CA Series PC/104 Multiport Serial Module

User's Manual

www.moxa.com/product

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1

Introduction

Welcome to the CA Series of PC/104 communication modules, a multiport serial module for industrial applications. It is designed for PC/104 CPU boards that accept the PC/104 expansion interface. Optional DB9 and DB25 cables are available to connect different devices. The device drivers make full use of the 64-byte Tx/Rx FIFO and on-chip flow control, which allows up to 921.6 Kbps data transmission.

The CA Series includes the following models:

CA-108: 8 ports, RS-232
CA-108-T: 8 ports, RS-232, wide temperature
CA-114: 4 ports, RS-232/422/485
CA-114-T: 4 ports, RS-232/422/485, wide temperature
CA-134I: 4 ports, RS-422/485, optical isolation protection
CA-134I-T: 4 ports, RS-422/485, optical isolation protection, wide temperature
CA-104 V2: 4 ports, RS-232
CA-104-T V2: 4 ports, RS-232, wide temperature
CA-132 V2: 2 ports, RS-422/485
CA-132-T V2: 2 ports, RS-422/485, wide temperature
CA-132I V2: 2 ports, RS-422/485, optical isolation protection
CA-132I-T V2: 2 ports, RS-422/485, optical isolation protection, wide temperature

2 KV optical isolation is provided on optical isolation models. Wide temperature models are rated for operation between -40 to 85°C.

The following topics are covered in this chapter:

- **Overview**
- **Package Checklist**
- **Product Features**
- **Product Specifications**

Overview

The CA Series PC/104 module is designed to be used with PC/104 CPU modules or CPU cards with the PC/104 expansion interface. Models are available for RS-232, RS-422, and RS-485, with 2, 4, or 8 ports. The serial ports are accessed through a 20 or 40-pin box header connector on the module. DIP switches allow you to configure the I/O base address and INT vector of each port. The industry-standard MOXA UART (16C550 compatible) is fully programmable. Built-in 15 KV ESD protection protects devices connected to the serial network.

Package Checklist

MOXA performs a careful mechanical and electrical inspection of each module prior to shipping. Your module should arrive in perfect electrical order, free of any marks or scratches. Please handle the module by the edges only, since your body's static charge can damage the integrated circuits. When the module is not in use, please keep it in the anti-static package provided. You may also use this package to return the module if it requires repair.

The CA Series module is shipped with the following items:

- CA Series PC/104 multiport serial module
- Documentation and Software CD
- Quick Installation Guide
- 5-year product warranty statement

Note: Please notify your sales representative if any of the above items are missing or damaged.

Product Features

The CA Series module features the following:

- 2, 4, or 8 serial ports (depending on model)
- RS-232, RS-422, or RS-485 operation (depending on model)
- 64-byte FIFOs and on-chip flow control
- Up to 921.6Kbps data transmission speed
- Built-in 15 KV ESD protection
- Configurable IRQ and I/O settings
- Onboard Tx, Rx LED indicators for each port
- Optional wide temperature support (-40 to 85°C)

Product Specifications

CA Series PC/104 Multiport Serial Module

Hardware

I/O controller	16C550C or compatible
Connector Type	40-pin box header (CA-108, CA-114, CA-134I, CA-104 V2) 20-pin box header (CA-132 V2, CA-132I V2)

Interface

Bus	PC/104 bus (Ver. 2.4)
No. of Ports	2 ports (CA-132 V2, CA-132I V2) 4 ports (CA-114, CA-134I, CA-104 V2) 8 ports (CA-108)
Max. No. of Modules	4

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

Parity	None, Even, Odd, Space, Mark
Data Bits	5, 6, 7, 8
Stop Bit(s)	1, 1.5, 2
IRQ	Shared IRQ for all ports (includes IRQ 3, 4, 5, 6, 7, 9, 10, 11, 12, 15)
FIFO	64 bytes
Additional Settings	I/O base address, interrupt vector, serial interface (all by DIP switch)
Driver Support	DOS Windows 2000, XP, 2003, Vista Linux 2.4, Linux 2.6

Power and Environment

Operating Temperature	Standard models: 0 to 55°C (32 to 131°F) "-T" models:, -40 to 85°C (-40 to 185°F)
Operating Humidity	5 to 95% RH
Storage Temperature	-40 to 70°C (-40 to 158°F)
ESD Protection	Embedded 15 KV ESD protection

Other

Dimensions (W x D)	96 x 90 mm
Regulatory Approvals	EN55022 Class A, EN55024, EN6100-3-2, EN61000-3-3, FCC Part 15 Class A
Warranty	5 years

2

Hardware Installation

This chapter explains how to install the CA Series PC/104 multiport serial module.

The following topics are covered:

- **Hardware Installation**
- **Block Diagrams**
  - I/O Base Address
  - Interrupt Vector
  - Serial Interface
  - IRQ

Hardware Installation

Installing the CA Series module is easy. Before inserting the module into the PC/104 slot, you must first configure the I/O base address, interrupt vector, IRQ, and serial interface (for select models).

ATTENTION

Safety First!
To prevent damage to your system or board, make sure your embedded PC's power is turned off before installing your CA Series module.

Step 1: Shut off power to your embedded PC and to any peripheral devices. After shutting off power, remove the cover of your embedded PC.

Step 2: Use the DIP switches on the module to select I/O base address, interrupt vector, IRQ, and serial interface (for select models). Details for each model are provided later in this chapter.

Step 3: Insert the module firmly into the embedded PC's PC/104 slot.

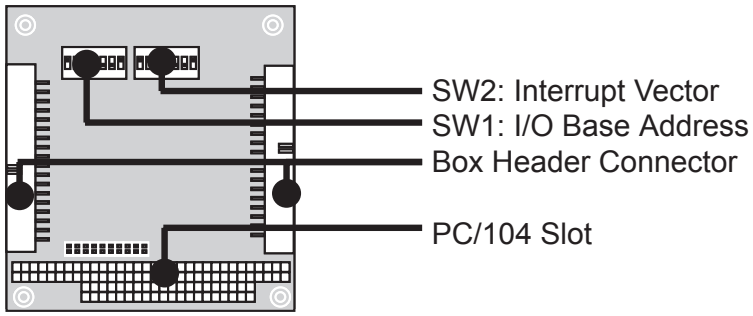
Step 4: Screw the control board in place.

Step 5: Connect the cables.

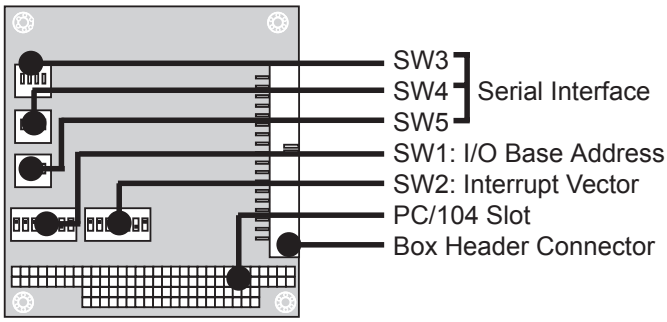
Step 6: Power on the embedded PC.

Block Diagrams

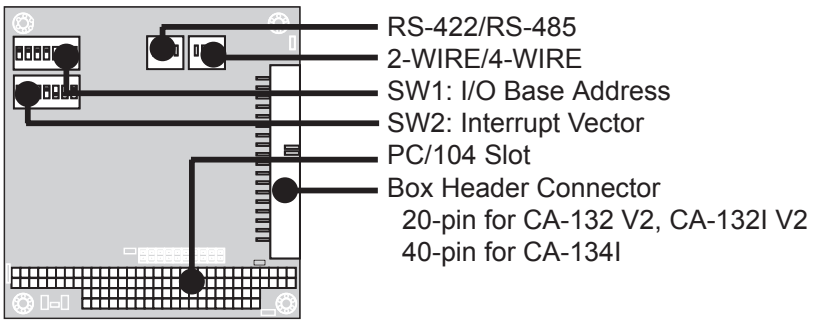
CA-108



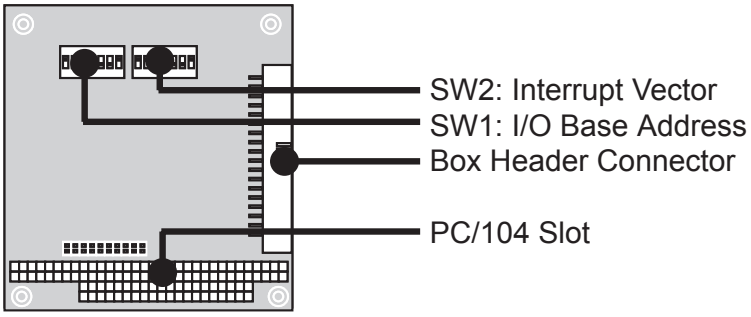
CA-114



CA-134I, CA-132 V2, CA-132I V2



CA-104 V2



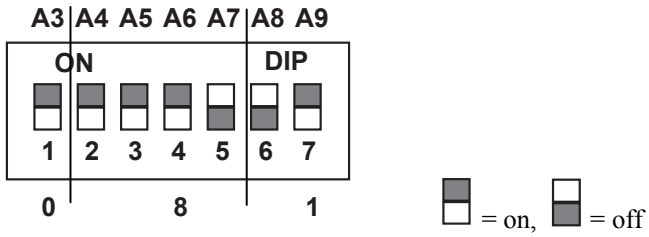
I/O Base Address

Use DIP switch SW1 to set port 1's I/O base address. The other ports will be configured automatically. The default I/O base address is 0×180 and allows settings from 0×000 to 0×3FF. Some popular settings are provided below:

A3	A4	A5	A6	A7	A8	A9	
8	1	2	4	8	1	2	Hex
ON	ON	ON	ON	ON	ON	ON	0×000
ON	ON	ON	ON	ON	ON	off	0×200
ON	ON	ON	ON	ON	off	off	0×300
ON	ON	ON	ON	off	off	off	0×380
ON	ON	ON	off	off	off	off	0×3C0
ON	ON	off	off	off	off	off	0×3E0
ON	off	off	off	off	off	off	0×3F0
off	off	off	off	off	off	off	0×3F8
off	ON	ON	ON	ON	ON	ON	0×008
off	off	ON	ON	ON	ON	ON	0×018
off	off	off	ON	ON	ON	ON	0×038
off	off	off	off	ON	ON	ON	0×078
off	off	off	off	off	ON	ON	0×0F8
off	off	off	off	off	off	ON	0×2F8

For example, an I/O base address of 0×180 should be set as follows:

A3	A4	A5	A6	A7	A8	A9	Hex
ON	ON	ON	ON	off	off	ON	0×180

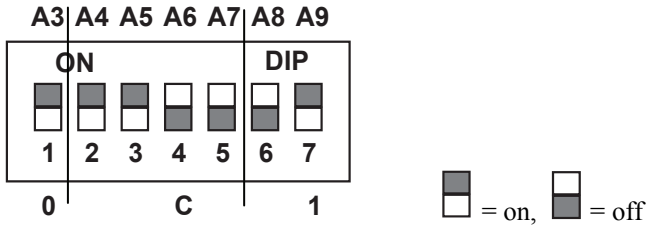


The other serial ports will be set automatically to 0×188, 0×190, 0×198, etc.

Interrupt Vector

Use DIP switch SW2 to set port 1's interrupt vector. The default interrupt vector is 0×1C0, with SW2 set as follows:

A3	A4	A5	A6	A7	A8	A9	Hex
ON	ON	ON	off	off	off	ON	0×1C0



Serial Interface

For the CA-114, use S3, S4, and S5 to select the serial interface as follows:

Mode	S3	S4	S5
RS-232	---	---	ON
RS-422	---	ON	off
4-wire RS-485	ON	off	off
2-wire RS-485	off	off	off

For the CA-134I, CA-132 V2, and CA-132I V2, use the 2-WIRE/4-WIRE and RS-422/RS-485 DIP switches to select the serial interface as follows:

Interface	2-WIRE/4-WIRE	RS422/RS485
RS-422	---	OFF
4-wire RS-485	OFF	ON
2-wire RS-485	ON	ON

IRQ

Before selecting an IRQ, please enter the PC's BIOS and reserve a dedicated IRQ for the module. On the module, the IRQ is set by a jumper. Before inserting the module into the PC/104 slot, use the jumper to select an IRQ (3, 4, 5, 6, 7, 9, 10, 11, 12, or 15).

3

Software Installation

After installing the CA Series module in your embedded computer, the next step is installing the software. Drivers for various operating systems are provided, including DOS, Windows, and Linux. This chapter explains how to install and remove the CA Series driver.

