PCI Express Board User’s Manual

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Moxa’s PCI Express serial boards meet the new slot standard for expansion boards, and work with any PCI Express slots. The boards have multiple RS-232/422/485 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

Moxa’s new PCI Express Multiport Serial Boards are designed for POS and ATM applications and for use by industrial automation system manufacturers and system integrators. The boards are compatible with all popular operating systems, and each of them supports data rates of up to 921.6 Kbps, and provides full modem control signals, ensuring compatibility with a wide range of serial peripherals. In addition, all models work with PCI Express ×1, allowing the boards to be installed in any available PCI Express slot (including ×1, ×2, ×4, ×8, ×16, ×32).

PCI Express Solution

The boards comply with PCI Express Spec. 1.1. The ports’ transmission parameters are configured after the boards are installed. The PCI BIOS automatically assigns the IRQ and I/O addresses. For this reason, you must plug the boards into the computer before installing the drivers. For more PCI Express information, refer to the “Technical Reference” appendix.

ESD Protection

The PCI Express boards come with built-in 15 KV ESD protection to prevent damage to the boards from lightning or high potential voltage. The surge protection feature makes the PCI Express boards 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

RS-485 uses differential data transmission over two wires to transmit data from one station to another, and allows multiple transmitters and receivers to be used on the same data line. RS-485 uses half-duplex transmission, which means that transmission and reception share the same data channels. For this reason, only one transmitter can be active at any given time.

Moxa’s serial boards have a built-in circuitry to switch transmitters on and off automatically. We call this form of switching ADDC® (automatic data direction control). ADDC® is much easier to implement than the traditional “handshaking” method that uses the RTS signal.

Operating System Support

The PCI Express boards are compatible with all major industrial platforms, including Windows 2000/XP/2003/Vista/2008, Windows 7/8/2012, Windows CE, DOS, Linux, FreeBSD, QNX, and SCO. Moxa device drivers are provided for smoother installation, configuration, and performance.

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

For application development, Moxa provides an easy-to-use serial communication library called PComm that runs under Windows NT/95/98/2000/XP/2003. 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 PCI Express boards are 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 PCI Express boards have the following outstanding features:

- PCI Express ×1 compliant
- Low profile board for compact-sized PCs
- Data flow LED display onboard
- 128-byte FIFO and on-chip H/W, S/W flow control
- 50 bps to 921.6 Kbps transmission speed
- Embedded 15 KV ESD surge protection

Package Checklist

The following items are included in the PCI Express board package:

- PCI Express serial board
- Document and Software CD-ROM
- Quick Installation Guide
- Low profile bracket

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

The following flowchart provides a brief summary of the procedure you should follow to install the PCI Express boards and also provides references to chapters with more detailed information:

1. Install the boards in PCI Express expansion slots.
   - Chapter 2, Hardware Installation
2. Install the drivers and configure the boards and ports.
   - Chapter 3, Software Installation
3. Connect the serial devices to the PCI Express board’s serial ports.
   - Chapter 5, Pin Assignments
4. Restart the system, and check the driver initialization status.
   - Chapter 3, Software Installation
5. Develop and run your serial communication applications.
   - Chapter 4, Serial Programming Tools
This chapter describes the PCI Express Series hardware installation procedure. Since the BIOS automatically assigns the PCI Express board’s IRQ number and I/O addresses, you must plug in the board before installing the driver.

The following topics are covered in this chapter:

- CP-118EL-A Dimensions
- CP-168EL-A Dimensions
- CP-104EL-A Dimensions
- CP-102E Dimensions
- CP-102EL Dimensions
- CP-132EL Dimensions
- CP-132EL-I Dimensions
- CP-114EL Dimensions
- CP-114EL-I Dimensions
- Plugging the Board into an Expansion Slot
CP-118EL-A Dimensions

CP-168EL-A Dimensions
CP-104EL-A Dimensions

CP-102E Dimensions
CP-102EL Dimensions

CP-132EL Dimensions
CP-132EL-I Dimensions

CP-114EL Dimensions
CP-114EL-I Dimensions

Plugging the Board into an Expansion Slot

Since the BIOS automatically assigns the PCI Express board's IRQ number and I/O addresses, you must plug the board 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 you turn off your computer before installing the board.

**Step 2:** Remove the PC’s cover.

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

**Step 4:** Plug the PCI Express board firmly into a free PCI Express slot.

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

**Step 6:** Replace the PC’s cover.

**Step 7:** Power on the PC. The BIOS will automatically set the IRQ and I/O address.

---

**NOTE**

Each Moxa PCI Express board uses one unique IRQ and I/O address, both of which are assigned automatically by the PCI BIOS.

**Step 8:** Proceed with the software installation discussed in the next chapter, “Software Installation.”
This chapter gives installation, configuration, and update/removal procedures for the driver for Windows 2000, Windows 2003/XP/Vista/2008 (32-bit/64-bit), Windows 7/8 (32-bit/64-bit), Windows 2012 (64-bit), DOS, Linux (32-bit/64-bit), and SCO, and WinCE 5.0. 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 you can install up to 4 PCI Express boards in one system, provided sufficient I/O address and IRQ number resources are available.

You can download the drivers from the Moxa website.

