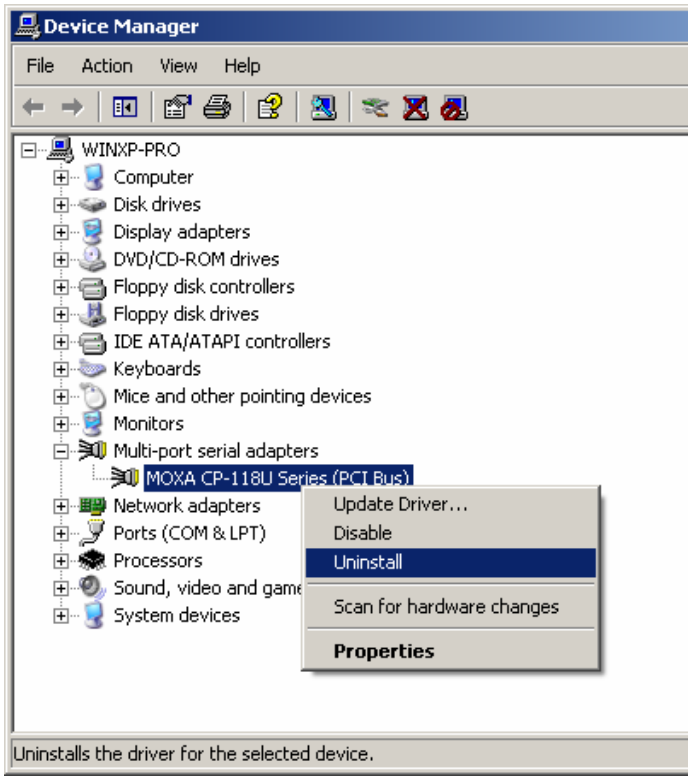
The PComm Lite software can downloaded for free from Moxa's website at www.moxa.com/support/free_downloads.htm.

Using Event Log

To use the **Event Log** to check the installation of your Moxa boards, click on **Start → Settings → Control Panel → Administrative Tools → Event Viewer** to enter the Event Viewer utility. Look under the **System** category to find the latest information relevant to Moxa's drivers.

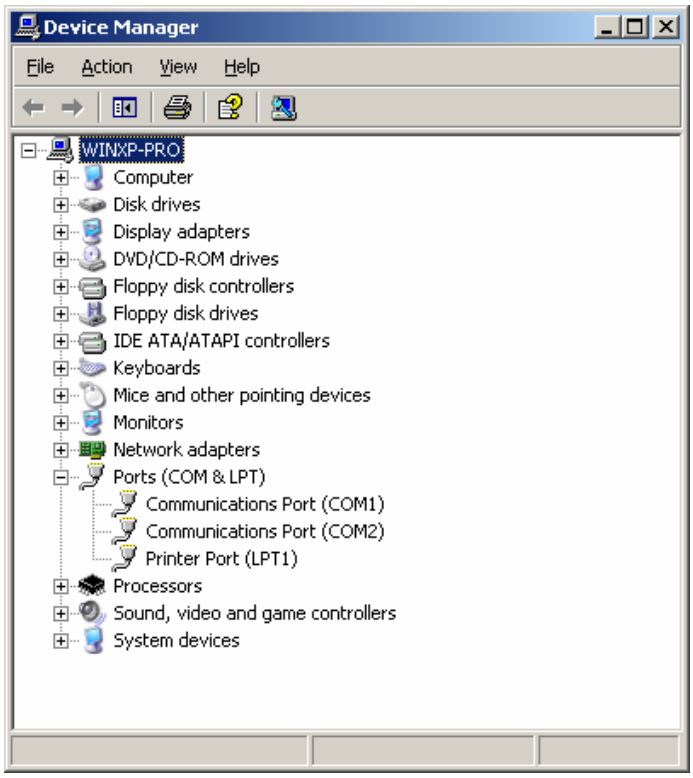
Removing the Driver

1. To uninstall the driver, click on **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click on **Device Manager**. Use the mouse to place the cursor over the CP-132U Series board under **Multi-port serial adapters**, and then click the right mouse button. Select the **Uninstall…** option.



2. Click on **OK** to proceed with uninstalling the board.

3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-132U Series board have been removed.



Windows 2000

In this section, we describe the installation procedure for Windows 2000.

Windows 2000 supports up to 256 serial ports, from COM1 to COM256. In order to utilize fully Windows 2000's multi-process and multi-thread advanced features, pure 32-bit Windows 2000 device drivers were developed for Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

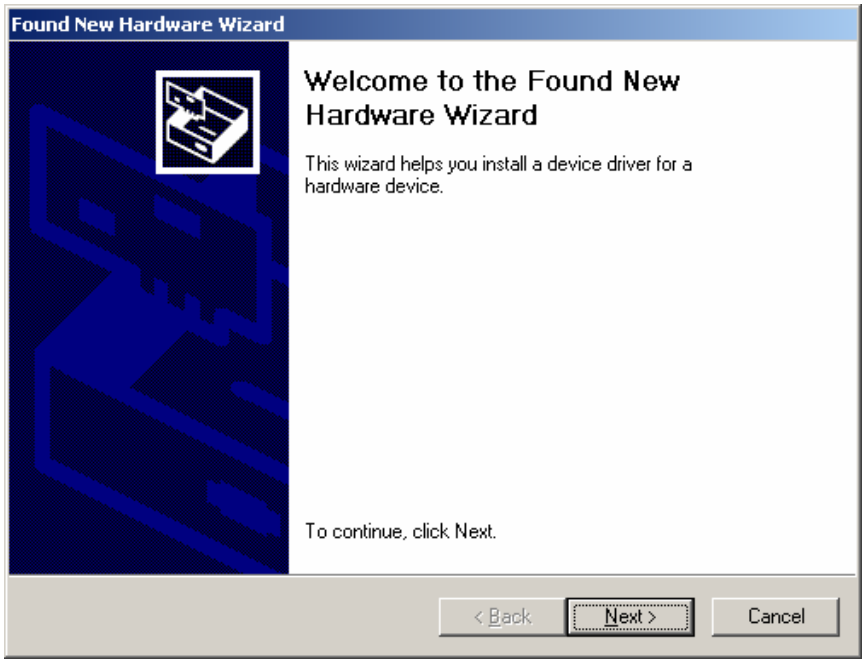
Installing the Driver for the First Time

The following procedure shows how to install the CP-132U driver for the first time under Windows 2000. First, make sure the board or boards have already been plugged into the system's PCI or PCI-X slot(s).

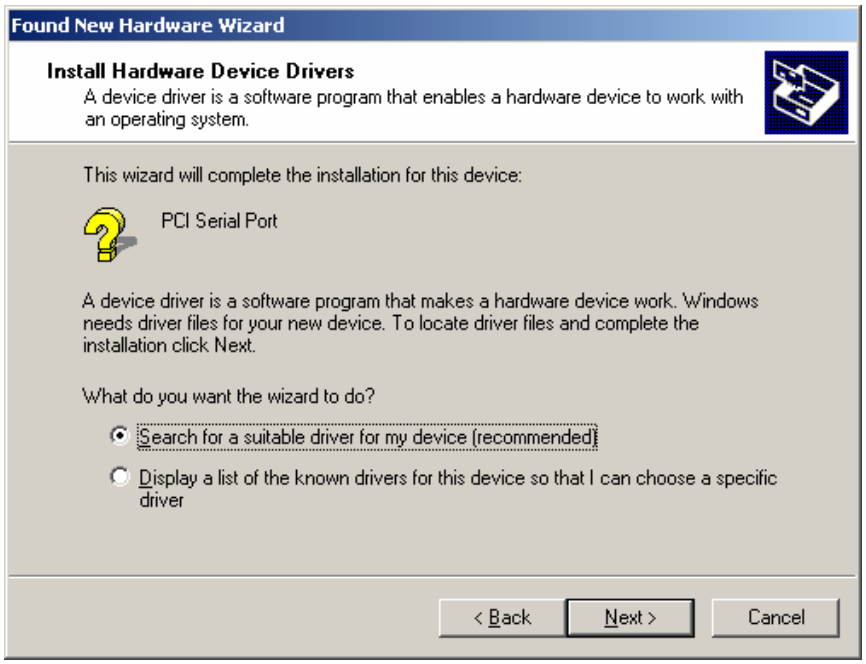
NOTE If you have already installed a CP-132U or other Moxa Smartio/Industio board in your computer, and you install additional boards, Windows 2000 will automatically detect and install the new board(s) the next time you boot up the computer. In this case, proceed directly to the next section, "Configuring the Ports," to configure the ports' serial transmission parameters.

1. After plugging the board into an expansion slot and powering on your PC, Windows 2000 will automatically detect the new board, and the **Found New Hardware** window will open.

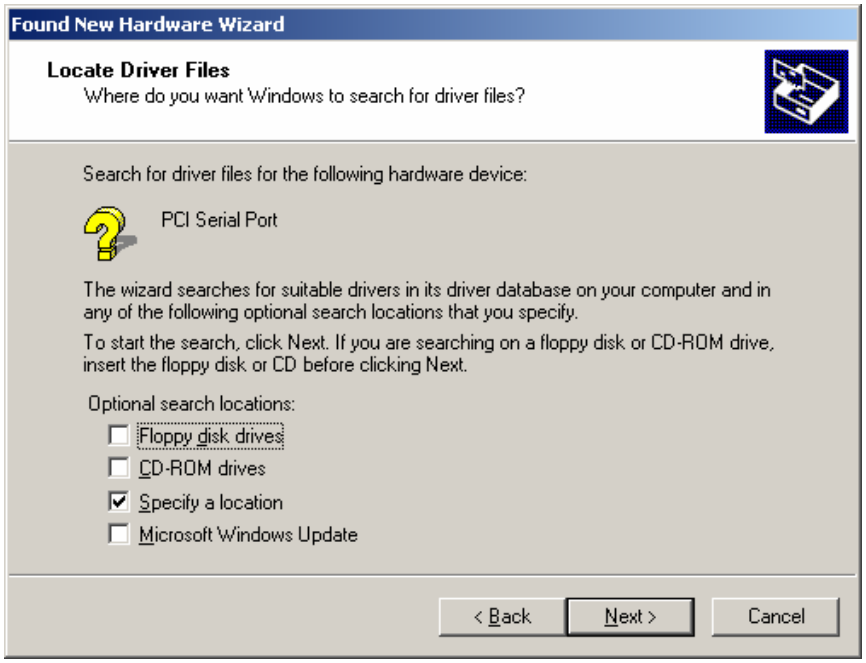
2. When the **Welcome to the Found New Hardware Wizard** window opens, click on **Next** to continue.



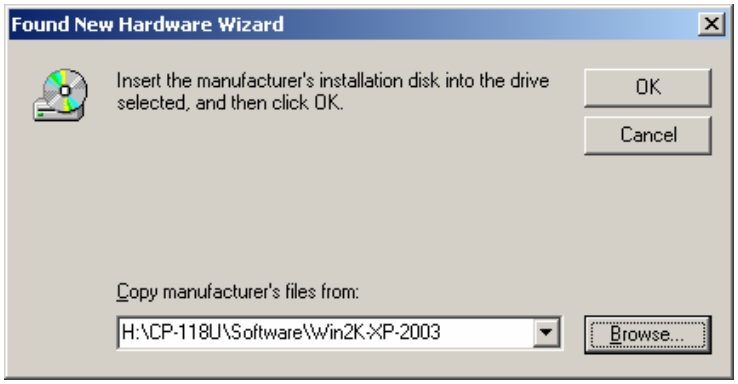
3. Select **Search for a suitable driver for my device (recommended)**, and then click on **Next** to continue.



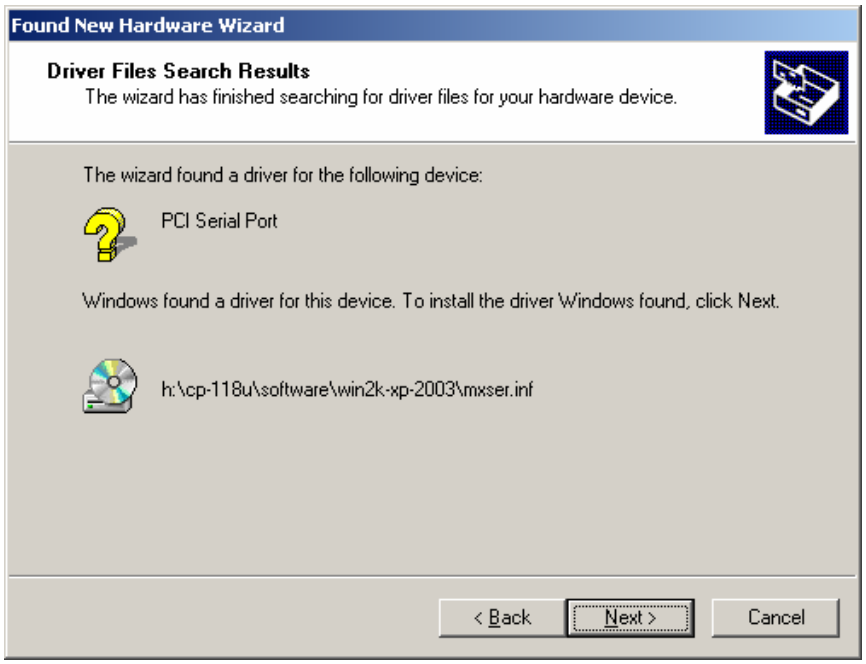
4. Select **Specify a location** and then click on **Next** to continue.



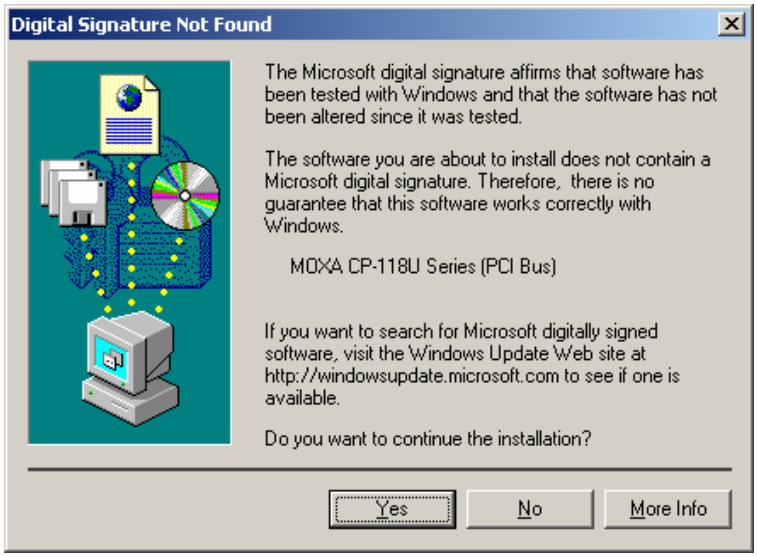
5. Navigate to the **\CP-132U\Software\Win2K-XP-2003** folder on the software CD, and then click on **OK** to continue.



