PCI Express Board User Manual

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www.moxa.com/products

PCI Express Board User Manual

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Technical Support Contact Information

www.moxa.com/support

Table of Contents

1. Introduction

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 to connect data acquisition equipment and other serial devices to a PC.

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 x1, allowing the boards to be installed in any available PCI Express slot (including x1, x2, x4, x8, x16, x32).

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 information about PCI Express, refer to the "Technical Reference" appendix.

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.
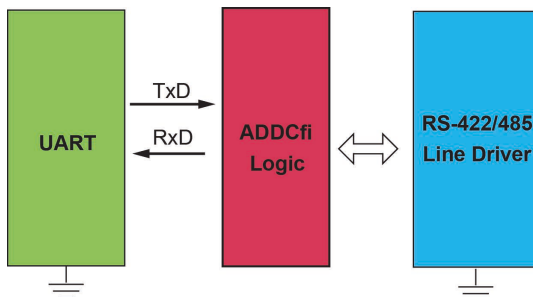
Operating System Support

The PCI Express boards are compatible with all major industrial platforms, including Windows, Windows CE, DOS, Linux, 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 the Windows operation system. Use this library to develop your own applications with Visual Basic, Visual C++, Borland Delphi, to name a few. 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.

Intelligent RS-485

With Intelligent RS-485, you only need one click to automatically tune the Pull High/Low and Termination resistors and get your system ready to go!

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
- Drivers are provided for Windows, Windows CE, Windows XP Embedded, DOS, Linux (32-bit/64-bit), SCO

Package Checklist

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

- PCI Express serial board
- Low-profile bracket
- Documentation
- Quick installation guide (printed)
- Warranty card

✎ **NOTE**

Please 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 it provides references to chapters with more detailed information:

Install the boards in PCI Express expansion slots.	Chapter 2, Hardware Installation
Install the drivers and configure the boards and ports.	Chapter 3, Software Installation
Connect the serial devices to the PCI Express board's serial ports.	Chapter 6, Pin Assignments
Restart the system and check the driver initialization status.	Chapter 3, Software Installation
If the card supports Intelligent RS-485 function, you can perform diagnosis and auto-tuning.	Chapter 4, Intelligent RS-485 Setting
Develop and run your serial communication applications	Chapter 5, Serial Programming Tools

2. Hardware Installation

In this chapter, we show the dimensions diagrams of all of the boards in the PCI Express Series and describe the 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 (driver installation is discussed in Chapter 3).

CP-118EL-A Dimensions
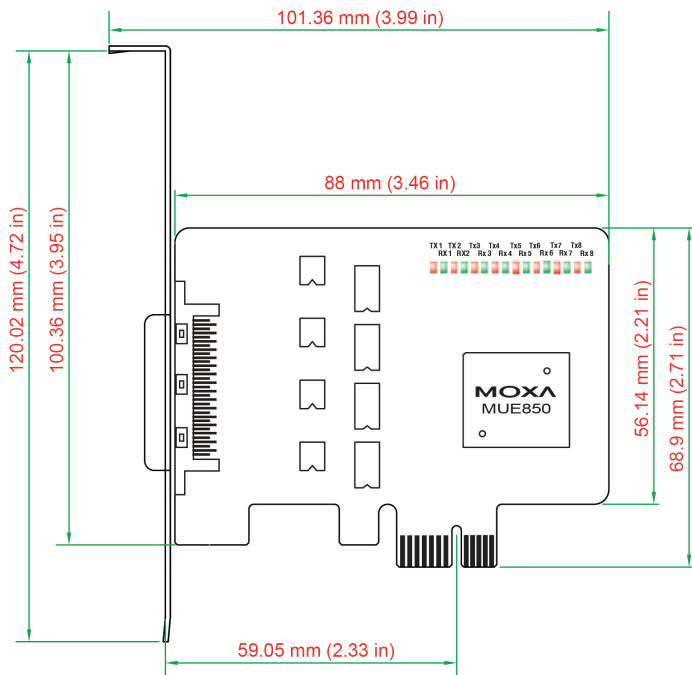
CP-168EL-A Dimensions

115.77 mm (4.57 in)

102 mm (4.02 in)

80 mm (3.15 in)

63.59 mm (2.5 in)

TX1 TX2 Tx3 Tx4 TX5 TX6 Tx7 Tx8
RX1 RX2 Rx3 Rx4 RX5 RX6 Rx7 Rx8

MOXA
MUE850

51.66 mm (2.04 in)

64.42 mm (2.54 in)

59.05 mm (2.33 in)

CP-104EL-A Dimensions

116.77 mm (4.6 in)

103 mm (4.06 in)

80 mm (3.15 in)

63.58 mm (2.5 in)

CP-104EL-A

TX1 TX2 Tx3 Tx4
RX1 RX2 Rx3 Rx4

MOXA
MUE450

54.45 mm (2.15 in)

67.21 mm (2.65 in)

59.05 mm (2.33 in)
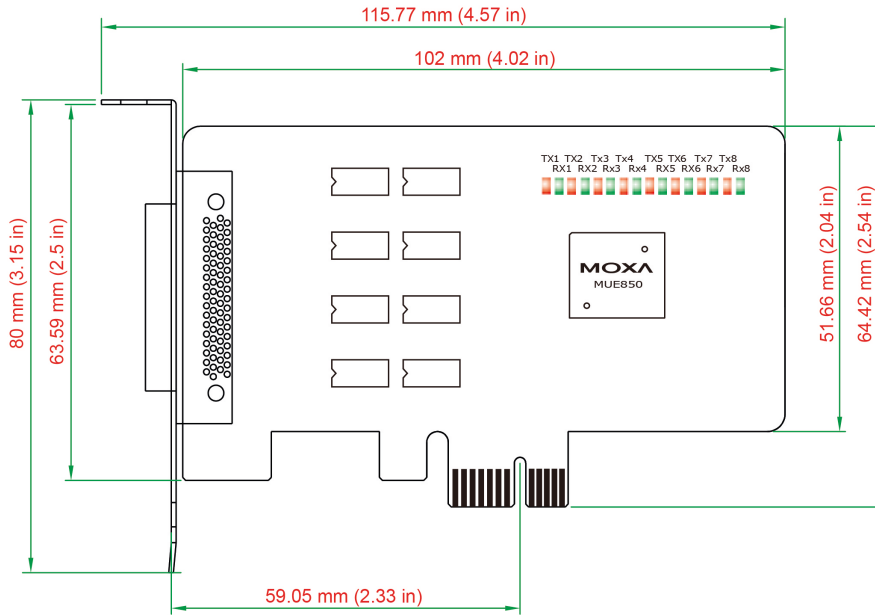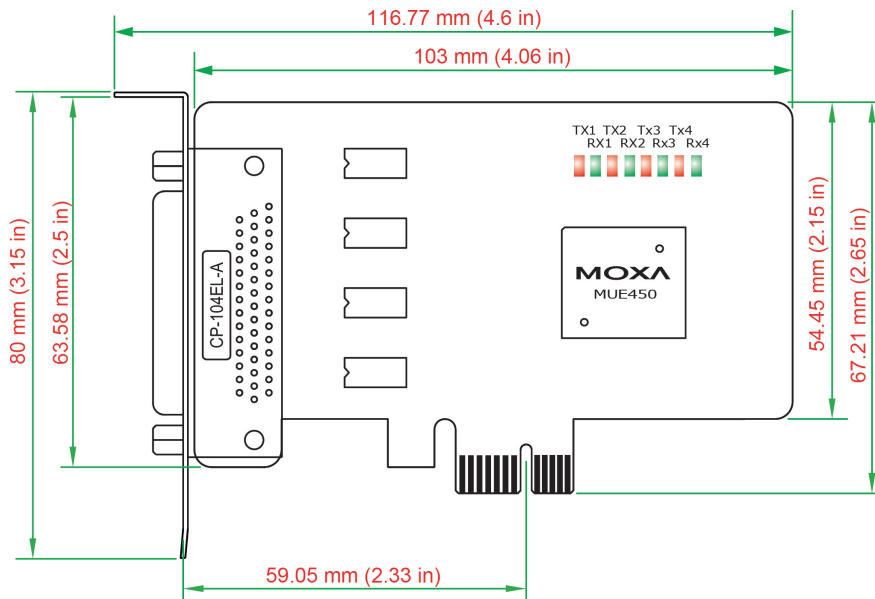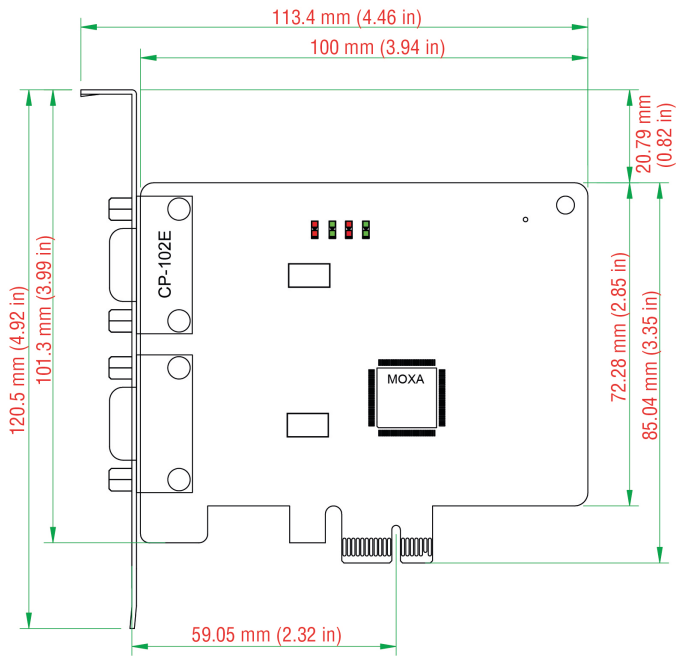
CP-102E Dimensions

CP-102EL Dimensions
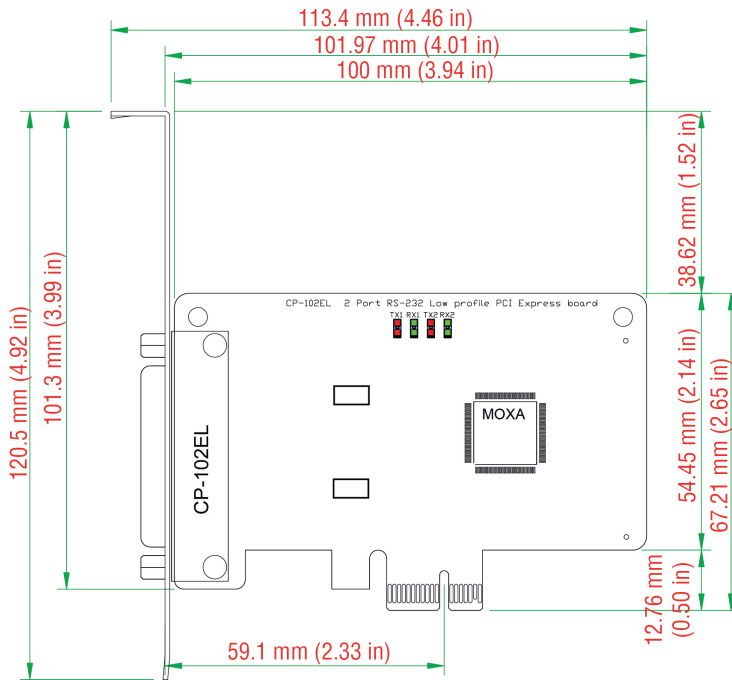
CP-132EL Dimensions
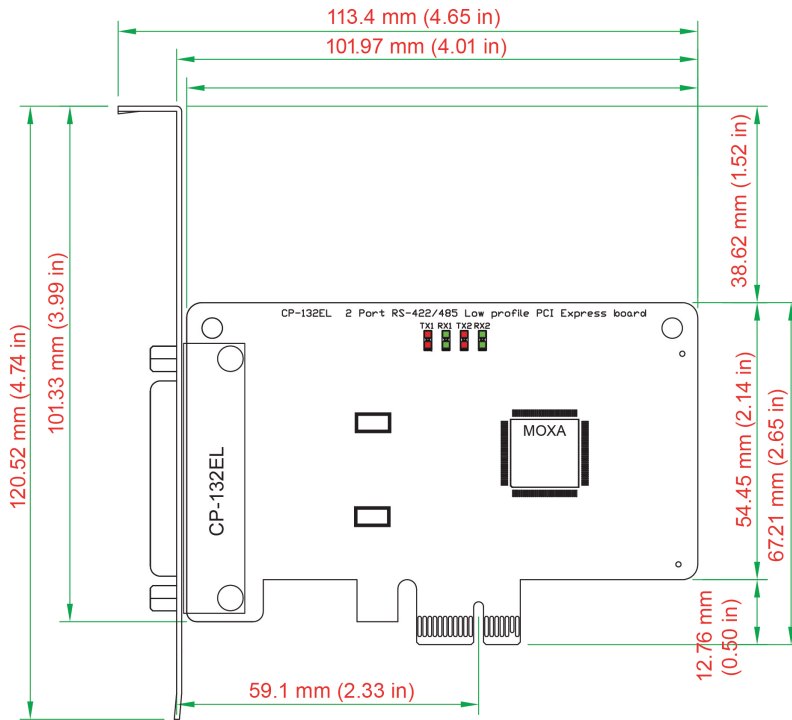
CP-132EL-I Dimensions
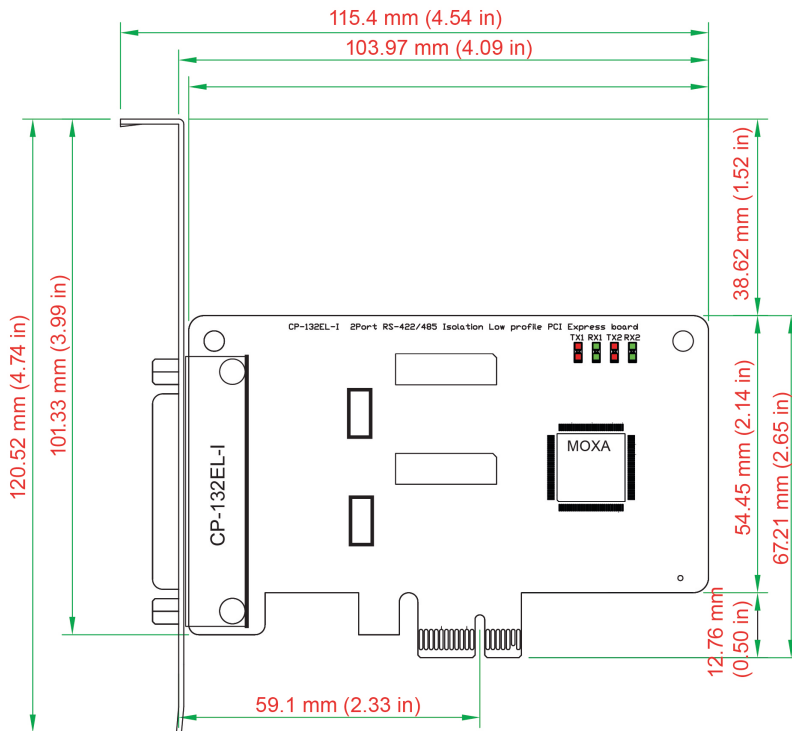
CP-114EL Dimensions
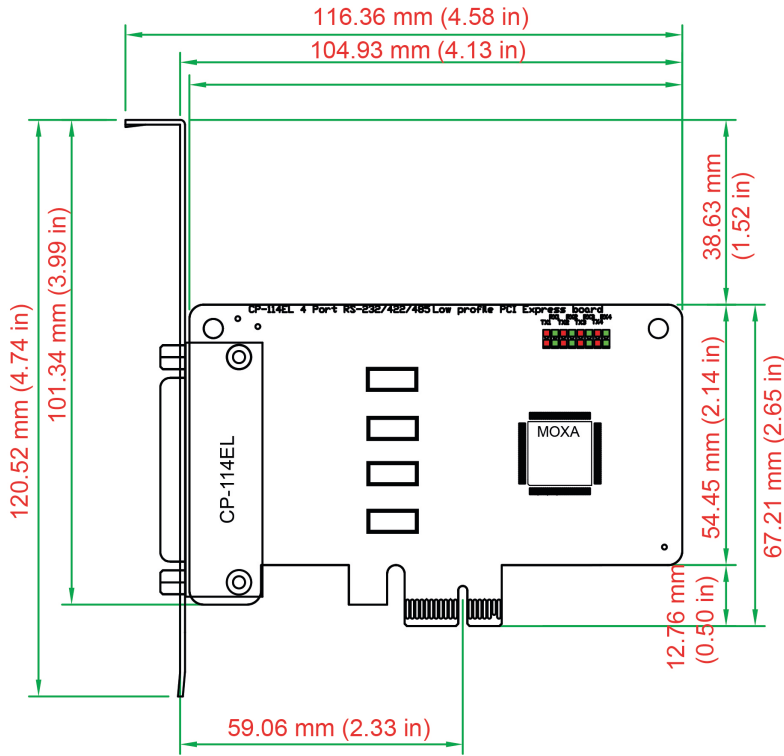
CP-114EL-I Dimensions
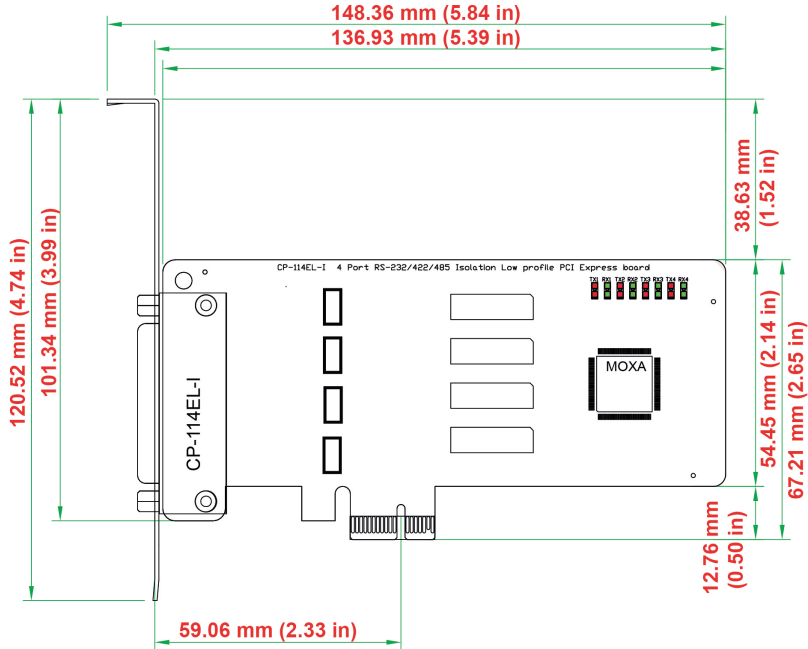
CP-116E-A Dimensions
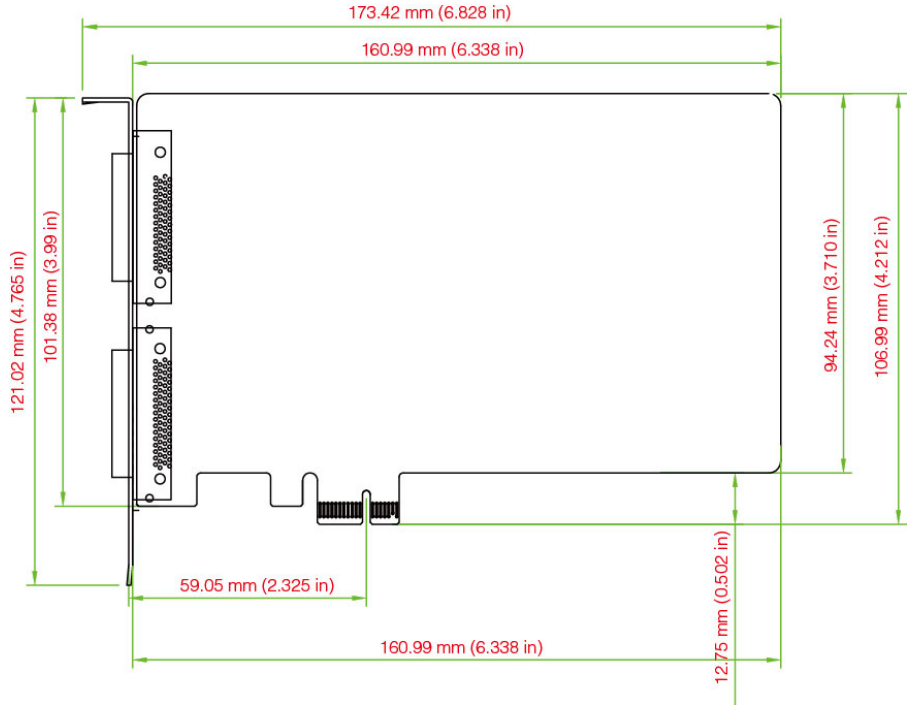
CP-134EL-A-I Dimensions
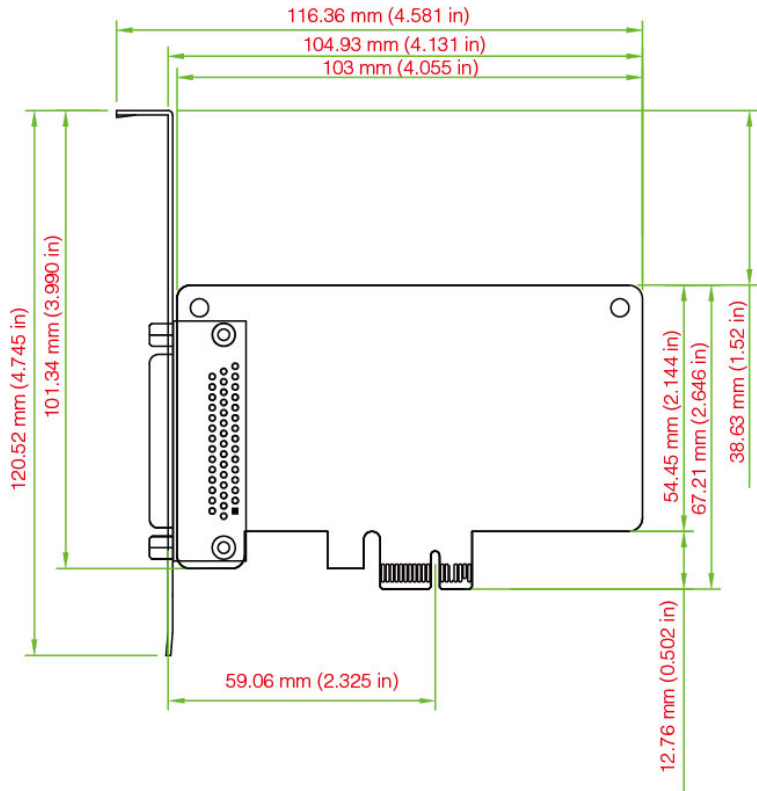
CP-118E-A-I/138E-A-I Dimensions
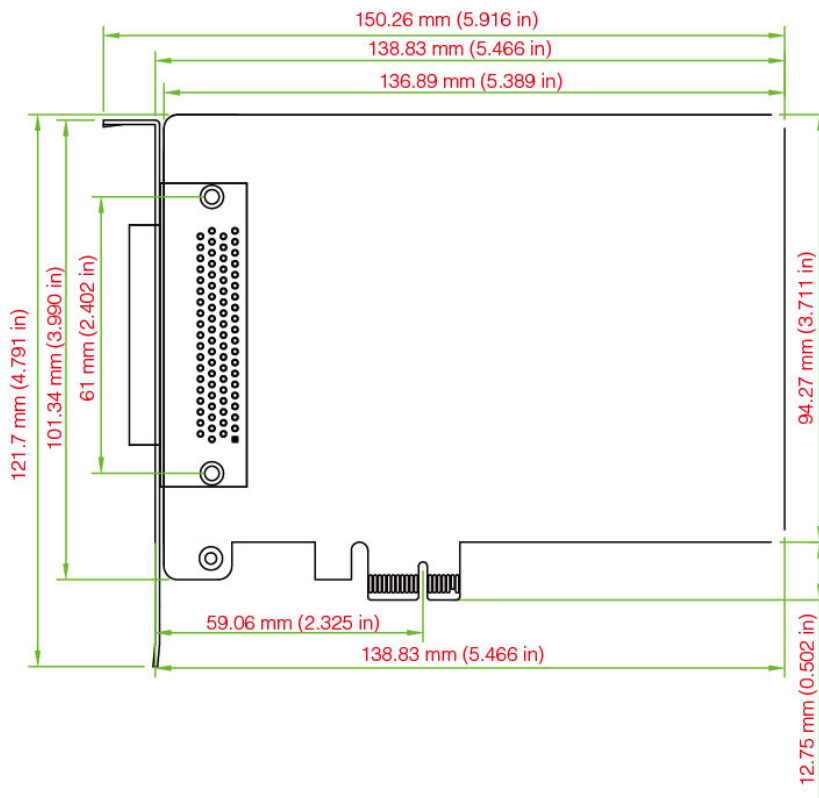
Plugging the Board into an Expansion Slot