The following topics are covered in this chapter:

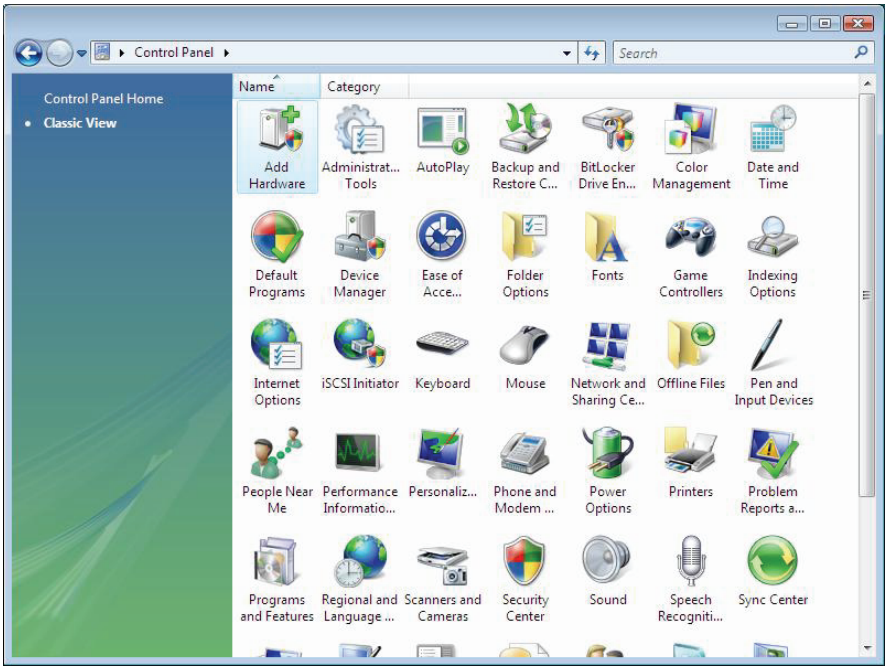
- **Windows Vista (32-bit)**
  - Installing the Driver
  - Using Device Manager to Verify Installation
  - Port Configuration
- **Windows XP, 2003 (32-bit)**
  - Installing the Driver
  - Using Device Manager to Verify Installation
  - Port Configuration
  - Using PComm
  - Using Event Log
  - Disabling the Module
  - Uninstalling the Module
- **Windows 2000**
  - Installing the Driver
  - Using Device Manager to Verify Installation
  - Port Configuration
  - Using PComm
  - Using Event Log
  - Disabling the Module
  - Uninstalling the Module
- **Windows NT**
  - Installing the Driver
  - Uninstalling the Module
- **Windows 95, 98, Me**
  - Installing the Driver
  - Uninstalling the Module
- **Linux**
- **DOS**
  - Installing the Driver
  - Driver Setup
  - Loading the Driver
  - Unloading the Driver

Windows Vista (32-bit)

The Windows Vista (32-bit) drivers conform to the Win32 COMM API standard and support all models in the CA Series. In the following instructions, the CA-114 is used as an example.

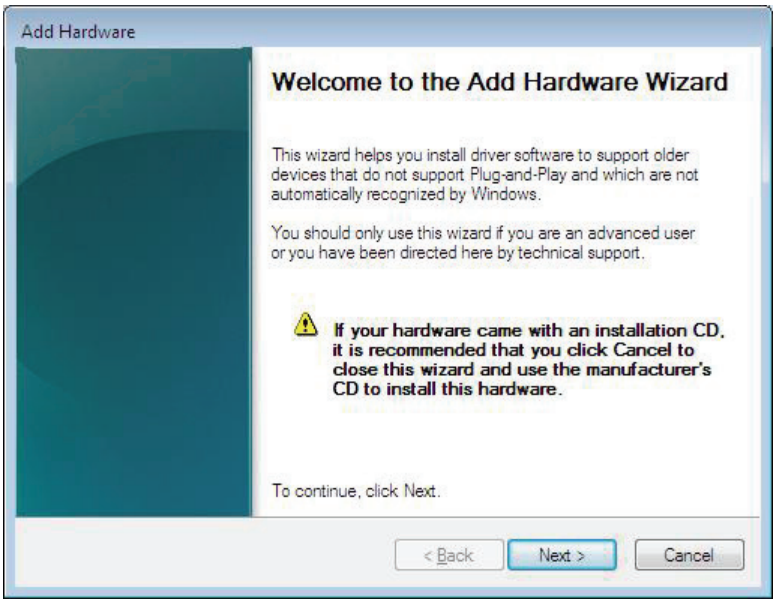
Installing the Driver

1. After turning the embedded computer on, log into Windows as Administrator.
2. Insert the Document and Software CD in your PC's CD-ROM drive.
3. Select **Add Hardware** from **Control Panel/Classic View**.

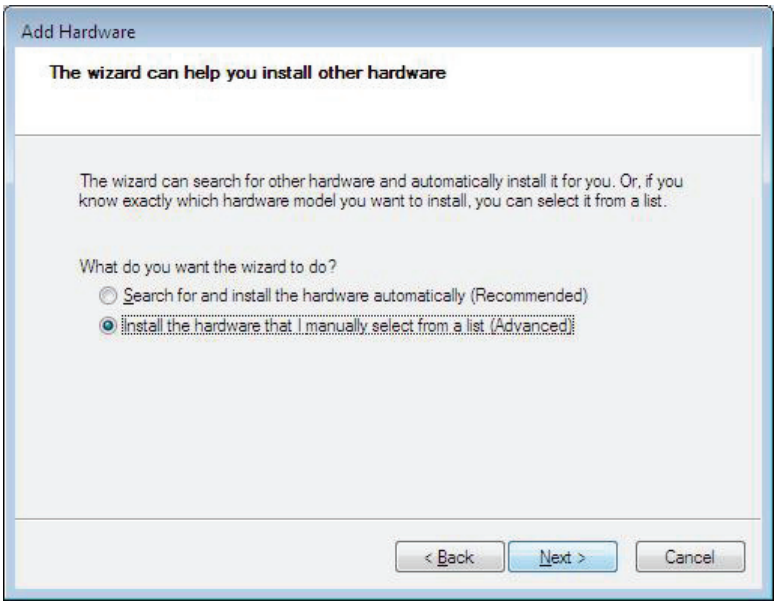


4. A window will appear stating that Windows needs your permission to continue. Click **Continue**.

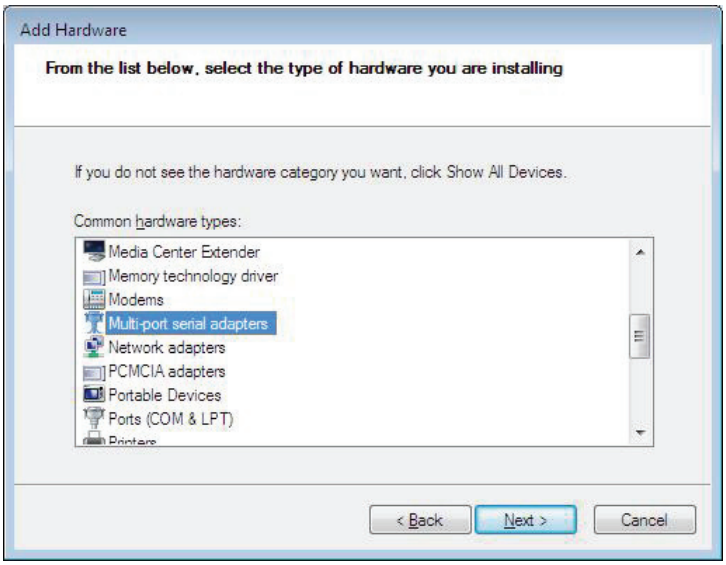
5. The Add Hardware Wizard will open. Click **Next** to continue.



6. Select **Install the hardware that I manually select from a list (Advanced)** and click **Next** to continue.

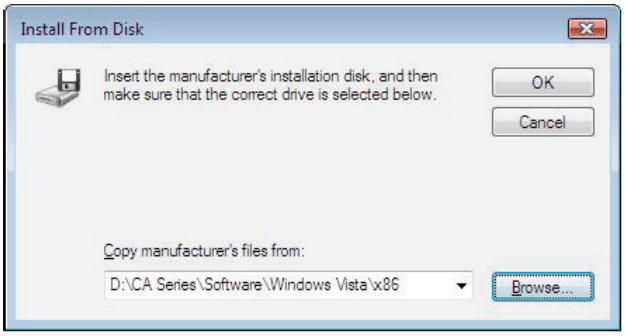


7. Select **Multi-port serial adapters** and click **Next** to continue.

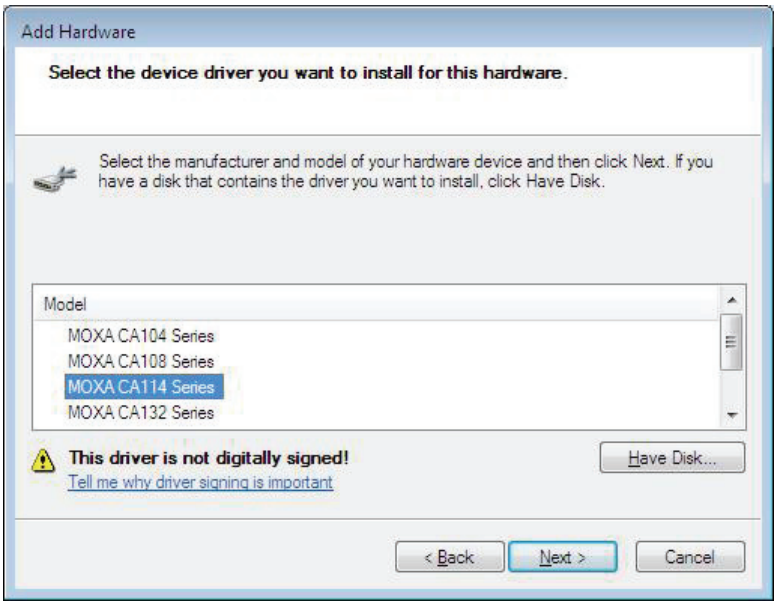


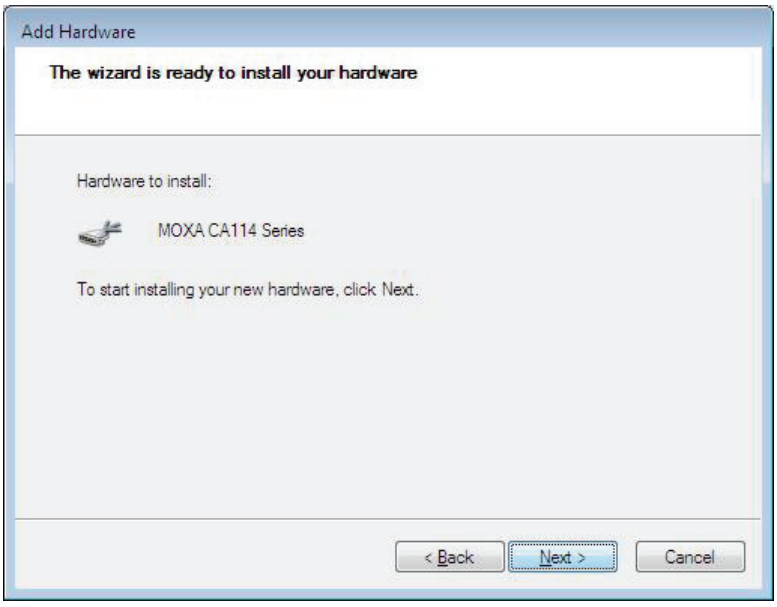
8. Click **Have Disk**.

9. For 32-bit (x86) platforms, select the **\CA Series\Software\Windows Vista\x86** folder on the CD and click **OK** to continue.