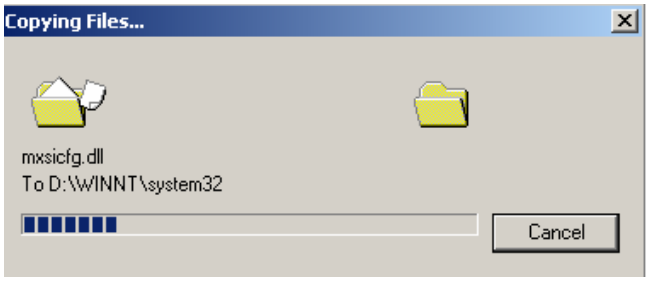
6. Click on **Next** to copy the driver files to your system.



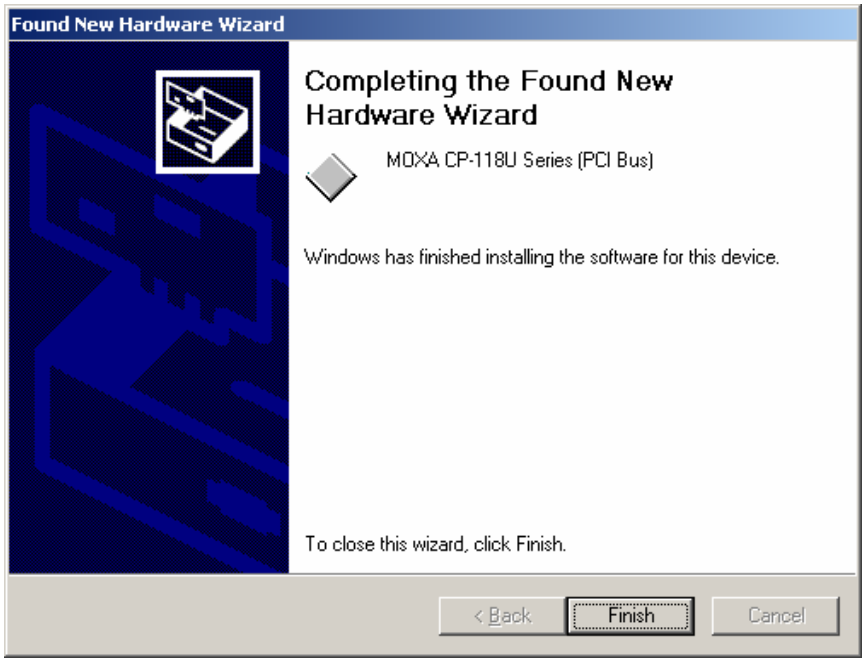
7. Wait while the installation wizard searches. The next window that opens cautions you that although this software hasn't passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click on **Yes** to proceed.



8. Wait while the files are copied to your hard drive.



9. The next window shows the model number of the board, and indicates that Windows has completed the driver installation. Click on **Finish** to continue with the rest of the installation procedure.



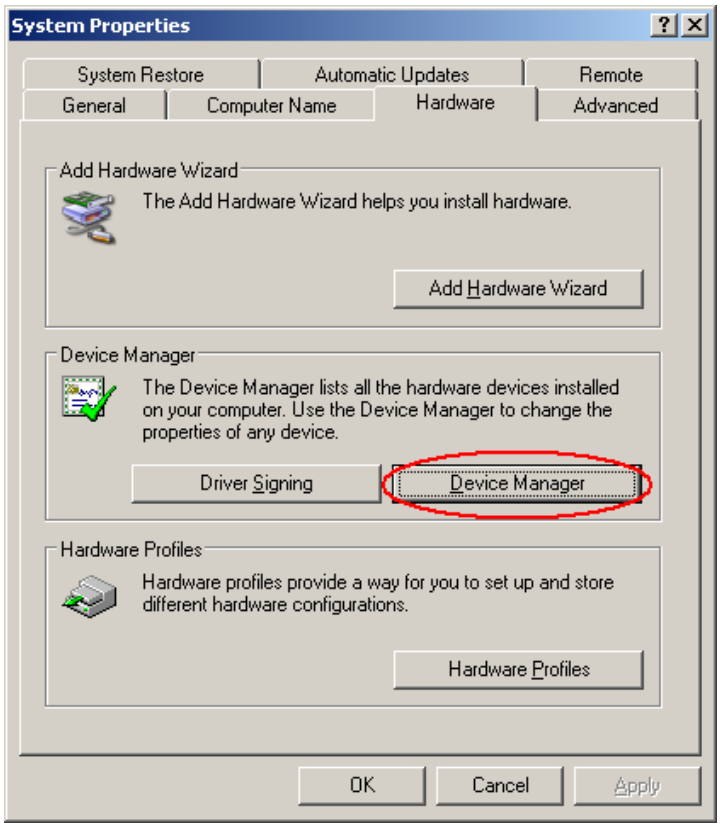
10. The **Found New Hardware** window will reappear and indicate that the board's ports are being installed.

11. The installation procedure is finished when the window closes. At this point, you can assume that the board and all of its ports have been installed successfully.

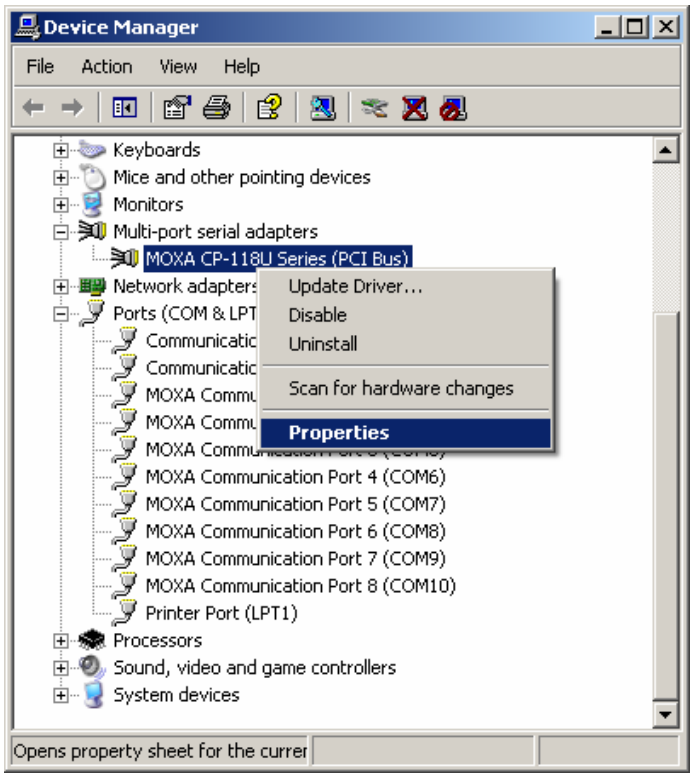
Configuring the Ports

After the driver has been installed, use Device Manager to configure the CP-132U serial ports.

1. Click on **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click on **Device Manager**.

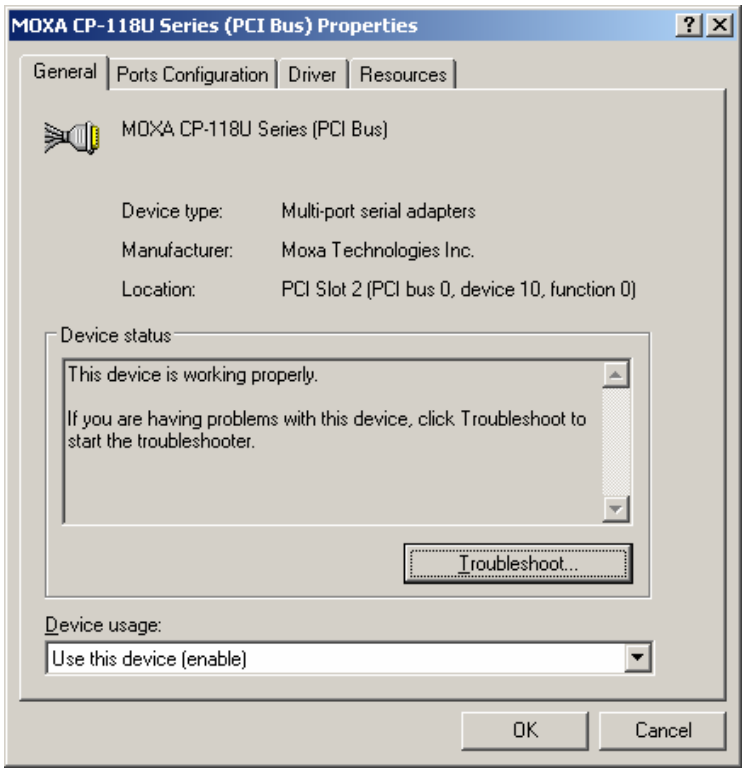


2. Expand the **Multi-port serial adapters** tab, right click on **Moxa CP-132U Series (PCI Bus)**, and then click on **Properties** to open the board's configuration panel.

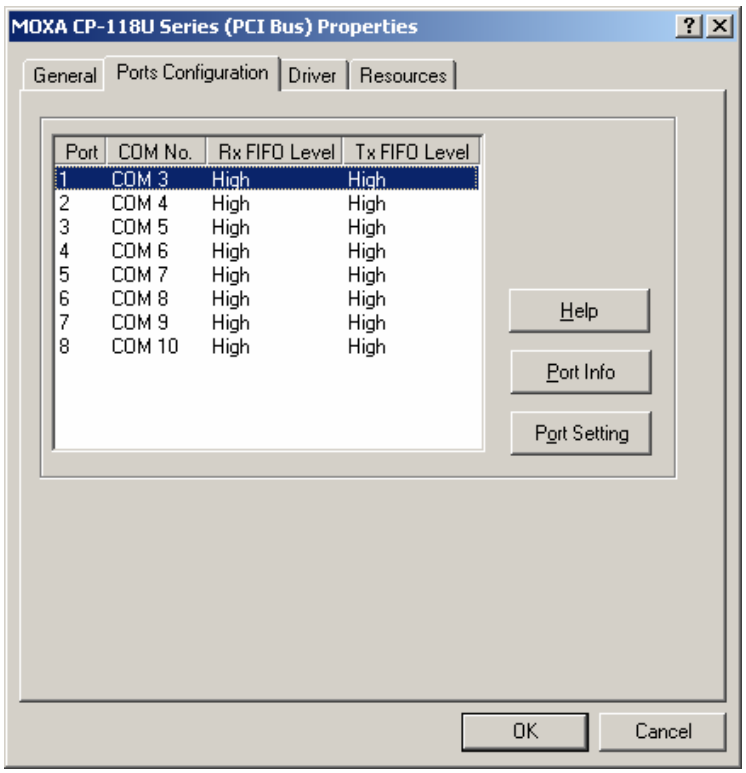


3. Basic information about the board is displayed on the **General** page. Click on the **Ports**

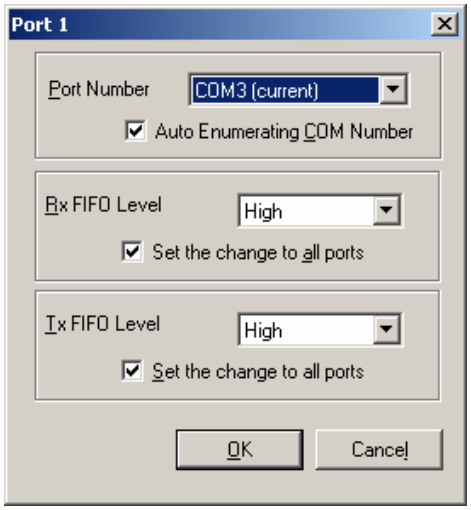
4. **Configuration** tab to configure the board's serial ports.



5. Click on the port you would like to configure to highlight it, and then click on **Port Setting**.



6. Select a COM number for the port from the **Port Number** pull-down list.
7. Check the **Auto Enumerating COM Number** checkbox to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM 3 is assigned to Port 1, then COM 4 (if not already occupied) will be assigned to Port 2, etc.
8. Select an **Rx FIFO Trigger** from the **Rx FIFO Level** pull-down list. Rx FIFO trigger levels of **High**, **Middle**, and **Low** are available, with the default set to High (120 bytes). Check **Set the change to all ports** checkbox to apply this Rx FIFO Trigger to all ports.
9. Select **a Tx FIFO Level** from the **Tx FIFO Level** pull-down list. Tx FIFO Levels of **High**, **Middle**, and **Low** are available, with the default set to High (128 bytes). Check **Set the change to all ports** checkbox to apply the just defined Tx FIFO Size to all ports.



	CP-132U	
	Tx FIFO	Rx FIFO
High	128	120
Middle	64	60
Low	1	1

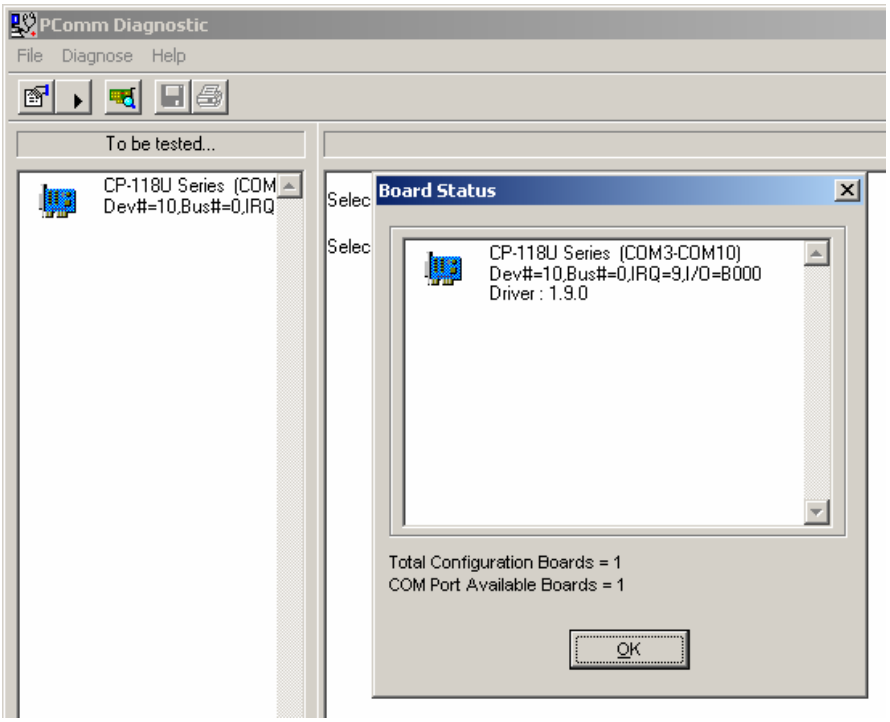
Unit: Bytes

10. Click on **OK** to save the port settings, and then click on **OK** in the **Property** window to finish the port settings procedure.