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."

3. Software Installation

In this chapter, we give installation, configuration, and update/removal procedures for the driver for Windows 2000, Windows 2003/XP/Vista/2008 (32-bit/64-bit), Windows 7/8/8.1/10 (32-bit/64-bit), Windows Server 2008 R2/2012/2012 R2/2016 (x64), DOS, Linux (32-bit/64-bit), 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 8 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.

Windows Drivers

Moxa provides drivers that allow you to use the PCI Express Series serial boards for various Windows platforms.

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

Plug the PCI Express board into an empty PCI Express slot. See the **Hardware Installation** chapter for details.

Turn on your PC. Windows will automatically detect the board.

Driver installed?

No | Yes

Install the driver that you can download from the Moxa website. See the **Installing the Driver** subsection in this chapter for detailed instructions.

Configure the board's ports. See the **Configuring the Ports** subsection in this chapter for detailed instructions.

Check the status of Moxa's multiport serial boards. See the **Checking the Status** subsection in this chapter for detailed instructions.

The PCI Express board and ports are ready to use.

Windows 2000, 2003/ XP/ Vista/ 2008 (x86/x64), 7/8/8.1/ 10 (x86/x64), Server 2008 R2/ 2012/ 2012 R2/ 2016 (x64)/Windows 8/8.1/10/11

This section includes the following topics:

- Installing the Driver
- Configuring the Ports
- Checking the Status
- Removing the Driver
- Uninstalling the Driver

We will take Window 10 with an CP-116E-A card as an example. This procedure is similar to the other Windows platforms regard to installing, configuring, checking the port status, and removing or uninstalling the PCI Express cards.

Installing the Driver

In this section, we describe how to install the PCI Express cards for the first time with Windows 10. 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 the Moxa's 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.

Second, you may download the drivers at www.moxa.com. Based on the OS type, choose the corresponding driver.

Follow the following procedures to install the driver.

1. Double Click the installation file that you download from the Moxa website.
2. The Setup Wizard will open. Click **Next** to begin installing the driver.
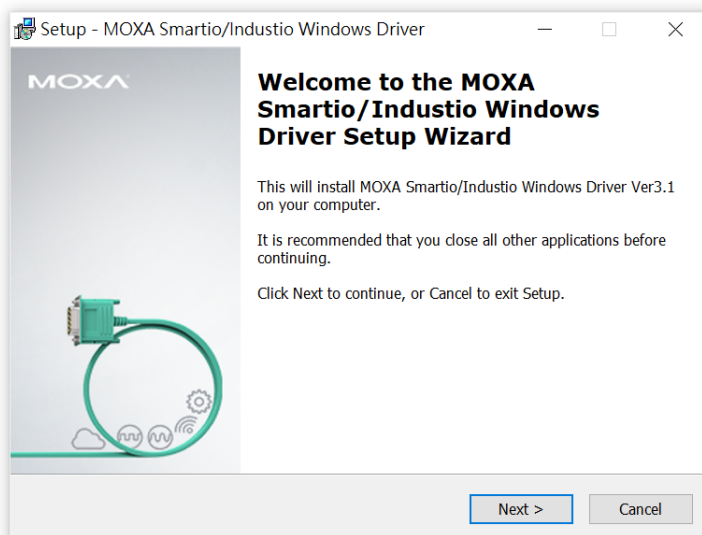
3. Please read the license agreement. If you agree, please click **Next** to continue.
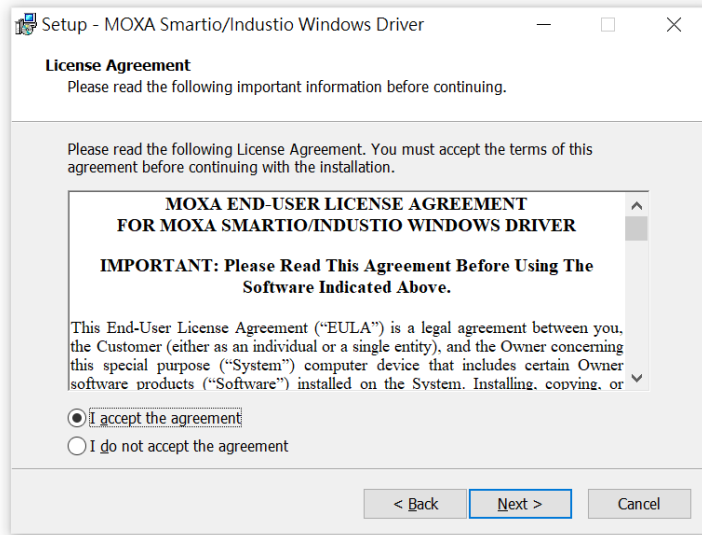
4. Click **Next** to install the driver in the indicated folder or click the **Browse...** button to locate a different folder.
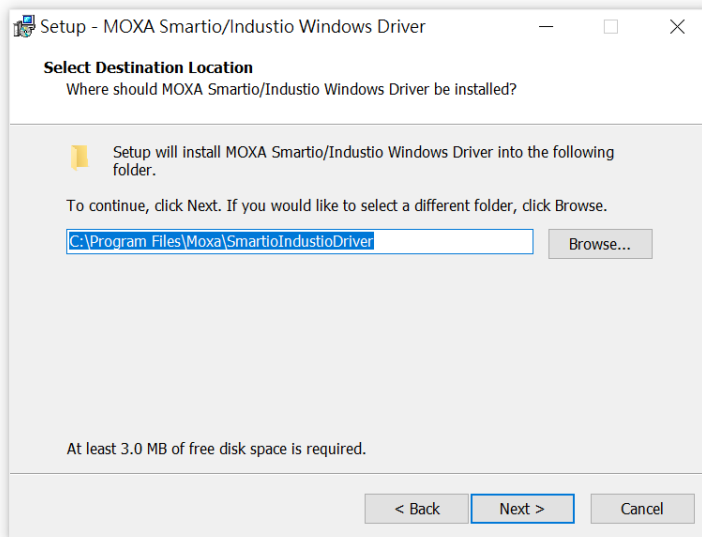
5. Select the component (tools) you want to install and click Next.

The default option is the basic installation, which installs the ViewCom tool. We recommend that you install all tools since they can be used for configuration, monitoring, and troubleshooting.

However, if you would like to install them later, uncheck the box in front of the tools.
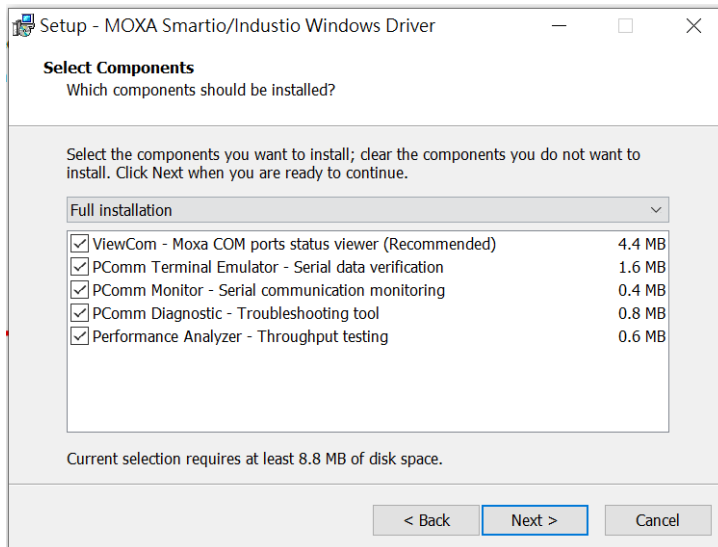
✎ **NOTE**

The following process is based on all the tools that have been selected.

6. This page shows the tools that will be installed in your computer. Click **Install** and continue the installation process.
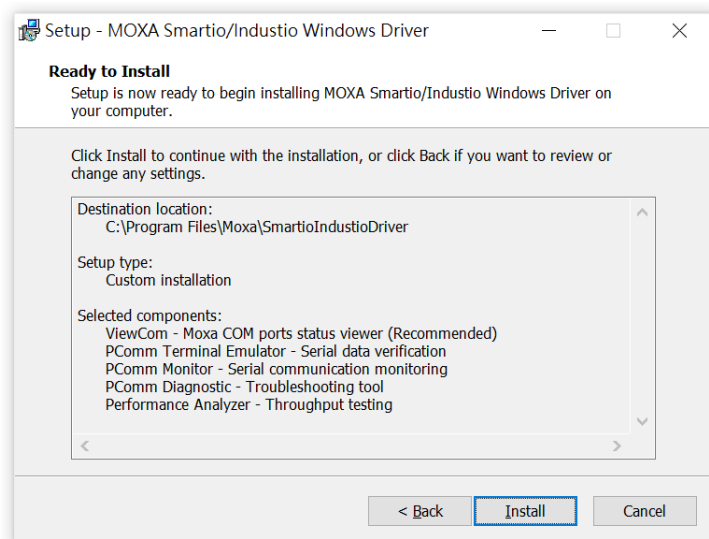
7. Please wait until the installation is completed.
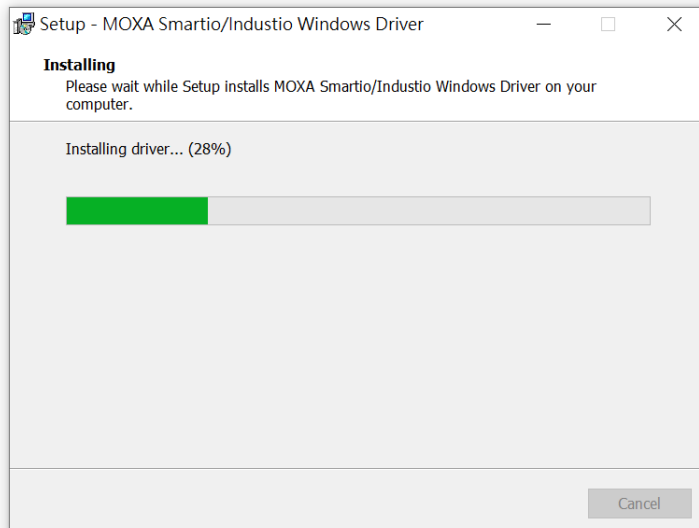
8. This page will show all applications that you have installed. Click **Next** to continue the installation process.
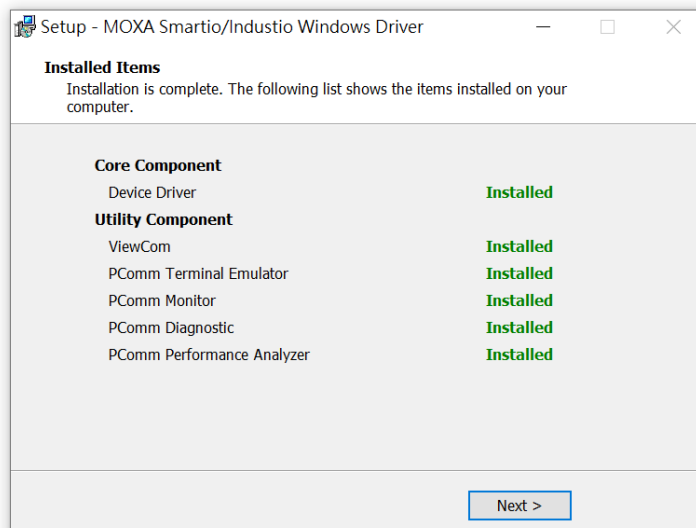
9. In this pager, you can check the serial card default port basic configuration here. You can also click the **Scan** button to refresh this page. Click **Next** to continue the install process.
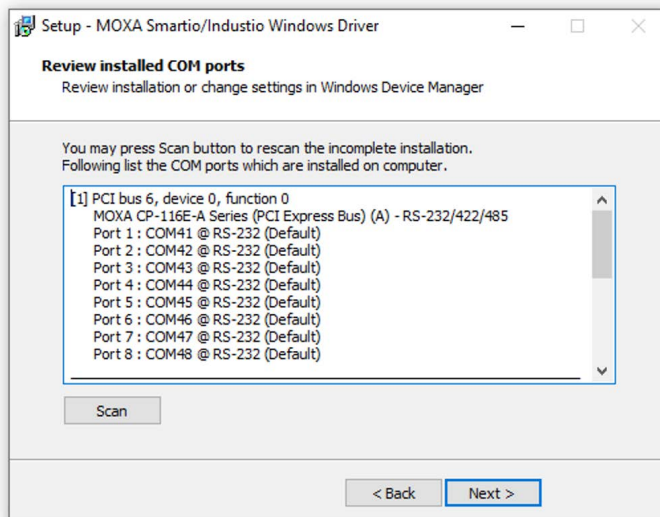
10. This is the final page of the installation process. It shows two ways to do further device configurations. One is going to the multi-port serial adapters on the device manager page; the other is use the **ViewCom** tool that you have installed. Click **Finish** the complete the installation process.
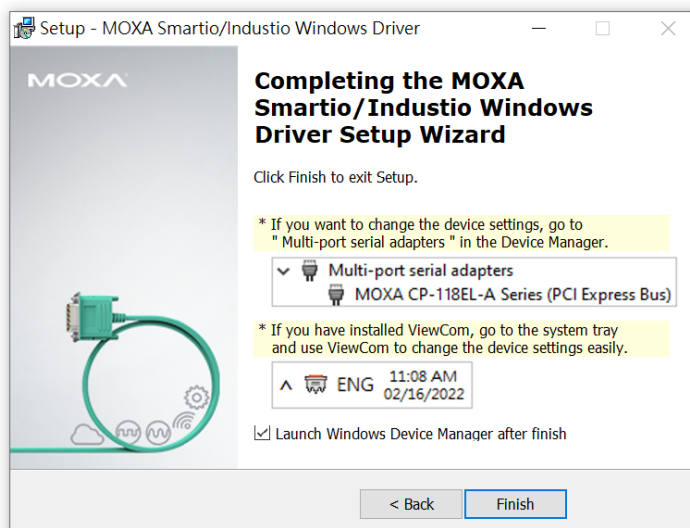
Configuring the Ports

After the driver has been installed, use the Device Manager to configure the serial port of your PCI Express cards (the CP-116E-A will be used as an example). In this section, we describe how to access MOXA Smartio/Industio Window Driver and lead you to do the serial port configuration.