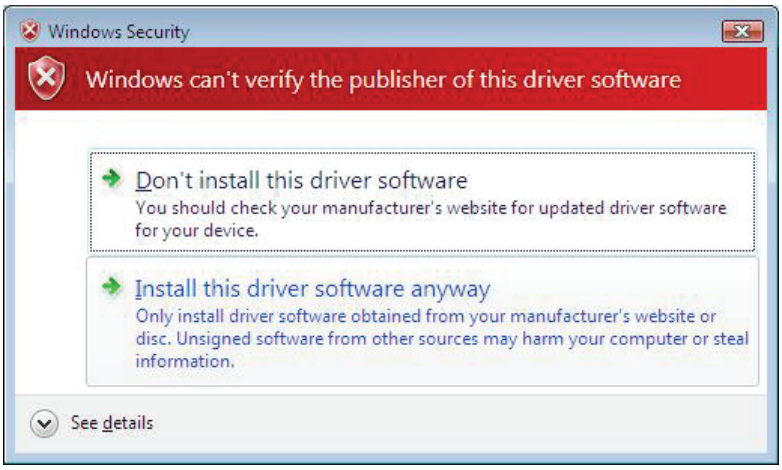


10. Select your CA Series model and click **Next** to continue.

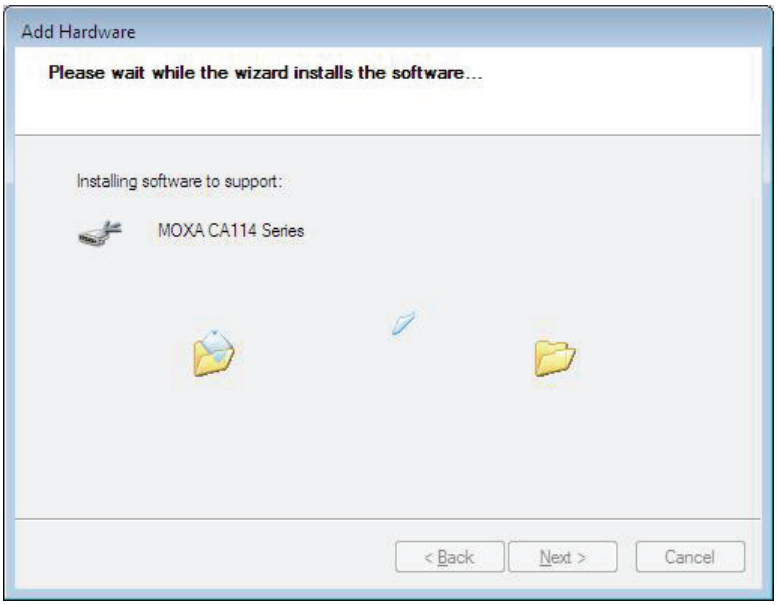




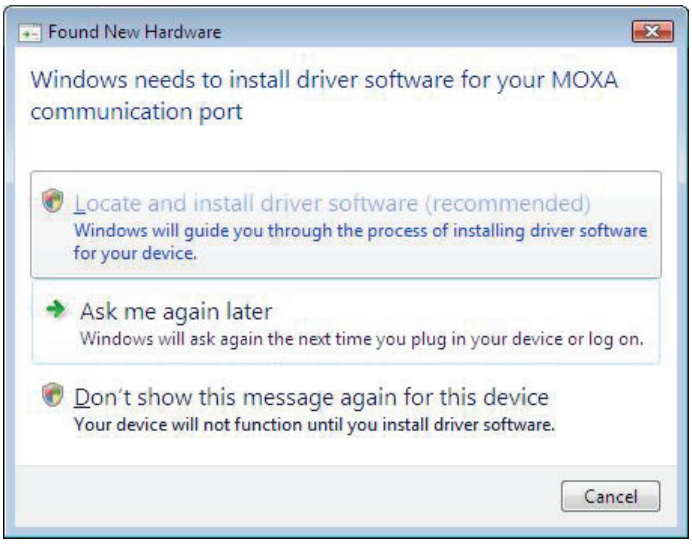
11. If you see a warning that the software has not passed Windows Logo testing, click **Install this driver software anyway**.



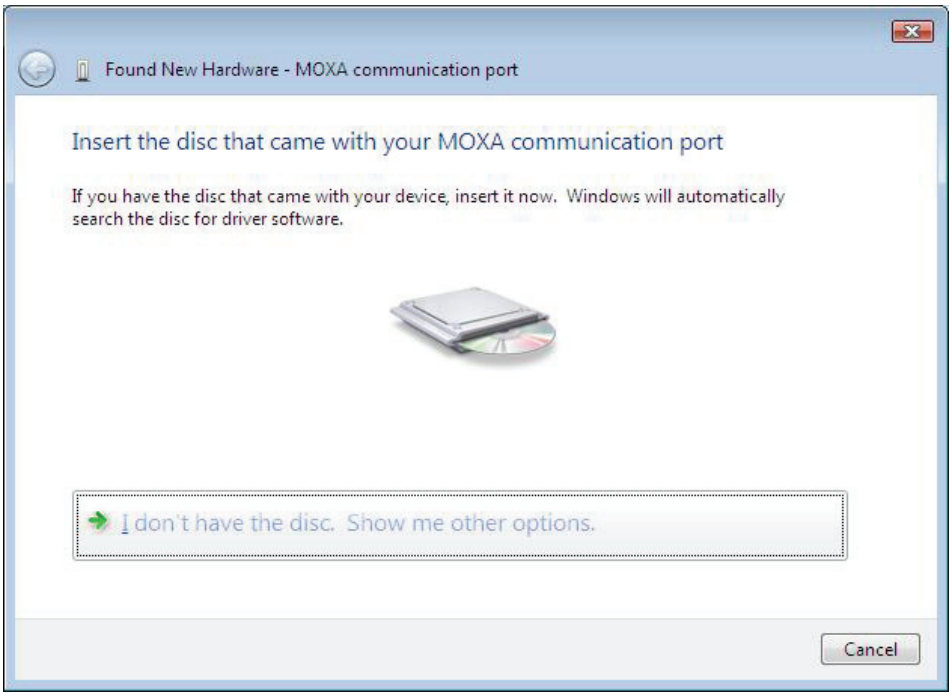
12. After the files have been installed, click **Finish**.



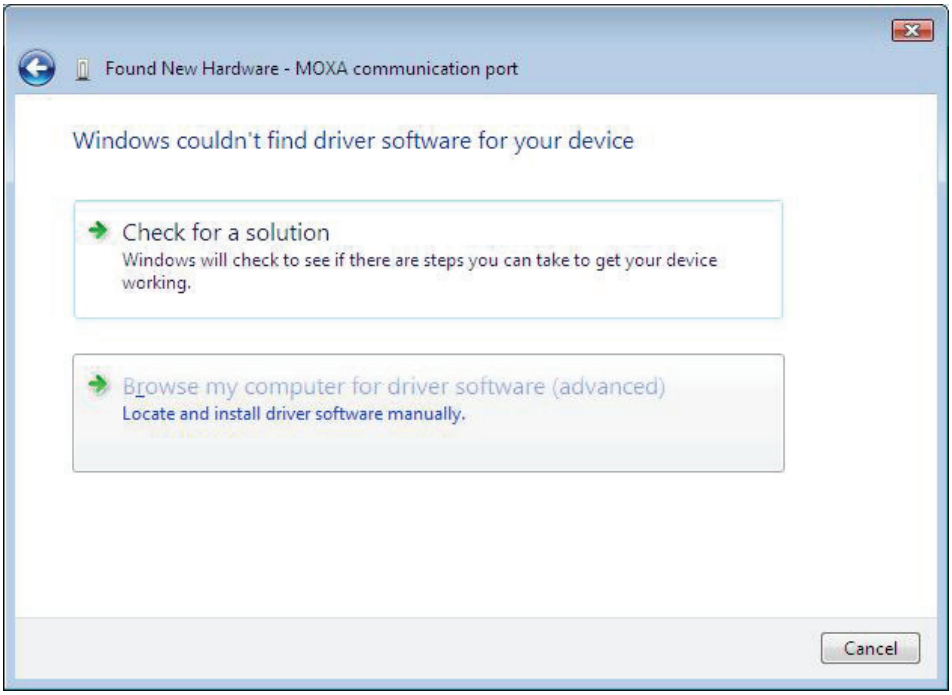
13. After the module is installed, you will be prompted to install the new serial ports. A **Found New Hardware Wizard** window will open for the first serial port, port 0. Select **Locate and install driver software (recommended)** to continue.



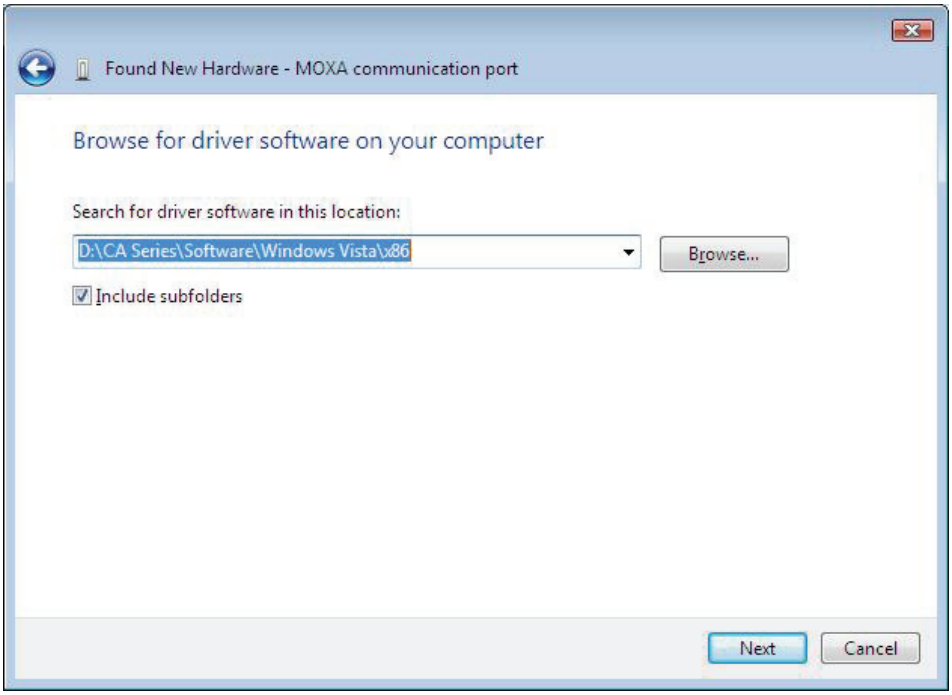
14. Select **I don't have the disc. Show me other options**.



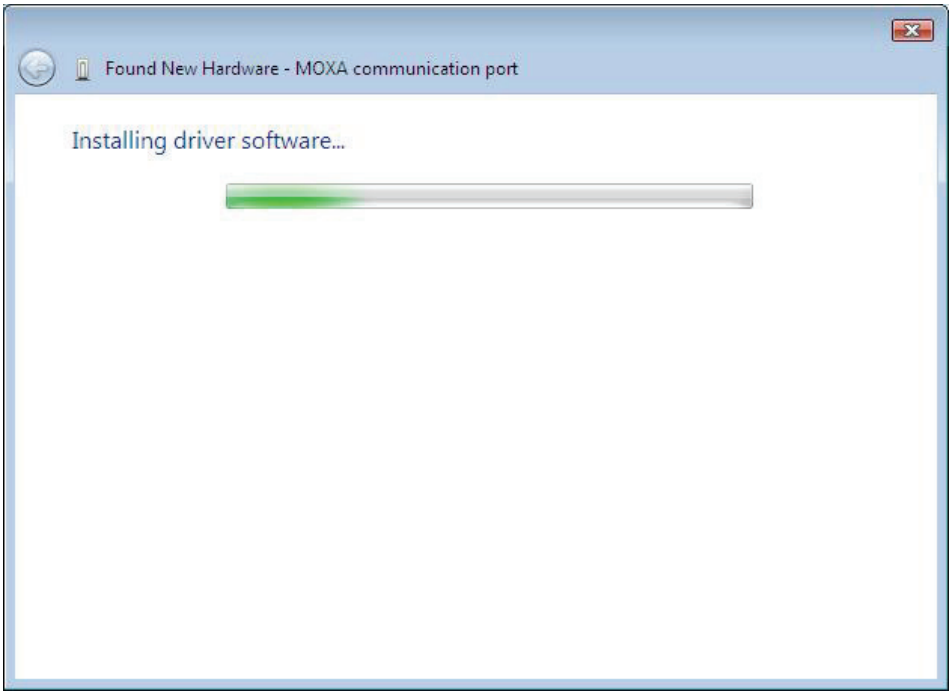
15. Select **Browse my computer for driver software (advanced)**.



