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

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www.moxa.com/product



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1 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
- **G** Features
- **D** 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.

ADDCTM (Automatic Data Direction Control) for RS-485

To make 2-wire RS-485 half-duplex connections easier to manage, ADDCTM (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 <u>www.moxa.com</u> 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
Prote	ction 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:



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
- **D** 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.











С

16.00 mm (0.630 in)

-6 19.76 mm (0.778 in) ţ.

10.20 mm (0.402 in)

0



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	Port 1			
Settings	S1-1	S2-1		
RS-422		OFF	2-WIRE ON S1 2-WIRE	RS485 ON 1 2 S2 RS422
RS-485 (2-wire)	ON	ON	2-WIRE ON S1 2-WIRE	RS485 ON 1 2 S2 RS422
RS-485 (4-wire)	OFF	ON	2-WIRE ON S1 2-WIRE	RS485 ON 1 2 S2 RS422

DIP Switch	Port 2			
Settings	S1-2	S2-2		
RS-422	_	OFF	2-WIRE ON S1 4-WIRE	RS485
RS-485 (2-wire)	ON	ON	2-WIRE ON S1 4-WIRE	RS485
RS-485 (4-wire)	OFF	ON	2-WIRE ON S1 2-WIRE	RS485

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.



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

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

- ➢ Windows 2003/XP
- ➢ Windows 2000
- ➢ Windows 95/98
- Windows NT
- **D** Non-Windows Drivers
 - > DOS
 - ➤ Linux

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-132IS, CP-132IS
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS, CI-134, CI-134I, CI-134IS, CI-132, 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.

Found New Hardware
 FOI Serial Port

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.

Found New Hardware Wizard				
	Welcome to the Found New Hardware Wizard			
	This wizard helps you install software for:			
	MOXA CP-118U Series (PCI Bus)			
	If your hardware came with an installation CD or floppy disk, insert it now.			
	What do you want the wizard to do?			
	C Install the software automatically (Recommended)			
	Install from a list or specific location (Advanced)			
	Click Next to continue.			
	< <u>B</u> ack. <u>N</u> ext > Cancel			

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.

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
Include this location in the search:
H:\CP-118U\Software\Win2K-XP-2003
O Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< <u>B</u> ack <u>N</u> ext > Cancel

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.

Found New Hardware Wizard	
Please wait while the wizard installs the soft	ware
MOXA CP-118U Series (PCI Bus) Hardward	Installation The software you are installing for this hardware: MOXA CP-118U Series (PCI Bus) has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.) Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has
	Continue Anyway STOP Installation

5. Wait while the driver software is installed.

Found New Hardware Wizard	
Please wait while the wizard installs the software	
MOXA CP-118U Series (PCI Bus)	
mxsicfg.dll To F:\WINXP\System32	⁶ >>
< <u>B</u> ack	Next > Cancel

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.

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
✓ Include this location in the search:
H:\CP-118U\Software\Win2K-XP-2003
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< <u>B</u> ack <u>N</u> ext > Cancel

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 \rightarrow Settings \rightarrow Control Panel \rightarrow System, select the Hardware tab, and then click on Device Manager.

System Properties ? 🔀				
System Restore Automatic Updates Remote General Computer Name Hardware Advanced				
Add Hardware Wizard The Add Hardware Wizard helps you install hardware. Add <u>H</u> ardware Wizard				
Device Manager The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device. Driver Signing Driver Signing				
Hardware Profiles Hardware profiles provide a way for you to set up and store different hardware configurations.				
Hardware <u>P</u> rofiles				
OK Cancel Apply				

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.

MOXA CP-	118U Serie	es (PCI Bus) Pr	operties		<u>?</u> ×
General	Ports Confi	iguration Driver	Resources		
Port 2 3 4 5 6 7 8	COM No. COM 3 COM 4 COM 5 COM 6 COM 7 COM 7 COM 8 COM 9 COM 10	Rx FIFO Level High High High High High High High	Tx FIFO Level High High High High High High High	<u>H</u> elp <u>P</u> ort Info P <u>o</u> rt Setting	
				OK Cano	;el

- 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.

Port 1	×			
			CP-132U	
Port Number COM3 (current)			Tx FIFO	Rx FIFO
Auto Enumerating COM Number	E	ligh	128	120
I ■ Auto Endinerating Com Number	N	/iddle	64	60
		JOW	1	1
Rx FIFO Level High	U	nit: Byt	es	
Set the change to all ports				
Ix FIFO Level High				
✓ Set the change to all ports				
<u> </u>				

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 \rightarrow Programs \rightarrow PComm Lite 2000(XP Ver 1.2) \rightarrow 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** \rightarrow **Settings** \rightarrow **Control Panel** \rightarrow **Administrative Tools** \rightarrow **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

 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.