Accessing MOXA Smartio/Industio Window Driver

There are two ways to access the Smartio/Industio Window Driver.

1. Expand the multi-port serial adapters tab, right-click Moxa **CP-116E-A Series**, and then click Properties to open the board's configuration panel. Please see the following section for more detail information for the PCIe port configuration.
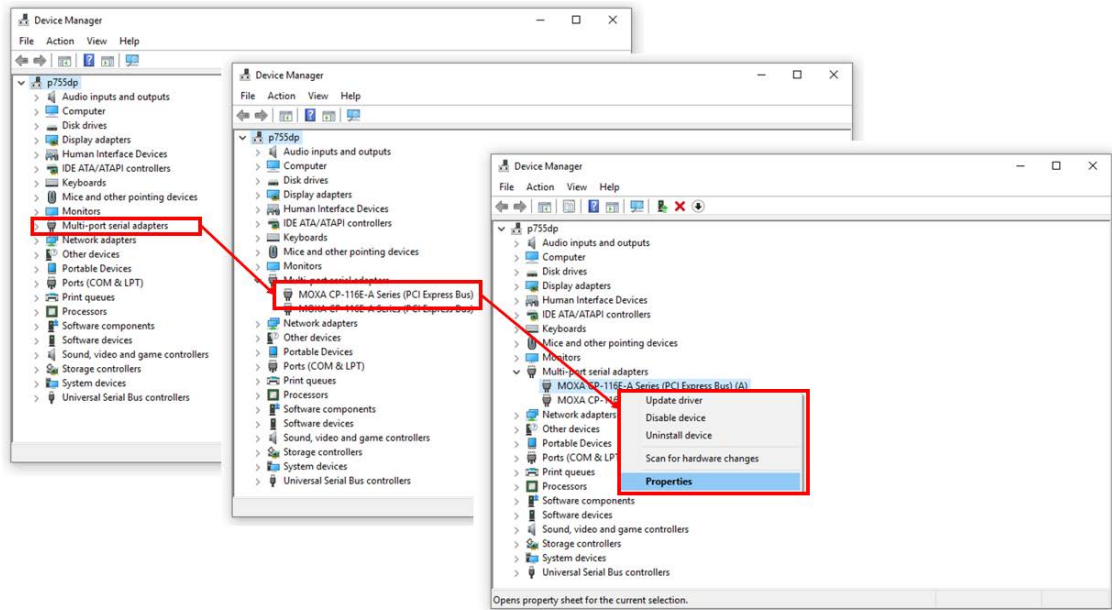
2. Use ViewCom Utility (You would need to install the ViewCom Utility to use this method)

    Clicking the ViewCom icon will lead you to the device manager page for monitoring and configuring your devices, including Moxa Serial Boards.
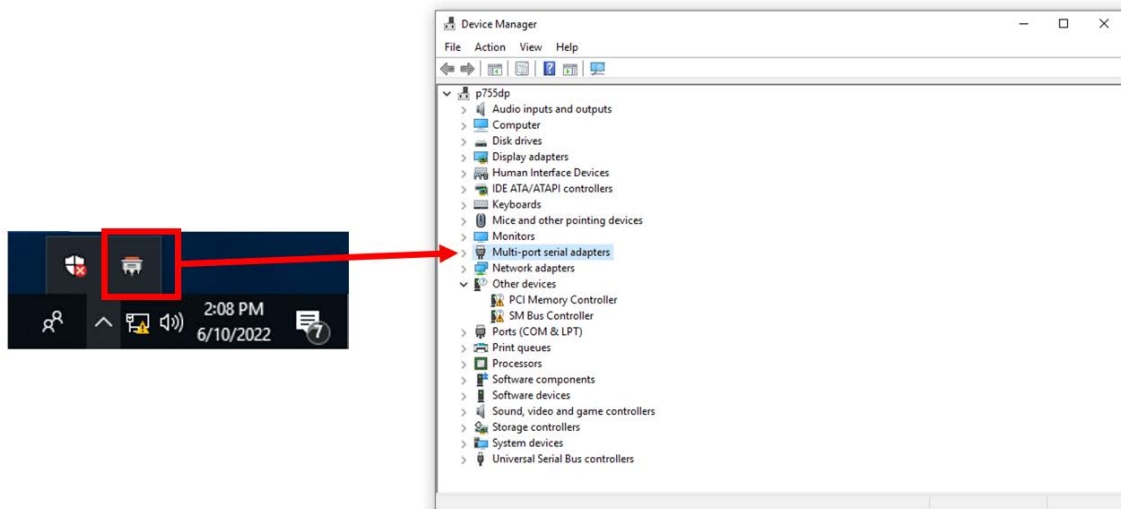
Configuring Serial Ports

You can set all parameters in the driver properties page configuration sheet. The following is the introduction to this page.
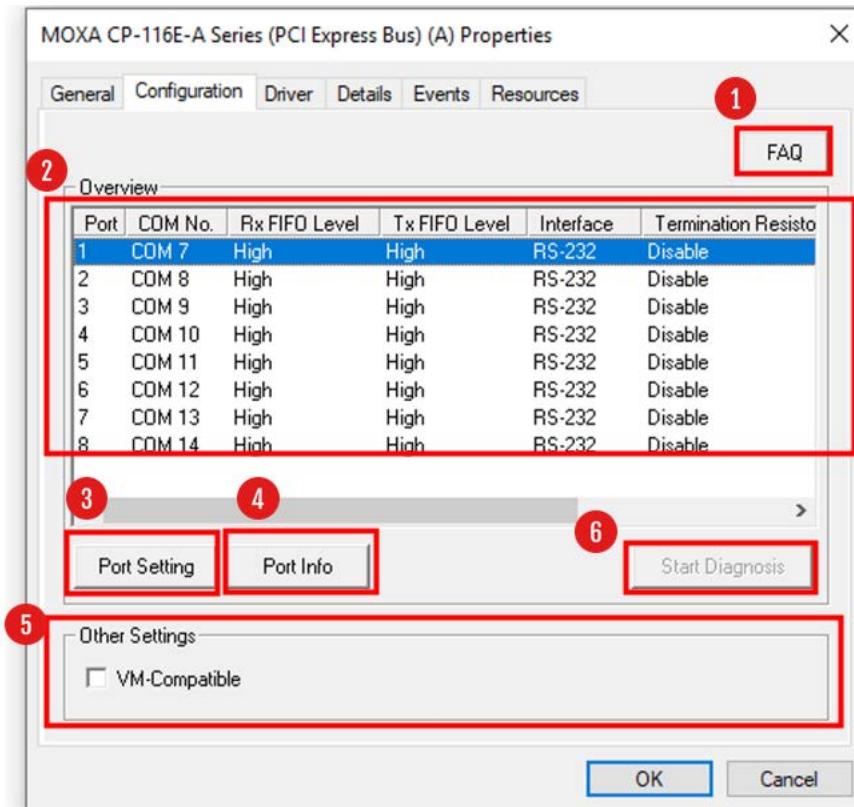
1. FAQ:

Click the FAQ button, and it will open the FAQ document. If you encounter problems, please check this document before you reach out to technical support.
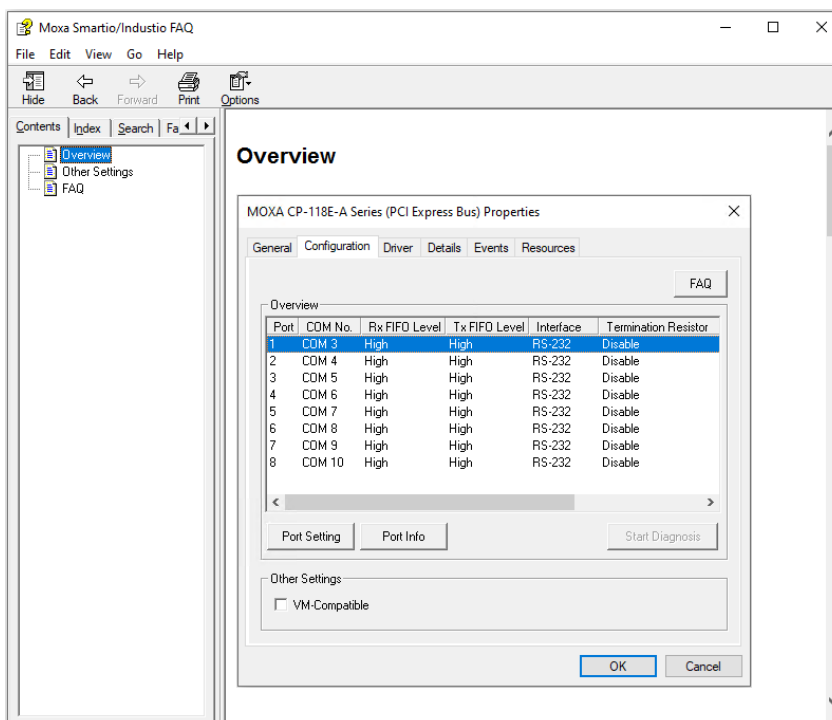
2. Overview:

In this section, it shows the port parameters, such as COM Number, TX and RX FIFO level, Termination Resistor, etc. The description of these parameters are as follows:
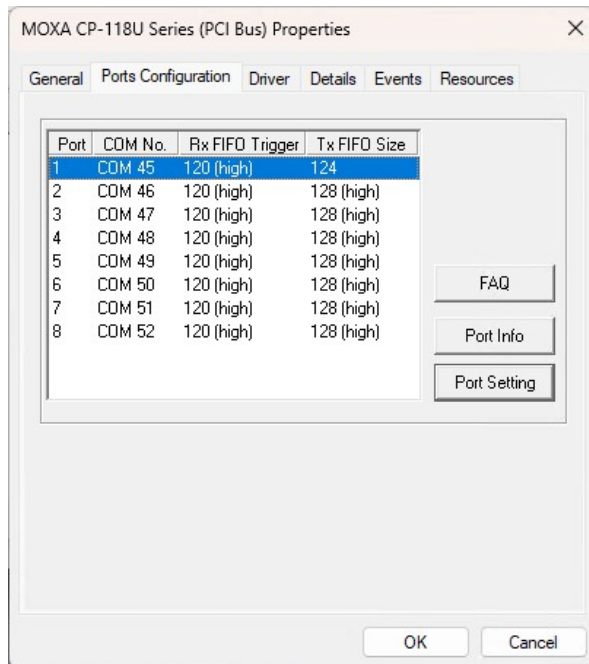
- **Port Number and COM No.**

  You will need to set up all the ports of the board with the desired "COM number", which should not conflict with other COM numbers in use.

- **RX and TX FIFO**

  ➢ Rx FIFO Level

  ❑ 1 (low) - Disables FIFO, resulting in decreased latency, and low throughput.

  ❑ 120 (high) - Results in high throughput, but with increased latency. (Default)

  ➢ Tx FIFO Level

  ❑ 1 (low) - Disables FIFO (recommended when the attached serial device has a small buffer, or slow transmission speed).

  ❑ 128 (high) - Results in high throughput. (Default)

- **Interface**

  This column shows the interface of all serial ports. You can change the interface by clicking the port setting button and make the changes in the "Port Setting" dialog box. (The default setting of the interface is RS-232)

- **Termination Resistor**

  You may need to enable the termination resistor in the long communication distance.

  ➢ Enable (120 Ω)

  ➢ Disable (Default)

- **Bias Resistor**

  In RS-422/485 mode, if you multidrop connections to many devices, it is better to change the bias resistor to 150 kΩ. On the other hand, if you only connect few devices, then it is fine to keep the default setting (1 kΩ).

  ➢ 1 kΩ.

  ➢ 150 kΩ. (Default)

- **Status**

  If you are in RS-485 mode, click the Start Diagnosis button. It will start the RS-485 diagnostics and will show results in the status column. You can follow the readout information and adjust the bias resistor and terminator resistor. For detailed information, please check chapter 4, "Configuring Intelligent RS-485".

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3. Port Setting:

Click this button, and it will open the port setting window for you to configure the serial ports.
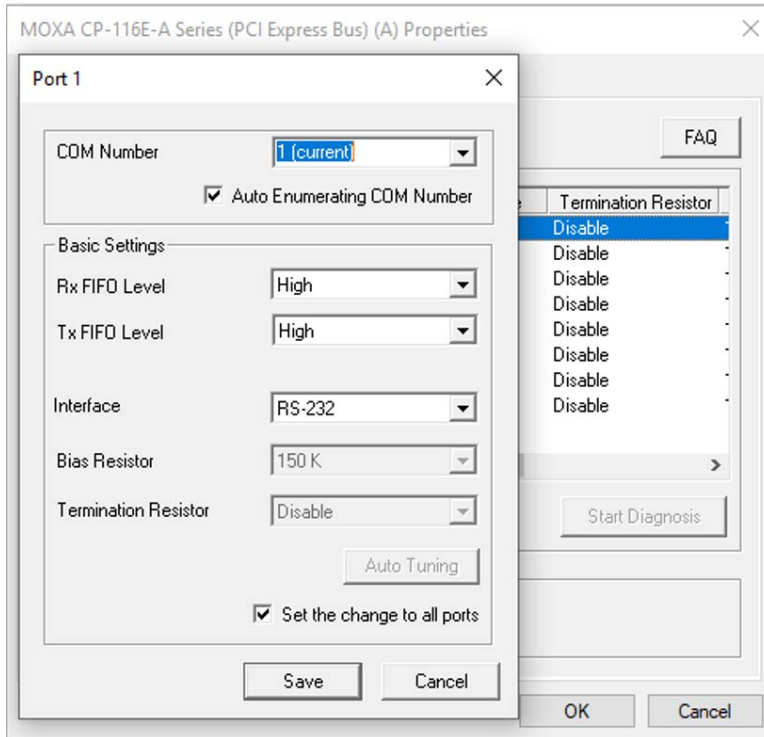
Port Number/Auto Enumerating COM Number

Select a COM number for the port from the Port Number pull-down list. You could also type the port number in the text column to quickly get the target port.

Select the **Auto Enumerating COM Number** option to map subsequent ports automatically. The port numbers will be assigned in sequence. For example, if COM 1 is assigned to Port 1, then COM 2 (if not already occupied) will be assigned to Port 2, etc.

Basic Settings (Rx, TX FIFO, Interface)

RX and TX FIFO
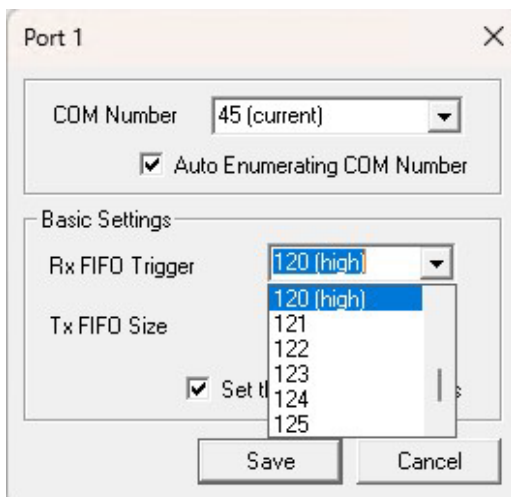
1. Select an Rx FIFO Trigger from the Rx FIFO Level pull-down list. Rx FIFO trigger levels from 1 byte to 120 byte, with the default set at 120 (high) bytes.
   - ➢ 1 (low) - 1 byte at a time/disables FIFO, resulting in decreased latency and low throughput.
   - ➢ 120 (high) - 120 byte, resulting in high throughput but with increased latency. (Default)

2. Select a Tx FIFO Level from the Tx FIFO Level pull-down list. Tx FIFO Levels 1 byte to 128 bytes, with the default set at 128 (High) bytes.

    ➢ 1 (low) - 1 byte/disables FIFO (recommended when the attached serial device has a small buffer or slow transmission speed).

    ➢ 128 (high) - Results in high throughput. (Default)

    TX/RX FIFO Size

	TX FIFO (Byte)	RX FIFO (Byte)
High (Default)	128	120
Middle	64	60
Low	1	1

Interface, Bias Resistor, and Termination Resistor
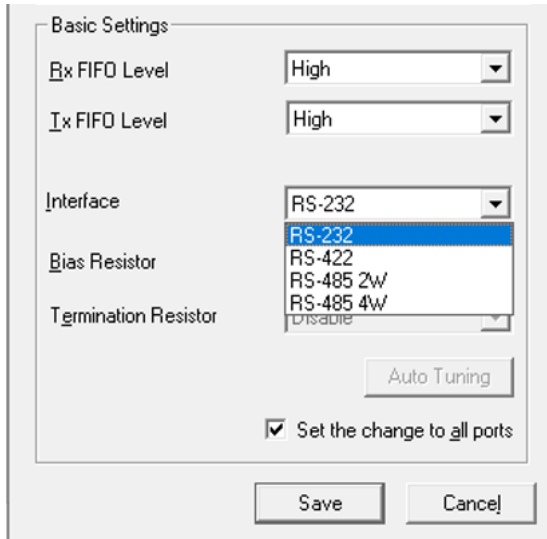
If you are using CP-118EL-A, CP-114EL, CP-114EL-I, CP-132EL, or CP-132EL-I, select Interface (RS-232, RS-422, RS-485-2W, or RS-485-4W), bias Resistor (150 k or 1 k) and termination Resistor (120 Ω, Enable, or Disable) for configuration. For illustration purposes, we use the CP -116E-A.

Select the **Set the change to all ports** option to apply the just defined Tx FIFO Size to all ports. Click **Save** to apply the port settings in the Property window to finish the port settings procedure.

4. Port Info:

Click this button, and you can get the information summary of this port. Click **OK** button to close this window.
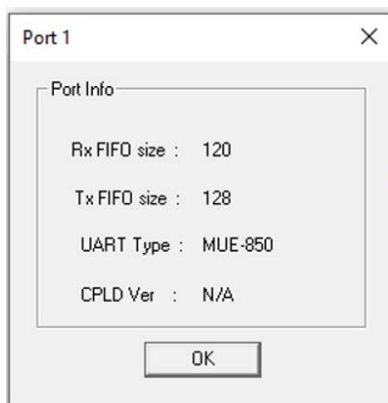
5. VM-compatible:

Tick this setting to ignore PCI capability if this board has a transmission issue on the virtual machine.

6. Start Diagnosis

Please go to the chapter 4, **"**Configuring Intelligent RS-485," for detailed information.

Checking the Status

The PComm Diagnostic program is a useful tool for checking the status of Moxa's multiport serial 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.

Go to start the program, click **The Windows icon** and find **the PComm Diagnostic Program**. If you just install it, the program will be shown on the recently added group. The program Default installation location is C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Moxa, you could also go to the location and launch the program directly.
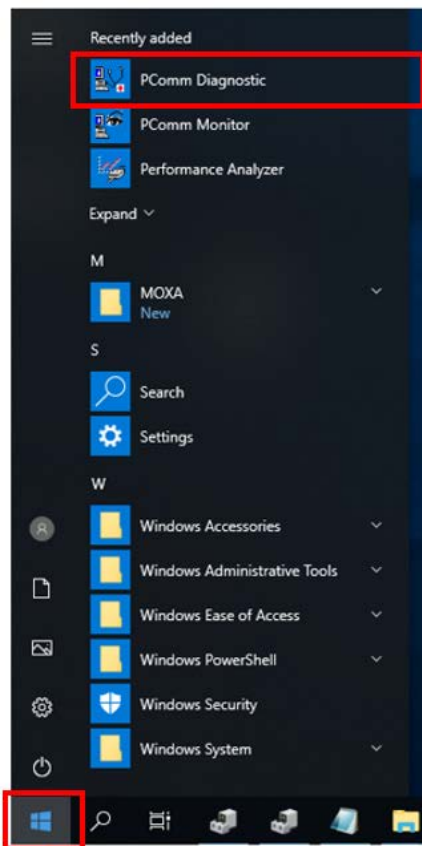
Or you can click the search icon and search for the **PComm Diagnostic** program and then launch this program.