The following topics are covered in this chapter:

- **Windows Drivers**
  - Windows 7/8 (32-bit/64-bit)
  - Windows 2008/Vista (32-bit/64-bit)
  - Windows 2003/XP (32-bit/64-bit)
  - Windows 2000

- **Non-Windows Drivers**
  - DOS
  - Linux (32-bit/64-bit)
  - SCO
Windows Drivers

Moxa provides drivers that allow you to use the following serial board products under Windows 7/8, Windows 2008/Vista/2003/XP/2000.

The overall procedure for installing the Windows drivers for the PCI Express boards is summarized in the flowchart on the right.

Windows 7/8 (32-bit/64-bit)

The Windows 8 installation procedures and popup windows are almost the same as Windows 7. Thus, in this section, we describe the installation procedure for Windows 7 as an example.

Installing the Driver

The following procedure describes how to install the CP-104EL-A driver for the first time with Windows 7. First, make sure that you have already plugged the board or boards into the system’s PCI Express slot(s).

NOTE

If you have already installed a CP-104EL-A or other Moxa PCI Express board in your computer, and you are installing additional boards, Windows 7 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 7 will automatically detect the new board, and a popup window that states Device driver software was not successfully installed will appear in the lower right corner of your computer screen.
* (The popup message will not show in Windows 8.)

![Installing device driver software](image)

2. Go to Device Manager/Other devices to install the **PCI Serial Port** driver. Right click on the PCI Serial port. Windows will offer to connect to the Windows update site to search for a driver. Select **Update Driver Software**.

![Device Manager](image)

3. Select **Browse my computer for device software** to continue.
4. Select **Search for driver software in this location**, select **Include subfolders**, and then click **Browse**.

   If the system is a 32-bit (x86) platform, navigate to the \CP-104EL-A Series\Software\Windows 7\x86 folder on the CD. If the system is a 64-bit (x64) platform, navigate to the \CP-104EL-A Series\Software\Windows 7\x64 folder on the CD, and then click **Next** to continue.

   The following figure shows the path for x86.

5. Wait while the driver software is installed. The next window shows the model name of the board, and indicates that Windows has completed the driver installation. Click **Close** to proceed with the rest of the installation procedure.
6. After installing the multiport serial adaptors driver, install the Moxa Port diver next. Right click on MOXA communication port. A popup window will open to help you install the driver for MOXA Port 0. Select Update Driver Software...

7. Select Browse my computer for device software to continue.
8. Select **Search for driver software in this location**, select **Include subfolders**, and then click **Browse**. If the system is a 32-bit (x86) platform, navigate to the \CP-104EL-A Series\Software\Windows 7\x86 folder on the CD. If the system is a 64-bit (x64) platform, navigate to the \CP-104EL-A Series\Software\Windows 7\x64 folder on the CD, and then click **Next** to continue.

The following figure shows the path for x86.

9. After all files have been copied to the system, window showing **Windows has successfully updated your driver software** will open to indicate that it has finished installing **MOXA Port 0**. The Port installation procedure is complete when Port 0 has been set up.
10. Repeat Step 7 through Step 11 for each of the remaining three ports. The last port to be installed will be Moxa Port 3, as shown in the following figure.
11. In Windows 7, you will see a message stating **Your device is ready to use** will appear to inform you that the hardware was installed successfully.

* (The popup message will not show in Windows 8.)

**Configuring the Ports**

After the driver has been installed, use Device Manager to configure the CP-104EL-A serial ports.

1. Expand the **Multi-port serial adapters** tab, right click **MOXA CP-104EL Series (PCI Express Bus)**, and then click **Properties** to open the board’s configuration panel.
2. Click the port you would like to configure to highlight it, and then click **Port Setting**.
3. Select a COM number for the port from the Port Number pull-down list. Select the Auto Enumerating COM Number option 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.
4. 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). Select **Set the change to all ports** option to apply this Rx FIFO Trigger to all ports.

5. 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). Select **Set the change to all ports** option to apply the just defined Tx FIFO Size to all ports.

<table>
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<th></th>
<th>Tx FIFO</th>
<th>Rx FIFO</th>
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<tr>
<td>High</td>
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<td>120</td>
</tr>
<tr>
<td>Middle</td>
<td>64</td>
<td>60</td>
</tr>
<tr>
<td>Low</td>
<td>1</td>
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Unit: Bytes

6. If you are using CP-118EL-A, CP-114EL, CP-114EL-I, CP-132EL, or CP-132EL-I, select **Interface** (RS-232, RS-422, 2-wire RS-485, 4-wire RS-485) and **Termination Resistor** (120Ω, Enable or Disable) to configure. We use the CP-118EL-A to illustrate. The following figures show the settings for configuring the port for RS-422 and no Termination Resistor (select Disable).

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

**Removing the Driver**

1. Go to **Device Manager**. Use the mouse to place the cursor over the CP-104EL-A Series board under **Multi-port serial adapters**, and then click the right mouse button. Select the **Uninstall** option.
2. Select **Delete the driver software for this device** and click **OK** to proceed with uninstalling the board.

3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-104EL-A Series board have been removed.
In this section, we describe the installation procedure for Windows Vista. The installation procedure for Windows 2008 is similar.

Windows 2008 and Windows Vista support up to 256 serial ports from COM1 to COM256. In order to make the best use of Windows 2008/Vista’s multi-process/multi-thread advanced features, 32-bit and 64-bit Windows 2008/Vista device drivers were developed for Moxa multiport boards. The drivers conform to the Win32 COMM API standard.