Using Moxa PComm Utility

The PComm Diagnostic program is a useful tool for checking the status of Moxa's multiport boards. The program can be used to test internal and external IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, etc. Use this program to ensure that your Moxa boards and ports are working properly.

To start the program, click on **Start → Programs → PComm Lite 2000(XP Ver 1.2) → PComm Diagnostic**.



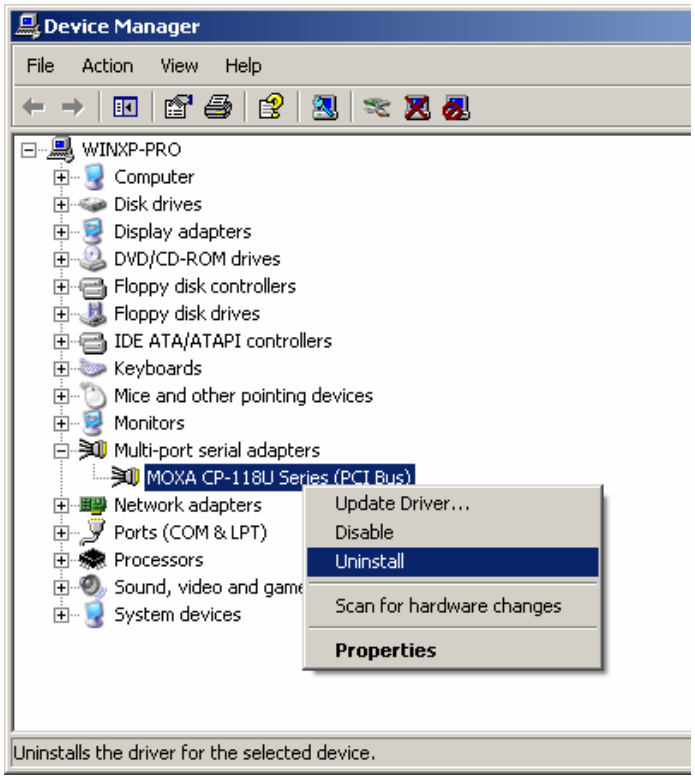
NOTE The PComm Lite software can downloaded for free from Moxa's website at www.moxa.com/support/free_downloads.htm.

Using Event Log

To use the **Event Log** to check the installation of your Moxa boards, click on **Start → Settings → Control Panel → Administrative Tools → Event Viewer** to enter the Event Viewer utility. Look under the **System** category to find the latest information relevant to Moxa's drivers.

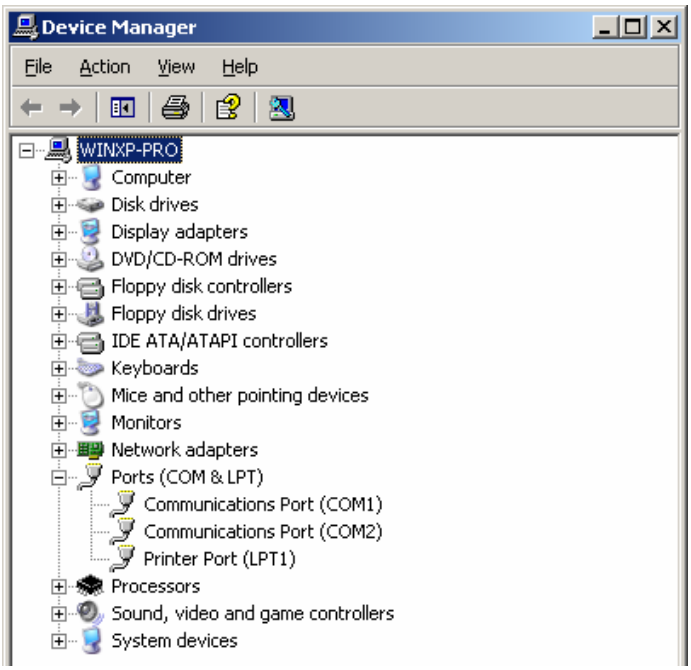
Removing the Driver

1. To uninstall the driver, click on **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click on **Device Manager**. Use the mouse to place the cursor over the CP-132U Series board under **Multi-port serial adapters**, and then click the right mouse button. Select the **Uninstall…** option.



2. Click on **OK** to proceed with uninstalling the board.

3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-132U series board have been removed.



Windows 95/98

In this section, we describe the installation procedure for Windows 98. The installation procedure for Windows 95 is similar.

The Windows 95/98 driver supports up to 128 serial ports, from COM1 to COM128. To utilize fully the advanced multi-process and multi-thread features of Windows 95/98, pure 32-bit Windows 95/98 virtual device port drivers (VxD) compliant with communication drivers (VCOMM) have been developed for the CP-132U and other Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

Installing the Driver for the First Time

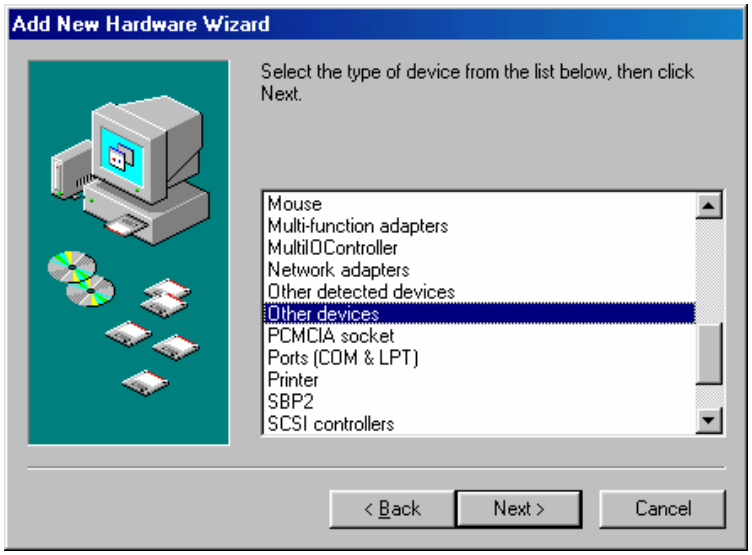
The following procedure shows how to install the CP-132U driver for the first time under Windows 98. First, make sure the board or boards have already been plugged into the system's PCI or PCI-X slot(s).

NOTE If you have already installed a CP-132U or other Moxa Smartio/Industio board in your computer, and you install additional boards, Windows 98/95 will automatically detect and install the new board(s) the next time you boot up the computer. In this case, proceed directly to the next section, "Configuring the Ports," to configure the ports' serial transmission parameters.

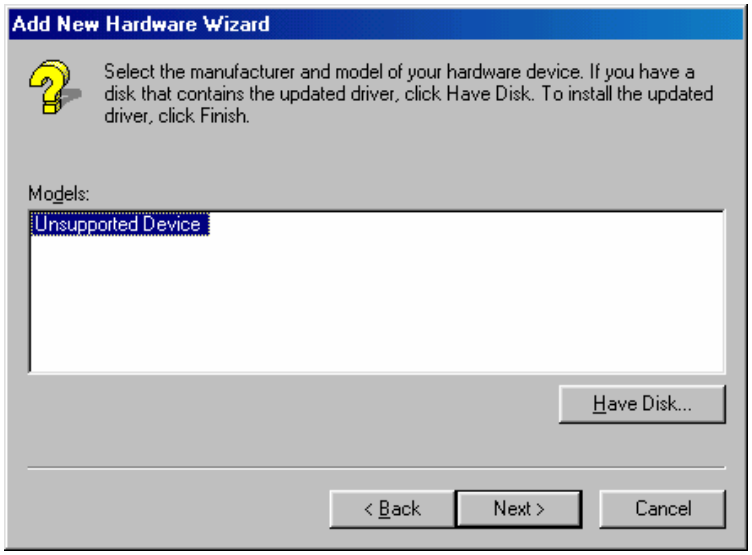
1. After plugging the board into an expansion slot and powering on your PC, Windows 98 will automatically detect the new board, and display the **Found New Hardware** window. When the **Add New Hardware Wizard** window opens, click on **Next** to continue.

2. Select **Display a list of all the drivers in a specific location, so you can select the driver you want.** and then click on **Next** to proceed.

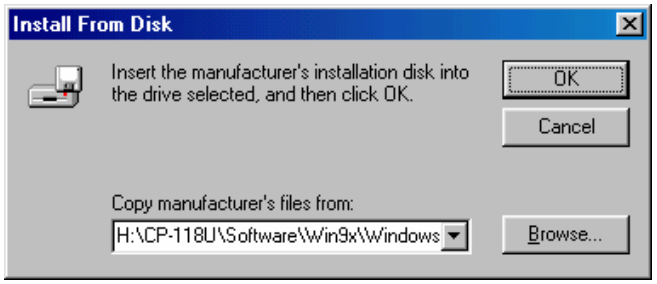
3. Select **Other Devices** and then click on **Next** to proceed.



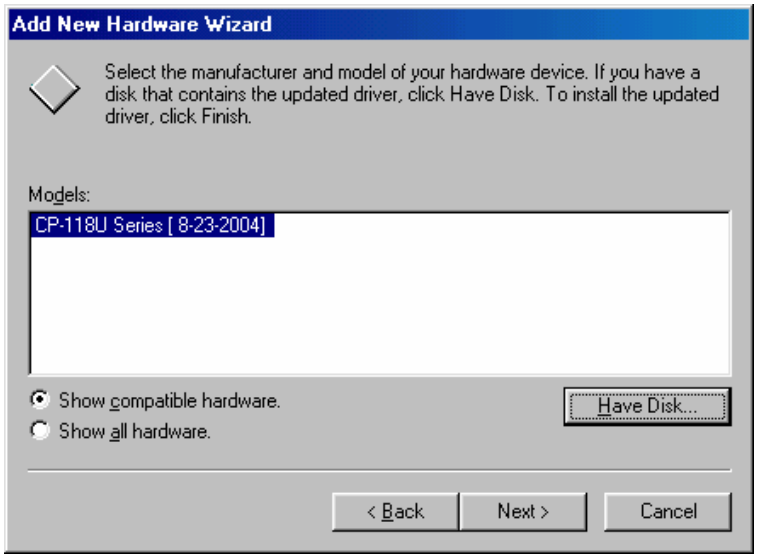
4. Click on **Have Disk**.



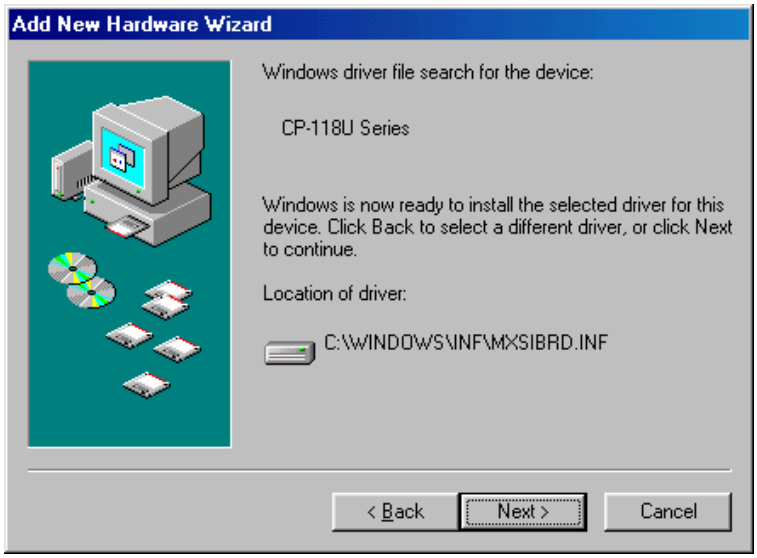
5. Use the **Browse** button to navigate to the **\CP-132U\Software\Win9x\Windows.95** folder on the Documentation and Software CD, and then click on **OK**.



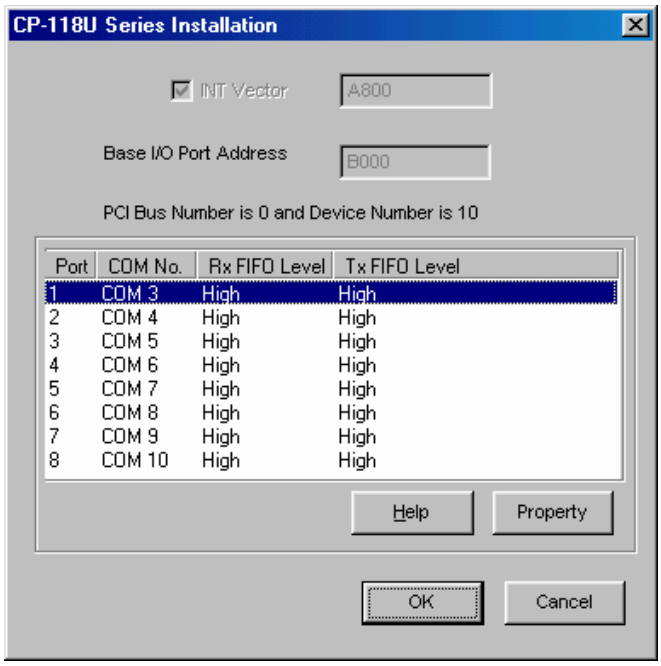
6. Click on **CP-132U Series [8-23-2004]** to highlight it, and then click on **Next**.



7. Verify that the **CP-132U Series** driver will be installed, and then click on **Next**.



8. Basic configuration information will be displayed in the **CP-132U Series Installation** window. Click on **OK** to complete the installation of the board.