If the serial board is installed successfully, you will see the installed serial device shown on the Board status.
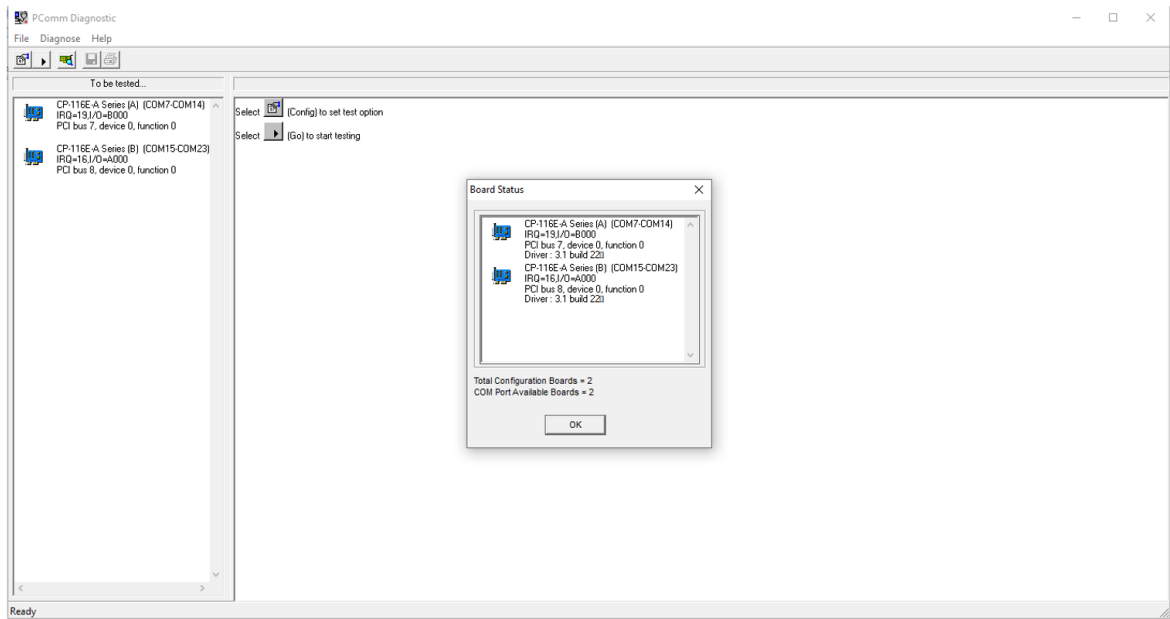
Removing the Driver

1. Open the Device Manager and use your mouse to place the cursor over MOXA CP-116E-A Series (PCI Express Bus) under Multi-port serial adapters. Right-click and select the **Uninstall** option.
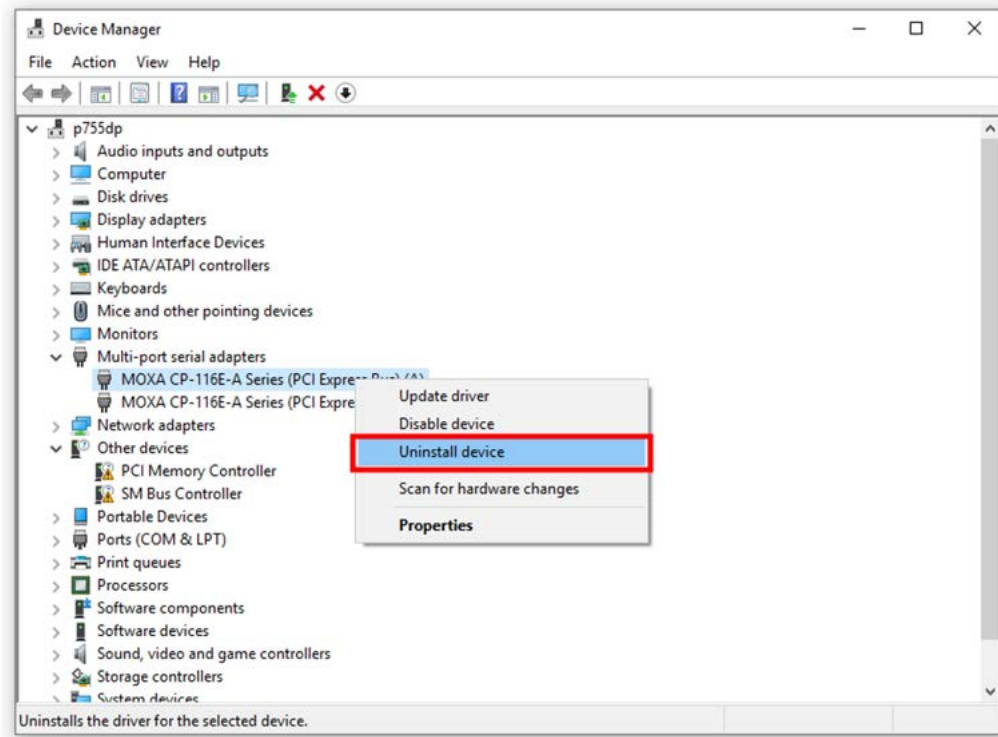
2. Select **Delete the driver software for this device** and click **Uninstall** to proceed with uninstalling the board.
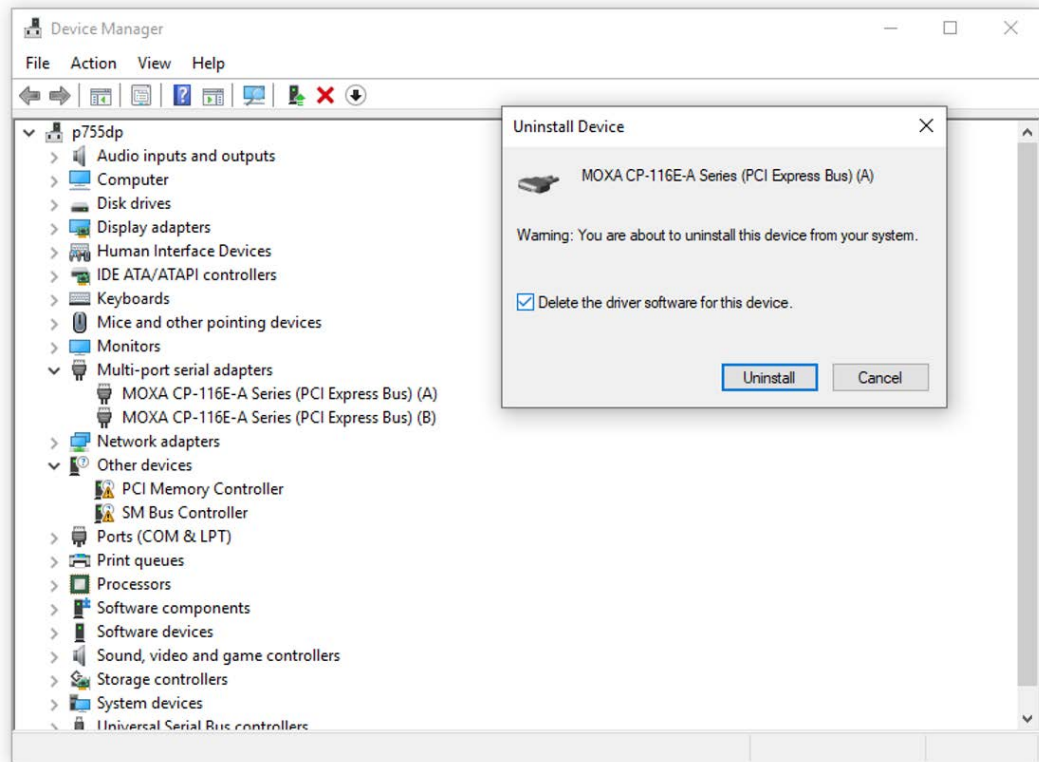
Uninstalling the Driver

The MSB driver may be removed through Add/Remove Programs in the Windows Control Panel. Open the Control Panel and click **Uninstall a program**.
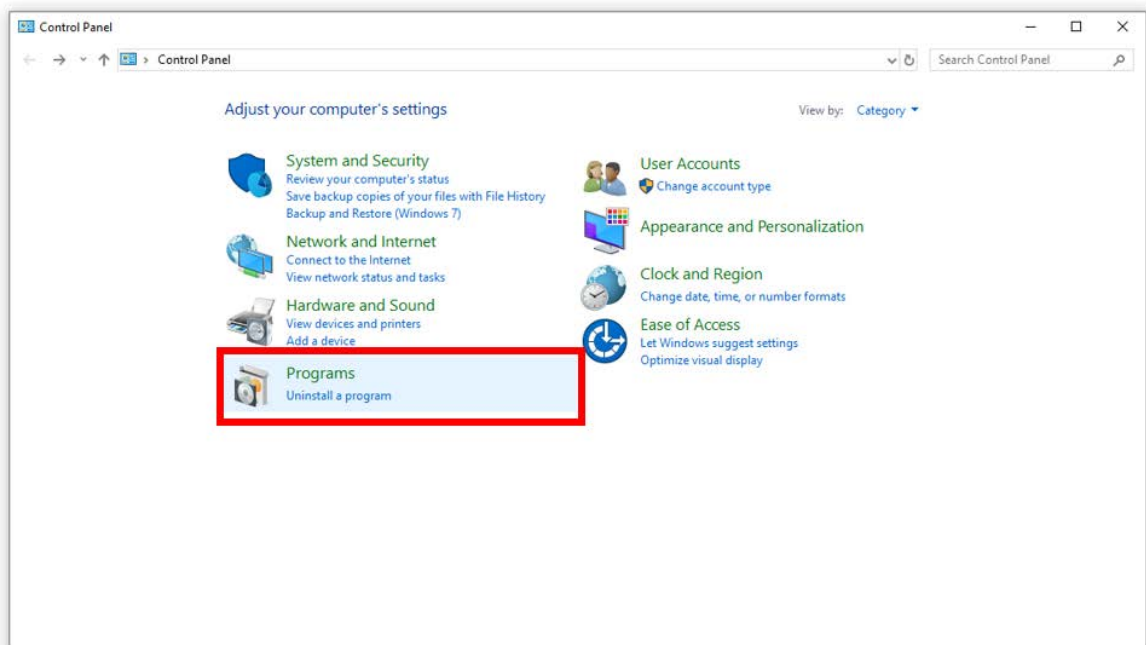
Click **Uninstall** next to MOXA Smartio/Industio Windows Driver Verx.xx
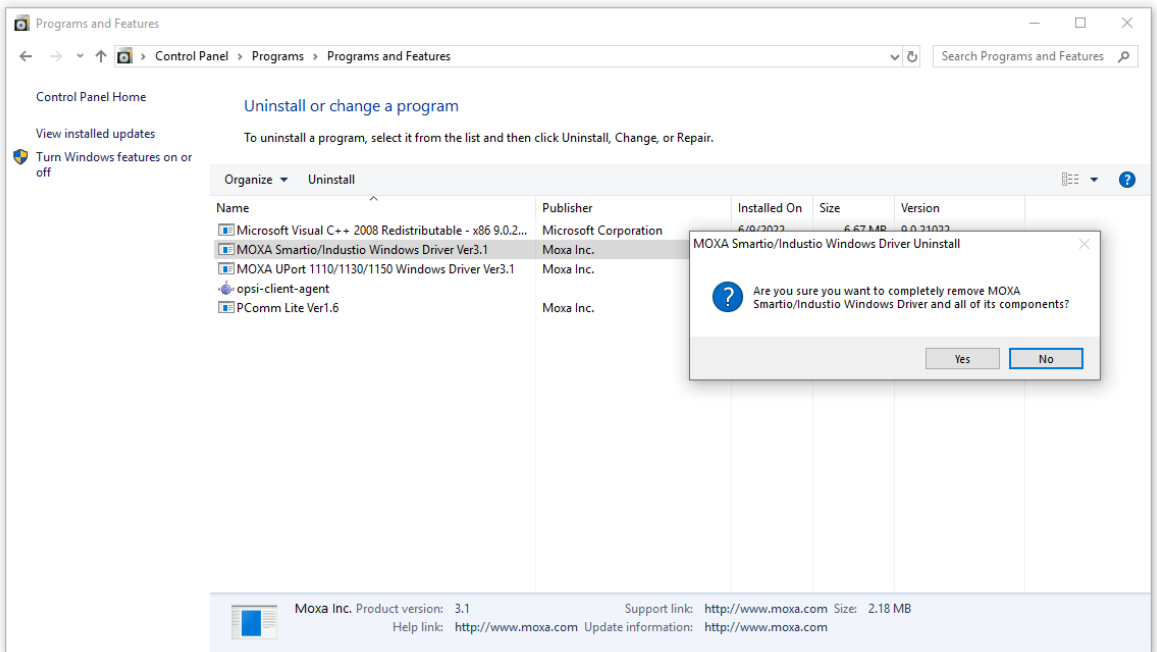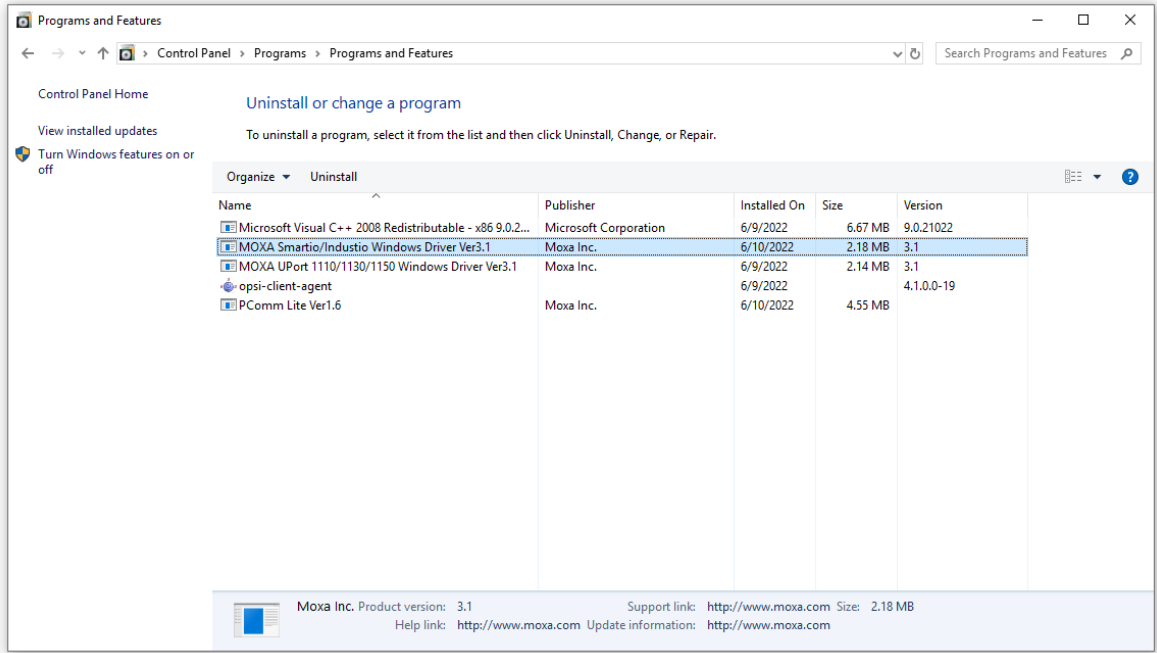
Wait until the uninstall process is done.
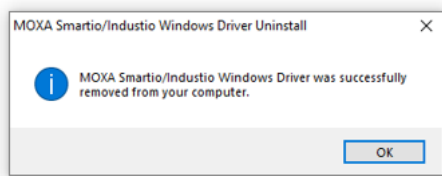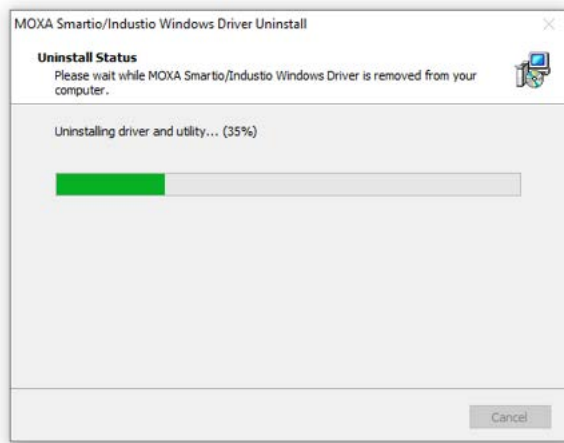
Non-Windows Drivers

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 for 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, CP-118E-A-I, CP-138E-A-I, CP-134EL-A-I, CP-116E-A.

⚠️ **WARNING**

If you are using a Serial ATA HDD for DOS, the installation process will hang. To prevent the installation process from hanging, change your HDD to an IDE drive.

✏️ **NOTE**

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

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 online 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.

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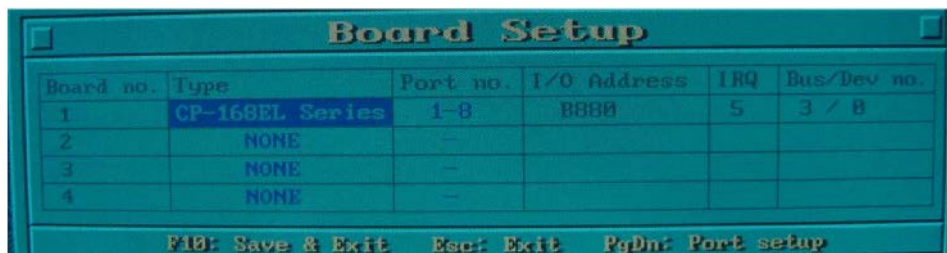
4. You may enter or modify the settings of each port at this stage. The values displayed first are the port's initial values that were set up when the driver was installed.

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.
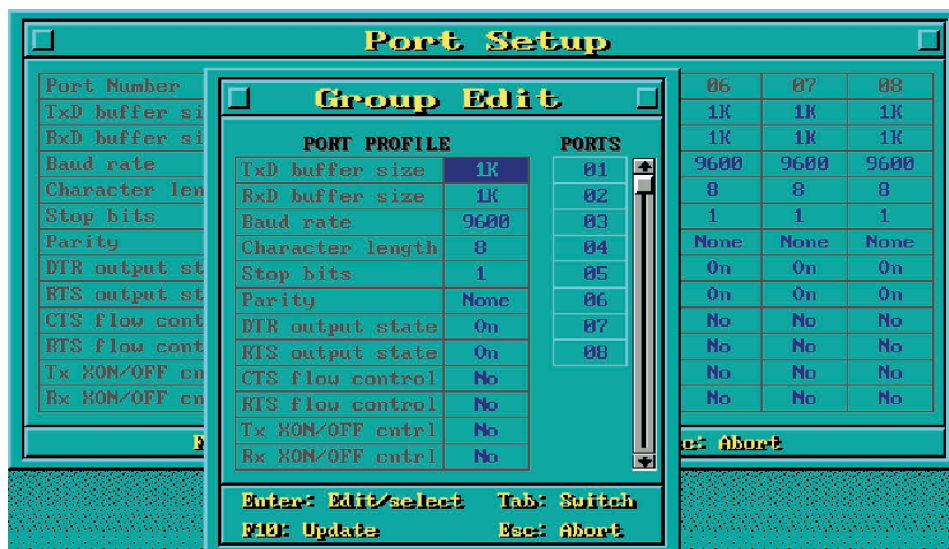
Loading the Driver

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 boards for Linux.