Installing the Driver

The following procedure describes how to install the CP-114EL driver for the first time with Windows Vista. First, make sure that you have already plugged the board or boards into the system’s PCI Express slot(s).

NOTE

If you have already installed a CP-114EL or other Moxa PCI Express board in your computer, and you are installing additional boards, Windows 2008/Vista 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 Vista will automatically detect the new board, and the **Found New Hardware** window will open.

![Found New Hardware Window](image)

2. The **Found New Hardware – PCI Serial Port** window will open automatically. This window will offer to connect to the Windows update site to search for a driver. Select **Don’t search online**.

![Found New Hardware - PCI Serial Port Window](image)

3. Select **I don’t have the disc. Show me other options**, and then click **Browse my computer for device software (advanced)** to continue.
4. Select **Search for driver software in this location**, select **Include subfolders**, and then click **Browse**. If the system is a 32-bit (x86) platform, navigate to the `\CP-114EL Series\Software\Windows 2008_Vista\x86` folder on the CD. If the system is a 64-bit (x64) platform, navigate to the `\CP-114EL Series\Software\Windows 2008_Vista\x64` folder on the CD, and then click **Next** to continue.
5. Wait while the installation wizard searches for the correct drivers. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Install this driver software anyway** to proceed.
6. Wait while the driver software is installed. The next window shows the model name of the board, and indicates that Windows has completed the driver installation. Click **Close** to proceed with the rest of the installation procedure.

7. The Found New Hardware window will open to help you install the driver for MOXA Port 0. Select **Don't search online**.
8. Select **Browse my computer for driver software (advanced)**.

9. Select **Search for driver software in this location**, select **Include subfolders**, and then click **Browse**. If the system is a 32-bit (x86) platform, navigate to the `\CP-114EL Series\Software\Windows 2008_Vista\x86` folder on the CD. If the system is a 64-bit (x64) platform, navigate to the `\CP-114EL Series\Software\Windows 2008_Vista\x64` folder on the CD, and then click **Next** to continue.
The following figure shows the path for x86.

![Image of x86 path]

The following figure shows the path for x64.

![Image of x64 path]

10. Wait while the installation wizard searches. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Install this driver software anyway** to proceed.
11. After all files have been copied to the system, the **software for this device has been successfully installed** window will open to indicate that it has finished installing **Port 0**. Port installation procedure is complete when Port 0 has been set up.

12. The “Your devices are ready to use” 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-114EL serial ports.

1. Click **Start** → **Settings** → **Control Panel** → **System**, select the **Hardware** tab, and then click **Device Manager**.
2. Expand the **Multi-port serial adapters** tab, right click **MOXA CP-114EL Series (PCI Express Bus)**, and then click **Properties** to open the board’s configuration panel.

3. Click the port you would like to configure to highlight it, and then click **Port Setting**.
4. Select a COM number for the port from the **Port Number** pull-down list.

5. Select the **Auto Enumerating COM Number** option 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). Select **Set the change to all ports** option 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). Select **Set the change to all ports** option to apply the just defined Tx FIFO Size to all ports.

8. If you use the CP-114EL, CP-114EL-I, CP-132EL, CP-132EL-I, CP-118EL-A, select **Interface** (RS-232, RS-422, 2-wire RS-485, 4-wire RS-485) and **Termination Resistor** (120Ω, Enable or Disable) to configure. Take CP-114EL for example. If you would like to configure as RS-422 and no Termination Resistor, please see figures below.
9. Click **OK** to save the port settings, and then click **OK** in the **Property** window to finish the **Using Event Log**

To use the **Event Log** to check the installation of your MOXA boards, click **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 **Start**  **Settings**  **Control Panel**  **System**, select the **Hardware** tab, and then click **Device Manager**. Use the mouse to place the cursor over the CP-114EL Series board under **Multi-port serial adapters**, and then click the right mouse button. Select the **Uninstall** option.

2. Select **Delete the driver software for this device** and click **OK** to proceed with uninstalling the board.
3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-114EL Series board have been removed.

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**Windows 2003/XP (32-bit/64-bit)**

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 make the best use of Windows 2003/XP’s multi-process/multi-thread advanced features, 32-bit and 64-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-118EL-A driver for the first time under Windows XP. First, make sure that you have already plugged the board or boards into the system’s PCI Express slot(s).
NOTE If you have already installed a CP-118EL-A or other Moxa PCI Express board in your computer, and you are installing 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 balloon will open in the bottom right corner of the Windows desktop.

2. The Welcome to the Found New Hardware Wizard window will open automatically. This window will offer to connect to the Windows update site to search for a driver. Select No, not at this time and click Next to continue.

3. Select Install from a list or specific location (Advanced), and then click Next to continue.
4. Select Search for the best driver in these locations, select Include this location in the search, and then click Browse. If the system is a 32-bit (x86) platform, navigate to the \CP-118EL Series\Software\Windows XP_2003\x86 folder on the CD. If the system is a 64-bit (x64) platform, navigate to the \CP-118EL Series\Software\Windows XP_2003\x64 folder on the CD, and then click Next to continue.

The following figure shows the path for x86.
5. Wait while the installation wizard searches for the correct drivers. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click **Continue Anyway** to proceed.
6. Wait while the driver software is installed.