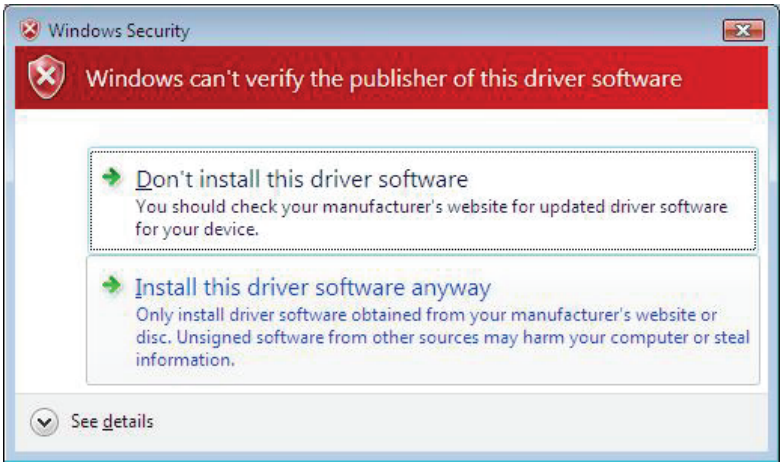
16. For 32-bit (x86) platforms, select the **\CA Series\Software\Windows Vista\x86** folder on the CD and click **OK** to continue.



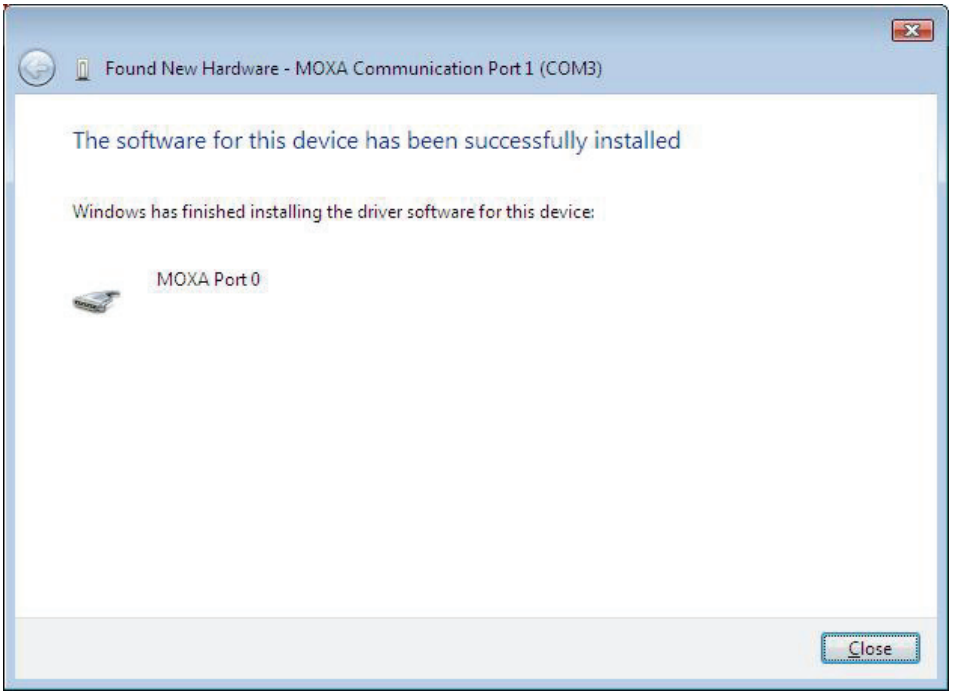
17. Windows will install the driver software.



18. If you see a warning that the software has not passed Windows Logo testing, click **Install this driver software anyway**.



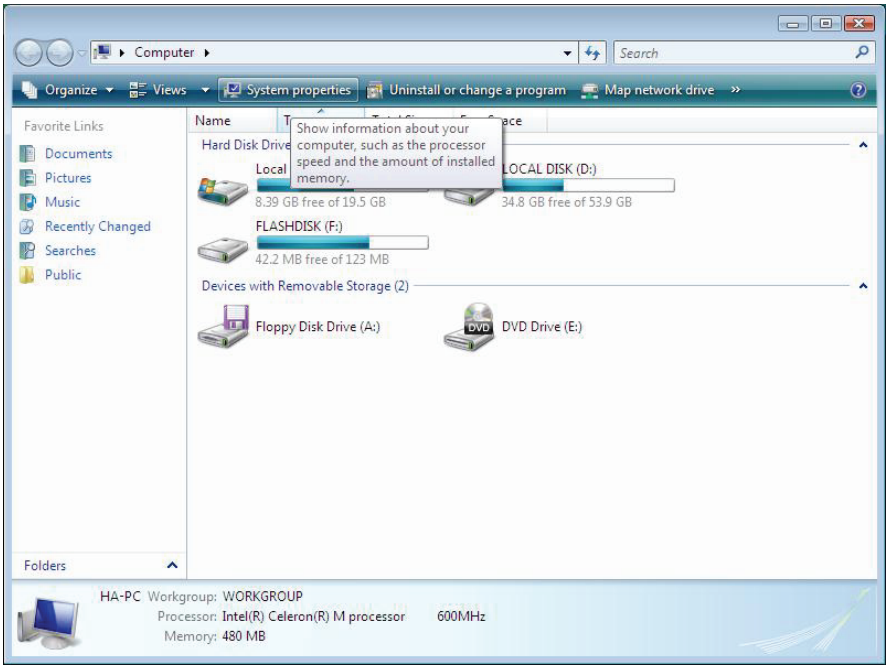
19. After the files have been installed, click **Close**. The remaining serial ports will automatically install in the background.



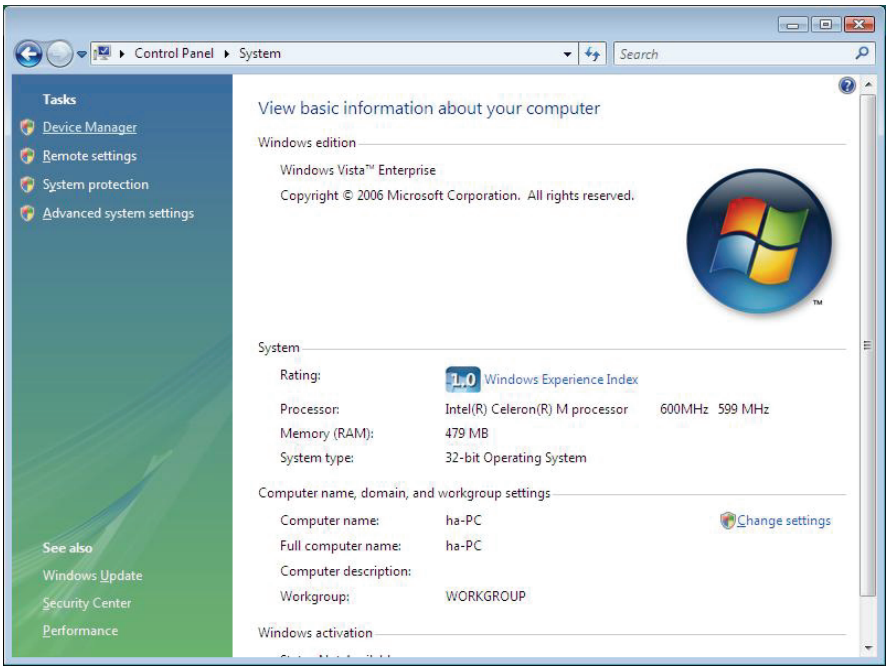
Using Device Manager to Verify Installation

You can use Windows Device Manager to verify proper installation of the CA Series module. In the following instructions, the CA-114 is used as an example.

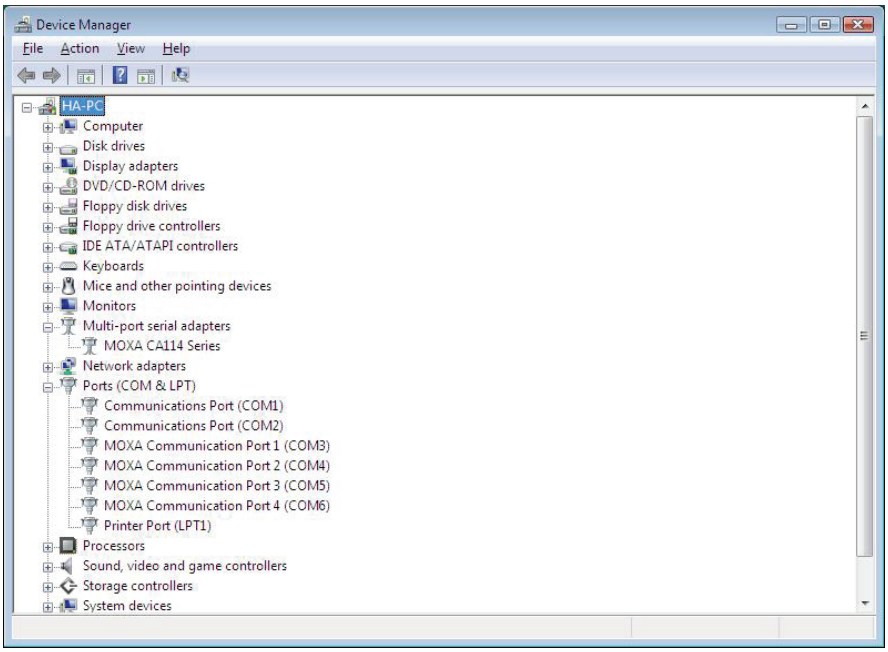
1. Under **My Computer**, click **System Properties**.



2. In the **System** window, click **Device Manager**.



3. In the **Device Manager** window, you should see your CA Series module under M**ulti-port serial adapters**. You should also see MOXA communication ports under **Ports (COM & LPT)**.

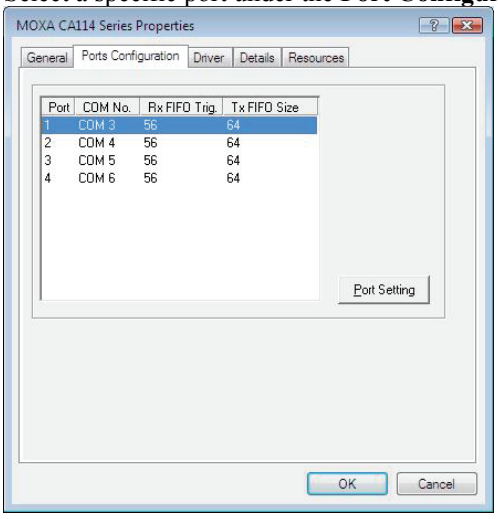


4. If you see any special marks, such as a question mark or an exclamation mark, next to the MOXA items, the installation of your module or serial ports was not successful. Examine the Windows event log for details.

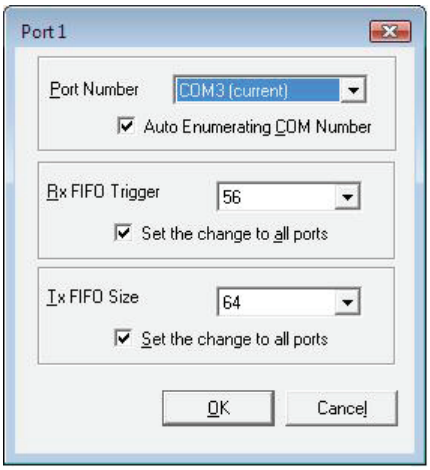
Port Configuration

After the driver is installed, a CA Series Properties window will appear. The system will map the serial ports automatically. It will prompt you to take care of port configuration if another CA Series module has been installed on the PC.

1. Select a specific port under the **Port Configuration** tab and click **Port Setting.**



2. Under **Port Number**, select a COM number to assign to the serial port.



   Select **Auto Enumerating COM Number** to map subsequent ports in numerical order. For example, if COM 3 is assigned to Port 1, then COM 4 will be automatically assigned to Port 2.

3. Select an **Rx FIFO Trigger.** The default value is 56 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.
4. Select a **Tx FIFO Size**. The default value is 64 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.
5. Click **OK** to approve the port settings. Click **OK** again to close the **CA Series Properties** window and apply the new port settings.

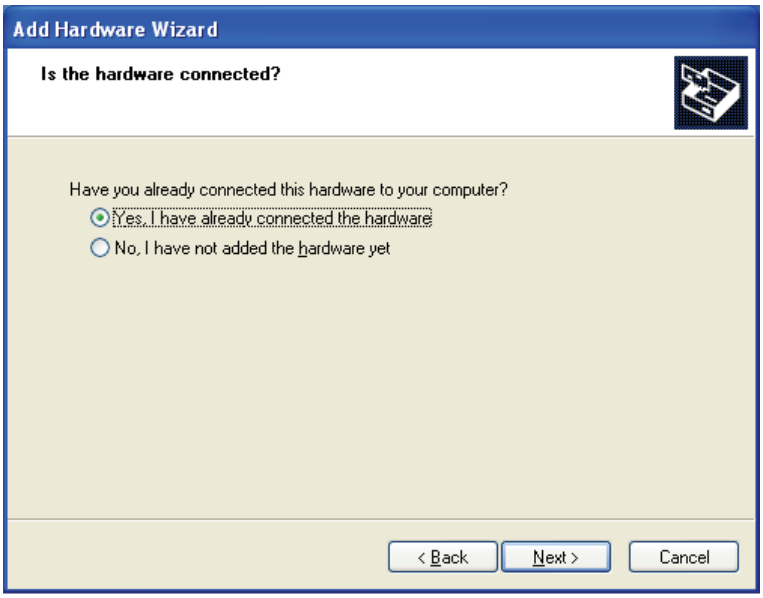
Windows XP, 2003 (32-bit)

The Windows XP and 2003 (32-bit) drivers conform to the Win32 COMM API standard and support all models in the CA Series. In the following instructions, the CA-114 is used as an example.