PCI Express Boards: CP-118EL, CP-168EL, CP-104EL, CP-102E, CP-102EL, CP-132EL, CP-132EL-I, CP-114EL, CP-114EL-I, CP-118E-A-I/ CP-138E-A-I/ CP-134EL-A-I/CP-116E-A

✎ **NOTE**

The following procedure shows how to install the CP-114EL driver for Linux.

Execute the following commands from the Linux prompt:

1. #cd /
   #mkdir moxa
   #cd moxa
   #cp /<driver directory>/driv_linux_smart_<version>_build_<build_date>.tgz .
   #tar -zxvf driv_linux_smart_<version>_build_<build_date>.tgz

2. #cd mxser
   #make clean; make install

3. #cd /moxa/mxser/driver
   #./msmknod

4. #modprobe mxupcie

5. For the 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	RS-232 mode
	RS422	RS-422 mode
	RS4852W	RS-485 2-wire mode
	RS4854W	RS-485 4-wire mode
Value	NONTERM	Non termination resistor
	120TERM	120-ohm termination resistor

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

SCO

- **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 can skip steps 4 and 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)				
Smartio/Industio Family Basic Configuration				
Board No.	Board Type	I/O Address	Interrupt	Bus/Dev No.
1	None	------------	------------	------------
2	None	------------	------------	------------
3	None	------------	------------	------------
4	None	------------	------------	------------
PgDn: getty Setting Esc: Exit Enter: Confirm Input Value Tab: Change Item				

5. After rebooting the computer, type "moxaadm"; when you 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.

MOXA Smartio/Industio Family Installation Utility (Ver 1.11)

Smartio/Industio Family Basic Configuration				
Board No.	Board Type	I/O Address	Interrupt	Bus/Dev No.
1	None	------------	------------	------------
2	None	------------	------------	------------
3	None	------------	------------	------------
4	None	------------	------------	------------
PgDn: getty Setting Esc: Exit				
Enter: Confirm Input Value 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 and 10 are only for the CP-132EL Series and CP-114EL Series.

---

9. After rebooting, type "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 the computer again.

11. Note that whenever you change a MAIN MENU item, you need to reboot your computer.

4. Configuring Intelligent RS-485

In this chapter, we describe the use of the "Auto-Tuning" and "Diagnosis" tools, supported by Moxa's Intelligent RS-485 boards, to tune your RS-485 network. The Auto-Tuning tool tests your RS-485 network and then configures certain Moxa boards (CP-118E-A-I, CP-138E-A-I, CP-134EL-A-I, and CP-116E-A) automatically. The Diagnosis tool can tell you how to manually configure other Moxa boards, as well as non-Moxa boards. We use the CP-116E-A board to demonstrate how to use the Intelligent RS-485 tools for Windows 7/8/8.1.

The basic procedure you should follow is illustrated in the following workflow diagram:
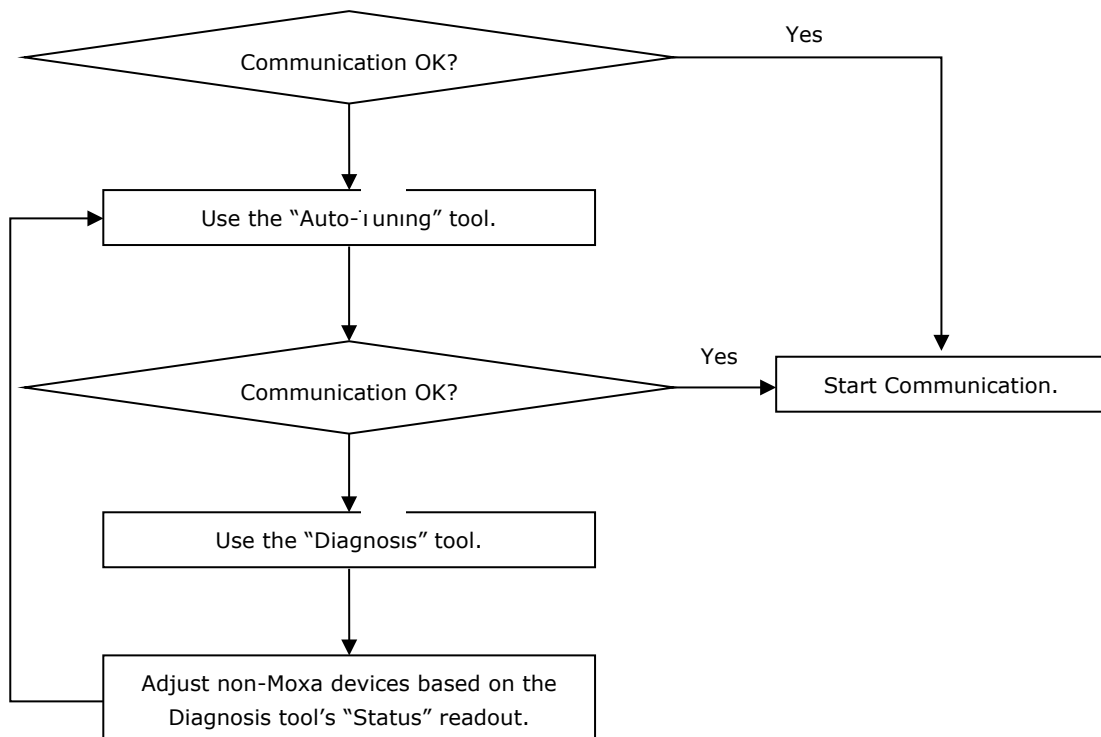
Windows Users

Take the following steps to use the Intelligent RS-485 function.

1. Expand the Multi-port serial adapters tab, right-click MOXA CP-116E-A Series (PCI Express Bus) and then click **Properties** to open the configuration panel.
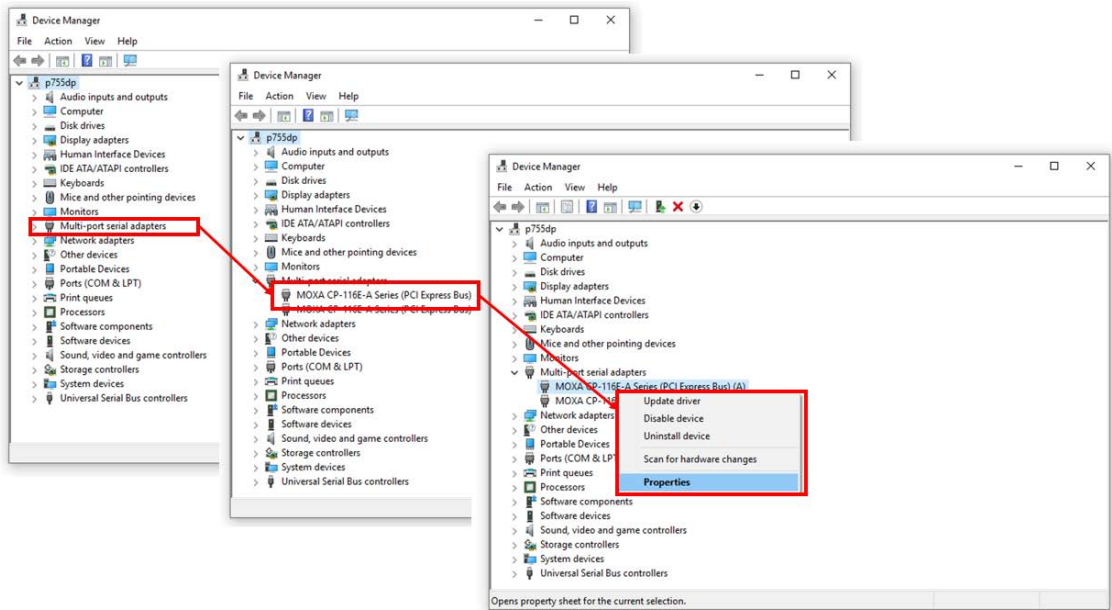
2. Double-click the COM number if you wish to configure.
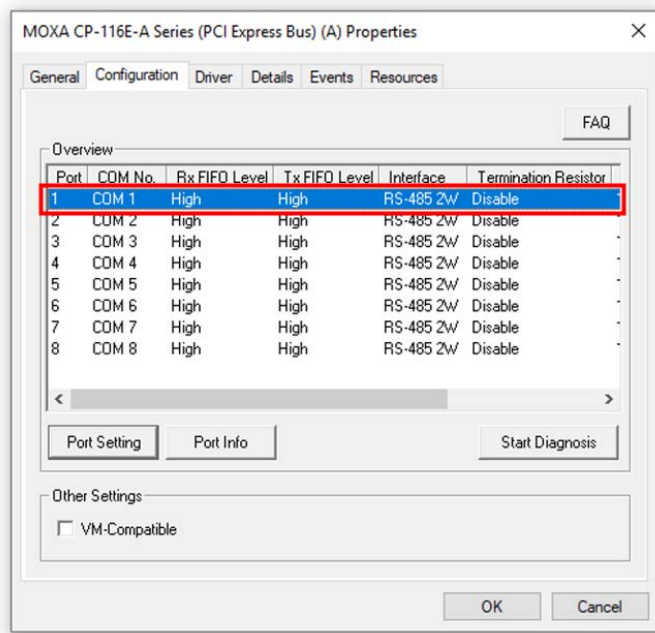
3. Check the **Auto Enumerating COM Number** option to map subsequent ports automatically. The port numbers will be assigned in sequence. Select **Interface** (RS-232, RS-422, RS-485-2W, or RS-485-4W) from the drop-down box. Click **Save** to save the settings.

✏️ **NOTE**

An Auto Tuning function is provided with RS-485-2W.

---
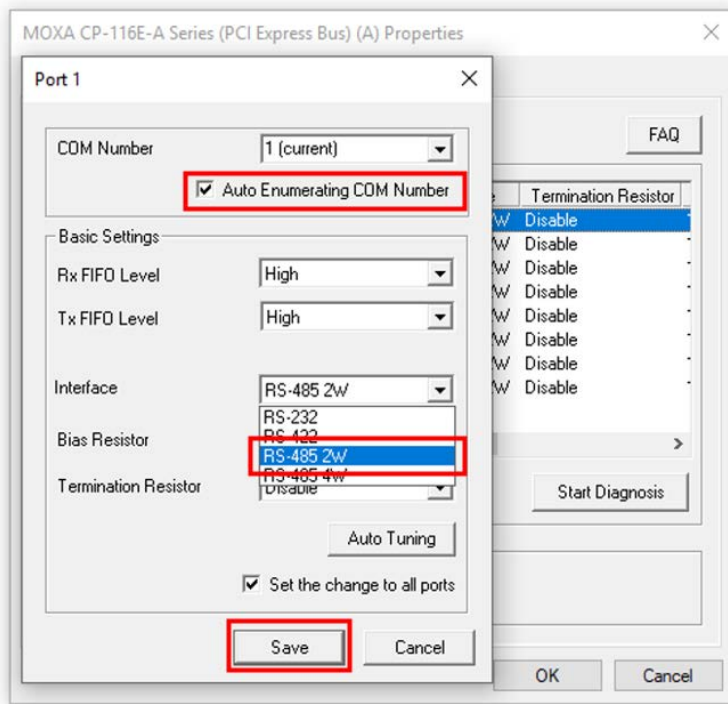
4. Click **Save** on the Ports Configuration page to save the settings.
5. Test if the communication is OK. If it's not OK, proceed to Step 6.
6. Click on the **COM Number**, click **Auto Tuning** next, and then click **OK**.
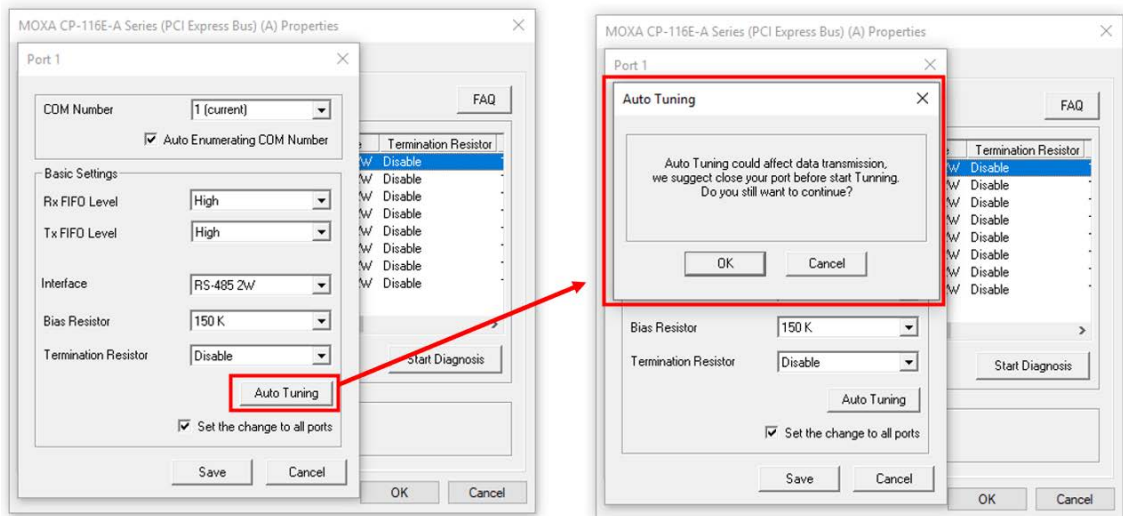
The PCIe board will automatically detect the RS-485 environment and suggest the correct Bias Resistor and Termination Resistor. Click **OK** to save the setting. To apply the setting, you need to click **Save** on the thevPorts Configuration page.

7. Test if the communication is OK. If it's not OK, proceed to Step 8.

8. Go to the properties screen and select the COM port that needs to be diagnosed. Click **Start Diagnosis** and when the CAUTION message appears, click **OK**.
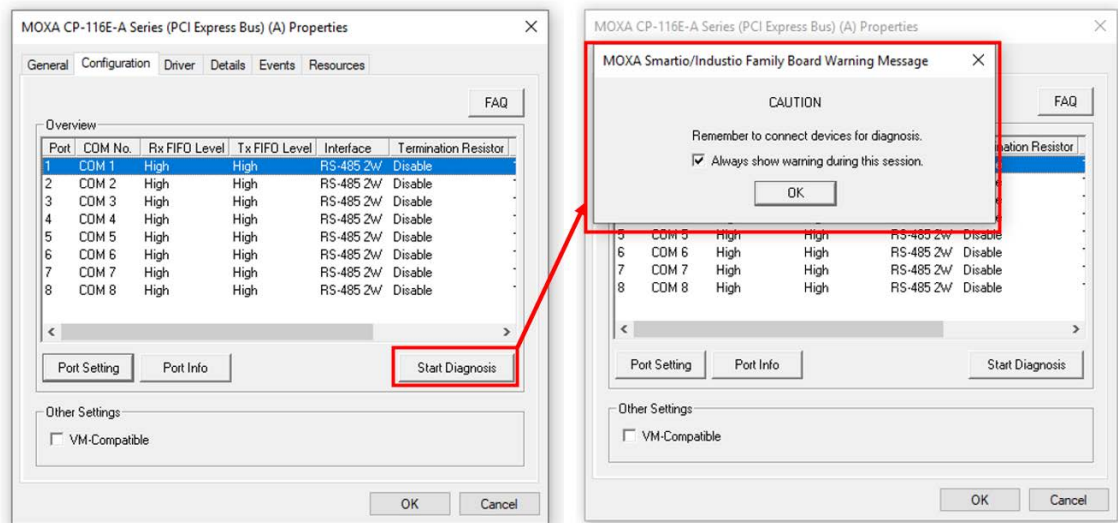
9. Adjust non-MOXA devices according to the Status. (Click the Resistor Diagnosis button, and it will show the diagnosis result in the status column. You can follow the readout information and adjust the bias resistor and terminator resistor.)
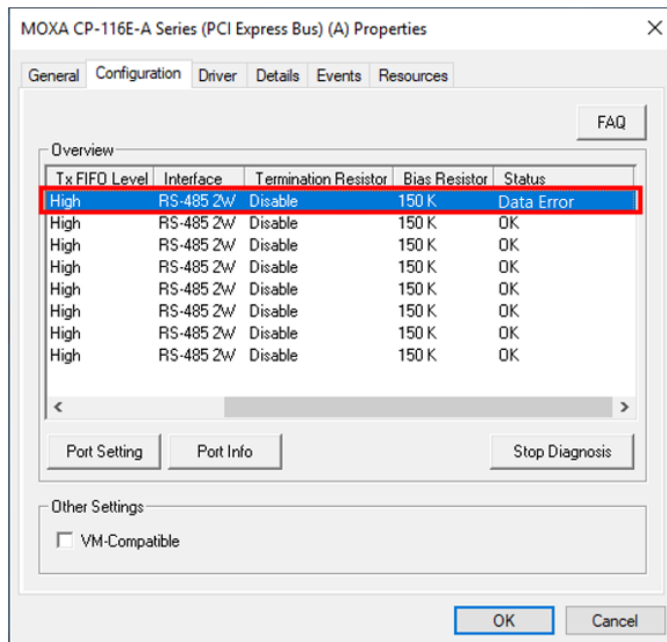
Status	Description/Cause	Adjust Pull-High /Low Resistor (Bias Resistor)	Adjust Terminator Resistor
OK	Communication OK	–	–
Waveform Distortion	Too many devices	✓	–
Receive Reflect Signal	Distance too long	–	✓
Data Error	Too many devices and distance too long	✓	✓

10. Repeat from Step 6 onwards until the communication is in order.

Linux Users

Take the following steps to configure the Intelligent RS-485 function.

1. Use the following command to do the configuration.

   `#./muestty -g /dev/ttyMUE1`

   ```
   root@linux:/moxa/mxser# muestty -g /dev/ttyMUE1
   muestty: /dev/ttyMUE1 is set to RS-485 2W mode.
   muestty: /dev/ttyMUE1 none terminal resistor.
   muestty: /dev/ttyMUE1 disable pull high/low resistor (150K ohm).
   ```

2. Test if the communication is OK. If it's OK, nothing further needs to be done. If it's not OK, proceed with Step 3.

3. Use the following command for the **Auto-Tuning** process. Enter "Y" to make the value effective immediately.

   `#./muestty -a (baud rate value) /dev/ttyMUE1`

   ```
   root@linux:~# muestty -a 115200 /dev/ttyMUE1

   Start tuning resistor...

   [Status]

   Pull High/Low Resistor  : 1K
   Terminator Resistor     : 120 ohm
   Tuning Status           : OK

   Note 1. To execute this command again if the serial device
           has been changed on the bus
        2. If the communication is correctly, record the related
           resistor value and init the setting on the rc.mxser file.
           Otherwise, execute the diagnose to get the error status.

   Done.

   Make these values effective immediately? [Y/n] (Enter for default=Y):
   y
   The values have been set now.
   ```

4. Test if the communication is OK. If it's OK, nothing further needs to be done. If it's not OK, proceed with Step 5.

5. Use the following command to run diagnosis.

   `#./muestty -d (baud rate value)    /dev/ttyMUE1`

   ```
   root@linux:~# muestty -d 115200 /dev/ttyMUE1

   Start diagnosing...

   [Status]

   Notice: Following results are based on correct devices connection.

   Pull High/Low Resistor  : 1K
   Terminator Resistor     : 120 ohm
   Alarm Status            : Data Error
   ```

6. Adjust non-MOXA devices according to the Status

Status	Cause	Adjust Pull-High /Low Resistor	Adjust Terminator Resistor
Waveform Distortion	Too many devices	✓	–
Receive Reflect Signal	Long distance	–	✓
Data Error	Too many devices & long distance	✓	✓

✏ **NOTE**

The Diagnosis tool is extremely sensitive; consequently, it could indicate errors even if the communication status is OK. In this case, you can decide whether or not to make the suggested configuration changes.