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

8. The **Found New Hardware Wizard** window will open to help you install the driver for Moxa Port 0. This window will offer to connect to the Windows update site to search for a driver. Select **No, not at this time** and then click **Next** to continue.
9. Select Install from a list or specific location (Advanced), and then click Next to proceed.

10. Select Search for the best driver in these locations, select Include this location in the search, and then click Browse. If necessary, use the Browse button to navigate to the \CP-118EL Series\Software\Windows XP_2003\x86 folder (32 bit platform) or \CP-118EL Series\Software\Windows XP_2003\x64 folder (64 bit platform), and then click Next to proceed.
The following figure shows the path for x86.

![Found New Hardware Wizard](image1.png)

The following figure shows the path for x64.

![Found New Hardware Wizard](image2.png)

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

13. 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 **Finish** to proceed with the rest of the installation.
14. 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.

15. The Found New Hardware balloon 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-118EL serial ports.

1. Click **Start → Settings → Control Panel → System**, select the **Hardware** tab, and then click **Device Manager**.
2. Expand the **Multi-port serial adapters** tab, right click **Moxa CP-118EL Series (PCI Express Bus)**, and then click **Properties** to open the board’s configuration panel.

3. Click the port you would like to configure to highlight it, and then click **Port Setting**.
4. Select a COM number for the port from the Port Number pull-down list.

5. Select the Auto Enumerating COM Number option 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). Select Set the change to all ports option 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). Select Set the change to all ports option to apply the just defined Tx FIFO Size to all ports.

8. If you use the CP-118EL-A, CP-114EL, CP-114EL-I, CP-132EL, CP-132EL-I, select Interface (RS-232, RS-422, 2-wire RS-485, 4-wire RS-485) and Termination Resistor (120Ω, Enable or Disable) to configure. Take the CP-114EL for example. If you would like to configure as RS-422 and no Termination Resistor, please see figures below.
9. Click **OK** to save the port settings, and then click **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 **Start → Programs → PComm Lite 2000 → PComm Diagnostic**.

NOTE: You can download the PComm Lite software for free from Moxa's website at [www.moxa.com/support/free_downloads.htm](http://www.moxa.com/support/free_downloads.htm).
Using Event Log

To use the Event Log to check the installation of your Moxa boards, click 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 Start → Settings → Control Panel → System, select the Hardware tab, and then click Device Manager. Use the mouse to place the cursor over the CP-118EL Series board under Multi-port serial adapters, and then click the right mouse button. Select the Uninstall... option.

2. Click OK to proceed with uninstalling the board.

3. The Device Manager window refreshes automatically, showing that the driver and ports for the CP-118EL 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-118EL-A driver for the first time under Windows 2000. First, make sure you have already plugged the board or boards into the system’s PCI Express slot(s).

NOTE  If you have already installed a CP-118EL-A or other Moxa PCI Express board in your computer, and you are installing 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 be displayed for a moment or two.
2. When the **Welcome to the Found New Hardware Wizard** window opens, click **Next** to continue.

![Welcome to the Found New Hardware Wizard](image1)

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

![Install Hardware Device Drivers](image2)

4. Select **Specify a location** and then click **Next** to continue.
5. Navigate to the `\CP-118EL Series \Software \Windows 2K` folder on the software CD, and then click OK to continue.

6. Click Next to copy the driver files to your system.
7. The next window that opens cautions you that although this software has not passed Windows Logo testing, the driver has been tested and shown that it can support the Windows OS. Click 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 Finish to continue with the rest of the installation procedure.

10. The Found New Hardware Wizard window will open to help you install the driver for Moxa Port 0. Click Next to continue.
11. Select **Search for a suitable driver for my device (recommended)**, and then click **Next** to continue.

12. Select **Specify a location** and then click **Next** to continue.
13. Navigate to the `\CP-118EL Series\Software\Windows 2K` folder on the software CD, and then click OK to continue.

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

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

17. 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 Finish to proceed with the rest of the installation.
Configuring the Ports

After the driver has been installed, use Device Manager to configure the CP-118EL serial ports.

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

2. Expand the Multi-port serial adapters tab, right click Moxa CP-118EL Series (PCI Express Bus), and then click Properties to open the board’s configuration panel.

3. Basic information about the board is displayed on the General page. Click the Ports Configuration tab to configure the board’s serial ports.
4. Click the port you would like to configure to highlight it, and then click **Port Setting**.

5. Select a COM number for the port from the **Port Number** pull-down list.

6. Select the **Auto Enumerating COM Number** option 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.

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). Select Set **the change to all ports** option 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). Select **Set the change to all ports** option to apply the just defined Tx FIFO Size to all ports.

<table>
<thead>
<tr>
<th></th>
<th>Tx FIFO</th>
<th>Rx FIFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>128</td>
<td>120</td>
</tr>
<tr>
<td>Middle</td>
<td>64</td>
<td>60</td>
</tr>
<tr>
<td>Low</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Unit: Bytes**

9. If you use the CP-118EL-A, CP-114EL, CP-114EL-I, CP-132EL, CP-132EL-I, select **Interface** (RS-232, RS-422, 2-wire RS-485, 4-wire RS-485) and **Termination Resistor** (120Ω, Enable or Disable) to configure. Take the CP-114EL for example. If you would like to configure as RS-422 and no Termination Resistor, please see figures below.