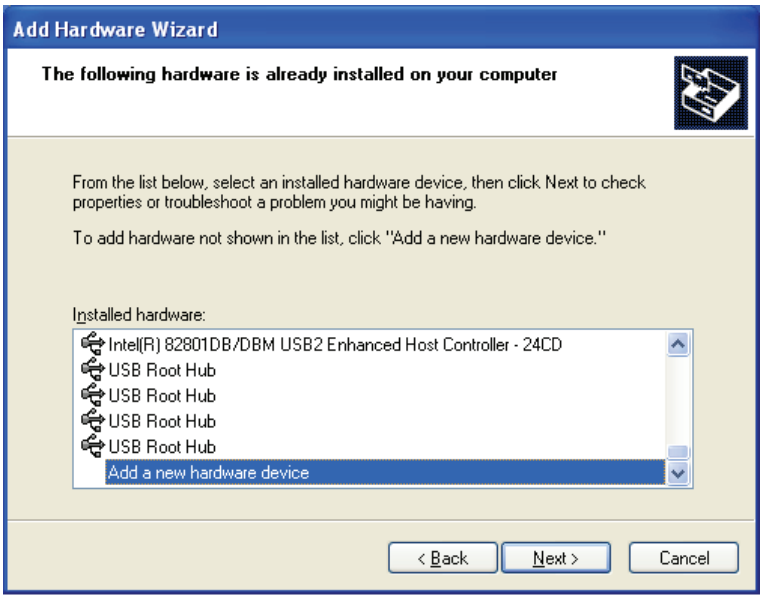
Installing the Driver

1. Select **Add Hardware Wizard** from the Control Panel. When the wizard opens, click **Next** to continue.

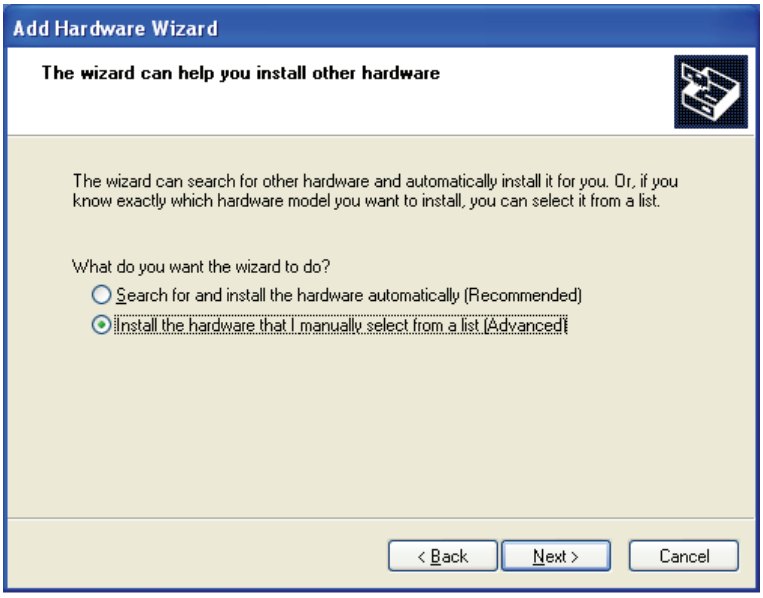
2. Select **Yes, I have already connected the hardware** and click **Next** to continue.



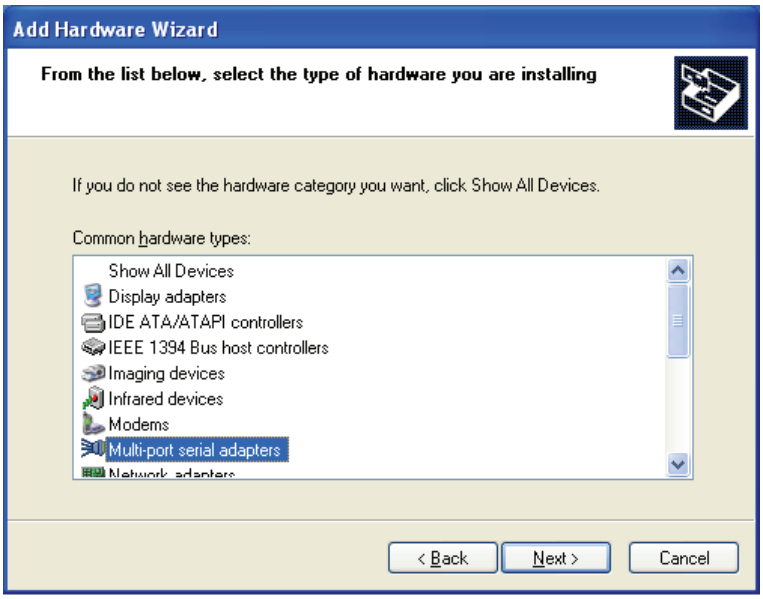
3. Select **Add a new hardware device** and click **Next** to continue.



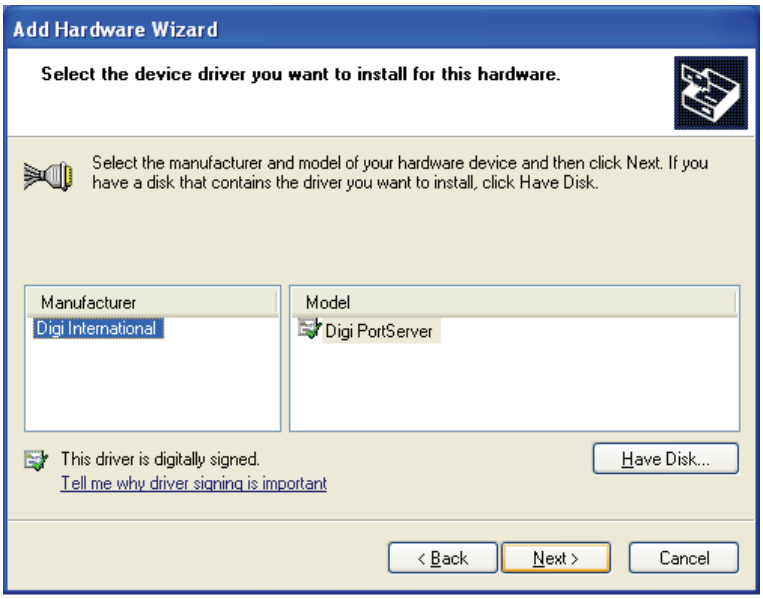
4. Select **Install the hardware that I manually select from a list (Advanced)** and click **Next** to continue.



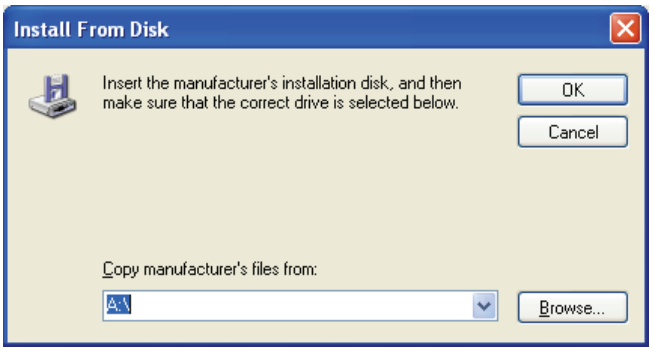
5. Select **Multi-port serial adapters** and click **Next** to continue.



6. Click **Have Disk**.

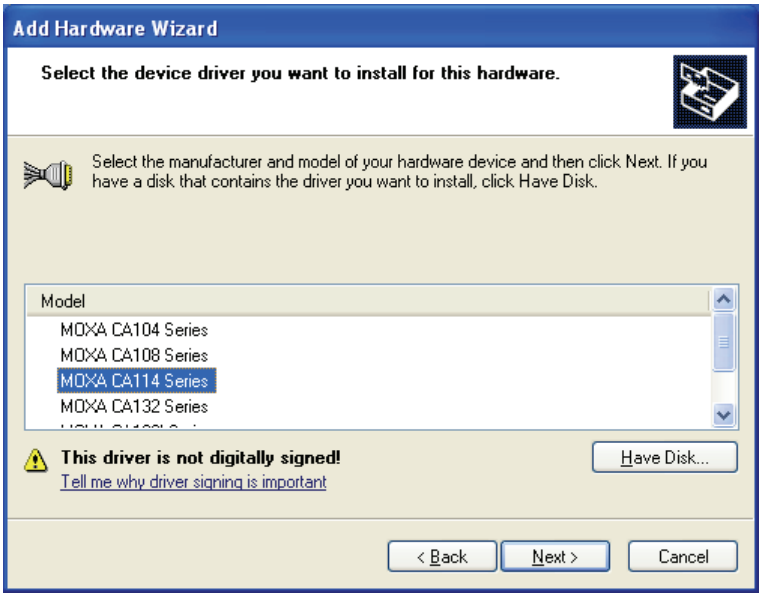


7. You will be prompted to insert the installation disk.



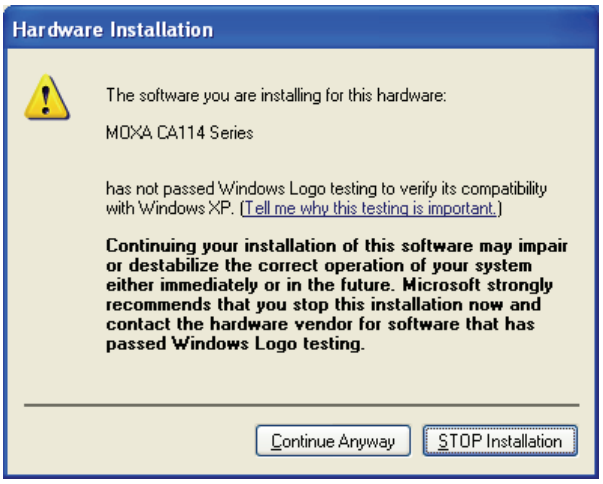
Insert the Document and Software CD into the CD-ROM drive and select the **\CA Series\Software\Windows XP_2003\x86** folder on the CD. Click **OK** to continue.

8. Select your CA Series model and click **Next** to continue.

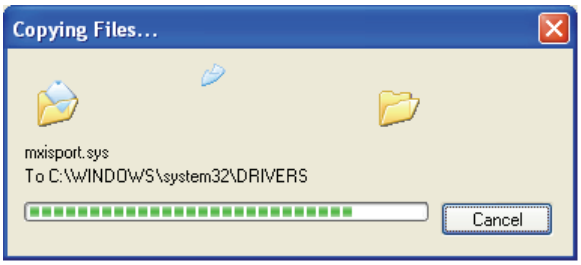


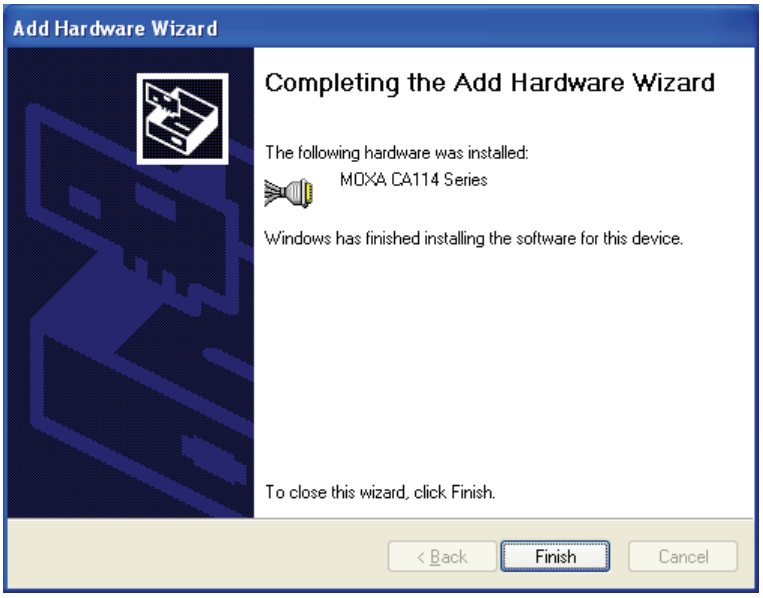
9. To begin installing the module, click **Next**.