9. This completes the installation of the CP-132U board. Click on **Finish** to exit the **Add New Hardware Wizard**.

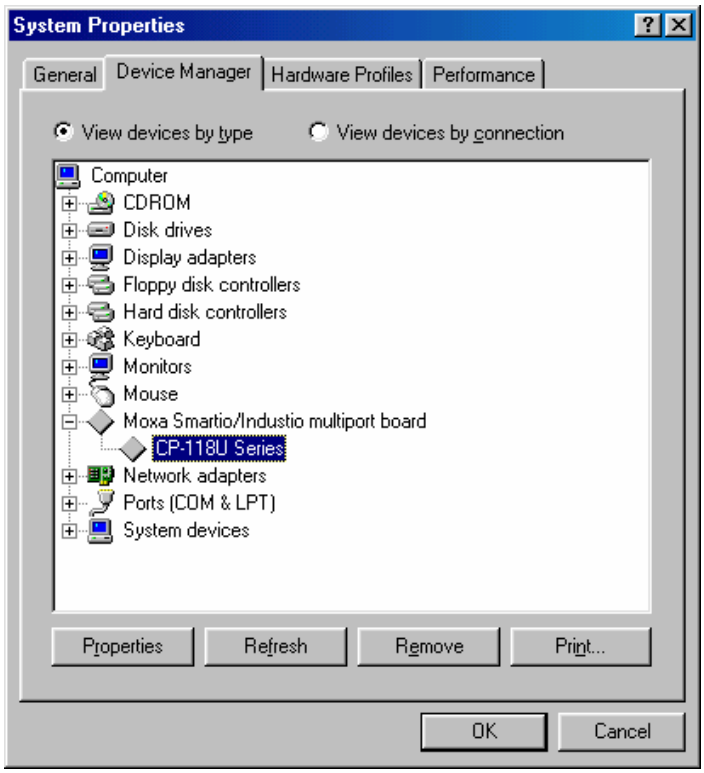
NOTE If an error message similar to "CP-132U board (BusNo=x, DevNo=x, Port1=COMx) interrupt number is invalid!" pops up, refer to the "Troubleshooting" chapter for solutions.

Configuring the Ports

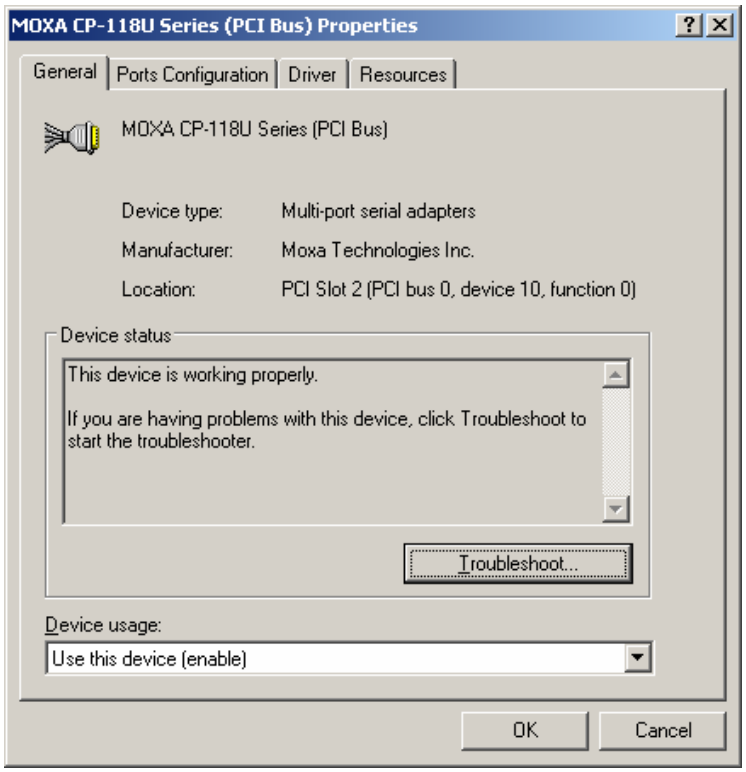
Follow the procedures given below to re-configure the board's COM ports.

Since CP-132U is a Universal PCI board, when a new board is added or an existing board is removed, the board's configuration will be added or removed automatically by the operating system when you restart the PC.

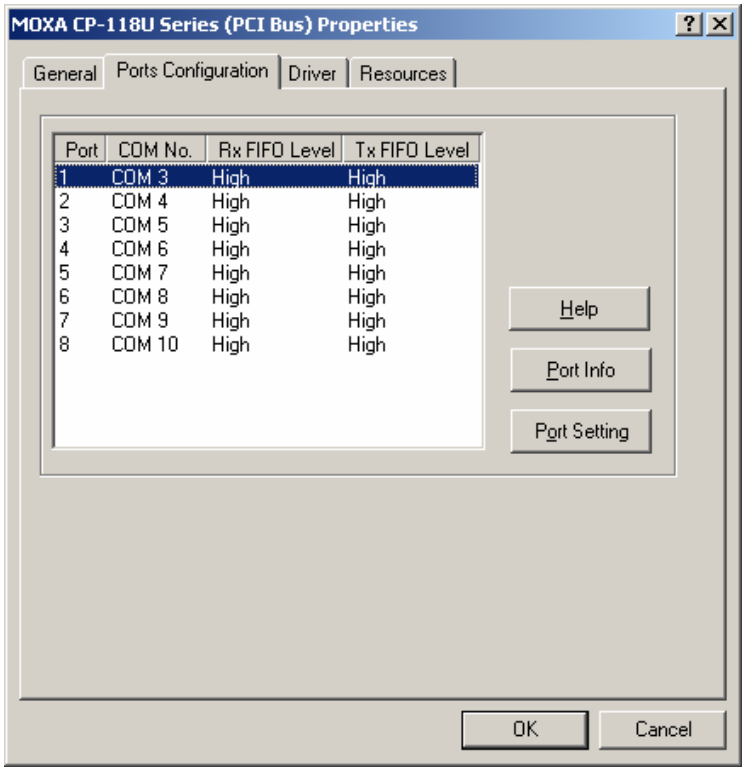
1. Open the **Control Panel** and the double click on the **System** icon.
2. Select the **Device Manager** tab, click on the desired CP-132U board under **Moxa Smartio/Industio multiport board** to highlight it, and then click on **Properties**.



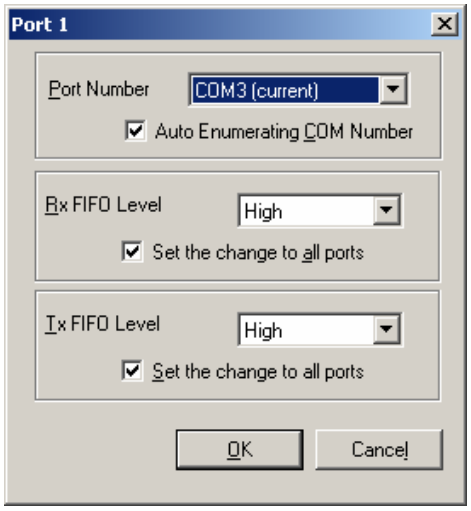
3. Basic information about the board is displayed on the **General** page. Click on the **Ports Configuration** tab to configure the board's serial ports.



4. Click on the port you would like to configure to highlight it, and then click on **Port Setting**.



5. Select a COM number for the port from the **Port Number** pull-down list.
6. Check the **Auto Enumerating COM Number** checkbox to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM3 is assigned to Port 1, then COM4 (if not already occupied) will be assigned to Port 2, etc.
7. Select an **Rx FIFO Trigger** from the **Rx FIFO Level** pull-down list. Rx FIFO trigger levels of **High**, **Middle**, and **Low** are available, with the default set to High (120 bytes). Check **Set the change to all ports** checkbox to apply this Rx FIFO Trigger to all ports.
8. Select **a Tx FIFO Level** from the **Tx FIFO Level** pull-down list. Tx FIFO Levels of **High**, **Middle**, and **Low** are available, with the default set to High (128 bytes). Check **Set the change to all ports** checkbox to apply the just defined Tx FIFO Size to all ports.



	CP-132U	
	Tx FIFO	Rx FIFO
High	128	120
Middle	64	60
Low	1	1

Unit: Bytes

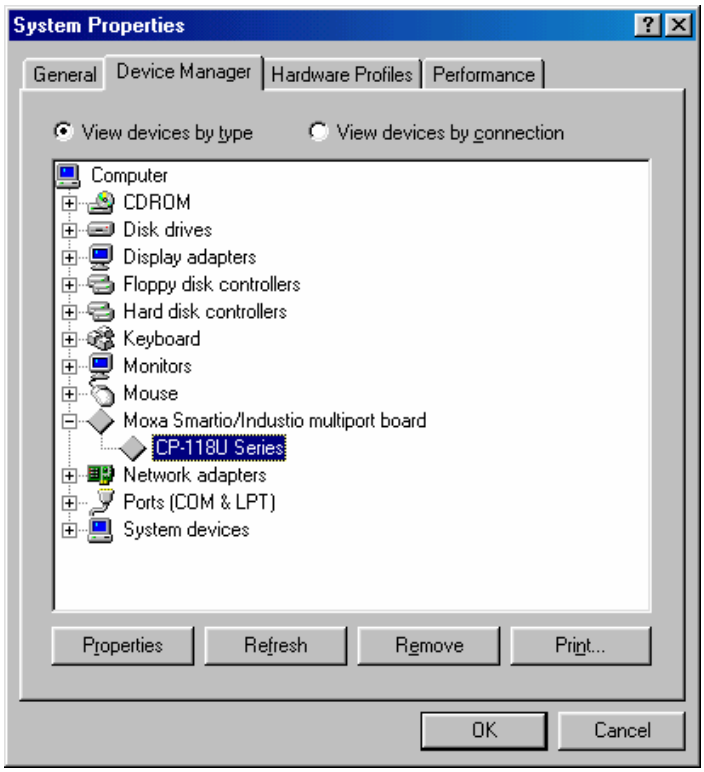
9. Click on **OK** to save the port settings, and then click on **OK** in the **Property** window to finish the port settings procedure.

Updating the Driver

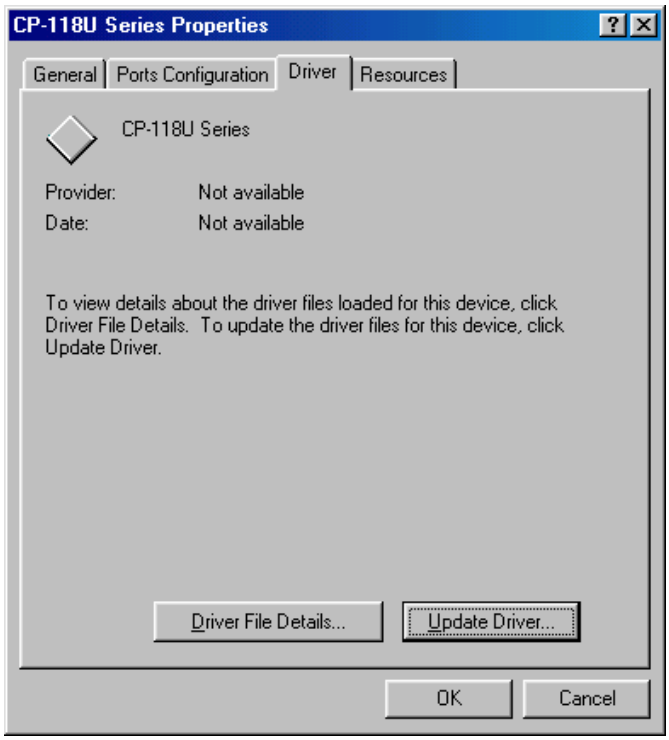
This section explains how to update the Windows 98 driver.

1. Open the **Control Panel**, click on the **System** icon, and select the **Device Manager** tab.

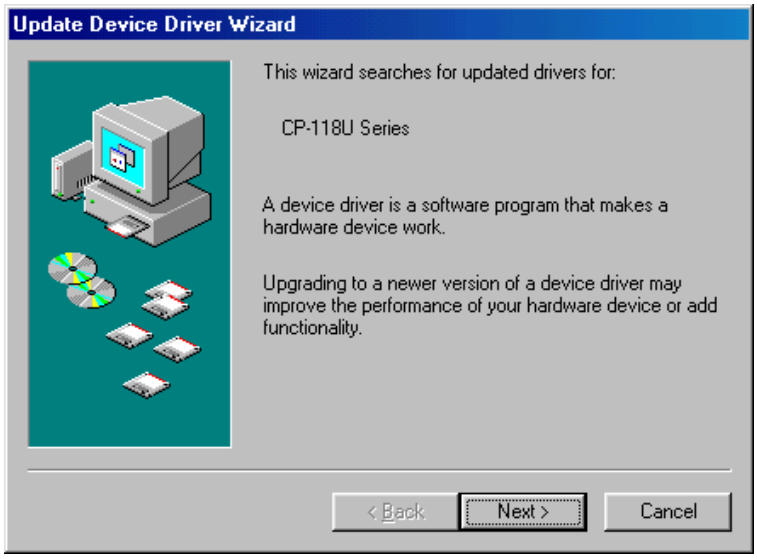
2. Click on a Moxa CP-132U board under **Moxa Smartio/Industio multiport board** to highlight it, and then click on **Properties**.



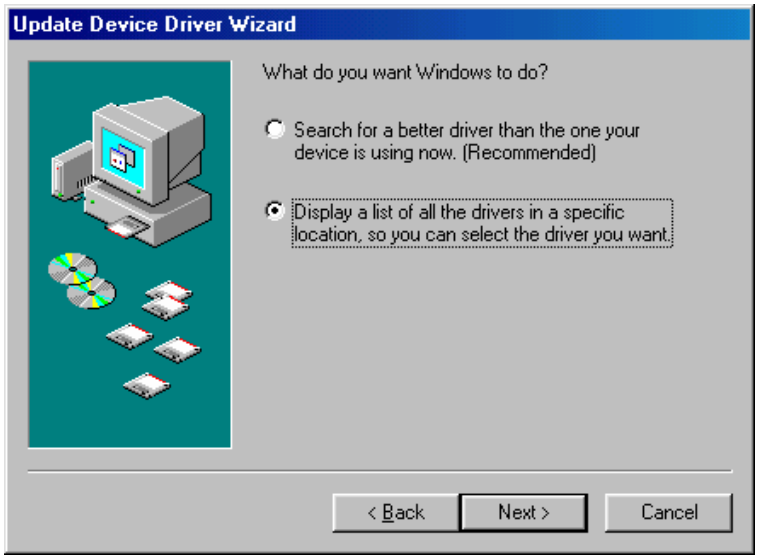
3. Select the **Driver** tab, and click on **Update Driver…**.



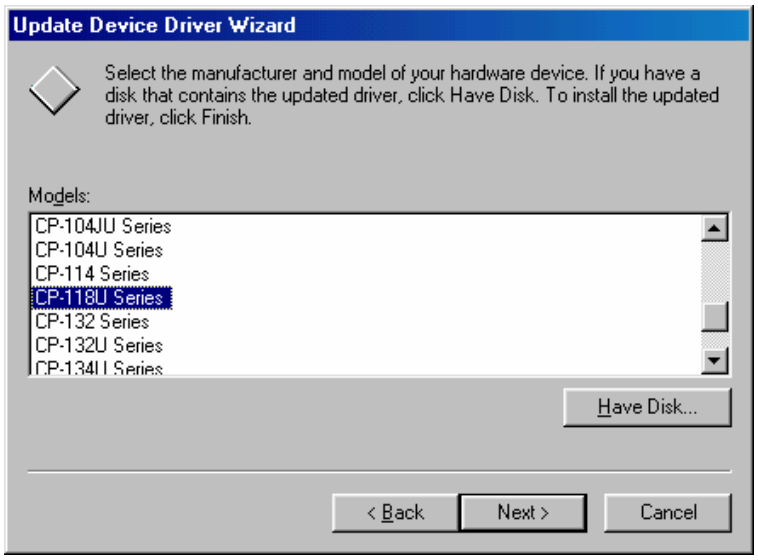
4. Click on **Next**.