10. Click **OK** to save the port settings, and then click **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 **Start → Programs → PComm Lite 2000 → PComm Diagnostic.**
NOTE  You can download the PComm Lite software 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 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 Start \ Settings \ Control Panel \ System, select the Hardware tab, and then click Device Manager. Use the mouse to place the cursor over the CP-118EL Series board under Multi-port serial adapters, and then click the right mouse button. Select the Uninstall... option.
2. Click **OK** to proceed with uninstalling the board.

3. The **Device Manager** window refreshes automatically, showing that the driver and ports for the CP-118EL Series board have been removed.
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:

- **PCI Express Boards**: CP-102E, CP-102EL, CP-132EL, CP-132EL-I, CP-104EL-A, CP-114EL, CP-114EL-I, CP-118EL-A, CP-168EL-A

**WARNING**

If you are using a Serial ATA HDD under DOS, the installation process will also hang. In this case, change your HDD to IDE drive.

**NOTE**

The following procedure shows how to install the CP-168EL driver under DOS.

### 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 Window]

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.

![Setup Confirmation]

### 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.

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. You can set the port numbers to any number between 0 and 255 (inclusive). However, you must ensure that you assign each port 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 convenient function 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 boards are detected, you will see a message similar to the following:

Smartio/Industio Family DOS driver Version 1.7
Setup driver ...

CP-168EL series (Bus=x,Dev=y) : OK!

Device driver setup O.K.

This indicates that the CP-168EL 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 (32-bit/64-bit)

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

- **PCI Express Boards:** CP-118EL, CP-168EL, CP-104EL, CP-102E, CP-102EL, CP-132EL, CP-132EL-I, CP-114EL, CP-114EL-I

**NOTE** The following procedure shows how to install the CP-114EL driver under Linux.

Execute the following commands from the Linux prompt:

1. `#mount /dev/cdrom /mnt/cdrom`
   `#cd /
   #mkdir moxa
   #cd moxa
   #cp /mnt/cdrom/<driver directory>/driv_linux_smart_vx.x_build_yymmddhh.tgz.
   #tar –xzvf driv_linux_smart_vx.x_build_yymmddhh.tgz.
   2.  `#cd mxser
        #make clean; make install`
   3.  `#cd /moxa/mxser/driver
        #./msmknod`
   4.  `#modprobe mxupcie`
   5.  For CP-132EL, CP-132EL-I, CP-114EL, CP-114EL-I, use the Moxa Port Configuration Tool to set Interface and Termination Resistor for the MUE series. The MUE series includes CP-102E, CP-102EL, CP-132EL, CP-132EL-I, CP-114EL and CP-114EL-I.

   **Usage:** muestty <operation> device
   **Device:** The MUE series device node
   **Operation:**
   `-h` Help
   `-g` Get interface and terminator type
   `-i intf` Set interface type with options below
   `-t value` Set termination resistor with options below

   **intf**
   - RS232
   - RS422
   - RS4852W
   - RS4854W
   **value**
   - NONTERM
   - 120TERM

   For example:
   To set the MUE interface
   `# muestty -i RS422 /dev/ttyMUE2`
   To set the MUE termination resistor
   `# muestty -t 120TERM /dev/ttyMUE2`

   6. Use the Moxa diagnostics utility to verify the driver status:

      `#cd /moxa/mxser/utility/diag
      #./msdiag`

   7. Use the Moxa terminal utility to test the tty ports:

      `#cd /moxa/mxser/utility/term
      #./msterm`
SCC

- SCO OpenServer 5
- SCO OpenServer 6
- SCO UnixWare 7

Follow the steps given in this section to install the SCO OpenServer 5/6 & SCO UnixWare 7 driver. The installation procedures for SCO UnixWare 7 and SCO OpenServer 5/6 are similar.

1. Copy the driver file .tar to your host.
2. `#tar xvf <driver tar file>
   #/tmp/moxa/mxinstall`
3. The window shown below will open next. Press RETURN to continue.

---

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Moxa Smartio/Industio Family Device Driver Installation (Ver. 1.11)
---

For SCO UnixWare 7

Tar files, please wait.....O.K.
Press RETURN to continue

NOTE: If your environment is SCO OpenServer 5/6, you could skip step 4 & 5

4. When you see the screen below, select “Esc” to exit and reboot your computer.

---

MOXA Smartio/Industio Family Installation Utility (Ver 1.11)

<table>
<thead>
<tr>
<th>Board No.</th>
<th>Board Type</th>
<th>I/O Address</th>
<th>Interrupt</th>
<th>Bus/Dev No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None</td>
<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>2</td>
<td>None</td>
<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>3</td>
<td>None</td>
<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>4</td>
<td>None</td>
<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
</tbody>
</table>

PgDn: getty Setting  Esc: Exit  Enter: Confirm Input Value  Tab: Change Item

5. After rebooting computer, key in “moxaadm”, you will see MAIN MENU, select Basic Configuration.

---

MAIN MENU

Basic Configuration
Advanced Configuration
Interface Configuration
Port Monitoring
Terminal Emulation
Driver Removal
Exit
6. You will see the following screen. Press Enter to select the MOXA Multiport Serial Board you installed by port and by model. For example, if you installed the CP-104EL, select 4 ports and then CP-104EL.