7. Repeat from Step 3 until the communication is OK.

5. Serial Programming Tools

Moxa provides an easy-to-use yet powerful serial programming library as well as utilities for communication troubleshooting for Windows platforms. The following sections provide details about the installation, the library, and the utilities for various platforms.

Moxa PComm

PComm, a professional serial communication tool for PCs, is a software package that runs under Windows NT95/98/2000/XP/2003/Vista/2008/7(x86 and x64). 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 for Windows NT95/98/2000/XP/2003/Vista/2008/7(x86 and x64), 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 online 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/Vista/2008/7(x86 and x64) 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 multiprocess, multithread 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 a brief description of each utility. For more information about these utilities, refer to the online documentation.

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 the search icon and search for the **PComm Diagnostic** program and launch this program.
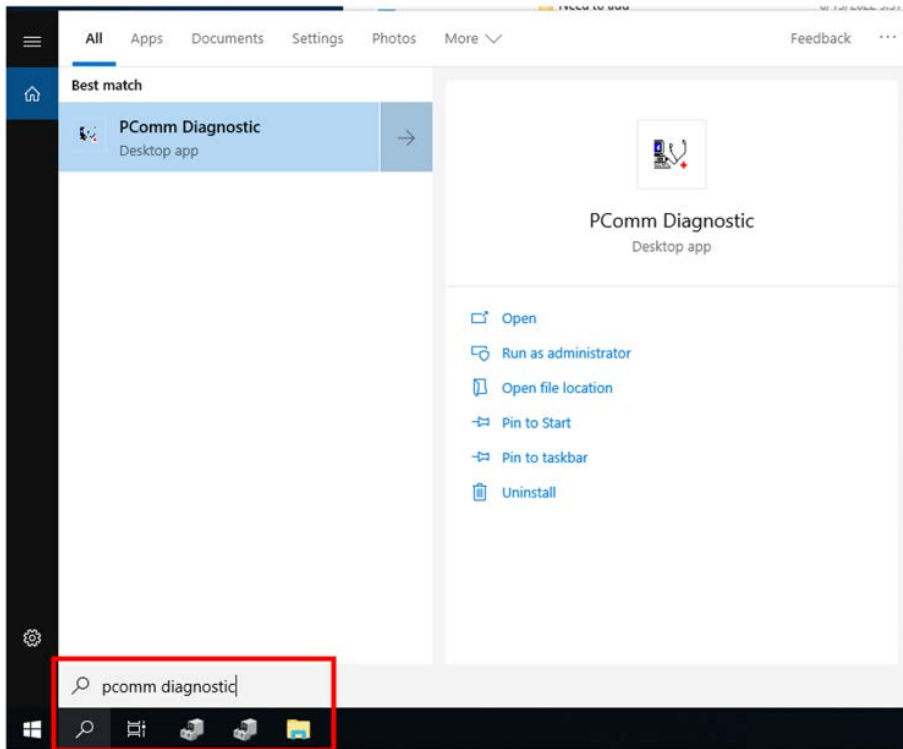
A typical test report for a Moxa board is as follows:
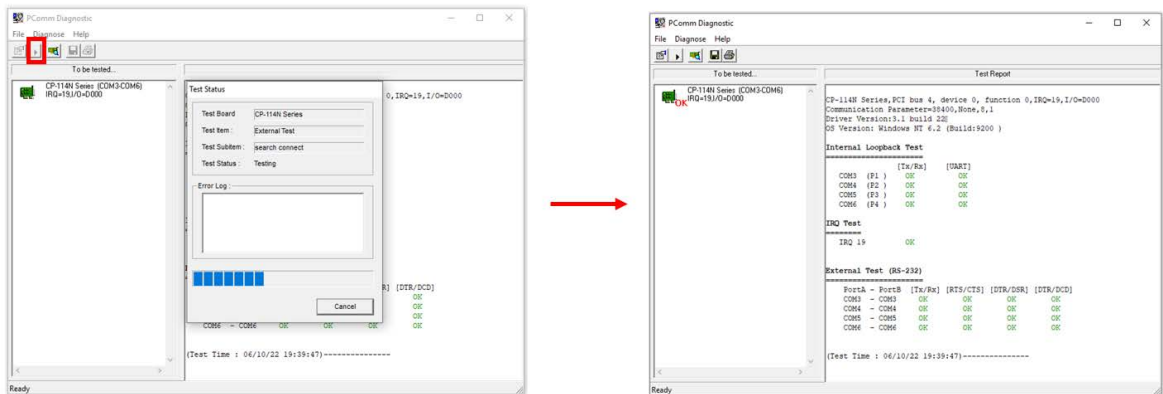
Monitor

This useful port status monitoring program allows you to monitor data transmission of selected Moxa COM ports.

To run the Monitor program, click the search icon and search for the **PComm Monitor** program and launch this program.
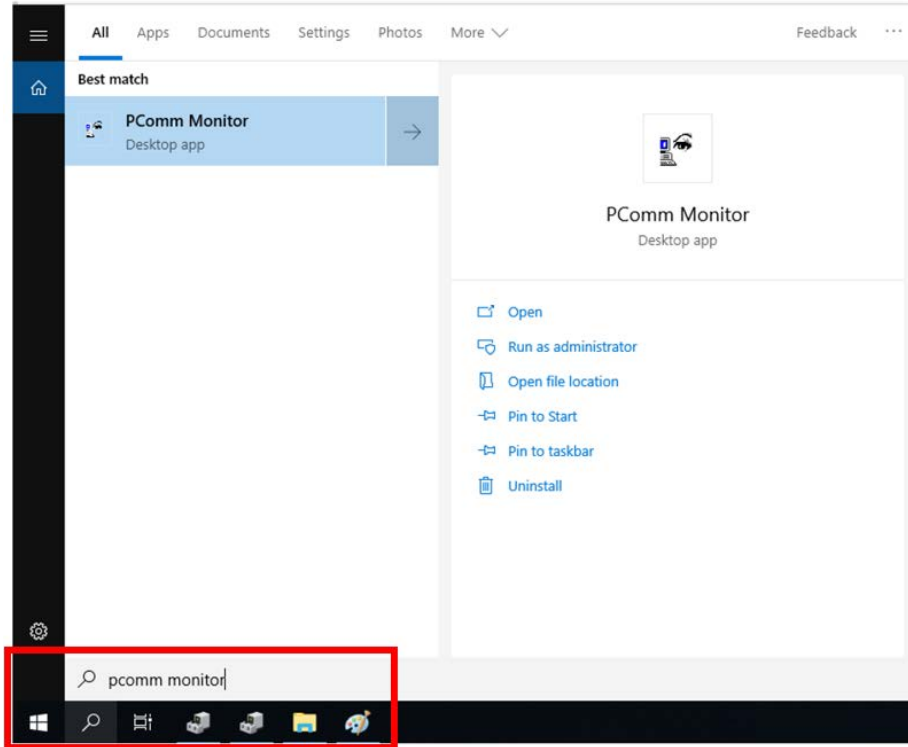
The program monitors data transmission/reception throughput and communication line status, with data updated and displayed on the screen at regular time intervals. Click a specific port to see a graph of the current communication parameters and status of that port.
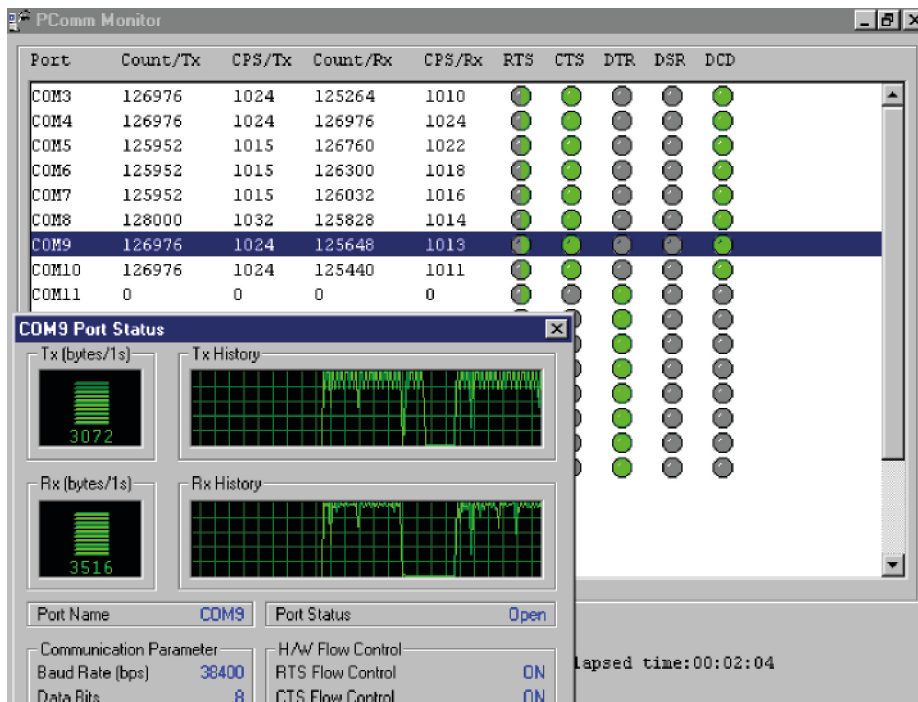
Terminal Emulator

Use Terminal Emulator to connect to your PC's serial ports to check if data is being transmitted correctly.

To run Terminal Emulator, click the search icon and search for the **PComm Terminal Emulator** program and launch this program.
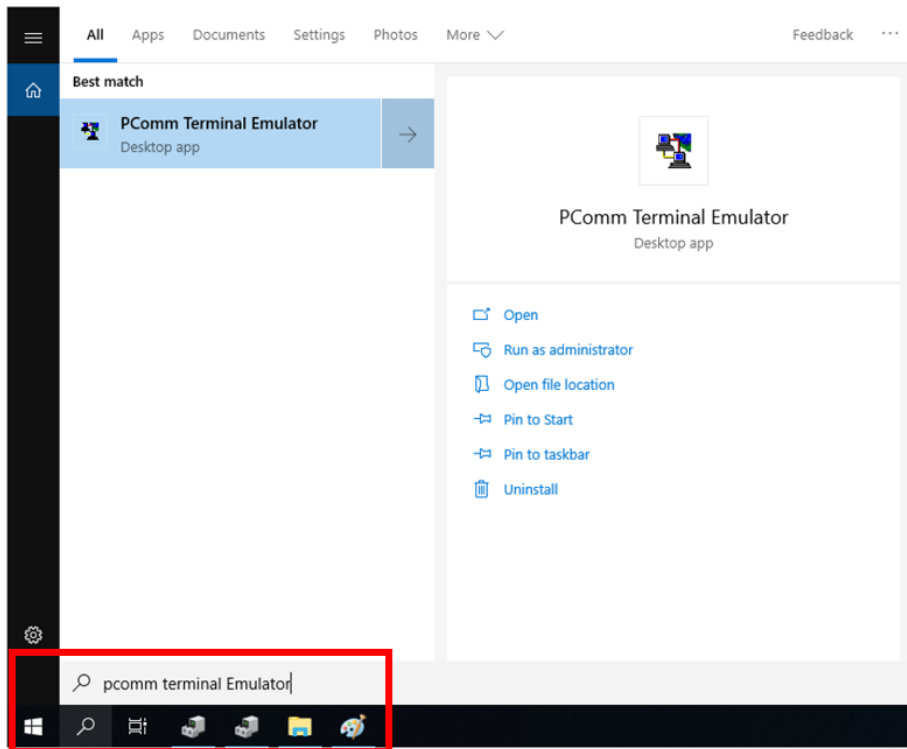
Terminal Emulator features multi-windows and supports VT100 and ANSI terminal types. You can transfer data interactively, send patterns periodically, and transfer files using ASCII, XMODEM, YMODEM, ZMODEM, and KERMIT protocols.
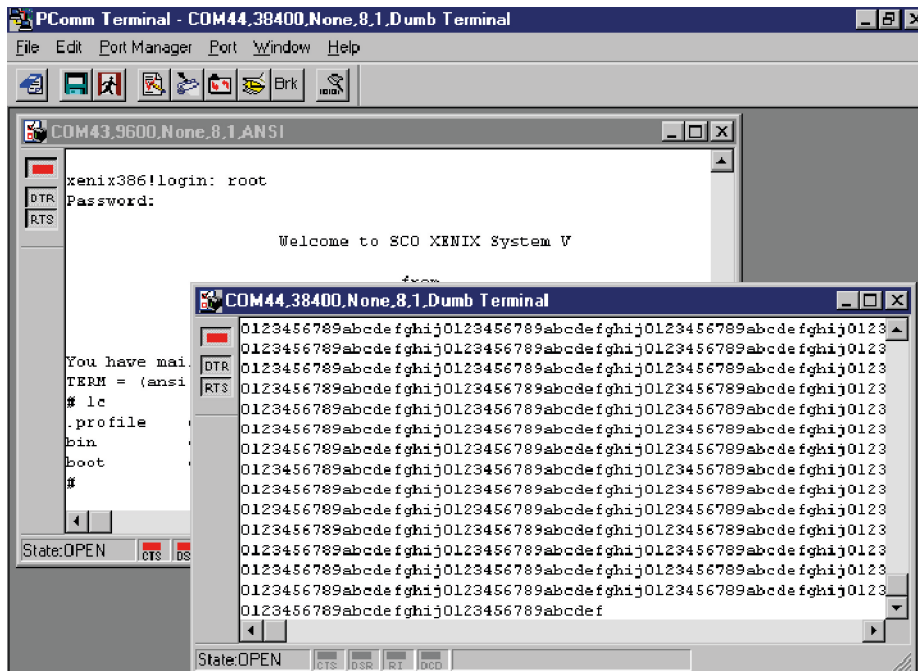
ViewCom

ViewCom is a useful tool to easily see the status of your Moxa serial boards. ViewCom is also a shortcut to the serial boards parameter configuration page. You don't need to go to "device manager" and find the serial boards name, which is complicated process.

✏️ **NOTE**

The default installation path for ViewCom is **C:\Program Files\Moxa\SmartioIndustioDriver**.

Go to this folder to launch the ViewCom.

There are many useful features in ViewCom.

1. Clicking the ViewCom icon will lead you to the device manager page for monitoring and configuring your devices, including Moxa sSerial boards.
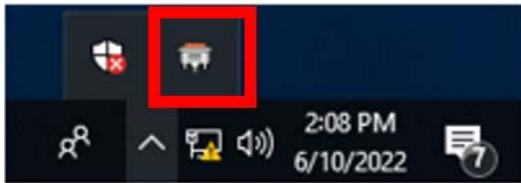
2. Hold you cursor on the ViewCom icon, and it will show the Moxa serial boards you have installed.
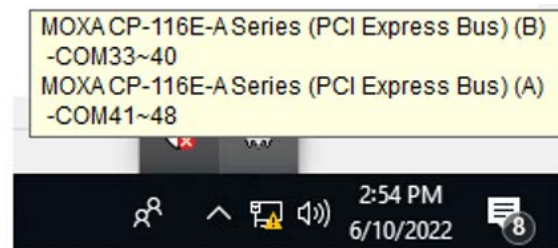
3. Rightclick on the ViewCom icon.
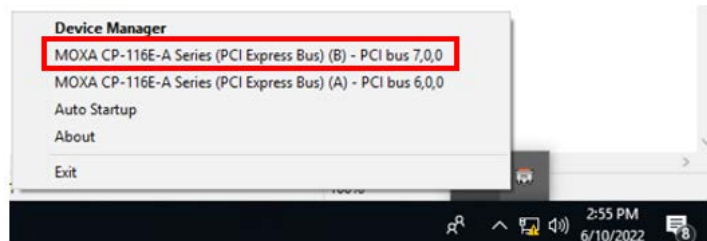
You can choose a Moxa multi-port serial board and go to the serial boards parameter configuration page directly.
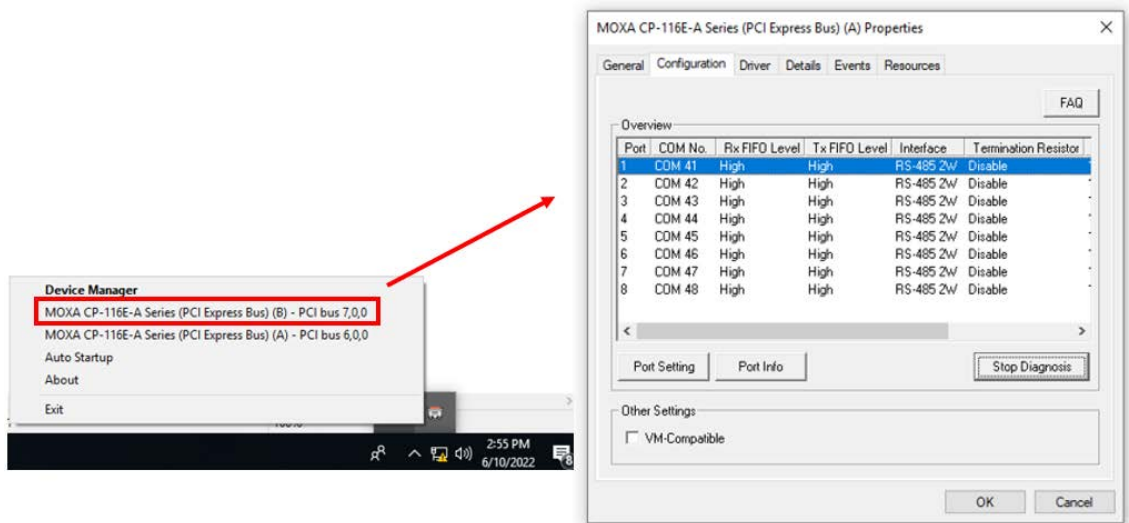
RS-485 Programming

If you are using your CP-118EL Series board for RS-485 applications, in addition to reading this section, you should also refer to Chapter 7, "Pin Assignments," 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™, an 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.