Found Ne	ew Hardware
-	PCI Serial Port
Installing	g

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

Found New Hardware Wizard	
	Welcome to the Found New Hardware Wizard This wizard helps you install a device driver for a hardware device.
	< <u>B</u> ack [Next >] Cancel

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

Found New Hardware Wizard
Install Hardware Device Drivers A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device: PCI Serial Port A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< <u>B</u> ack <u>N</u> ext > Cancel

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

Found New Hardware Wizard	
Locate Driver Files Where do you want Windows to search for drive	er files?
Search for driver files for the following hardware	device:
PCI Serial Port	
The wizard searches for suitable drivers in its driv any of the following optional search locations that	iver database on your computer and in at you specify.
To start the search, click Next. If you are search insert the floppy disk or CD before clicking Next.	hing on a floppy disk or CD-ROM drive,
Optional search locations:	
CD-ROM drives	
Specify a location	
Microsoft Windows Update	
	< <u>B</u> ack <u>N</u> ext> Cancel

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.

Found New Hardware Wizard
Driver Files Search Results The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
PCI Serial Port
Windows found a driver for this device. To install the driver Windows found, click Next.
h:\cp-118u\software\win2k-xp-2003\mxser.inf
< <u>B</u> ack Next> Cancel

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.

Copying Files	×
\simeq	
mxsicfg.dll To D:\\//INNT\system32	
	Cancel

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 \rightarrow Settings \rightarrow Control Panel \rightarrow System, select the Hardware tab, and then click on Device Manager.

System Properties ?
System Restore Automatic Updates Remote General Computer Name Hardware Advanced
Add Hardware Wizard The Add Hardware Wizard helps you install hardware. Add <u>H</u> ardware Wizard
Device Manager The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device. Driver Signing Device Manager
Hardware Profiles Hardware profiles provide a way for you to set up and store different hardware configurations. Hardware Profiles
OK Cancel Apply

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.

MOXA CP-118U Series (PCI Bus) Properties			? ×
General	Ports Configuratio	n Driver Resources	
»()	MOXA CP-118U	Series (PCI Bus)	
	Device type:	Multi-port serial adapters	
	Manufacturer:	Moxa Technologies Inc.	
	Location:	PCI Slot 2 (PCI bus 0, device 10, function 0)	
	ce status		
This device is working properly. If you are having problems with this device, click Troubleshoot to start the troubleshooter.			
		Iroubleshoot	
<u>D</u> evice	usage:		
Use th	is device (enable)	•	
		OK Ca	ncel

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

MOXA CP-	118U Serie	≥s (PCI Bus) Pr	operties		<u>?</u> ×
General	Ports Confi	iguration Driver	Resources		
Port 1 2 3 4 5 6 7 8	COM No. COM 3 COM 4 COM 5 COM 6 COM 7 COM 8 COM 9 COM 10	Rx FIFO Level High High High High High High High	Tx FIFO Level High High High High High High	Help Port Info Port Setting	
				OK Cano	:el
- 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.

Port 1	×			
			CP-132U	
Port Number COM3 (current)			Tx FIFO	Rx FIFO
Auto Enumerating COM Number		High	128	120
Auto Endinerating Com Number		Middle	64	60
		Low	1	1
<u>R</u> x FIFO Level High ▼		Unit: By	tes	
Set the change to all ports				
Ix FIFO Level				
$\boxed{\checkmark}$ Set the change to all ports				
<u> </u>				

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 \rightarrow Programs \rightarrow PComm Lite 2000(XP Ver 1.2) \rightarrow 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** \rightarrow **Settings** \rightarrow **Control Panel** \rightarrow **Administrative Tools** \rightarrow **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

 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.

Confirm I	Device Removal
»()	MOXA CP-118U Series (PCI Bus)
Warning	: You are about to uninstall this device from your system.
	Cancel

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.

Add New Hardware Wiz	zard
	 What do you want Windows to do? Search for the best driver for your device. (Recommended). Display a list of all the drivers in a specific location, so you can select the driver you want.
	< <u>B</u> ack Next > Cancel

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

Add New Hardware Wiz	ard Select the type of device from the list below, then click Next.
	Mouse Multi-function adapters MultilOController Network adapters Other detected devices Other devices PCMCIA socket Port (CM # 1 CD)
•	Poins (LUM & LP1) Printer SBP2 SCSI controllers ✓ < <u>B</u> ack Next > Cancel

4. Click on **Have Disk**.

Add Nev	Hardware Wizard				
%	Select the manufacturer and model of your hardware device. If you have a disk that contains the updated driver, click Have Disk. To install the updated driver, click Finish.				
Models:					
Unsupp	orted Device				
	<u>H</u> ave Disk				
	< <u>B</u> ack Next > Cancel				

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.