<table>
<thead>
<tr>
<th>MOXA Smartio/Industio Family Installation Utility (Ver 1.11)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smartio/Industio Family Basic Configuration</strong></td>
</tr>
<tr>
<td><strong>Board No.</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

PgDn: getty Setting  Enter: Confirm Input Value  Esc: Exit  Tab: Change Item

7. The board’s basic information, such as I/O address, Bus No., and Device No., will be shown. The SCO system will assign the resources automatically to the PCI Express board you selected.

8. Next, press "Esc" to exit and reboot your computer.

**NOTE**  Steps 9 & 10 are only for CP-132EL Series and CP-114EL Series

9. After rebooting, key in “moxaadm”. When you see MAIN MENU, select **Interface Configuration** to set your Resister and Interface. For example, if you want to set one of the CP-114EL ports as RS-422 and 120Ω, you have to select RS-422 and 120Ω.

10. Save your Interface Configuration and then reboot computer again.

11. Note that whenever you change a MAIN MENU item, you have to reboot your computer.
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 provide 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**
  - Diagnostics (for Moxa boards only)
  - Terminal Emulator

- **RS-485 Programming**
  - ADDC™
Moxa PComm

PComm, a professional serial communication tool for PCs, is a software package that runs under Windows NT95/98/2000/XP/2003. 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 NT95/98/2000/XP/2003, and is a simpler programming solution compared to the more complex Windows Win32 COMM API.

• Useful utilities such as diagnostics, 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 diagnostics and monitor utilities are for Moxa boards only. To use these utilities, you must have a Moxa board and the appropriate Windows (NT/95/98/2000/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 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 provide brief descriptions of each utility. For more information about these utilities, read the on-line help from the Documentation and Software CD.

Diagnostics (for Moxa boards only)

This convenient diagnostics 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 diagnostics program allows the user to check both the hardware and software functions.

To run the diagnostics program, click Start → Program → PComm Lite → Diagnostic. A typical test report for a Moxa board is as follows:

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 a specific port to see a graph of the current communication parameters and status of that port.

To run the Monitor program, click 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 Start → Program → PComm Lite → Terminal Emulator.

RS-485 Programming

If you are using your CP-118EL 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-118EL 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 transmission and
reception.

ADDC™

ADDC™ is the best method for switching between transmission and reception when using 2-wire RS-485.
When using ADDC™, additional code is not required to switch between data transmission and reception, since
the board’s built-in intelligent hardware mechanism automatically manages the switching mechanism. RS-485
programming using ADDC™ mode is just as simple and straightforward as RS-232 or RS-422 programming.
The following topics are covered in this chapter:

- **CP-118EL-A**
  - Board Side Pin Assignments—Female SCSI VHDCI68
  - Device Side Pin Assignments

- **CP-168EL-A**
  - Board Side Pin Assignments—Female SCSI VHDCI68
  - Device Side Pin Assignments

- **CP-104EL-A**
  - Board Side Pin Assignments—Female DB44
  - Device Side Pin Assignments

- **CP-102E**
  - Board Side Pin Assignments—Male DB9

- **CP-102EL**
  - Board Side Pin Assignments—Female DB25
  - Device Side Pin Assignments

- **CP-132EL/CP-132EL-I**
  - Board Side Pin Assignments—Female DB25
  - Device Side Pin Assignments

- **CP-114EL/CP-114EL-I**
  - Board Side Pin Assignments—Female DB44
  - Device Side Pin Assignments
To select a PCIe board accessories please refer to the following table:

<table>
<thead>
<tr>
<th>PCIe Board</th>
<th>Model</th>
<th>Connector Type</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP-118EL-A</td>
<td>CBL-M68M9x8-100/OPT8-M9+</td>
<td>Male DB9</td>
<td>RS-232</td>
</tr>
<tr>
<td></td>
<td>OPT8B+/OPT8C+</td>
<td>Male DB25</td>
<td>RS-232</td>
</tr>
<tr>
<td></td>
<td>OPT8A+/OPT8S+</td>
<td>Female DB25</td>
<td>RS-422/4-wire RS-485</td>
</tr>
<tr>
<td></td>
<td>CBL-M68M25x8-100</td>
<td>Male DB9</td>
<td>2-wire RS-485</td>
</tr>
</tbody>
</table>

| CP-168EL-A | CBL-M68M9x8-100/OPT8-M9+ | Male DB9 | RS-232          |
|            | OPT8B+/OPT8S+ | Male DB25      | RS-422          |
|            | OPT8A+/OPT8S+ | Female DB25    | RS-422/RS-485   |
|            | CBL-M68M25x8-100 | Male DB9       | 2-wire RS-485   |

| CP-104EL-A | CBL-M44M9x4-50 | Male DB9 | RS-232          |
|            | CBL-M44M25x4-50 | Male DB25 | RS-422/4-wire RS-485 |

| CP-102EL  | CBL-M25M9x2-50 | Male DB9 | RS-232          |

| CP-132EL/CP-132EL-I | CBL-M25M9x2-50 | Male DB9 | RS-422/4-wire RS-485 |
|                     |               |          | 2-wire RS-485       |

| CP-114EL/CP-114EL-I | CBL-M44M9x4-50 | Male DB9 | RS-232          |
|                     | CBL-M44M25x4-50 | Male DB25 | RS-422/4-wire RS-485 |

### CP-118EL-A

The CP-118EL-A board has a female SCSI VHDCI68 connector on the board, with various connection options available for connecting from the board to your serial devices. In this chapter, we provide pin assignments for the board side connector, as well as pin assignments for device side connectors for the different connection options.