10. If you see a warning that the software has not passed Windows Logo testing, click **Continue Anyway**.



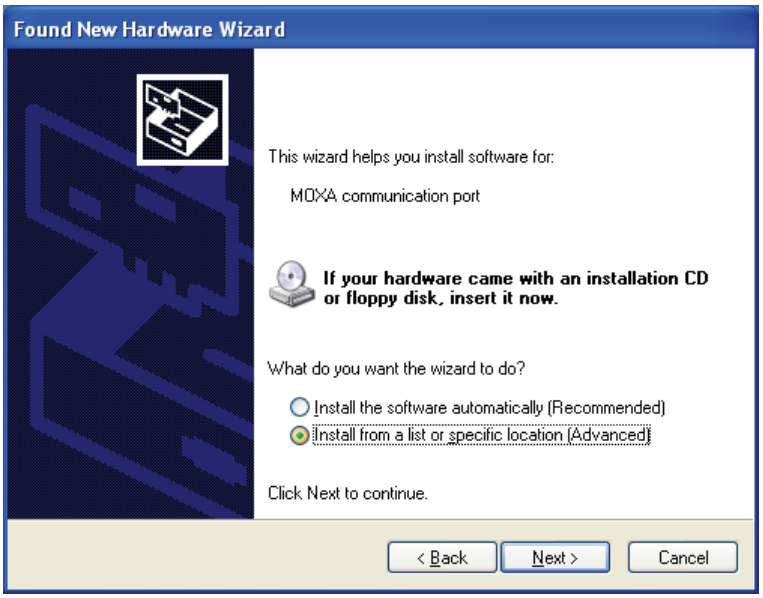
11. Windows will install the drivers. When the installation is complete, click **Finish**.



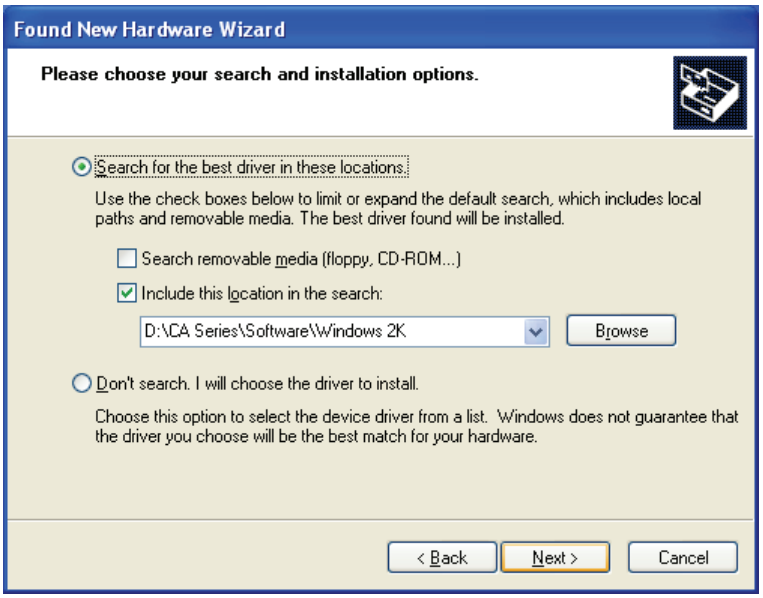


12. After the module is installed, you will be prompted to install the new serial ports. A **Found New Hardware Wizard** window will open for the first serial port, port 0. Select **No, not this time** and click **Next**.

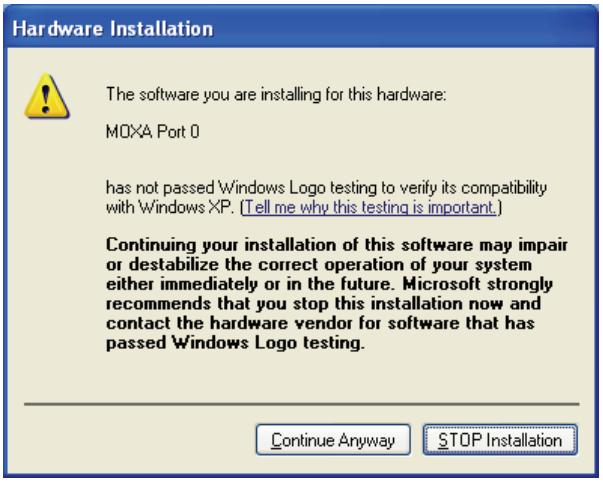
13. Select **Install from a list or specific location (Advanced)** and click **Next**.



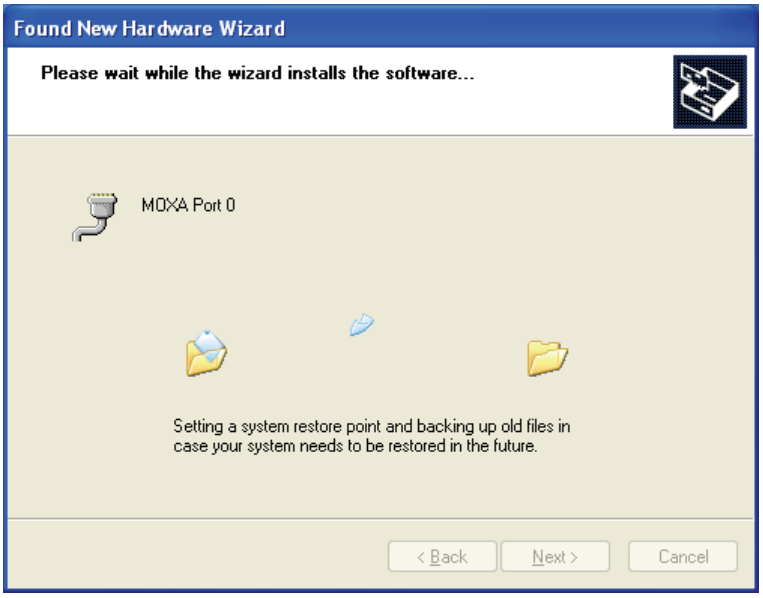
14. Select **Search for the best driver in these locations** and **Include this location in the search**. Select the **\CA Series\Software\Windows XP_2003\x86** folder on the CD and click **Next**.



15. If you see a warning that the software has not passed Windows Logo testing, click **Continue Anyway**.



16. Windows will install the necessary drivers.



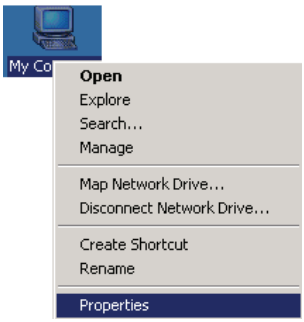
17. After the installation is complete, click **Finish**.

18. Repeat the installation process for the remaining serial ports.

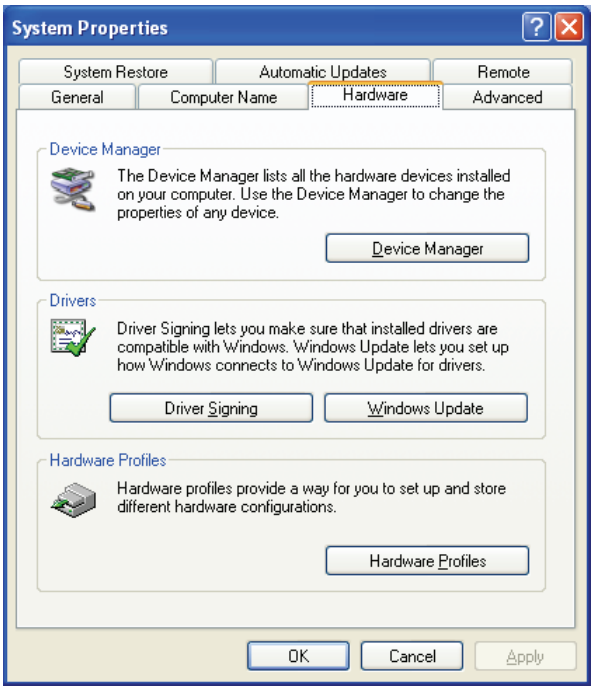
Using Device Manager to Verify Installation

You can use Windows Device Manager to verify proper installation of the CA Series module. In the following instructions, the CA-114 is used as an example.

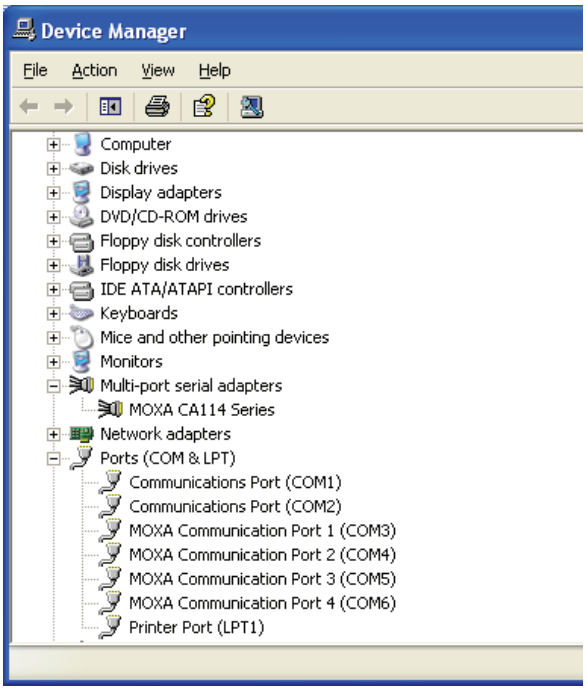
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.



3. In the **Device Manager** window, you should see your CA Series module under M**ulti-port serial adapters**. You should also see MOXA communication ports under **Ports (COM & LPT)**.

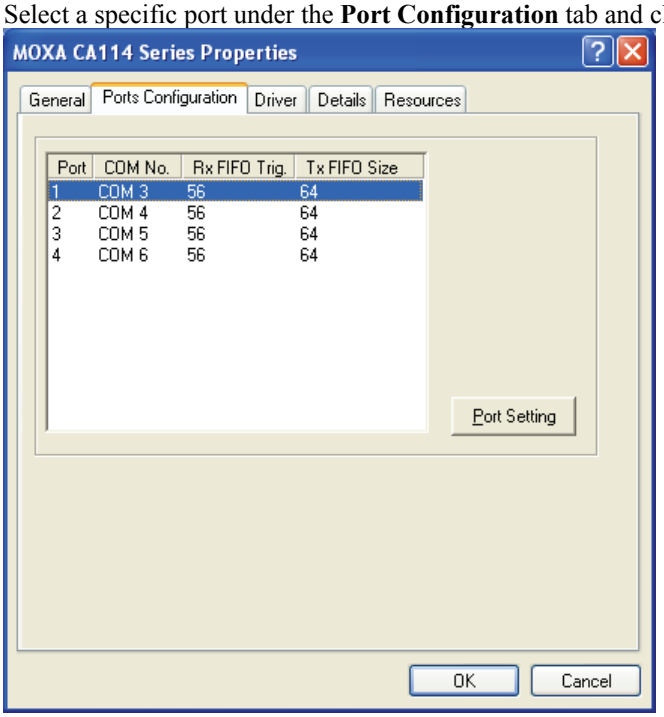


4. If you see any special marks, such as a question mark or an exclamation mark, next to the MOXA items, the installation of your module or serial ports was not successful. Examine the Windows event log for details.

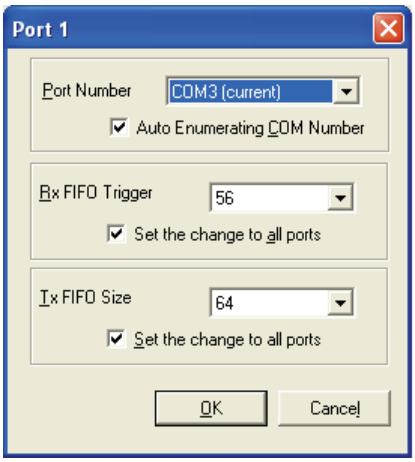
Port Configuration

After the driver is installed, a CA Series Properties window will appear. The system will map the serial ports automatically. It will prompt you to take care of port configuration if another CA Series module has been installed on the PC.