6. Programming Guide

If you want to develop your own driver, no matter whether on a Windows or Linux platform, the Moxa Smartio/Industio Programming Guide is a useful instruction. The following topics are covered in this chapter:

Relative Product List

Resource Requirement for Moxa Board

IRQ * 1

I/O:

UART register:	64 bytes (8 bytes / port * 8port) for MU860
	4096 bytes (512 bytes / port * 8port) for MUE250/450/850
IRQ Vector register:	16 bytes (only 1 byte used)

PCI Configuration for Moxa Board

A. MOXA Vendor ID = 0x1393

B. Device ID = (Please see Moxa Board PCI Device ID List section)

C. Hardware resource on Device Configuration Register of **PCI configuration space**:

Resource Name	Chip	Address Offset		Size
IRQ	All	0x3C		
IRQ Vector Address	MU860	0x1C	BAR3	16 bytes
UART register (I/O Base Address)	MU860	0x18	BAR2	64 bytes
UART register (Memory Base Address)	MUE250, MUE450, MUE850	0x14	BAR1	4096 bytes
Vector Base Address	MUE250, MUE450, MUE850	0x18	BAR2	16 bytes

Byte Offset	0-7	8-15	16-23	24-31
00h	Vendor ID		Device ID	
04h	Command		Status	
08h	…			
0Ch	…			
10h	BAR0			
14h	BAR1			
18h	BAR2			
1Ch	BAR3			
…	…			
3Ch	Interrupt Line	Interrupt Pin	Reserved	

✎ **NOTE**

For MUE250, MUE450, and MUE850 Chips Only: Memory mode is recommended for these chips to access UART. To use memory mode, the driver has to access the memory base address, which is located at BAR1.

UART Register Structure for MU860 chip


```
┌───────────────┬───────────────────────────────────────────┐
│               Total 64 bytes                               │
├───────┬───────┬─────────────────────────────┬─────────────┤
│8 bytes│8 bytes│        ........             │             │
└───────┴───────┴─────────────────────────────┴─────────────┘
  1st port's  2nd port's                        8th port's
  UART        UART            .....             UART
  register    register                          register
```

```
        UART register, 8 bytes for each port
┌──────┬──────┬──────────────────────┬──────────┐
│1 byte│1 byte│        ....          │          │
└──────┴──────┴──────────────────────┴──────────┘
  1st        2nd                         8th
  register,  register,                   register,
  RBR/THR    IER                         SCR
```
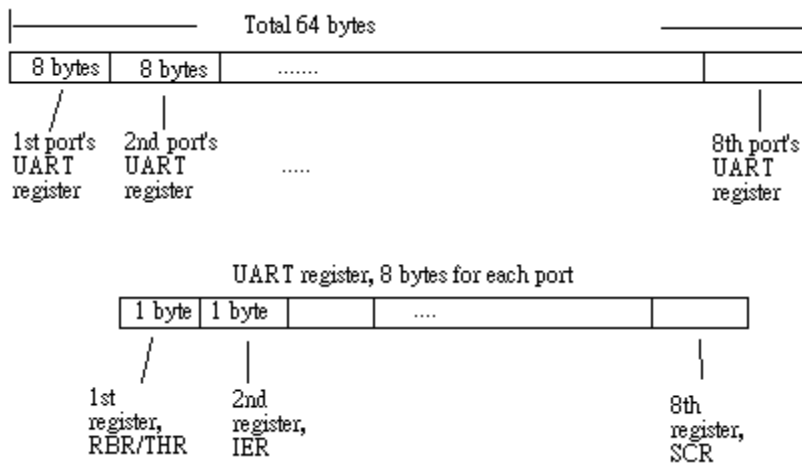
> ✏ **NOTE**
>
> For detailed UART register description, please see UART Datasheet section.

UART register address = I/O base address + (port-1) *8

For example, if the base address is 0x180:

The first port's UART register's I/O address is 0x180+(1-1)*8 = 0x180
    The first register's I/O address is 0x180,
    The second register's I/O address is 0x181, …..

The second port's UART register's I/O address is 0x180+(2-1)*8 = 0x188
    The first register's I/O register is 0x188,
    The second register's I/O register is 0x189, …..

IRQ Vector Register Structure


```
┌───────────────────────────────────────────────────────┐
│               Total 1 byte (8 bits)                    │
├───────┬───────┬─────────────────────────────┬─────────┤
│ 1 bit │ 1 bit │        .....                │  1 bit  │
└───────┴───────┴─────────────────────────────┴─────────┘
 bit7: 8th port   bit6: 7th port                bit0 : 1th port
```
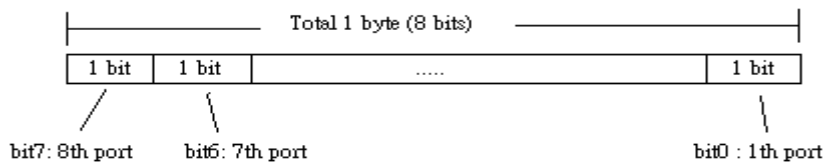
Bit Value	Status
0	Interrupt pending. Please read the UART register to get the detail interrupt information *.
1	No interrupt pending.

All serial ports on the same Moxa board use the same IRQ. Check Vector to know which port issues the interruption. Besides, you can also get the information by querying the IIR of each port.

UART Register Structure for MUE250, MUE450, and MUE850 chips

There are 512 bytes for each UART register and 0x200 offset between each port. However, there is one exception, for the models which are 4-port boards, such as **CP-104EL-A, CP-114EL, CP-114EL-I, and CP-134EL-A**, the offset of the fourth UART register is 0xE00.

Registers for 8 ports   **Registers for 4 ports**
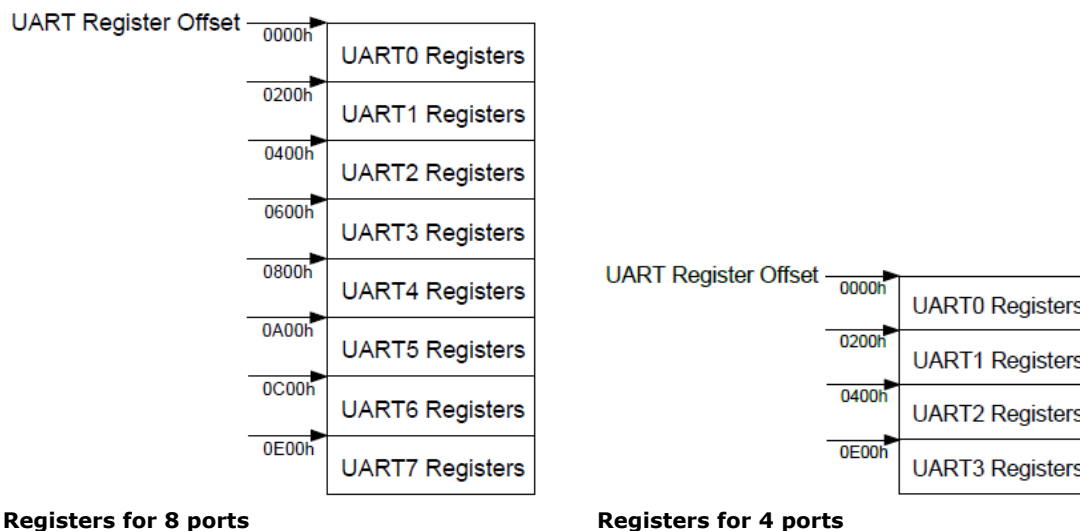
✏️ **NOTE**

For a detailed description of the UART register, please see the UART Datasheet section.

UART register address = I/O base address + (port-1) * 0x200

For example, if the base address is 0x200:

The first port's UART register's I/O address is 0x200 + (1-1) * 0x200 = 0x200
    The first register's I/O address is 0x200,
    The second register's I/O address is 0x201, …..

The second port's UART register's I/O address is 0x200 + (2-1) * 0x200 = 0x400
    The first register's I/O register is 0x400,
    The second register's I/O register is 0x401, …..

✏️ **NOTE**

For CP-104EL-A, CP-114EL, CP-114EL-I, and CP-134EL-A only:

1st port's UART register address = I/O base address
2nd port's UART register address = I/O base address + 1 * 0x200
3rd port's UART register address = I/O base address + 2 * 0x200
4th port's UART register address = I/O base address + 7 * 0x200

Control Serial Interface and Termination Resistor for MUE chips

For Moxa boards that use MUE250, MUE450, and MUE850 chips, BAR2, which allocates 16 bytes, is the vector base address that can be used to control serial interface and termination resistors according to the following table.

Offset	Bit	Port #	Parameters
0x4	[3..0]	1	
	[7..4]	2	
0x5	[3..0]	3	0x0 : RS-232
	[7..4]	4	0x1 : RS-422
0x6	[3..0]	5	0xF : RS-485 2W
	[7..4]	6	0xB : RS-485 4W
0x7	[3..0]	7	
	[7..4]	8	
0x8	[7..0]	[8..1]	GPIO – Input
0x9	[7..0]	[8..1]	GPIO direction configuration 0 : Set GPIO direction to input 1 : Set GPIO direction to output
0xA	[7..0]	[8..1]	GPIO – Output (Termination Resistor) 0 : Low (0 Ohm) 1 : High (120 Ohm)

Especially, the interfaces of 4 ports model, such as CP-114EL and CP-114EL-I, are using the following offset to set the interface of port 4.

Offset	Bit	Port #	Parameters
0x4	[3..0]	1	
	[7..4]	2	
0x5	[3..0]	3	0x0 : RS-232
	[7..4]	–	0x1 : RS-422
0x6	[3..0]	–	0xF : RS-485 2W
	[7..4]	–	0xB : RS-485 4W
0x7	[3..0]	4	

For Baud Rate Setting

For General PC Com Port: CLK=1.8432MHz

$$Div = CLK/(Baud \times 16)$$

But for Moxa Board: CLK=**14.7456**MHz

$$Div = \mathbf{CLK}/(Baud \times 16)$$

Moxa Board PCI Device ID List

Model	Ports	Bus	Chip	Max Baud	Vendor ID	Device ID
CP-102U	2	UPCI	MU860	921.6k	0x1393	0x1022
CP-102UL	2	UPCI	MU860	921.6k	0x1393	0x1021
CP-132UL	2	UPCI	MU860	921.6k	0x1393	0x1321
CP-132UL-I	2	UPCI	MU860	921.6k	0x1393	0x1321
CP-102E	2	PCIe	MUE250	921.6k	0x1393	0x1024
CP-102EL	2	PCIe	MUE250	921.6k	0x1393	0x1025
CP-132EL	2	PCIe	MUE250	921.6k	0x1393	0x1322
CP-132EL-I	2	PCIe	MUE250	921.6k	0x1393	0x1322
CP-104UL	4	UPCI	MU860	921.6k	0x1393	0x1041
CP-104JU	4	UPCI	MU860	921.6k	0x1393	0x1042
CP-114UL	4	UPCI	MU860	921.6k	0x1393	0x1143
CP-114UL-I	4	UPCI	MU860	921.6k	0x1393	0x1143
CP-134U	4	UPCI	MU860	921.6k	0x1393	0x1340
CP-134U-I	4	UPCI	MU860	921.6k	0x1393	0x1340
CP-104EL-A	4	PCIe	MUE450	921.6k	0x1393	0x1045
CP-114EL	4	PCIe	MUE450	921.6k	0x1393	0x1144
CP-114EL-I	4	PCIe	MUE450	921.6k	0x1393	0x1144
CP-134EL-A	4	PCIe	MUE450	921.6k	0x1393	0x1342
CB-114	4	PC/104-Plus	MU860	921.6k	0x1393	0x1142
CB-134I	4	PC/104-Plus	MU860	921.6k	0x1393	0x1341
CP-118U	8	UPCI	MU860	921.6k	0x1393	0x1180
CP-118U-I	8	UPCI	MU860	921.6k	0x1393	0x1180
CP-138U	8	UPCI	MU860	921.6k	0x1393	0x1380
CP-138U-I	8	UPCI	MU860	921.6k	0x1393	0x1380
CP-168U	8	UPCI	MU860	921.6k	0x1393	0x1681
CP-116E-A(A)	8	PCIe	MUE850	921.6k	0x1393	0x1160
CP-116E-A(B)	8	PCIe	MUE850	921.6k	0x1393	0x1161
CP-118EL-A	8	PCIe	MUE850	921.6k	0x1393	0x1182
CP-118E-A-I	8	PCIe	MUE850	921.6k	0x1393	0x1183
CP-138E-A-I	8	PCIe	MUE850	921.6k	0x1393	0x1381
CP-168EL-A	8	PCIe	MUE850	921.6k	0x1393	0x1683
CB-108	8	PC/104-Plus	MU860	921.6k	0x1393	0x1080

UART Datasheet

Moxa's chips are compatible with the following chips. For more details about UART register description, please refer to the links below.

UART	Port	Datasheet
MU-860	2-8	TL16C550C
MUE-250	2	PI7C9X7952
MUE-450	4	PI7C9X7954
MUE-850	8	PI7C9X7958

7. Pin Assignments

PCIe Board Accessories Table

To select a PCIe board accessories please refer to the following table:

PCIe Board	Model	Connector Type	Interface
CP-118EL-A	CBL-M68M9x8-100/ OPT8-M9+	DB9 male	RS-232 RS-422/4-wireRS-485 2-wireRS-485
	OPT8B+/ CBL-M68M25x8-100	DB25 male	
	OPT8A+/OPT8S+	DB25 female	
CP-168EL-A	CBL-M68M9x8-100/ OPT8-M9+	DB9 male	RS-232
	OPT8B+/OPT8C+	DB25 male	
	OPT8A+/OPT8S+	DB25 female	
CP-104EL-A	CBL-M44M9x4-50	DB9 male	RS-232
	CBL-M44M25x4-50	DB25 male	
CP-102EL	CBL-M25M9x2-50	DB9 male	RS-232
CP-132EL/ CP-132EL-I	CBL-M25M9x2-50	DB9 male	RS-422/4-wire RS-485/ 2-wire RS-485
CP-114EL/ CP-114EL-I	CBL-M44M9x4-50	DB9 male	RS-232 RS-422/4-wire RS-485 2-wire RS-485
	CBL-M44M25x4-50	DB25 male	
CP-118E-A-I/ CP-138E-A-I	CBL-M78M9x8-100	DB9 male	RS-232 RS-422/4-wireRS-485 2-wire RS-485
	CBL-M78M25x8-100	DB25 male	
CP-134EL-A-I	CBL-M44M9x4-50	DB9 male	RS-422/4-wire RS-485/ 2-wire RS-485
	CBL-M44M25x4-50	DB25 male	
CP-116E-A	OPT8-M9+/ CBL-M68M9x8-100	DB9 male	RS-232 RS-422/4-wire RS-485 2-wire RS-485
	OPT8B+/ CBL-M68M25x8-100	DB25 male	
	OPT8A+/OPT8S+	DB25 female	

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

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	RxD6	13	DCD4	25	TxD2	37	RI7	49	RI5	61	TxD1
2	CTS6	14	RTS4	26	GND	38	RTS7	50	CTS5	62	DSR1
3	RI6	15	RI4	27	TxD0	39	DCD7	51	RxD5	63	DTR1
4	RTS6	16	CTS4	28	DSR0	40	DTR7	52	RxD3	64	DCD1
5	DCD6	17	RxD4	29	DTR0	41	DSR7	53	CTS3	65	RTS1
6	DTR6	18	RxD2	30	DCD0	42	TxD7	54	RI3	66	RI1
7	DSR6	19	CTS2	31	RTS0	43	GND	55	RTS3	67	CTS1
8	TxD6	20	RI2	32	RI0	44	TxD5	56	DCD3	68	RxD1
9	GND	21	RTS2	33	CTS0	45	DSR5	57	DTR3		
10	TxD4	22	DCD2	34	RxD0	46	DTR5	58	DSR3		
11	DSR4	23	DTR2	35	RxD7	47	DCD5	59	TxD3		
12	DTR4	24	DSR2	36	CTS7	48	RTS5	60	GND		

RS-422 and 4-wire RS-485

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	TxD6+(B)	18	TxD2+(B)	35	TxD7+(B)	52	TxD3+(B)
5	TxD6-(A)	22	TxD2-(A)	39	TxD7-(A)	56	TxD3-(A)
6	RxD6-(A)	23	RxD2-(A)	40	RxD7-(A)	57	RxD3-(A)
8	RxD6+(B)	25	RxD2+(B)	42	RxD7+(B)	59	RxD3+(B)
9	GND	26	GND	43	GND	60	GND
10	RxD4+(B)	27	RxD0+(B)	44	RxD5+(B)	61	RxD1+(B)
12	RxD4-(A)	29	RxD0-(A)	46	RxD5-(A)	63	RxD1-(A)
13	TxD4-(A)	30	TxD0-(A)	47	TxD5-(A)	64	TxD1-(A)
17	TxD4+(B)	34	TxD0+(B)	51	TxD5+(B)	68	TxD1+(B)

2-wire RS-485

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
6	D6-(A)	23	D2-(A)	40	D7-(A)	57	D3-(A)
8	D6+(B)	25	D2+(B)	42	D7+(B)	59	D3+(B)
9	GND	26	GND	43	GND	60	GND
10	D4+(B)	27	D0+(B)	44	D5+(B)	61	D1+(B)
12	D4-(A)	29	D0-(A)	46	D5-(A)	63	D1-(A)

Device Side Pin Assignments

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

Pin	RS-232	RS-422/RS-485-4W	RS-485-2W
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
9	–	–	–

Male DB25 (OPT8B+/ CBL-M68M25x8-100)

Pin	RS-232	RS-422/RS-485-4W	RS-485-2W
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	RTS	–	–
5	CTS	–	–
6	DSR	–	–
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DTR	RxD-(A)	Data-(A)

Female DB25 (OPT8A+/S+)

Pin	RS-232	RS-422/RS-485-4W	RS-485-2W
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	CTS	–	–
5	RTS	–	–
6	DTR	RxD-(A)	Data-(A)
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DSR	–	–

CP-168EL-A

The CP-168EL-A board has a female SCSI VHDCI68 connector on the board, with various connection options available to connect 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 the RS-232 interface onboard.

Board Side Pin Assignments-Female SCSI VHDCI68

RS-232

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	RxD6	13	DCD4	25	TxD2	37	RI7	49	RI5	61	TxD1		
2	CTS6	14	RTS4	26	GND	38	RTS7	50	CTS5	62	DSR1		
3	RI6	15	RI4	27	TxD0	39	DCD7	51	RxD5	63	DTR1		
4	RTS6	16	CTS4	28	DSR0	40	DTR7	52	RxD3	64	DCD1		
5	DCD6	17	RxD4	29	DTR0	41	DSR7	53	CTS3	65	RTS1		
6	DTR6	18	RxD2	30	DCD0	42	TxD7	54	RI3	66	RI1		
7	DSR6	19	CTS2	31	RTS0	43	GND	55	RTS3	67	CTS1		
8	TxD6	20	RI2	32	RI0	44	TxD5	56	DCD3	68	RxD1		
9	GND	21	RTS2	33	CTS0	45	DSR5	57	DTR3				
10	TxD4	22	DCD2	34	RxD0	46	DTR5	58	DSR3				
11	DSR4	23	DTR2	35	RxD7	47	DCD5	59	TxD3				
12	DTR4	24	DSR2	36	CTS7	48	RTS5	60	GND				

Device Side Pin Assignments

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

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	–
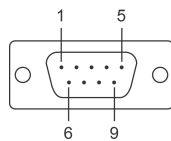
Male DB25 (OPT8B+/ CBL-M68M25x8-100)

Pin	RS-232
2	TxD
3	RxD
4	RTS
5	CTS
6	DSR
7	GND
8	DCD
20	DTR
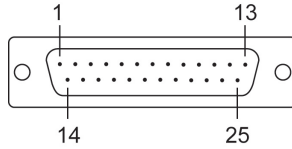
Female DB25 (OPT8A+/S+)

Pin	RS-232
2	RxD
3	TxD
4	CTS
5	RTS
6	DTR
7	GND
8	DCD
20	DSR
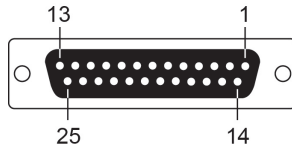
CP-104EL-A

Board Side Pin Assignments-Female DB44

RS-232
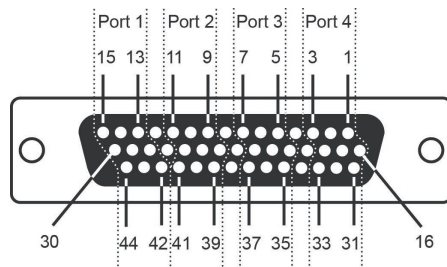
Port 1		Port 2		Port 3		Port 4	
13	TxD	9	TxD	5	TxD	1	TxD
14	RxD	10	RxD	6	RxD	2	RxD
15	RTS	11	RTS	7	RTS	3	RTS
28	CTS	24	CTS	20	CTS	16	CTS
29	DTR	25	DTR	21	DTR	17	DTR
30	DSR	26	DSR	22	DSR	18	DSR
42	DCD	39	DCD	35	DCD	31	DCD
44	GND	41	GND	37	GND	33	GND

Device Side Pin Assignments

Male DB9 (CBL-M44M9x4-50)

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	–
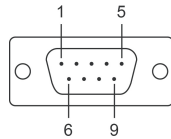
Male DB25 (CBL-M44M25x4-50)

Pin	RS-232
2	TxD
3	RxD
4	RTS
5	CTS
6	DSR
7	GND
8	DCD
20	DTR
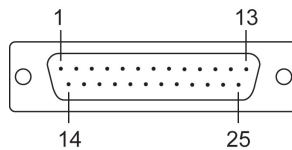
CP-102E

Board Side Pin Assignments-Male DB9

The CP-102E has two male DB9 connectors onboard.