5. Select **Display a list of all the drivers in a specific location, so you can select the driver you want.**, and then click on **Next**.



6. In the next window, the CP-132U Series option should already be highlighted. Click on **Have Disk…** and then navigate to the folder that contains the new driver file.

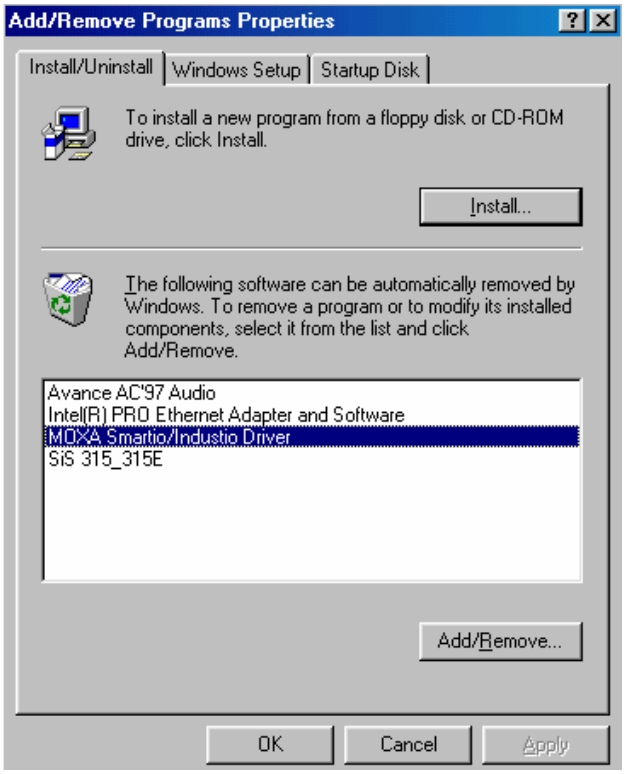


7. Follow the on-screen instructions to complete the driver update procedure.

Removing the Driver

This section explains how to remove the CP-132U driver.

1. Open the **Control Panel**, double click on the **Add/Remove Programs** icon, and then select the **Install/Uninstall** tab.
2. Click on the **Moxa Smartio/Industio Driver** option and then click on **Add/Remove** to start the driver removal process.



3. Click on **Yes** to confirm that you want to remove the driver.

4. Click on **OK**.

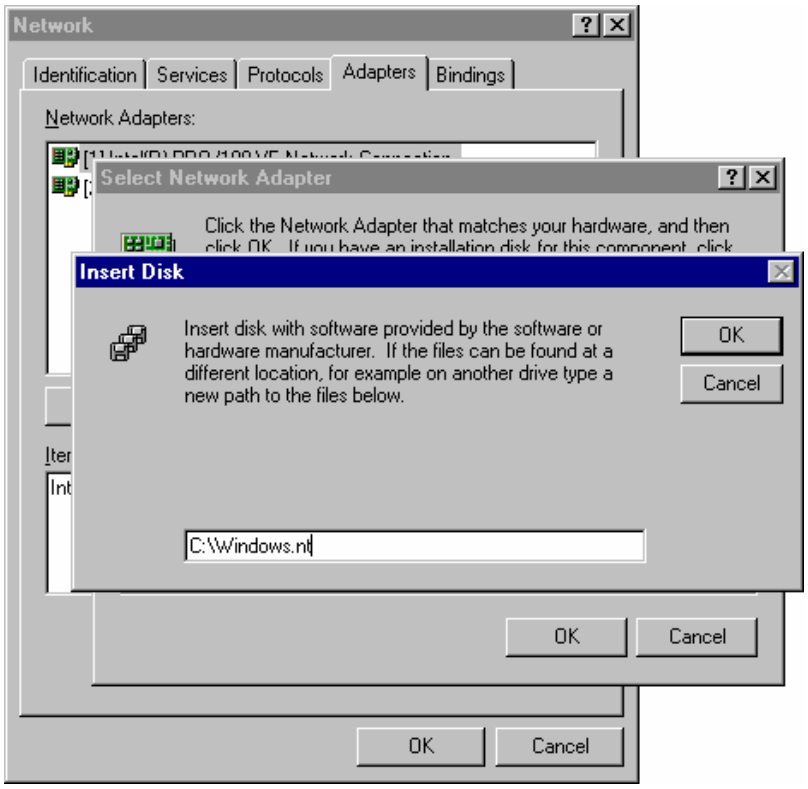
Windows NT

Windows NT supports up to 256 serial ports, from COM1 to COM256. To utilize fully Windows NT's multi-process and multi-thread advanced features, pure 32-bit Windows NT device drivers were developed for the CP-132U boards and other Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

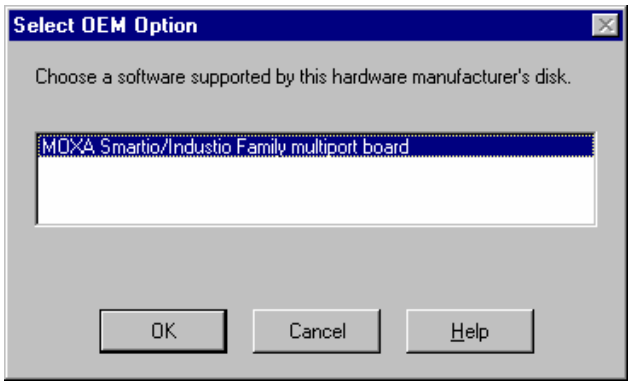
Installing the Driver for the First Time

The following procedure explains how to install the Smartio CP-132U driver for the first time. First make sure the board or boards are already plugged into the system's PCI slot(s).

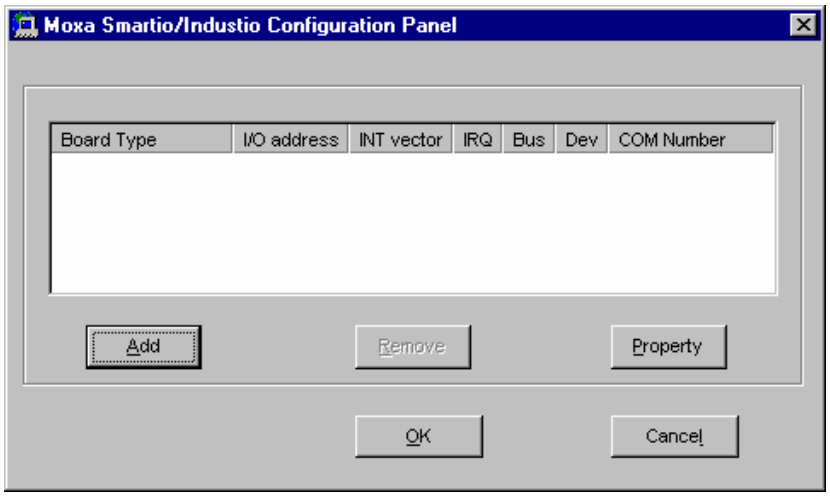
1. Log into NT as Administrator.
2. Copy the **Windows.nt** folder, located under **\CP-132U\Software\WinNT** on the Documentation and Software CD, to your computer's hard disk (under the C: drive, for example).
3. Open the **Control Panel**, click on the **Network** icon, and select the **Adapters** tab.
4. Click on **Add** and then **Have Disk…** to open the **Select Network Adapter** window.
5. Specify the exact path and file name of the driver file, **C:\Windows.nt**, in the example shown here, and then click on **OK** to proceed.



6. Select **Moxa Smartio/Industio Family multiport board** in the **Select OEM Option** window, and then click on **OK** to start installing the driver.



7. The **Moxa Smartio/Industio Configuration Panel** window appears. Click on **Add** to open the **Property** configuration window to change port settings and set advanced FIFO configuration options.

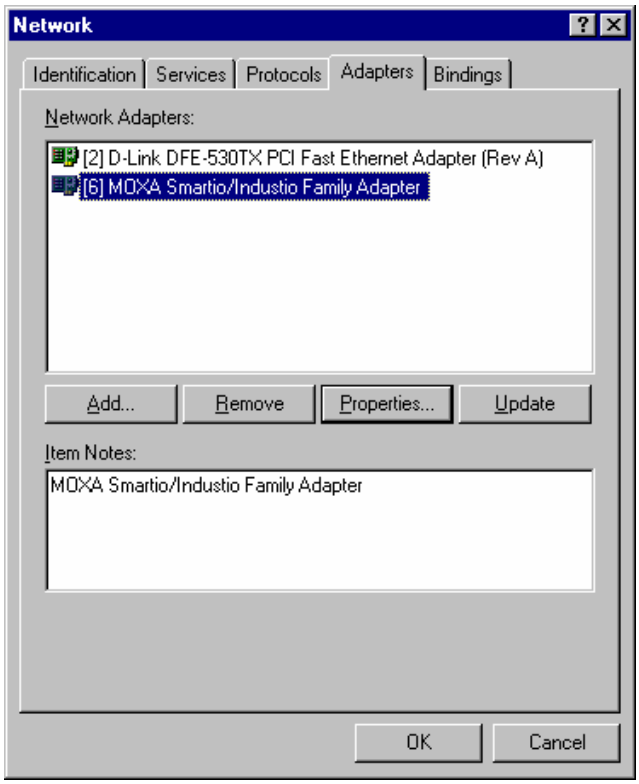


8. Continue from Step 3 in the next section, "Configuring the Ports."

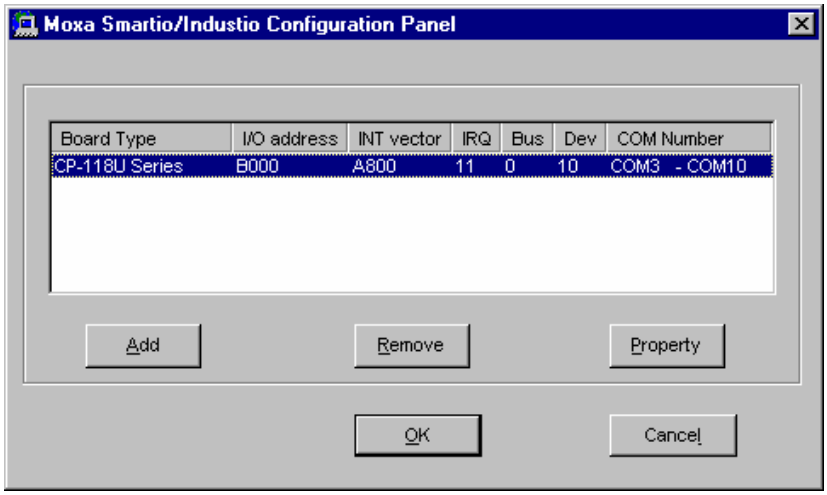
Configuring the Ports

Follow the instructions in this subsection if the CP-132U Windows NT driver is already installed, and you wish to re-configure a board's ports or configure the ports of a newly installed board. In addition to the procedures listed below, you may also click on **Start → Programs → Moxa Utility → Moxa Smartio/Industio Configuration Panel → Property**, and then refer to the instructions in the previous section, "Installing the Driver for the First Time."

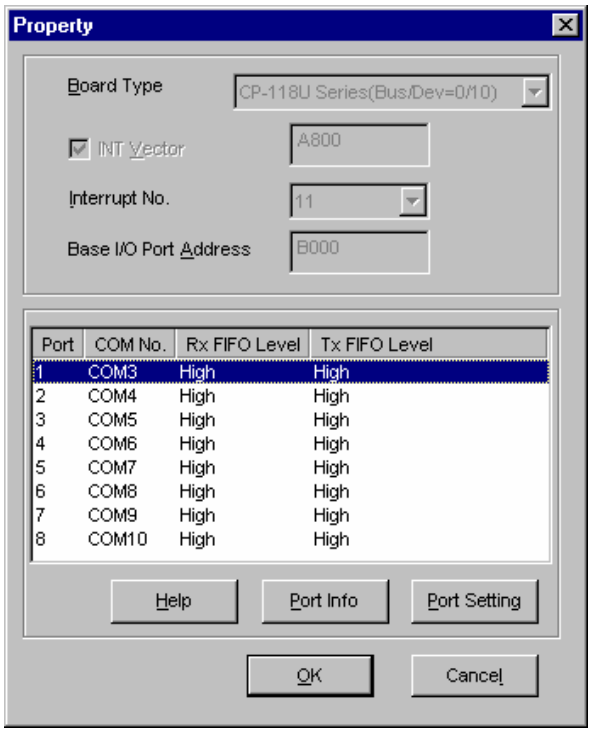
1. Open the **Control Panel**, click on the **Network** icon, and then select the **Adapters** tab. Click on **Moxa Smartio/Industio Family Adapter** to highlight it, and then click on **Properties**.



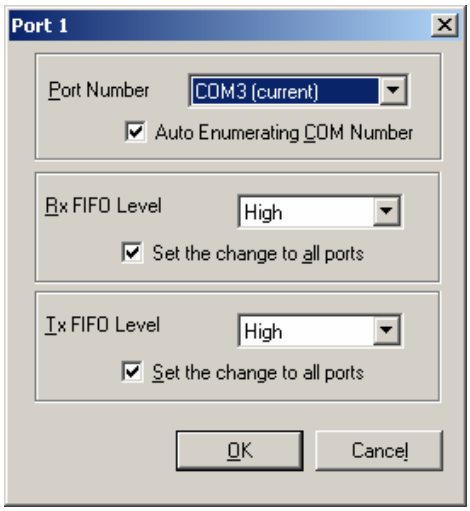
2. Select the board whose ports you wish to configure to highlight it, and then click on **Property**.



3. Select the just installed CP-132U board from the **Board Type** pull-down list, click on a specific port to highlight it, and then click on **Port Setting** to configure the port.