The CP-118EL-A board supports RS-232, 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. You can connect ten receivers 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-118EL-A 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.
Board Side Pin Assignments—Female SCSI VHDCI68

### RS-232

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### 2-wire RS-485

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Device Side Pin Assignments

**Male DB9 (CBL-M68M9x8-100/OPT8-M9+)**

![Diagram of Male DB9]

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<td>Data+(B)</td>
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**Male DB25 (OPT8B+/ CBL-M68M25x8-100)**

![Diagram of Male DB25]

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**Female DB25 (OPT8A+/S+)**

![Diagram of Female DB25]

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The CP-168EL-A board has a female SCSI VHDCI68 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-168EL-A board supports RS-232 interface on board.

### Board Side Pin Assignments—Female SCSI VHDCI68

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Device Side Pin Assignments

Male DB9 (CBL-M68M9x8-100/OPT8-M9+)

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Female DB25 (OPT8K+)

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CP-104EL-A

Board Side Pin Assignments—Female DB44

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5-7
Device Side Pin Assignments

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**Male DB25 (CBL-M44M25x4-50)**

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CP-102E

Board Side Pin Assignments—Male DB9

CP-102E has two Male DB9 connectors on board.

Male DB9

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CP-102EL

Board Side Pin Assignments—Female DB25

RS-232

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Device Side Pin Assignments

Male DB9 (CBL-M25M9x2-50)

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CP-132EL/CP-132EL-I

Board Side Pin Assignments—Female DB25

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Device Side Pin Assignments

Male DB9 (CBL-M25M9x2-50)

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## CP-114EL/CP-114EL-I

### Board Side Pin Assignments—Female DB44

![DB44 Connector Diagram](image_url)

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#### RS-422 & 4-wire RS-485

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Device Side Pin Assignments

Male DB9 (CBL-M44M9x4-50)

![DB9 Diagram]

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<th>RS-422 &amp; 4-wire RS-485</th>
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<td>Data+(B)</td>
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Male DB25 (CBL-M44M25x4-50)

![DB25 Diagram]

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<td>22</td>
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</table>
Common PCI Express Series problems and possible solutions are as follows. 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.

The following topics are covered in this chapter:

- General Troubleshooting
General Troubleshooting

1. **The Moxa PCI Express board cannot be detected by the Moxa driver while installing the driver.**
   **Hardware causes and solutions:**
   a. Express slot. It is also possible that a slot has malfunctioned. In this case, try other slots until you find one that works.
   b. The motherboard does not have an available IRQ for the PCI Express board. In this case, enter the BIOS and make sure there is an available IRQ under PCI/PnP settings.

2. **The Moxa PCI Express 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 the Diagnostic program reports an error, replace the faulty components.

   **Software Causes and Solutions:**
   a. PCI Express 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 diagnostics LED indicators on the mini tester.
   b. The board control application may 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 platform).
The following topics are covered in this appendix:

- **Product Specifications**
  - CP-118EL-A Specifications
  - CP-168EL-A Specifications
  - CP-104EL-A Specifications
  - CP-102E Specifications
  - CP-102EL Specifications
  - CP-132EL Series Specifications
  - CP-114EL Series Specifications
Product Specifications

CP-118EL-A Specifications

Hardware
Connectors  SCSI VHDCI68
Comm. Controller  16C550C compatible

Interface
Bus Interface  PCI Express × 1
Number of Ports  8
Max No. of Boards  4 (only one IRQ required)

Signals
RS-232  TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422  TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
4-wire RS-485  TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
2-wire RS-485  Data+(B), Data-(A), GND

Performance
Baudrate  50 bps to 921.6 Kbps

Configuration
Data Bits  5, 6, 7, 8
Stop Bits  1, 1.5, 2
I/O address/IRQ  BIOS assigned
Parity  None, Even, Odd, Space, Mark
Flow Control  RTS/CTS, XON/XOFF

Power and Environment
Power Requirement  1285 mA (3.3V)
Operating Temperature  0 to 55°C (32 to 132°F)
Operating Humidity  5 to 95% RH
Storage Temperature  -20 to 85°C (-4 to 185°F)
ESD Protection  Embedded 15 KV ESD Protection
Regulatory Approvals  EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 FCC Part 15 Class B
Warranty  5 years
CP-168EL-A Specifications

**Hardware**

Connectors  
SCSI VHDCI68

Comm. Controller  
16C550C compatible

**Interface**

Bus Interface  
PCI Express × 1

Number of Ports  
8

Max No. of Boards  
4 (only one IRQ required)

**Signals**

RS-232  
TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

**Performance**

Baudrate  
50 bps to 921.6 Kbps

**Configuration**

Data Bits  
5, 6, 7, 8

Stop Bits  
1, 1.5, 2

I/O address/IRQ  
BIOS assigned

Parity  
None, Even, Odd, Space, Mark

Flow Control  
RTS/CTS, XON/XOFF

**Power and Environment**

Power Requirement  
1225 mA (3.3V)