Add New Hardware Wizard						
Select the manufacturer and disk that contains the updat driver, click Finish.	Select the manufacturer and model of your hardware device. If you have a disk that contains the updated driver, click Have Disk. To install the updated driver, click Finish.					
Mo <u>d</u> els:						
CP-118U Series [8-23-2004]						
 Show <u>compatible hardware</u>. Show <u>all hardware</u>. 	Have Disk					
	< <u>B</u> ack Next > Cancel					

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

Add New Hardware Wiz	rard
	Windows driver file search for the device:
	CP-118U Series
	Windows is now ready to install the selected driver for this device. Click Back to select a different driver, or click Next to continue.
🏽 🗞 🌧 🛛	Location of driver:
	Careed Concert

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

CF	P-118U	Series In:	stallation		×
		M	INT Vector	A800	j
		Base I/O Port Address		B000]
		PCI Bus Nu	mber is 0 and De	vice Number is 10	
	Port	COM No.	Rx FIFO Level	Tx FIFO Level	
	1	COM 3	High	High	
	2	COM 4	High	High	
	3	COM 5	High	High	
	4	COM 6	High	High	
	5	COM 7	High	High	
	6	COM 8	High	High	
	7	COM 9	High	High	
	8	COM 10	High	High	
				Help	Property
				ОК	Cancel

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

Add New Hardware Wizard				
	CP-118U Series Windows has finished installing the software you selected that your new hardware device requires.			
	Kancel			

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**.

System Properties	×
General Device Manager Hardware Profiles Performance	1
Computer COROM Disk drives Display adapters Floppy disk controllers Hard disk controllers Keyboard Monitors Mouse Mouse Moxa Smartio/Industio multiport board CP118U Series Network adapters Ports (COM & LPT) System devices	
P <u>r</u> operties Refresh R <u>e</u> move Pri <u>n</u> t	
OK Cancel	

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.

MOXA CP-1	118U Series (PC	I Bus) Properties	? ×	
General	Ports Configuratio	n Driver Resources		
»()	MOXA CP-118U	Series (PCI Bus)		
	Device type:	Multi-port serial adapters		
	Manufacturer:	Moxa Technologies Inc.		
	Location:	PCI Slot 2 (PCI bus 0, device 10, function 0)		
Devic	e status device is working p I are having proble the troubleshooter.	roperly. ms with this device, click Troubleshoot to		
Device usage:				
		<u>I</u>	1	
		OK 0	ancel	

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

MOXA CP-1	OXA CP-118U Series (PCI Bus) Properties				
General	Ports Confi	guration Driver	Resources		
Port 2 4 5 6 7 8	COM No. COM 3 COM 4 COM 5 COM 6 COM 7 COM 8 COM 9 COM 10	Rx FIFO Level High High High High High High	Tx FIFO Level High High High High High High	Help Port Info Pgrt Setting	
				OK Cano	el :

- 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.

Port 1	X	×
		CP-132U
Port Number COM3 (current)	-	Tx FIFO Rx FIFO
Auto Enumerating COM N	umbor	High 128 120
Auto Endinerating Cold N	umber	Middle 64 60
		Low 1 1
<u>R</u> x FIFO Level High	•	Unit: Bytes
Set the change to all ports		
Ix FIFO Level High	•	
Set the change to all ports	:	
	ancel	

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**.

System Properties	? ×
General Device Manager Hardware Profiles Performance	
 View devices by type View devices by connection Computer CDROM Disk drives Display adapters Floppy disk controllers Hard disk controllers Keyboard 	
Monitors Mouse Moxa Smartio/Industio multiport board CP-118U Series Network adapters Ports (COM & LPT) System devices	
Properties Refresh Remove Print	
OK Can	icel

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**.

Update Device Driver V	√izard
Update Device Driver V	 ✓izard What do you want Windows to do? C Search for a better driver than the one your device is using now. (Recommended) C Display a list of all the drivers in a specific location, so you can select the driver you want.
	< <u>B</u> ack Next > Cancel

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.

Update Device Driver Wizard
Select the manufacturer and model of your hardware device. If you have a disk that contains the updated driver, click Have Disk. To install the updated driver, click Finish.
Mo <u>d</u> els:
CP-104JU Series CP-104U Series CP-114 Series CP-118U Series CP-132 Series CP-132U Series CP-134U Series CP-134U Series T
< <u>B</u> ack Next > Cancel

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.