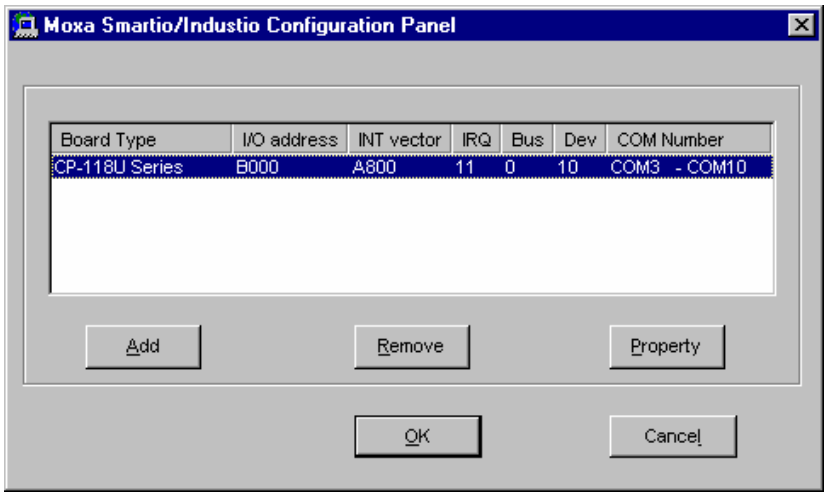
4. Select a COM number for the port from the **Port Number** pull-down list.
5. Check the **Auto Enumerating COM Number** checkbox to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM3 is assigned to Port 1, then COM4 (if not already occupied) will be assigned to Port 2, etc.
6. Select an **Rx FIFO Trigger** from the **Rx FIFO Level** pull-down list. Rx FIFO trigger levels of **High**, **Middle**, and **Low** are available, with the default set to High (120 bytes). Check **Set the change to all ports** checkbox to apply this Rx FIFO Trigger to all ports.
7. Select a Tx FIFO Level from the **Tx FIFO Level** pull-down list. Tx FIFO Levels of **High**, **Middle**, and **Low** are available, with the default set to High (128 bytes). Check **Set the change to all ports** checkbox to apply the just defined Tx FIFO Size to all ports.



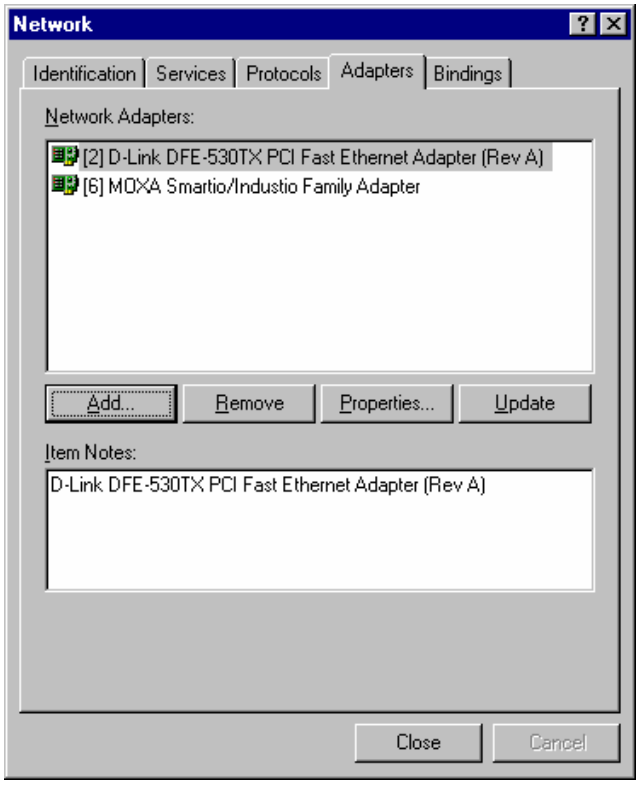
	CP-132U	
	Tx FIFO	Rx FIFO
High	128	120
Middle	64	60
Low	1	1

Unit: Bytes

8. Click on **OK** to save the settings, and then click on **OK** in the **Property** window to complete the port settings and return to the **Moxa Smartio/Industio Configuration Panel** window. The just configured CP-132U board will be listed, as shown below. Click on **OK** to return to the **Network** window.



9. Click on **Close** to close the **Network** window.



10. Restart the PC to activate the new settings.

NOTE The driver configuration will NOT take effect until you restart the PC.

Using Event Log

Once the system restarts, you may check the event log recorded by the Moxa driver to verify that the board's ports have been initialized successfully.

To view the event log, enter the **Administrative** group, click the **Event Viewer** icon, and then select **Log** and **System** to check a message similar to "Moxa CP-132U board, with first serial port COM3, has been enabled" for each newly configured board.

NOTE If an error message similar to "Cannot find any configured Moxa Smartio/Industio series board!" pops up, refer to the Troubleshooting chapter for possible solutions.

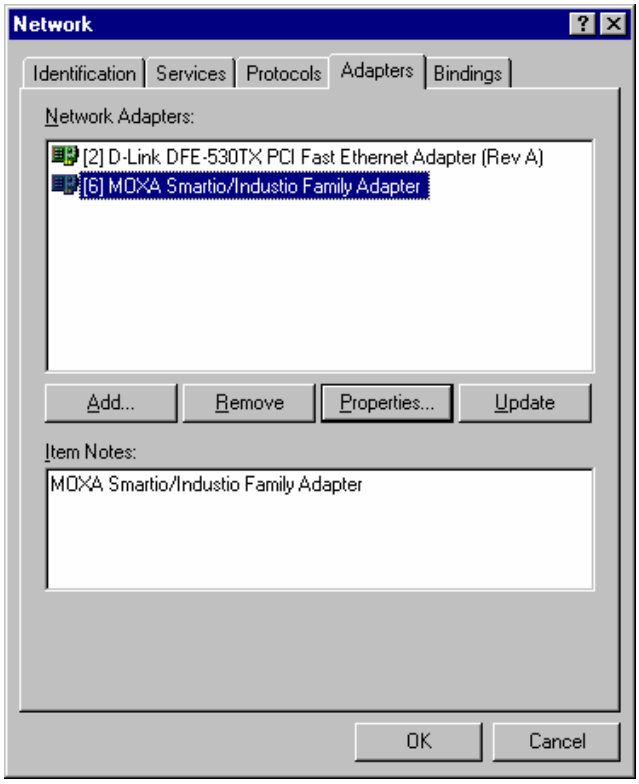
Removing a CP-132U Board

To remove a CP-132U board, first shut down your PC, and then physically remove the board from the PCI or PCI-X slot. The next time you start up the PC, the system will automatically remove the configuration for the board. You do not need to click the **Remove** button in the **Moxa Smartio/Industio Configuration Panel**.

Removing the Driver

To remove the CP-132U driver:

1. Open the **Control Panel**, click on the **Network** icon, and select the **Adapters** tab.
2. Click on **Moxa Smartio/Industio Family Adapter** in the **Network Adapters** list to highlight it.
3. Click on **Remove**.



4. Click on **Close**, and then restart the system.

Updating the Driver

To update the CP-132U driver:

1. Remove the current driver (see the previous subsection for instructions).
2. Restart the system.
3. Install the new driver. Refer to the "Installing the Driver for the First Time" section for instructions.

Non-Windows Drivers

Drivers are provided for DOS, Linux, and SCO.

DOS

Moxa DOS API-232 is a software package that assists users in developing new programs, or debugging existing programs for serial communications. This section explains how to install the package, how to set up the driver, and how to load or unload the driver.

Moxa provides drivers that allow you to use the following serial board products under DOS:

- **Universal PCI Boards:** CP-118U, CP-168U, CP-104UL, CP-104JU, CP-102U, CP-102UL, CP-134U, CP-134U-I, CP-132UL, CP-132UL-I V2(CP-132U-I V1)
- **PCI Boards:** C168H/PCI, C104H/PCI, C104HS/PCI, CP-114, CP-114I, CP-114S, CP-114IS, CP-132, CP-132I, CP-132S, CP-132IS
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS, CI-134, CI-134I, CI-134IS, CI-132, CI-132I, CI-132IS
- **cPCI Boards:** CT-114I

Installing the Driver

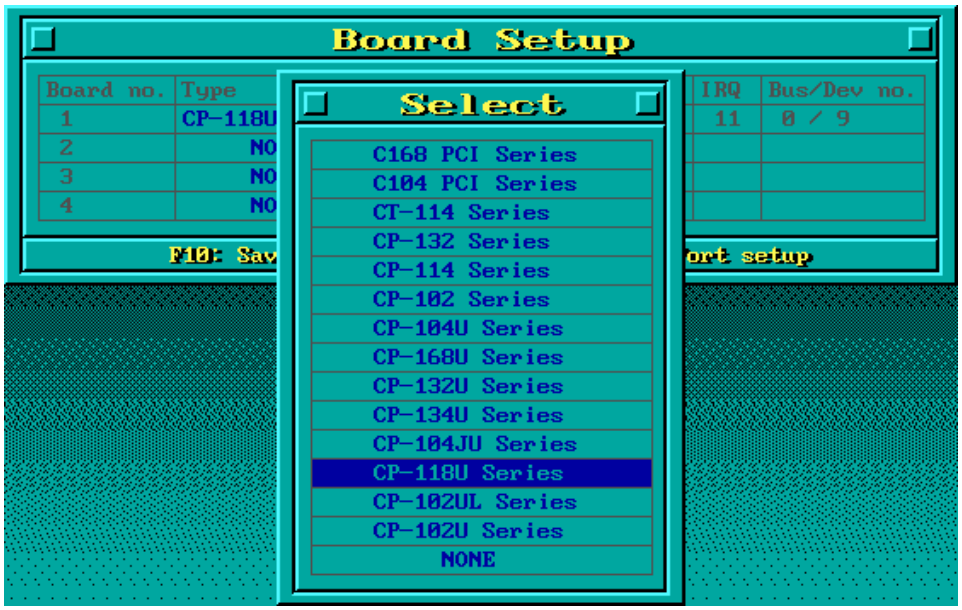
1. Run the installation program, **DOSINST.EXE** from the **\Software\DOS** folder on the Documentation and Software CD. Specify the target API-232 directory (e.g. C:\Moxa) to which the driver will be copied. Press F2 to start the installation.

2. After the installation is complete, a window will open to ask if you want to run **SETUP.EXE**. Press **Y** to run the program.

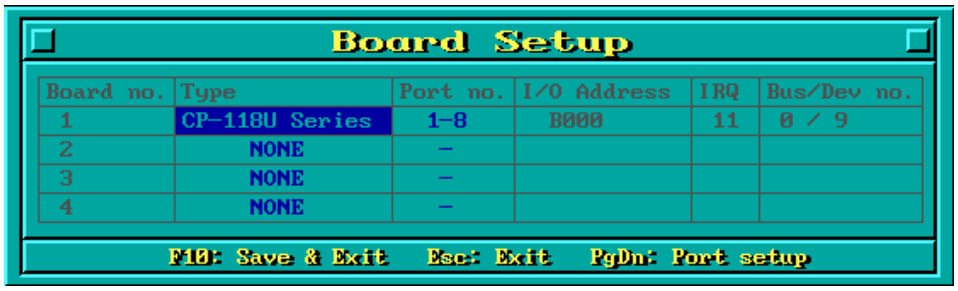
Setting up the Driver

This section covers some of the setup program's most frequently used functions. For complete details, press F1 to open the on-line help file.

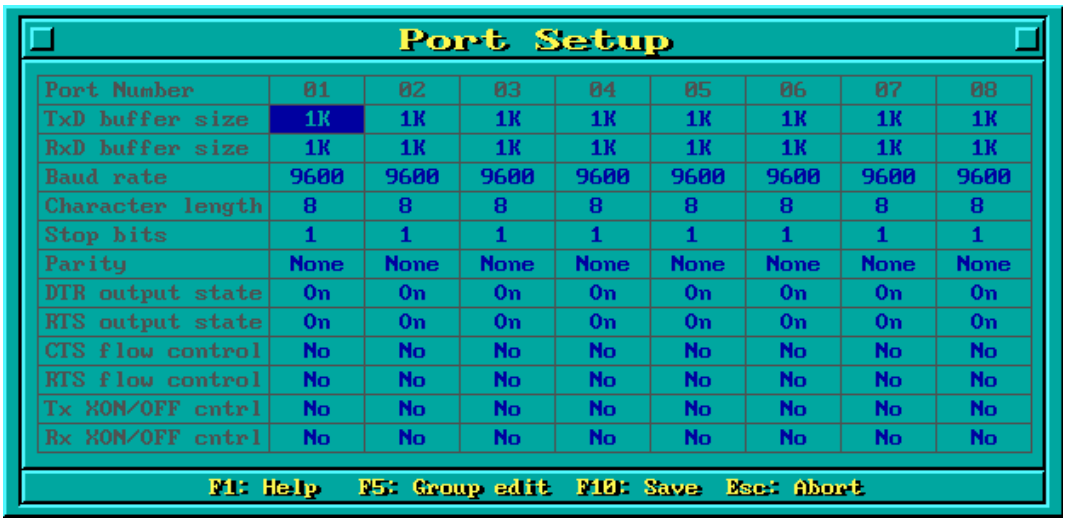
1. Run **BIN\SETUP.EXE**.
2. Press **Enter** to select the model name of the Moxa board you are installing.



3. A window will open displaying basic configuration information for all boards of this type currently installed in the system. Press **PgDn** to configure the port settings.



4. You may enter or modify the settings of each port at this stage. The values displayed first are the port's initial values that were set up when the driver was installed.



Port Number	01	02	03	04	05	06	07	08
TxD buffer size	1K	1K	1K	1K	1K	1K	1K	1K
RxD buffer size	1K	1K	1K	1K	1K	1K	1K	1K
Baud rate	9600	9600	9600	9600	9600	9600	9600	9600
Character length	8	8	8	8	8	8	8	8
Stop bits	1	1	1	1	1	1	1	1
Parity	None	None	None	None	None	None	None	None
DTR output state	On	On	On	On	On	On	On	On
RTS output state	On	On	On	On	On	On	On	On
CTS flow control	No	No	No	No	No	No	No	No
RTS flow control	No	No	No	No	No	No	No	No
Tx XON/OFF cntrl	No	No	No	No	No	No	No	No
Rx XON/OFF cntrl	No	No	No	No	No	No	No	No

5. Press **F10** to save the changes and exit the SETUP program.

Legends

In this section, we explain the meaning of some of the fields and functions.

Port number

This is the ID of the port. Application software uses port number (ID) when referring to a port. Port numbers can be set to any number between 0 and 255 (inclusive). However, you must ensure that each port is assigned a unique port number. If you are developing your own application software, then you may want to select port numbers that take into consideration the structure of the program.