1. Select a specific port under the **Port Configuration** tab and click **Port Setting.**



2. Under **Port Number**, select a COM number to assign to the serial port.



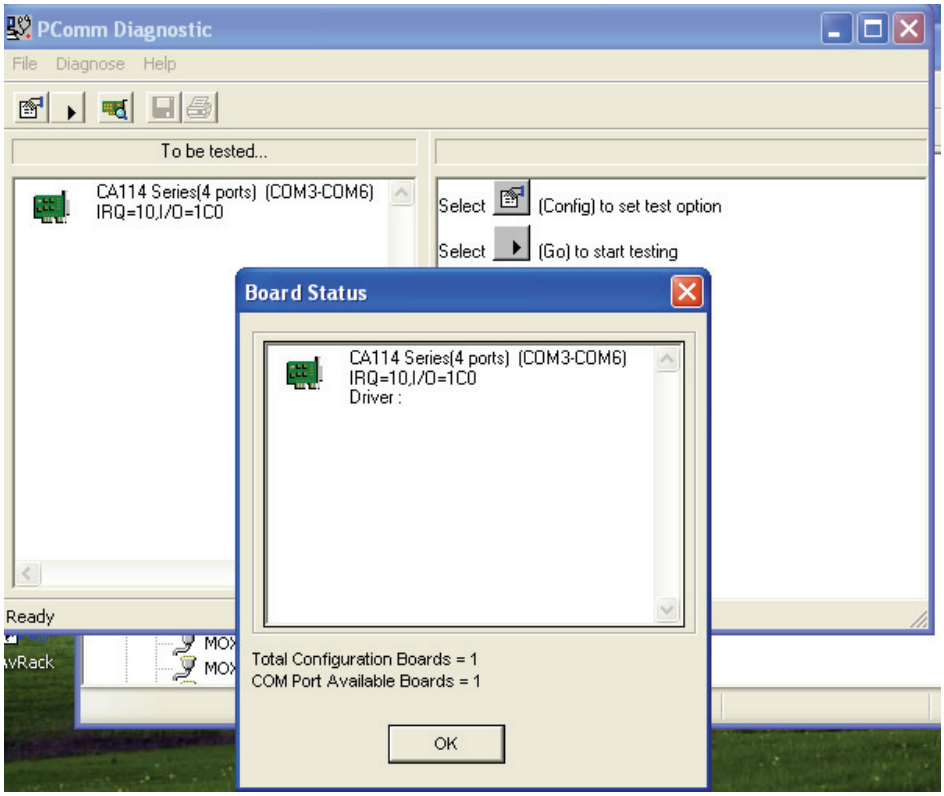
   Select **Auto Enumerating COM Number** to map subsequent ports in numerical order. For example, if COM 3 is assigned to Port 1, then COM 4 will be automatically assigned to Port 2.

3. Select an **Rx FIFO Trigger.** The default value is 56 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.
4. Select a **Tx FIFO Size**. The default value is 64 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

5. Click **OK** to approve the port settings. Click **OK** again to close the **CA Series Properties** window and apply the new port settings.

Using PComm

PComm Diagnostic is a useful program for checking the module's status. It provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, and other items. You can use PComm Diagnostic to verify that the module and serial ports are working properly.



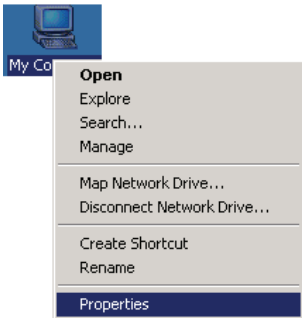
You can download the free version of PComm at Moxa's website (www.moxa.com).

Using Event Log

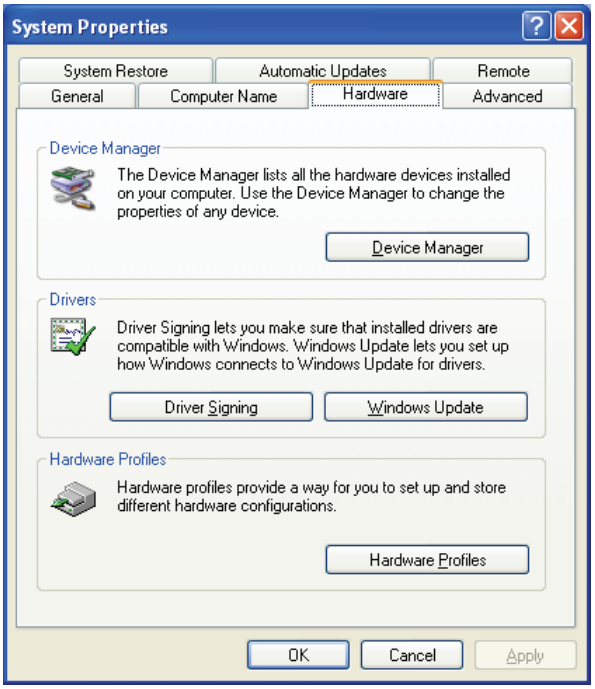
You may refer to the Windows event log to verify operation of the module. To view the event log, open Event Viewer, which is located under Administrative Tools in the Control Panel. Information about the module will be located under the System category.

Disabling the Module

1. Right-click **My Computer** and select **Properties** in the context menu.



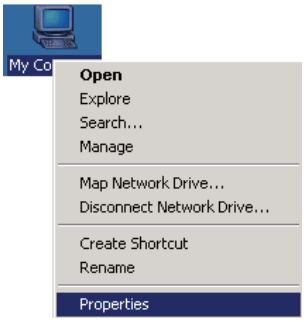
2. In the **Hardware** tab, click **Device Manager**.



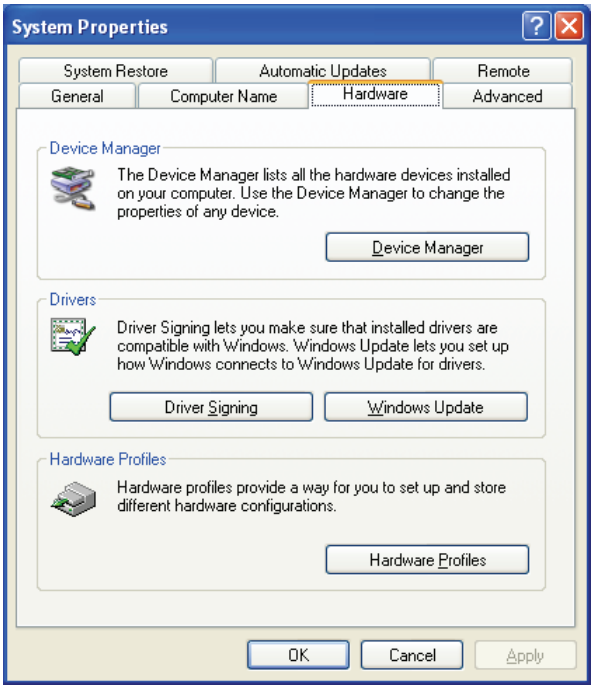
3. In **Device Manager**, right-click your module under **Multi-port serial adapters** and select **Disable** in the context menu. This will disable the module.

Uninstalling the Module

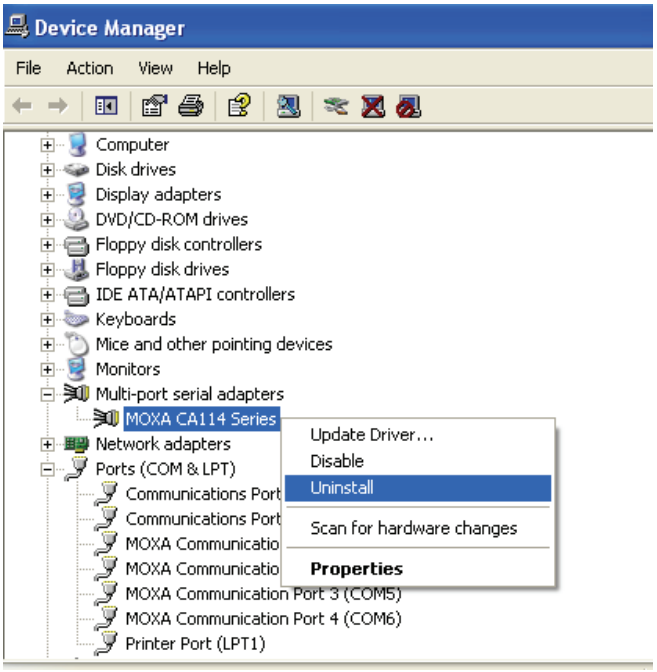
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.



3. Right-click your module under **Multi-port serial adapters** and select **Uninstall** in the context menu.



4. A confirmation dialog will appear. Click **OK** to uninstall the device.

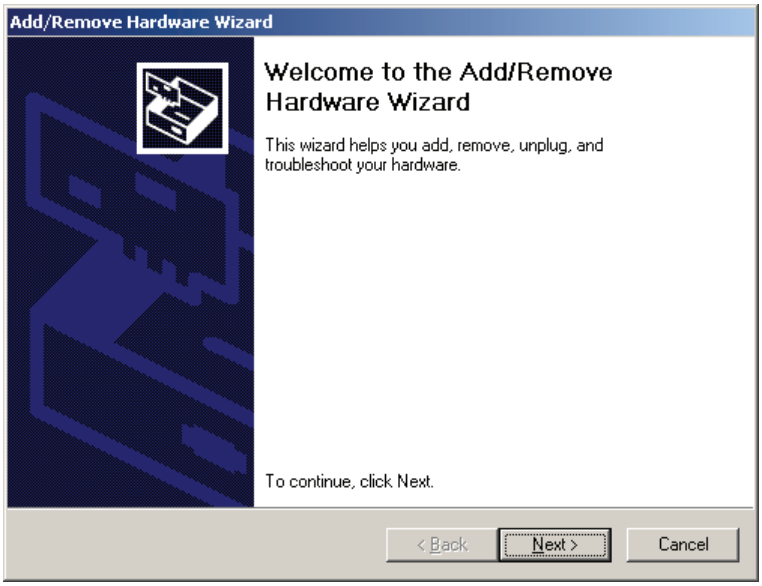
Windows 2000

The Windows 2000 drivers conform to the Win32 COMM API standard and support all models in the CA Series. In the following instructions, the CA-114 is used as an example.

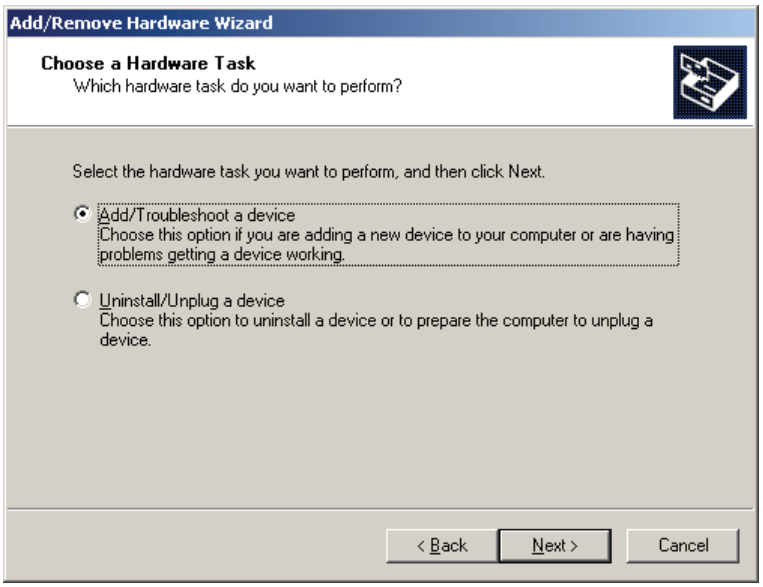
Installing the Driver

1. Open **Add/Remove Hardware** in the **Control Panel**.

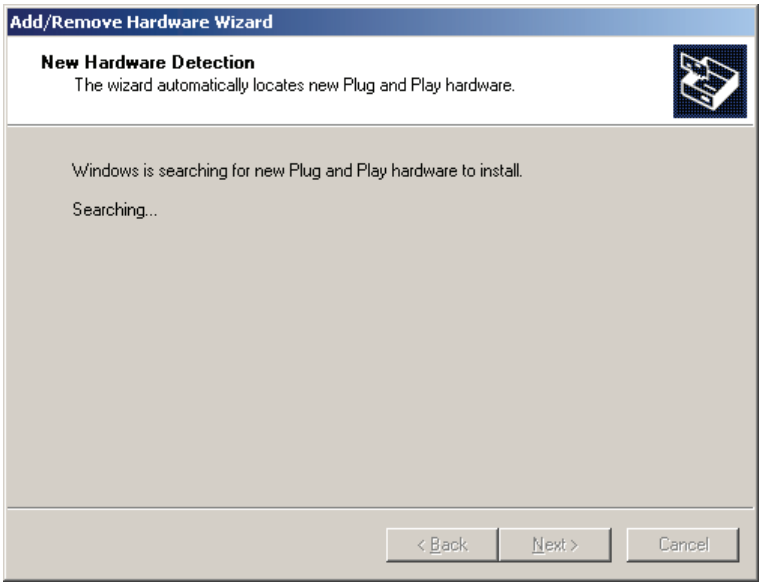
2. The **Add/Remove Hardware Wizard** window will open. Click **Next** to continue.