Operating Temperature  
0 to 55°C (32 to 132°F)

Operating Humidity  
5 to 95% RH

Storage Temperature  
-20 to 85°C (-4 to 185°F)

ESD Protection  
Embedded 15 KV ESD Protection

**Regulatory Approvals**

EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 FCC Part 15 Class B

**Warranty**

5 years
CP-104EL-A Specifications

Hardware
Connectors Female DB44
Comm. Controller 16C550C compatible

Interface
Bus Interface PCI Express × 1
Number of Ports 4
Max No. of Boards 4 (only one IRQ required)

Signals
RS-232 TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Performance
Baudrate 50 bps to 921.6 Kbps

Configuration
Data Bits 5, 6, 7, 8
Stop Bits 1, 1.5, 2
I/O address/IRQ BIOS assigned
Parity None, Even, Odd, Space, Mark
Flow Control RTS/CTS, XON/XOFF

Power and Environment
Power Requirement 805 mA (3.3V)
Operating Temperature 0 to 55°C (32 to 132°F)
Operating Humidity 5 to 95% RH
Storage Temperature -20 to 85°C (-4 to 185°F)
ESD Protection Embedded 15 KV ESD Protection
Regulatory Approvals EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 FCC Part 15 Class B

Warranty 5 years
CP-102E Specifications

**Hardware**
- Connectors: Male DB9 x 2
- Comm. Controller: 16C550C compatible

**Interface**
- Bus Interface: PCI Express × 1
- Number of Ports: 2
- Max No. of Boards: 4

**Signal**
- RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

**Performance**
- Baudrate: 50 bps to 921.6 Kbps

**Configuration**
- Data Bits: 5, 6, 7, 8
- Stop Bits: 1, 1.5, 2
- I/O address/IRQ: BIOS assigned
- Parity: None, Even, Odd, Space, Mark
- Flow Control: RTS/CTS, XON/XOFF

**Environment**
- Operating Temperature: 0 to 55°C (32 to 132°F)
- Operating Humidity: 5 to 95% RH
- Storage Temperature: -20 to 85°C (-4 to 185°F)
- ESD Protection: Embedded 15 KV ESD Protection
- Regulatory Approvals: EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B
- Warranty: 5 years
CP-102EL Specifications

**Hardware**
- **Connectors**: Female DB25
- **Comm. Controller**: 16C550C compatible

**Interface**
- **Bus Interface**: PCI Express x 1
- **Number of Ports**: 2
- **Max No. of Boards**: 4

**Signal**
- **RS-232**: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

**Performance**
- **Baudrate**: 50 bps to 921.6 Kbps

**Configuration**
- **Data Bits**: 5, 6, 7, 8
- **Stop Bits**: 1, 1.5, 2
- **I/O address/IRQ**: BIOS assigned
- **Parity**: None, Even, Odd, Space, Mark
- **Flow Control**: RTS/CTS, XON/XOFF

**Environment**
- **Operating Temperature**: 0 to 55°C (32 to 132°F)
- **Operating Humidity**: 5 to 95% RH
- **Storage Temperature**: -20 to 85°C (-4 to 185°F)

**ESD Protection**
- **Embedded 15 KV ESD Protection**

**Regulatory Approvals**
- EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B

**Warranty**
- 5 years
CP-132EL Series Specifications

Hardware
Connectors Female DB25
Comm. Controller 16C550C compatible

Interface
Bus Interface PCI Express × 1
Number of Ports 2
Max No. of Boards 4

Signal
RS-422 TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485 4-Wire TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485 2-Wire Data+(B), Data-(A), GND

Performance
Baudrate 50 bps to 921.6 Kbps

Configuration
Data Bits 5, 6, 7, 8
Stop Bits 1, 1.5, 2
I/O address/IRQ BIOS assigned
Parity None, Even, Odd, Space, Mark
Flow Control XON/XOFF

Environment
Operating Temperature 0 to 55°C (32 to 132°F)
Operating Humidity 5 to 95% RH
Storage Temperature -20 to 85°C (-4 to 185°F)

ESD Protection Embedded 15 KV ESD Protection
Optical Isolation 2 KV (only for CP-132EL-I)
Regulatory Approvals EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B

Warranty 5 years
CP-114EL Series Specifications

**Hardware**
- Connectors: Female DB44
- Comm. Controller: 16C550C compatible

**Interface**
- Bus Interface: PCI Express × 1
- Number of Ports: 4
- Max No. of Boards: 4

**Signal**
- RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
- RS-485 4-Wire: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
- RS-485 2-Wire: Data+(B), Data-(A), GND

**Performance**
- Baudrate: 50 bps to 921.6 Kbps

**Configuration**
- Data Bits: 5, 6, 7, 8
- Stop Bits: 1, 1.5, 2
- I/O address/IRQ: BIOS assigned
- Parity: None, Even, Odd, Space, Mark
- Flow Control: RTS/CTS, XON/XOFF

**Environment**
- Operating Temperature: 0 to 55°C (32 to 132°F)
- Operating Humidity: 5 to 95% RH
- Storage Temperature: -20 to 85°C (-4 to 185°F)

**ESD Protection**
- Embedded 15 KV ESD Protection
- Optical Isolation: 2 KV (only for CP-114EL-I)

**Regulatory Approvals**
- EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, IEC-61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B

**Warranty**
- 5 years