TxD buffer size

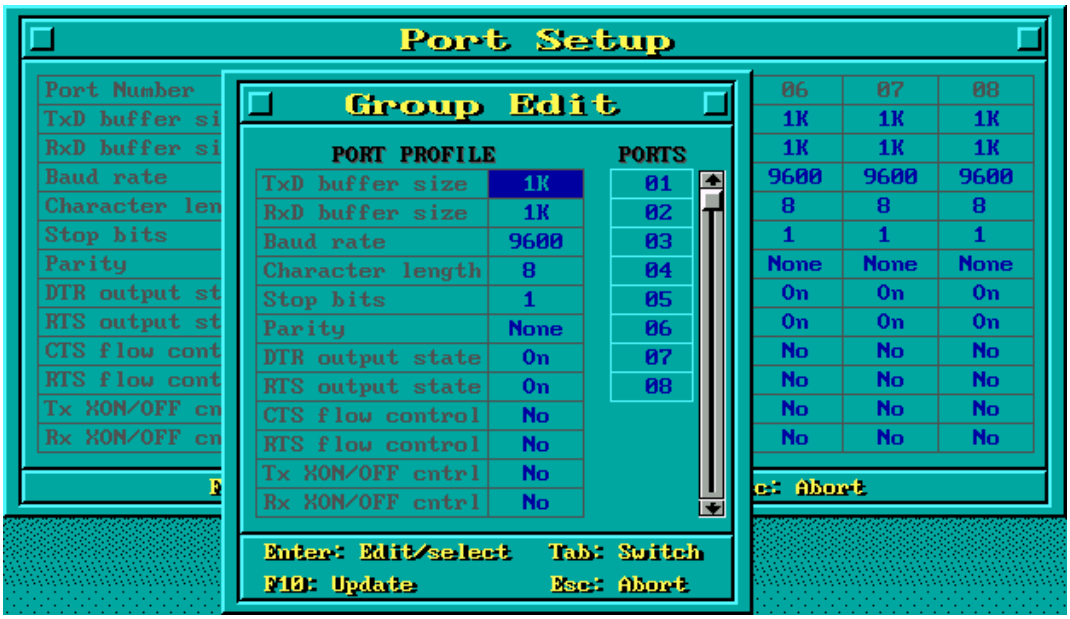
The TxD buffer is the transmission (output) buffer allocated by the system for each port.

RxD buffer size

The RxD buffer is the receiving (input) buffer allocated by the system for each port.

F5 Group Edit

This is a convenient function that allows you to edit the configuration of several ports at one time as a group.



Loading the Driver

After completing the setup procedure, run **BIN\DP-DRV.EXE** from the DOS prompt to load the driver. The driver will automatically detect the boards that have already been installed. If one or more board is detected, you will see a message similar the following:

Smartio/Industio Family DOS driver Version 1.5
Setup driver …
CP-132U series (Bus= x ,Dev=y) : OK!
Device driver setup O.K.

This means that the CP-132U Series driver has been installed properly. At this point, you may execute applications that support API-232 functions, or start developing applications using the API-232 library.

Unloading the Driver

To unload (release) the driver from memory, type **DP-DRV/Q** at the DOS prompt and then press **Enter**.

Linux

Moxa provides drivers that allow you to use the following serial board products under Linux.

- **Universal PCI Boards:** CP-118U,CP-168U, CP-104UL, CP-104JU, CP-102U, CP-102UL, CP-134U, CP-134U-I, CP-132UL, CP-132UL-I V2(CP-132U-I V1)
- **PCI Boards:** C168H/PCI, C104H/PCI, C104HS/PCI, CP-114, CP-114I, CP-114S, CP-114IS, CP-132, CP-132I, CP-132S, CP-132IS
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS, CI-134, CI-134I, CI-134IS, CI-132, CI-132I, CI-132IS
- **cPCI Boards:** CT-114I

Execute the following commands from the Linux prompt:

1.
```
#mount /dev/cdrom /mnt/cdrom
#cd /
#mkdir moxa
```

2.
```
#cd moxa
#cp /mnt/cdrom/<driver directory>/mxser.tgz .
```

3.
```
#tar xvfz mxser.tgz
```

4.
```
#cd mxser
#make clean; make install
```

5.
```
#cd /moxa/mxser/driver
#./msmkod
```

6.
```
#modprobe mxser
```

   (If you install ISA Boards, use the command # insmod mxser ioaddr=0x???, 0x???, 0x???, 0x??? <- 1st ISA, 2nd ISA, 3rd ISA, 4th ISA)
   Using /lib/modules/2.4.20-8/kernel/drivers/char/mxser.o
   Warning: loading /lib/modules/2.4.20-8/kernel/drivers/char/mxser.o will taint the kernel: no license
   See http://www.tux.org/lkml/#export-tainted for information about tainted modules
   Moxa Smartio/Industio family driver version 1.7
   Tty devices major number = 30, callout devices major number = 35
   Found Moxa CP-132U series board (BusNo=2,DevNo=13)
   Module mxser loaded, with warnings

7. Use the Moxa diagnostic utility to verify the driver status:
```
#cd /moxa/mxser/utility/diag
#./msdiag
= Moxa Smartio/Industio Family Multiport Board Status Utility(1.1)=
 Tty Device Major Number= 30.
 Callout device Major Number= 35.
Board 1 : CP-132U series (BusNo=2, DevNo=13)
Port 1: 0xac00, max. baud rate = 230400 bps.
Port 2: 0xac08, max. baud rate = 230400 bps.
Port 3: 0xac10, max. baud rate = 230400 bps.
Port 4: 0xac18, max. baud rate = 230400 bps.
Port 5: 0xac20, max. baud rate = 230400 bps.
Port 6: 0xac28, max. baud rate = 230400 bps.
Port 7: 0xac30, max. baud rate = 230400 bps.
Port 8: 0xac38, max. baud rate = 230400 bps.
```

8. Use the Moxa terminal utility to test the tty ports:
```
#cd /moxa/mxser/utility/term
#./msterm
```

4

Serial Programming Tools

Moxa provides an easy to use yet powerful serial programming library, and communication troubleshooting utilities under Windows 2000/XP/2003, Windows 95/98, and Windows NT. The following sections give details about the installation, the library, and the utilities for various platforms.

The following topics are covered in this chapter:

Moxa PComm

PComm, a professional serial comm tool for PCs, is a software package that runs under Windows NT/2000/XP/2003/95/98. PComm provides:

- A powerful serial communication library that simplifies serial programming tasks for most popular programming languages. The serial communication library is useful for developing applications for data communications, remote access, data acquisition, and industrial control under Windows NT/2000/XP/2003/95/98, and is a simpler programming solution compared to the more complex Windows Win32 COMM API.
- Useful utilities such as diagnostic, monitor, and terminal emulator.
- Illustrative sample programs.
- Comprehensive on-line documentation.

Installing PComm

To install PComm, run **\Setup.exe** from the Documentation and Software CD. Note that the PComm diagnostic and monitor utilities are for Moxa boards only. To use these utilities, you must have a Moxa board and the appropriate Windows (95/98/NT/2000/XP/2003) device driver installed in your system. See the "Software Installation" chapter for instructions on how to install the drivers.

After installing PComm, click on **Start**, select **Program Files**, and then the **PComm Lite group** to select from the list of utilities and documents.

PComm Programming Library

The serial communication library helps you develop serial communications programs for any COM port that complies with the Microsoft Win32 API. This library facilitates the implementation of multi-process, multi-thread serial communication programs, and greatly reduces the time required to develop applications.

For a complete description of the library functions and sample programs for Visual C++, Visual Basic, and Delphi, check the help file and the sample programs in the PComm directory.

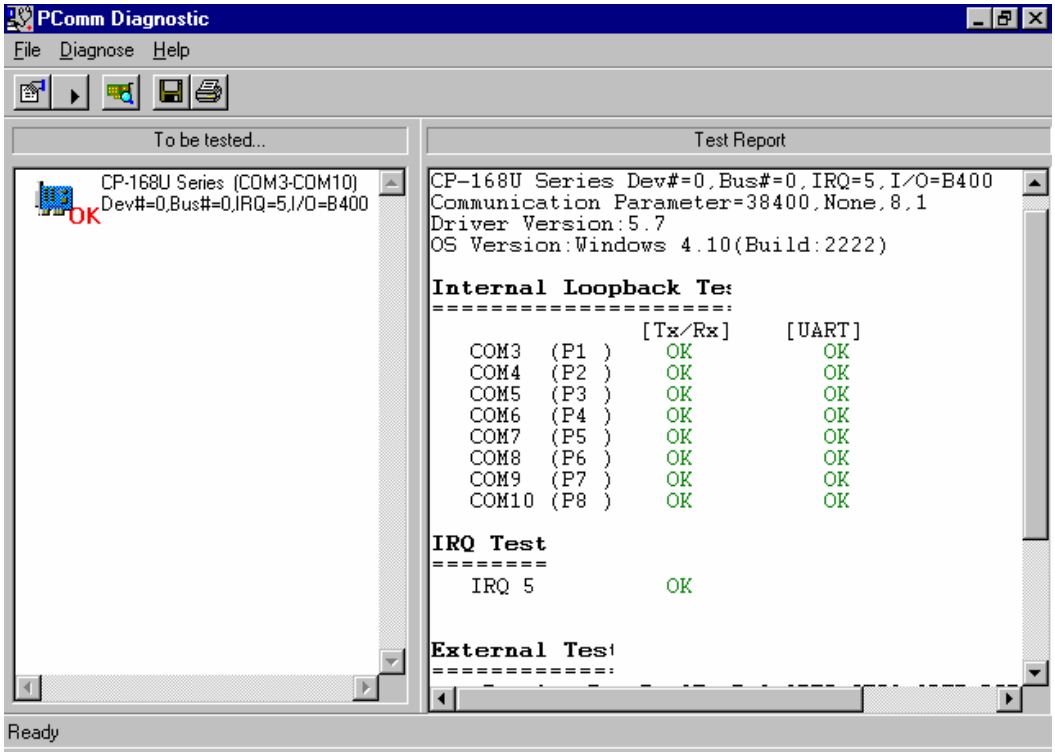
Utilities

In this section, we give brief descriptions of each utility. For more information about these utilities, read the on-line help from the Documentation and Software CD.

Diagnostic (for Moxa boards only)

This convenient diagnostic program, which only works with Moxa boards and ports, provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, DTR/DCD, etc. The diagnostic program allows the user to check the function of both software and hardware.

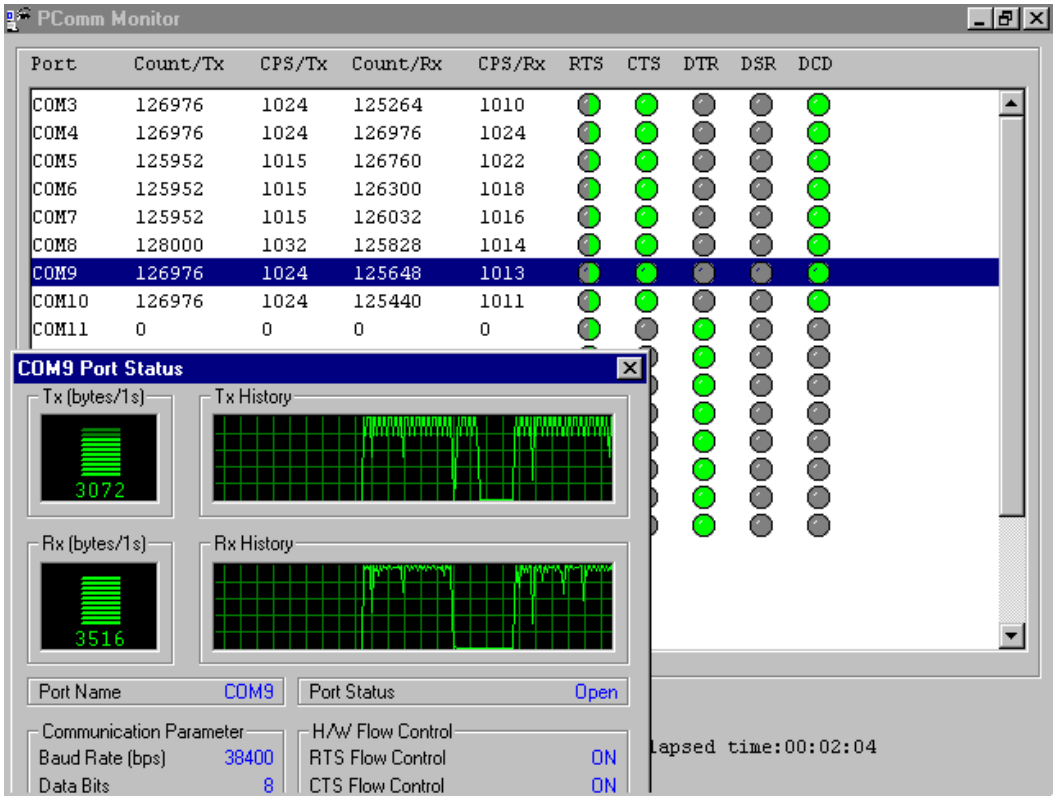
To run the Diagnostic program, click on **Start → Program → PComm Lite → Diagnostic**. A typical test report for a Moxa board is shown below.



Monitor (for Moxa boards under Windows NT/2000/XP/2003)

This useful port status monitoring program allows you to monitor data transmission of selected Moxa COM ports. The program monitors data transmission/receiving throughput, and communication line status, with data updated and displayed on the screen at regular time intervals. Click on a specific port to see a graph of the current communication parameters and status of that port.

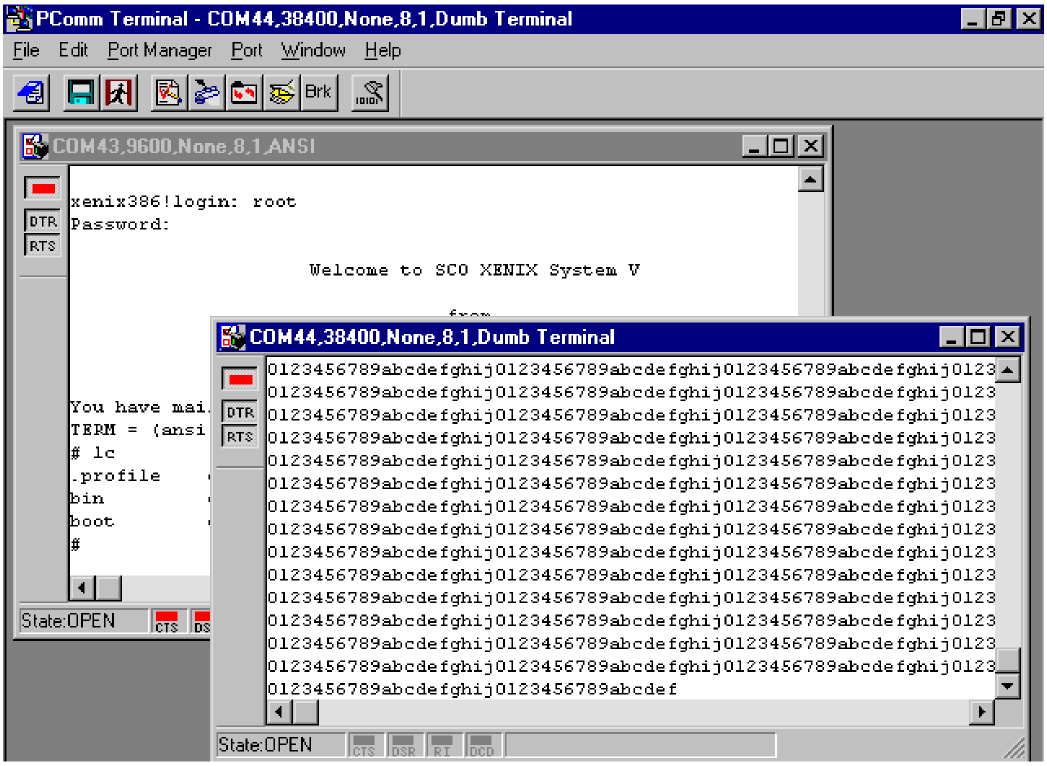
To run the Monitor program, click on **Start → Program → Pcomm Lite → Monitor**.