Add/Remo	ve Programs Properties	'×
Install/Uni	install Windows Setup Startup Disk	
Z	To install a new program from a floppy disk or CD-ROM drive, click Install.	
	Install]
3	<u>I</u> he following software can be automatically removed by Windows. To remove a program or to modify its installed components, select it from the list and click Add/Remove.	
Avance Intel(R)	AC'97 Audio PRO Ethernet Adapter and Software	
SiS 315	Smartio/Industio Driver _315E	
		.
	Add/ <u>H</u> emove	1
		_
	OK Cancel Apply	

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



4. Click on OK.

М	MOXA Smartio/Industio Driver 🛛 🛛 🕅				
	Remove MOXA Smartio/Industio Driver complete !				

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.

Network
Identification Services Protocols Adapters Bindings
Network Adapters:
Select Network Adapter
Click the Network Adapter that matches your hardware, and then Click OK I fruou have an installation disk for this component click
Insert Disk
Insert disk with software provided by the software or hardware manufacturer. If the files can be found at a different location, for example on another drive type a new path to the files below.
C:\Windows.nt
OK Cancel
OK Cancel

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

Select OEM Option	\times
Choose a software supported by this hardware manufacturer's disk.	
MOXA Smartio/Industio Family multiport board	
OK Cancel <u>H</u> elp	

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.

Moxa Smartio/Industio Configuration Panel							
			15.0	_	-		_
Board Type	I/O address	INT vector	IRQ	Bus	Dev	COM Number	
Add		Remove	1			Property	
·							
		<u>o</u> k				Cancel	

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** \rightarrow **Programs** \rightarrow **Moxa Utility** \rightarrow **Moxa Smartio/Industio Configuration Panel** \rightarrow **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**.

Network	? X
Identification Services Protocols Adapters Bindings	
Network Adapters:	-
Add <u>R</u> emove <u>Properties</u> <u>U</u> pdate	
Item Notes:	
M0XA Smartio/Industio Family Adapter	
OK Car	ncel

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

Moxa Smartio/Indu	Moxa Smartio/Industio Configuration Panel						
Board Type	I/O address	INT vector	IRQ	Bus	Dev	COM Number	1
CP-118U Series	8000	A800	11	0	10	COM3 - COM10	
Add		Remove				Property	
		<u>o</u> k				Cancel	
			_				

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.

Proper	y .			>
B	oard Type	C	P-118U Series	(Bus/Dev=0/10) 💌
Ŀ	INT ⊻ec	ior	A800	
ļr	iterrupt No		11	~
В	ase I/O Poi	t <u>A</u> ddress	B000	
Port	COM No.	Rx FIFO	Level Tx FIF	O Level
1	COM3	High	High	
2	COM4 COM5	High	High	
	COMB	High	High	
5	COM7	High	High	
li é	COM8	High	High	
7	COM9	High	High	
8	COM10	High	High	
	Ŀ	elp	Port Info	Port Setting
		[<u>o</u> ĸ	Cancel

- 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.
- Select a Tx FIFO Level from the Tx FIFO Level pull-down list. Tx FIFO Levels of High, 7. 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.

Port 1	
Port Number COM3 (current)	High
Auto Enumerating <u>C</u> OM Number	Middle (
Rx FIFO Level High	Unit: Byte
Set the change to all ports	
Ix FIFO Level High	
Set the change to all ports	
<u> </u>	

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

es

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.

Moxa Smartio/Indu	stio Configur	ation Pane	I					
Board Type	I/O address	INT vector	IRQ	Bus	Dev	COMIN	lumber	
CP-118U Series	B000	A800	11	0	10	COM3	- COM10)
1								
<u>A</u> dd		<u>R</u> emove				Prop	erty	
			_					
			_					
		<u>o</u> k				Car	ncel	

9. Click on Close to close the Network window.

Network					
Identification Services Protocols Adapters Bindings					
Network Adapters:					
■ [2] D-Link DFE-530T× PCI Fast Ethernet Adapter (Rev A) ■ [6] MO×A Smartio/Industio Family Adapter					
Add Bemove Properties Update Item Notes:					
Close Cancel					

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**.

Network ? 🗙					
Identification Services Protocols Adapters Bindings					
Network Adapters:					
[2] D-Link DFE-530TX PCI Fast Ethernet Adapter (Rev A) [5] MOXA Smartio/Industio Family Adapter					
Add <u>R</u> emove <u>Properties</u> <u>U</u> pdate					
MOXA Smartio/Industio Family Adapter					
OK Cancel					

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-132IS, CP-132IS
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS, CI-134, CI-134I, CI-134IS, CI-132, 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.