Male DB9

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	–
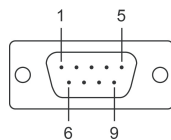
CP-102EL

Board Side Pin Assignments—Female DB25

RS-232

Pin	RS-232	Pin	RS-232
1	–	13	–
2	DCD1	14	–
3	GND	15	DTR1
4	CTS1	16	DSR1
5	RxD1	17	RTS1
6	–	18	TxD1
7	–	19	–
8	–	20	–
9	DTR0	21	DCD0
10	DSR0	22	GND
11	RTS0	23	CTS0
12	TxD0	24	RxD0
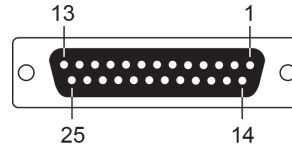
Device Side Pin Assignments

Male DB9 (CBL-M25M9x2-50)

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	–
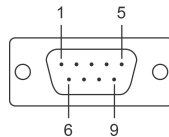
CP-132EL/CP-132EL-I

Board Side Pin Assignments—Female DB25
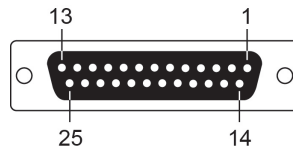
RS-422 & 4-wire RS-485 | 2-wire RS-485

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	–	14	–	1	–	14	–
2	TxD1-(A)	15	RxD1-(A)	2	–	15	Data1-(A)
3	GND1	16	–	3	GND1	16	–
4	–	17	–	4	–	17	–
5	TxD1+(B)	18	RxD1+(B)	5	–	18	Data1+(B)
6	–	19	–	6	–	19	–
7	–	20	–	7	–	20	–
8	–	21	TxD0-(A)	8	–	21	–
9	RxD0-(A)	22	GND0	9	Data0-(A)	22	GND0
10	–	23	–	10	–	23	–
11	–	24	TxD0+(B)	11	–	24	–
12	RxD0+(B)	25	–	12	Data0+(B)	25	–
13	–			13	–		

Device Side Pin Assignments

Male DB9 (CBL-M25M9x2-50)

Pin	RS-422/RS-485-4W	RS-485-2W
1	TxD-(A)	–
2	TxD+(B)	–
3	RxD+(B)	Data+(B)
4	RxD-(A)	Data-(A)
5	GND	GND
6	–	–
7	–	–
8	–	–
9	–	–
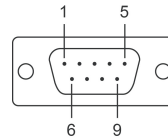
CP-114EL/CP-114EL-I

Board Side Pin Assignments—Female DB44
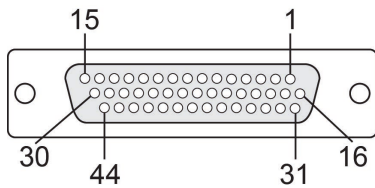
RS-232

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	TxD3	13	TxD0	25	DTR1	37	GND
2	RxD3	14	RxD0	26	DSR1	38	–
3	RTS3	15	RTS0	27	–	39	DCD1
4	–	16	CTS3	28	CTS0	40	–
5	TxD2	17	DTR3	29	DTR0	41	GND
6	RxD2	18	DSR3	30	DSR0	42	DCD0
7	RTS2	19	–	31	DCD3	43	–
8	–	20	CTS2	32	–	44	GND
9	TxD1	21	DTR2	33	GND		
10	RxD1	22	DSR2	34	–		
11	RTS1	23	–	35	DCD2		
12	–	24	CTS1	36	–		

RS-422 & 4-wire RS-485

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	RxD3(+)	13	RxD0(+)	25	RxD1(-)	37	GND
2	TxD3(+)	14	TxD0(+)	26	–	38	–
3	–	15	–	27	–	39	TxD1(-)
4	–	16	–	28	–	40	–
5	RxD2(+)	17	RxD3(-)	29	RxD0(-)	41	GND
6	TxD2(+)	18	–	30	–	42	TxD0(-)
7	–	19	–	31	TxD3(-)	43	–
8	–	20	–	32	–	44	GND
9	RxD1(+)	21	RxD2(-)	33	GND		
10	TxD1(+)	22	–	34	–		
11	–	23	–	35	TxD2(-)		
12	–	24	–	36	–		

2-wire RS-485

Pin	Signal	Pin	Signal	Pin	Signal
1	Data3+(B)	16	–	31	–
2	–	17	Data3-(A)	32	–
3	–	18	–	33	GND3
4	–	19	–	34	–
5	Data2+(B)	20	–	35	–
6	–	21	Data2-(A)	36	–
7	–	22	–	37	GND2
8	–	23	–	38	–
9	Data1+(B)	24	–	39	–
10	–	25	Data1-(A)	40	–
11	–	26	–	41	GND1
12	–	27	–	42	–
13	Data0+(B)	28	–	43	–
14	–	29	Data0-(A)	44	GND0
15	–	30	–		

Device Side Pin Assignments

Male DB9 (CBL-M44M9x4-50)

Pin	RS-232	RS-422/RS-485-4W	RS-485-2W
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
9	–	–	–
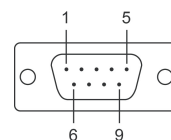
Male DB25 (CBL-M44M25x4-50)

Pin	RS-232	RS-422/RS-485-4W	RS-485-2W
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	RTS	–	–
5	CTS	–	–
6	DSR	–	–
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DTR	RxD-(A)	Data-(A)
22	–	–	–

CP-118E-A-I/CP-138E-A-I

Board Side Pin Assignments—Female DB78
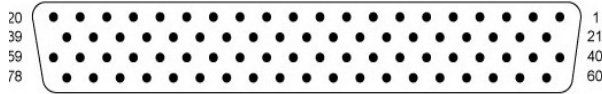
RS-232

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND7	21	RTS7	40	CTS7	60	DCD7
2	TXD7	22	DTR7	41	DSR7	61	RXD7
3	–	23	RTS6	42	–	62	DCD6
4	GND6	24	DTR6	43	CTS6	63	RXD6
5	TXD6	25	–	44	DSR6	64	–
6	GND5	26	RTS5	45	CTS5	65	DCD5
7	TXD5	27	DTR5	46	DSR5	66	RXD5
8	–	28	RTS4	47	–	67	DCD4
9	GND4	29	DTR4	48	CTS4	68	RXD4
10	TXD4	30	–	49	DSR4	69	–
11	GND3	31	RTS3	50	CTS3	70	DCD3
12	TXD3	32	DTR3	51	DSR3	71	RXD3
13	–	33	RTS2	52	–	72	DCD2
14	GND2	34	DTR2	53	CTS2	73	RXD2
15	TXD2	35	–	54	DSR2	74	–
16	GND1	36	RTS1	55	CTS1	75	DCD1
17	TXD1	37	DTR1	56	DSR1	76	RXD1
18	–	38	RTS0	57	–	77	DCD0
19	GND0	39	DTR0	58	CTS0	78	RXD0
20	TXD0			59	DSR0		

RS-485-4W/RS-422

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND7	21	–	40	–	60	TXD7-
2	RXD7+	22	RXD7-	41	–	61	TXD7+
3	–	23	–	42	–	62	TXD6-
4	GND6	24	RXD6-	43	–	63	TXD6+
5	RXD6+	25	–	44	–	64	–
6	GND5	26	–	45	–	65	TXD5-
7	RXD5+	27	RXD5-	46	–	66	TXD5+
8	–	28	–	47	–	67	TXD4-
9	GND4	29	RXD4-	48	–	68	TXD4+
10	RXD4+	30	–	49	–	69	–
11	GND3	31	–	50	–	70	TXD3-
12	RXD3+	32	RXD3-	51	–	71	TXD3+
13	–	33	–	52	–	72	TXD2-
14	GND2	34	RXD2-	53	–	73	TXD2+
15	RXD2+	35	–	54	–	74	–
16	GND1	36	–	55	–	75	TXD1-
17	RXD1+	37	RXD1-	56	–	76	TXD1+
18	–	38	–	57	–	77	TXD0-
19	GND0	39	RXD0-	58	–	78	TXD0+
20	RXD0+			59	–		

RS-485-2W

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND7	21	–	40	–	60	–
2	DATA7+	22	DATA7-	41	–	61	–
3	–	23	–	42	–	62	–
4	GND6	24	DATA6-	43	–	63	–
5	DATA6+	25	–	44	–	64	–
6	GND5	26	–	45	–	65	–
7	DATA5+	27	DATA5-	46	–	66	–
8	–	28	–	47	–	67	–
9	GND4	29	DATA4-	48	–	68	–
10	DATA4+	30	–	49	–	69	–
11	GND3	31	–	50	–	70	–
12	DATA3+	32	DATA3-	51	–	71	–
13	–	33	–	52	–	72	–
14	GND2	34	DATA2-	53	–	73	–
15	DATA2+	35	–	54	–	74	–
16	GND1	36	–	55	–	75	–
17	DATA1+	37	DATA1-	56	–	76	–
18	–	38	–	57	–	77	–
19	GND0	39	DATA0-	58	–	78	–
20	DATA0+			59	–		

Device Side Pin Assignments—Male DB9

PIN	RS-232	RS-422/RS-485-4W	RS-485-2W
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
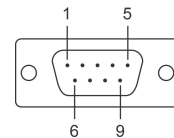
Male DB25 (CBL-M78M25x8-100)

PIN	RS-232	RS-422/RS-485-4W	RS-485-2W
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	RTS	–	–
5	CTS	–	–
6	DSR	–	–
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DTR	RxD-(A)	Data-(A)
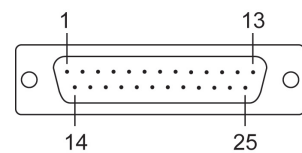
CP134EL-A-I

Board Side Pin Assignments—Female DB44

RS-422

Pin	Signal	Pin	Signal	Pin	Signal
1	RXD4+	16	–	31	TXD4-
2	TXD4+	17	RXD4-	32	–
3	–	18	–	33	GND4
4	–	19	–	34	–
5	RXD3+	20	–	35	TXD3-
6	TXD3+	21	RXD3-	36	–
7	–	22	–	37	GND3
8	–	23	–	38	–
9	RXD2+	24	–	39	TXD2-
10	TXD2+	25	RXD2-	40	–
11	–	26	–	41	GND2
12	–	27	–	42	TXD1-
13	RXD1+	28	–	43	–
14	TXD1+	29	RXD1-	44	GND1
15	–	30	–		

RS-485-4W

Pin	Signal	Pin	Signal	Pin	Signal
1	RXD4+	16	–	31	TXD4-
2	TXD4+	17	RXD4-	32	–
3	–	18	–	33	GND4
4	–	19	–	34	–
5	RXD3+	20	–	35	TXD3-
6	TXD3+	21	RXD3-	36	–
7	–	22	–	37	GND3
8	–	23	–	38	–
9	RXD2+	24	–	39	TXD2-
10	TXD2+	25	RXD2-	40	–
11	–	26	–	41	GND2
12	–	27	–	42	TXD1-
13	RXD1+	28	–	43	–
14	TXD1+	29	RXD1-	44	GND1
15	–	30	–		

RS-485-2W

Pin	Signal	Pin	Signal	Pin	Signal
1	DATA4+	16	–	31	–
2	–	17	DATA4-	32	–
3	–	18	–	33	–
4	–	19	–	34	–
5	DATA3+	20	–	35	–
6	–	21	DATA3-	36	–
7	–	22	–	37	–
8	–	23	–	38	–
9	DATA2+	24	–	39	–
10	–	25	DATA2-	40	–
11	–	26	–	41	–
12	–	27	–	42	–
13	DATA1+	28	–	43	–
14	–	29	DATA1-	44	–
15	–	30	–		

Device Side Pin Assignments—Male DB9

PIN	RS-232	RS-422/RS-485-4W	RS-485-2W
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
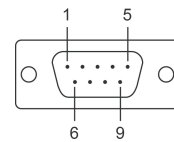
Male DB25 (CBL-M44M25x4-50)

PIN	RS-232	RS-422/RS-485-4W	RS-485-2W
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	RTS	–	–
5	CTS	–	–
6	DSR	–	–
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DTR	RxD-(A)	Data-(A)

CP-116E-A

Board Side Pin Assignments—Female SCSI VHDCI68
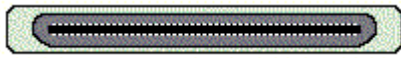
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	RxD6	13	DCD4	25	TxD2	37	–	49	–	61	TxD1
2	CTS6	14	RTS4	26	GND	38	RTS7	50	CTS5	62	DSR1
3	–	15	–	27	TxD0	39	DCD7	51	RxD5	63	DTR1
4	RTS6	16	CTS4	28	DSR0	40	DTR7	52	RxD3	64	DCD1
5	DCD6	17	RxD4	29	DTR0	41	DSR7	53	CTS3	65	RTS1
6	DTR6	18	RxD2	30	DCD0	42	TxD7	54	–	66	–
7	DSR6	19	CTS2	31	RTS0	43	GND	55	RTS3	67	CTS1
8	TxD6	20	–	32	–	44	TxD5	56	DCD3	68	RxD1
9	GND	21	RTS2	33	CTS0	45	DSR5	57	DTR3		
10	TxD4	22	DCD2	34	RxD0	46	DTR5	58	DSR3		
11	DSR4	23	DTR2	35	RxD7	47	DCD5	59	TxD3		
12	DTR4	24	DSR2	36	CTS7	48	RTS5	60	GND		

Device Side Pin Assignments—Male DB9

PIN	RS-232	RS-422/RS-485-4W	RS-485-2W
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

Male DB25 (OPT8B+ / CBL-M68M25x8-100)

PIN	RS-232	RS-422/RS-485-4W	RS-485-2W
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	RTS	–	–
5	CTS	–	–
6	DSR	–	–
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DTR	RxD-(A)	Data-(A)
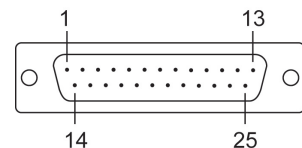
Female DB25 (OPT8A+/S+)

PIN	RS-232	RS-422/RS-485-4W	RS-485-2W
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	CTS	–	–
5	RTS	–	–
6	DTR	RxD-(A)	Data-(A)
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DSR	–	–

8. Troubleshooting

In this chapter, we discuss the common PCI Express Series problems and possible solutions. 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 Moxa PCI Express board cannot be detected by the Moxa driver while installing the driver.**

  Hardware causes and solutions:

  ➢ Express slot. It is also possible that a slot has malfunctioned. In this case, try other slots until you find one that works.

  ➢ 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.

- **The Moxa PCI Express board and driver are activated but cannot transfer (transmit/receive) data.**

  Hardware Causes and Solutions:

  ➢ Make sure the cable wiring is connected correctly. Refer to the "Pin Assignments" chapter for correct cable connections.

  ➢ 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:

  ➢ 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 Chapter 7 "Pin Assigments" for proper wiring diagrams; then, check the line status of the suspected port, using the diagnostics LED indicators on the mini tester.

  ➢ 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 that runs under Windows platform).

A. Product Specifications

CP-118EL-A Specifications

Hardware	
Connector	SCSI VHDCI68
Comm. Controller	16C550C compatible
Interface	
Bus Interface	PCI Express ´ 1
Number of Ports	8
Max No. of Boards	8 (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
Standards and Certifications	EN55032, 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	
Connector	SCSI VHDCI68
Comm. Controller	16C550C compatible
Interface	
Bus Interface	PCI Express ´ 1
Number of Ports	8
Max No. of Boards	8 (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
Standards and Certifications	EN55032, 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	
Connector	Female DB44
Comm. Controller	16C550C compatible
Interface	
Bus Interface	PCI Express ´ 1
Number of Ports	4
Max No. of Boards	8 (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
Standards and Certifications	EN55032, 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	
Connector	Male DB9 x 2
Comm. Controller	16C550C compatible
Interface	
Bus Interface	PCI Express ´ 1
Number of Ports	2
Max No. of Boards	8
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
Standards and Certifications	EN55032, 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	
Connector	Female DB25
Comm. Controller	16C550C compatible
Interface	
Bus Interface	PCI Express ´ 1
Number of Ports	2
Max No. of Boards	8
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
Standards and Certifications	EN55032, 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	
Connector	Female DB25
Comm. Controller	16C550C compatible
Interface	
Bus Interface	PCI Express ´ 1
Number of Ports	2
Max No. of Boards	8
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)
Standards and Certifications	EN55032, 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	
Connector	Female DB44
Comm. Controller	16C550C compatible
Interface	
Bus Interface	PCI Express ´ 1
Number of Ports	4
Max No. of Boards	8
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)
Standards and Certifications	EN55032, 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-118E-A-I Specifications

Hardware	
Connector	Female DB 78
Comm. Controller	16C550C Compatible
Interface	
Bus Interface	PCI-Express x 1
Number of Ports	8
Max No. of Boards	8
Signal	
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-422	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	2356 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
Surge Protection	4 kV
Standards and Certifications	EN55032, 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-138E-A-I Specifications

Hardware	
Connector	Female DB 78
Comm. Controller	16C550C Compatible
Interface	
Bus Interface	PCI-Express x 1
Number of Ports	8
Max No. of Boards	8
Signal	
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-422	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	2356 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
Surge Protection	4 kV
Standards and Certifications	EN55032, 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-134EL-A-I Specifications

Hardware	
Connector	Female DB 44
Comm. Controller	16C550C Compatible
Interface	
Bus Interface	PCI-Express x 1
Number of Ports	4
Max No. of Boards	8
Signal	
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-422	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	3414 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
Surge Protection	4 kV
Standards and Certifications	EN55032, 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-116E-A Specifications

Hardware	
Connector	Female SCSI VHDCI68
Comm. Controller	16C550C Compatible
Interface	
Bus Interface	PCI-Express x 1
Number of Ports	16
Max No. of Boards	8
Signal	
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-422	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	2733 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)
Surge Protection	4 kV
ESD Protection	Embedded 15 kV ESD Protection
Standards and Certifications	EN55032, 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