Terminal Emulator

Use Terminal Emulator to connect to your PC's serial ports to check if data is being transmitted correctly. Terminal Emulator features multi-windows, and supports VT100 and ANSI terminal types. You can transfer data interactively, send patterns periodically, and transfer files using ASCII, XMODEM, YMODEM, ZMODEM, and KERMIT protocols.

To run Terminal Emulator, click on **Start → Program → Pcomm Lite → Terminal Emulator**.



RS-485 Programming

If you are using your CP-132U Series board for RS-485 applications, in addition to reading this section, you should also refer to the "Connection Cables and Cable Wiring" chapter for more details about using RS-485.

The CP-132U Series supports 2-wire half-duplex RS-485 and 4-wire full duplex RS-485 communication. Ports configured for 2-wire RS-485 use the Data+ and Data- pins for both transmitting and receiving data. Moxa's own ADDC™ (Automatic Data Direction Control) technology is used to switch between transmitting and receiving.

ADDC™

ADDC™ is the best method for switching between transmission and receiving when using 2-wire RS-485.

When using ADDC™, additional code is not required to switch between data transmitting and receiving, since the switching mechanism is managed automatically by the board's built-in intelligent hardware mechanism. This means that RS-485 programming using ADDC™ mode is just as simple and straightforward as RS-422 programming.

5

Pin Assignments

The CP-132U board has a female DB44 connector on the board, with various connection options available for connecting from the board to your serial devices. In this chapter, we give pin assignments for the board side connector, as well as pin assignments for device side connectors for the different connection options.

The CP-132U board supports RS-422, 4-wire RS-485, and 2-wire RS-485. Note that the RS-422 standard uses a balanced voltage digital interface to allow 9600 bps communication over cables of up to 4000 feet in length. Ten receivers can be connected to one driver for broadcasting systems. The RS-485 standard is an enhanced version of the RS-422 balanced line standard. It allows multiple drivers and receivers to work on a multidrop network. A maximum of 32 drivers and 32 receivers can be set up on a multidrop network. The CP-132U board supports both 2-wire half-duplex and 4-wire full-duplex RS-485 communications. In 2-wire RS-485, Data+/- pins are used for both data transmitting and receiving.

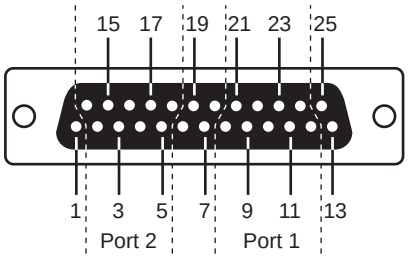
The following topics are covered in this chapter:

Board Side Pin Assignments—Female DB25

The RS-422 standard uses a balanced voltage digital interface to allow 9600 bps communication over cables of up to 4000 feet in length. Ten receivers can be connected to any one driver for broadcasting systems.

The RS-485 standard is an enhanced version of the RS-422 balanced line standard. It allows multiple drivers and receivers to work on a multidrop network. A maximum of 32 drivers and 32 receivers can be set up on a multidrop network.

The CP-132UL Series supports both 2-wire half-duplex and 4-wire full-duplex RS-485 communications. In 2-wire RS-485, Data+/- pins are used for both data transmitting and receiving, depending on the RTS signal.



CP-132UL (RS-422/4-wire RS-485)

	Port 1	Port 2
RxD+(B)	12	18
TxD+(B)	24	5
RTS+(B)	11	17
CTS+(B)	23	4
RxD-(A)	9	15
RTS-(A)	10	16
TxD-(A)	21	2
CTS-(A)	8	14
SGND	22	3

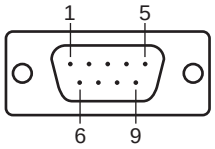
CP-132U (2-wire RS-485)

	Port 1	Port 2
Data+(B)	12	
Data-(A)	9	

Device Side Pin Assignments

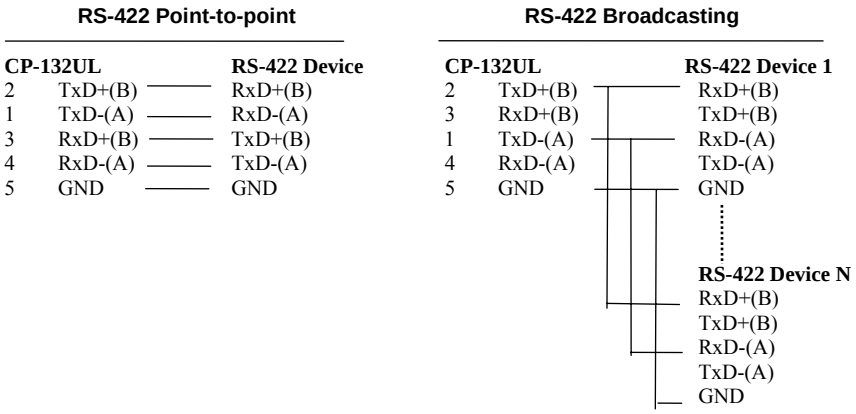
In this subsection we give the pinouts for individual ports. Refer to the DB9 pinout diagrams if you are using the Model M44M9x4 cable, and refer to the DB25 pinout diagrams if you are using the Model M44M25x4 cable.

Male DB9



Pin	RS-422	4-wire RS-485	2-wire RS-485
1	TxD-(A)	TxD-(A)	---
2	TxD+(B)	TxD+(B)	---
3	RxD+(B)	RxD+(B)	Data+(B)
4	RxD-(A)	RxD-(A)	Data-(A)
5	GND	GND	GND
6	RTS-(A)	---	---
7	RTS+(B)	---	---
8	CTS+(B)	---	---
9	CTS-(A)	---	---

Cable Wiring



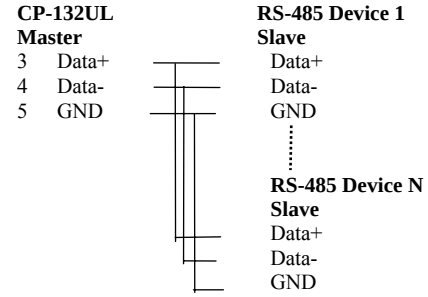
CP-132UL – RS-422 with Handshaking

CP-132UL		RS-422 Device
2	TxD+(B) ——	RxD+(B)
1	TxD-(A) ——	RxD-(A)
3	RxD+(B) ——	TxD+(B)
4	RxD-(A) ——	TxD-(A)
5	GND ——	GND
7	RTS+(B) ——	CTS+(B)
6	RTS-(A) ——	CTS-(A)
8	CTS+(B) ——	RTS+(B)
9	CTS-(A) ——	RTS-(A)

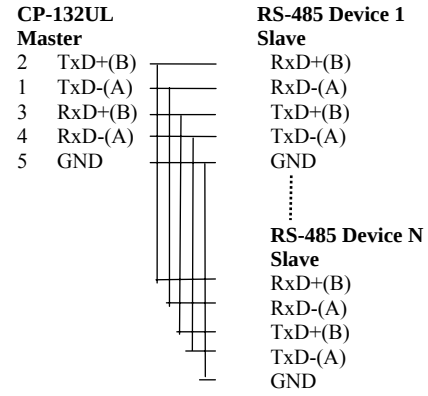
CP-132UL – 2-wire RS-485

CP-132UL		RS-422 Device
3	Data+(B) ——	Data+(B)
4	Data-(A) ——	Data-(A)
5	GND ——	GND

Multidrop 2-wire RS-485 (half-duplex)



Multidrop 4-wire RS-485 (full-duplex)



See the section "**RS-485 Programming**" in the "**Serial Programming Tools**" chapter for more details on RS-485 programming.

Impedance Matching and Termination Resistors

When using RS-422/485 serial communications, an electrical signal that travels through two different resistance junctions in a transmission line will sometimes give rise to signal reflection due to the impedance mismatch. Signal reflection causes signal distortion, which in turn contributes to communication errors. The solution to this problem is to establish the same impedance at the ends of the transmission line, as in the line itself, by terminating the ends of the line with resistors.

6

Troubleshooting

Common CP-132U Series problems and possible solutions are listed below. If you still have problems after reading this chapter, 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.

General Troubleshooting

1. **The Moxa CP-132U board cannot be detected by the Moxa driver while installing the driver.**

   Hardware causes and solutions:

   a. The board is not installed in the computer. Please install it.
   b. The board is not properly plugged into the system. If this is the case, re-plug the board into a 32-bit PCI slot. It is also possible that a slot has malfunctioned. In this case, try other slots until you find one that works.
   c. The motherboard does not have an available IRQ for the CP-132U Series board. In this case, enter the BIOS and make sure there is an available IRQ under PCI/PnP settings.

2. **The Moxa CP-132U board and driver are activated but cannot transfer (transmit/receive) data.**

   Hardware Causes and Solutions:

   a. Make sure the cable wiring is connected correctly. Refer to the "Pin Assignments" chapter for correct cable connections.
   b. The cable or the board could be defective. Try other ports, cables, or boards to verify this, or use the PComm Diagnostic utility to test the Moxa board and port conditions. If Diagnostic reports an error, replace the faulty components.

   Software Causes and Solutions:

   a. CP-132U Series boards will check the line status (CTS) before transmitting data if the RTS/CTS flow control feature is set to Enable in the configuration or application program. Refer to the "Connection Cables and Cable Wiring" chapter for proper wiring diagrams, and check the line status of the suspected port using the diagnostic LED indicators on the mini tester.
   b. The board control application might not be written correctly according to the corresponding API of the operating system. To check this problem, run another application that you know is correct, or use the utilities provided by Moxa (such as Pcomm Terminal emulator or HyperTerminal under Windows NT and Windows 95/98).

Windows NT

This section is specifically for troubleshooting problems for Windows NT. For general problems and solutions, 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 the Moxa board was found, but the IRQ is conflicting with another adapter. Check the PCI BIOS IRQ settings first and then select an IRQ that is available.

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

   Make sure the PCI board is seated firmly in the expansion slot.

3. **The COM number of the CP-132U Series conflicts with others.**

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

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

   This could be caused by an IRQ or memory conflict with other ISA Bus adapters, such as LAN and SCSI boards, or the system BIOS. Refer to the corresponding problem in the previous section, "General Troubleshooting," for possible solutions.

Windows 95/98

This section is specifically for troubleshooting under Windows 95/98. For general problems and solutions, see the previous section, "General Troubleshooting."

1. **The system fails to find the CP-132U Series board!**

   The board(s) is (are) not plugged in properly.

2. **The slot the boards are plugged into is defective. Try another slot until you find one that works.**

   The board might be defective.

3. **After the system reboots, the error message "CP-132U Series (BusNo=x, DevNo=x, Port1=COMx) interrupt number is invalid!" appears.**

   This indicates that the Moxa board was found, but the IRQ conflicts with another adapter. Make sure the Moxa board's IRQ does not conflict with other adapters' IRQ. Check the PCI BIOS IRQ settings and select an available IRQ for Moxa boards.

A

Technical Reference

Product Specifications

Bus interface	32-bit PCI	
Number of ports	2	
Max. No. of boards	4	
I/O address	Assigned by PCI BIOS	
IRQ	Assigned by PCI BIOS	
Comm. controller	Moxa UART (16C550C compatible)	
Transmission speed	50 bps to 230.4 Kbps (CP-132UL, CP-132U-I) 50 bps to 921.6 Kbps (CP-132UL V2, CP-132UL-I V2)	
Data bits	5, 6, 7, 8	
Stop bits	1, 1.5, 2	
Parity	none, even, odd, space, mark	
Flow Control	RTS/CTS, XON/XOFF	
Connector	Female DB25	
Data signals	RS-422	TxD+(B)/-(A), RxD+(B)/-(A), RTS+(B)/-(A), CTS+(B)/-(A), GND
	4-wire RS-485	TxD+(B)/-(A), RxD+(B)/-(A), GND
	2-wire RS-485	Data+(B)/-(A), GND
Connectors	2 DB9 male ports	
Optical isolation	Max. 2000V (CP-132U-I, CP-132UL-I V2)	
Surge protection	ESD max. 16000V (CP-132UL, CP-132U-I, CP-132UL V2, CP-132UL-I V2)	
Termination Resistor	120 Ω	
Operating temperature	0 to 55°C	
Power requirement	CP-132UL 220 mA (+5V) CP-132UL V2 120 mA (+5V) CP-132U-I 578 mA (+5V) CP-132UL-I V2 490 mA (+5V)	
Dimensions (W × D)	CP-132UL 120 × 64.5 mm CP-132UL V2 120 × 64.5 mm CP-132U-I 120 × 100 mm CP-132UL-I V2 120 × 64.5 mm	
Operation Systems	Windows 95/98/NT/2000/XP/2003, Linux, DOS, FreeBSD	

PCI

The 32-bit CP-132UL Series board complies with PCI Specifications 2.1, and the IRQ and I/O address hardware configuration is automatically assigned by the PCI BIOS. This means that you must plug in the board before installing the driver.

As opposed to 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; this is called slot-sensitivity or slot-dependency. This may also apply to PCI slots in a PC with a 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 slot-dependency, it is necessary to re-configure the driver software once the board is plugged into different PCI slots.

Up to 4 CP-132U Series boards are allowed in one system. When installing more than one board, remember the order the boards are installed to distinguish the installed boards from each other.

Moxa UART

The Moxa UART is an intelligent asynchronous controller that supports one full duplex channel that simultaneously transfers data at a transmission speed of 921.6 Kbps. To increase 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, helping to prevent data loss.