Installation					
Target directory	<u>C: NMOXA</u>				
M: Help	12: Start 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.

	Board Setup	
Board no.Type1CP-118U	Select [IRQ Bus≠Dev no. 11 0 ≠ 9
2 N0 3 N0	C168 PCI Series C104 PCI Series	
4 NO	CT-114 Series CP-132 Series	ort satup
	CP-102 Series CP-104U Series	
	CP-168U Series CP-132U Series	
	CP-134U Series CP-104JU Series	
	CP-118U Series CP-102UL Series	
	NONE	

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.

	Board Setup						
Board no.	Туре	Port no.	I/O Address	I RQ	Bus/Dev no.		
1	CP-118U Series	1-8	B000	11	0/9		
2	NONE	-					
3	NONE	-					
4	NONE	—					
F10: Save & Exit Esc: Exit FgDn: Fort setup							

Port Setup								
Port Number	01	02	03	04	05	06	07	08
TxD buffer size	1K							
RxD buffer size	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							
DTR output state	0n	0n	On	0n	On	On	On	On
RTS output state	0n	0n	On	0n	On	On	On	On
CTS flow control	No							
RTS flow control	No							
Tx XON/OFF cntrl	No							
Rx XON/OFF cntrl	No							
MI: Help N5: Group edit MD: Save Mse: Abort								

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.

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.

Port Setup							
Port Number	C Ceoup	5613	<u>њ</u> П	06	07	08	
TxD buffer si		14131	• •	1K	1K	1K	
RxD buffer si	PORT PROFILE	2	PORTS	1K	1 K	1 K	
Baud rate	TxD buffer size	1K	01 💻	9600	9600	9600	
Character len	RxD buffer size	1K	02 -	8	8	8	
Stop bits	Baud rate	9600	03	1	1	1	
Parity	Character length	8	04	None	None	None	
DTR output st	Stop bits	1	05	0n	0n	0n	
RTS output st	Parity	None	06	0n	0n	0n	
CTS flow cont	DTR output state	On	07	No	No	No	
RTS flow cont	RTS output state	On	08	No	No	No	
Tx XON/OFF cn	CTS flow control	No		No	No	No	
Rx XON/OFF cn	RTS flow control	No		No	No	No	
	Tx XON/OFF cntrl	No			- 4		
3	Rx XON/OFF cntrl	No	H	e- Abio	e :		
Mater: Mit/select Tab: Suitch							
	Mill: Update	Dec	: Aboet				

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-132IS, CP-132IS
- **ISA Boards:** C168H, C168HS, C168P, C104H, C104HS, C104P, CI-104J, CI-104JS, CI-134, CI-134IS, CI-132I, CI-132IS CI-132IS
- cPCI Boards: CT-114I

Execute the following commands from the Linux prompt:

- 1. #mount /dev/cdrom /mnt/cdrom
 #cd /
 #mkdir moxa
- #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???, 0x??? <- 1st ISA, 2nd ISA, 3rd ISA, 4th ISA)</p>
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/Industic 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

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

- Installing PComm
- PComm Programming Library

□ Utilities

- Diagnostic (for Moxa boards only)
- Monitor (for Moxa boards under Windows NT/2000/XP/2003)
- Terminal Emulator
- □ RS-485 Programming
 - ➢ ADDC™

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 \rightarrow Program \rightarrow PComm Lite \rightarrow 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 \rightarrow Program \rightarrow Pcomm Lite \rightarrow 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** \rightarrow **Program** \rightarrow **Pcomm Lite** \rightarrow **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 ADDCTM (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:

- **D** Board Side Pin Assignments—Female DB25
- **Device Side Pin Assignments**
 - ➢ Male DB9
 - ➤ Cable Wiring
- **Impedance Matching and Termination Resistors**

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



Cable Wiring

RS-422 Point-to-point **RS-422** Device **CP-132UL** TxD+(B) RxD+(B) 2 1 TxD-(A) RxD-(A) 3 RxD+(B) TxD+(B)4 RxD-(A) TxD-(A) 5 GND GND

RS-422 Broadcasting



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.

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 CP-132UL V2 CP-132U-I CP-132UL-I V2	220 mA (+5V) 120 mA (+5V) 578 mA (+5V) 490 mA (+5V)		
Dimensions (W × D)	CP-132UL CP-132UL V2 CP-132U-I CP-132UL-I V2	120 × 64.5 mm 120 × 64.5 mm 120 × 100 mm 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.