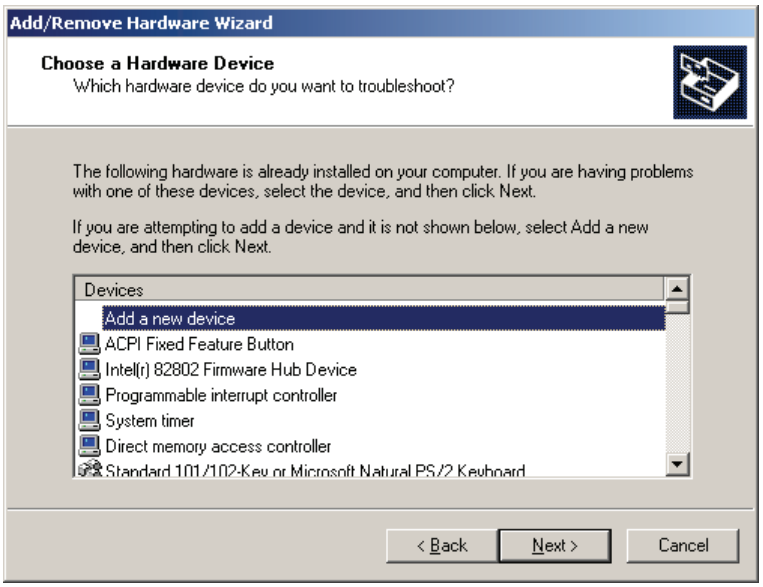
3. Select **Add/Troubleshoot a device** and click **Next**.



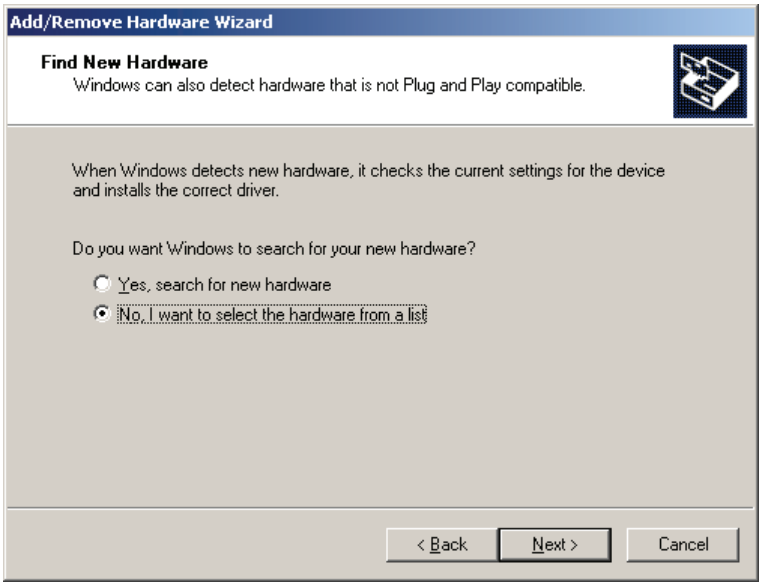
4. Windows will search for new hardware.



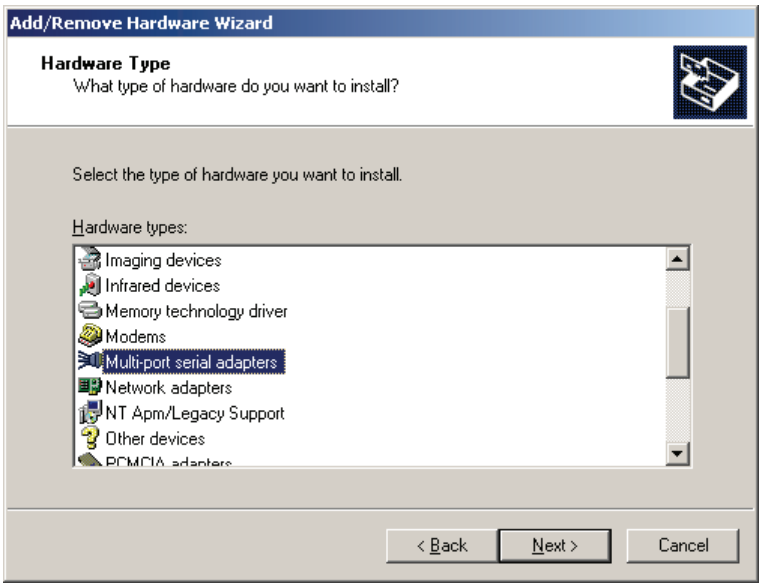
5. When the search is complete, select **Add a new device** and click **Next** to continue.



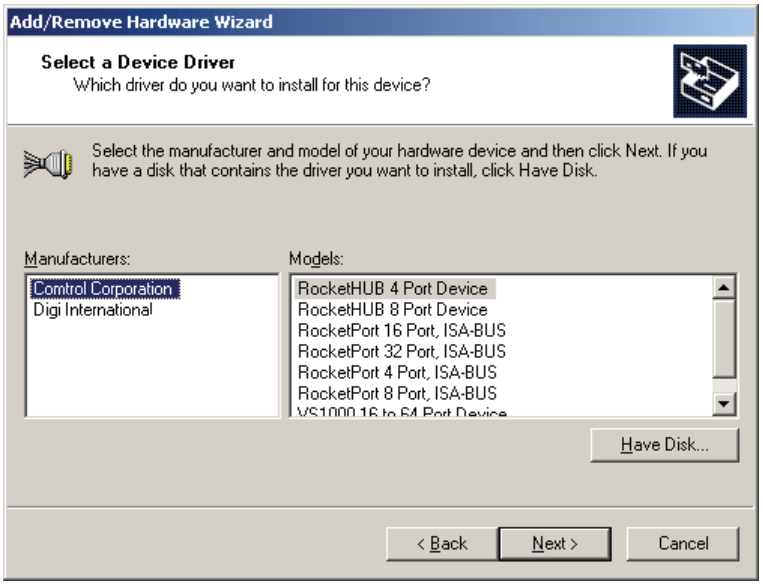
6. Select **No, I want to select the hardware from a list** and click **Next** to continue.



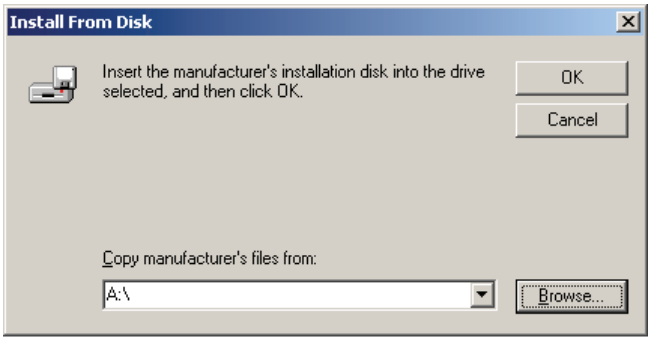
7. Select **Multi-port serial adapters** and click **Next** to continue.



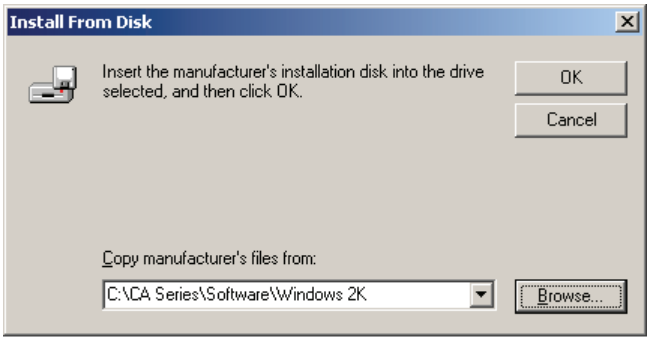
8. Click **Have Disk**.



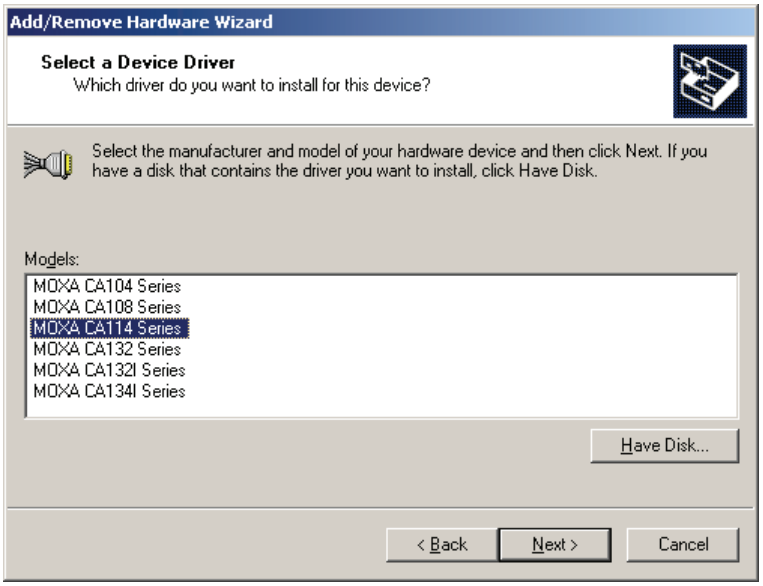
9. You will be prompted to insert the installation disk.



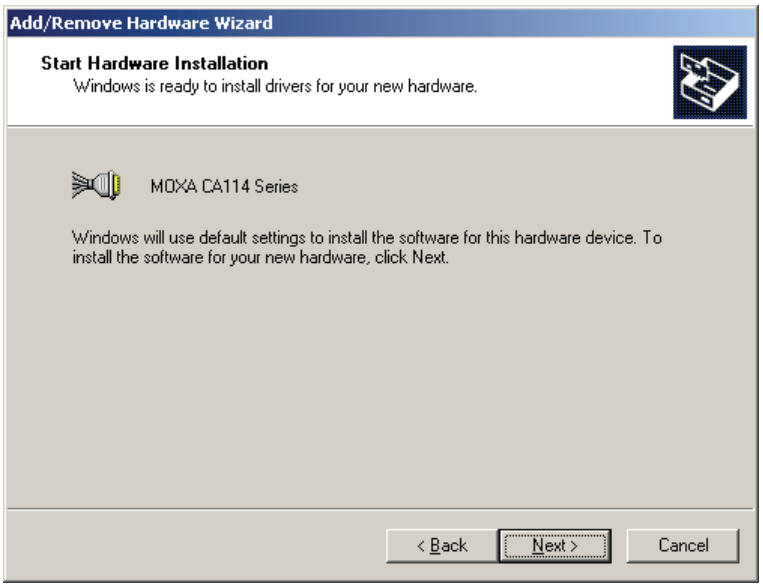
Insert the Document and Software CD into the CD-ROM drive and select the **\CA Series\Software\Windows 2K** folder on the CD. Click **OK** to continue.



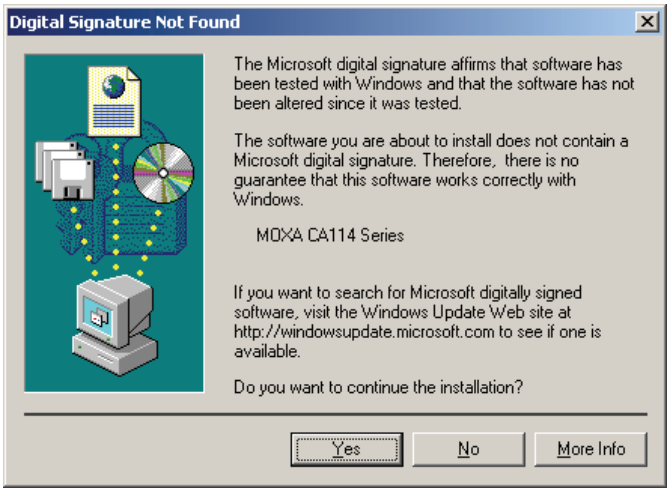
10. Select your CA Series model and click **Next** to continue.



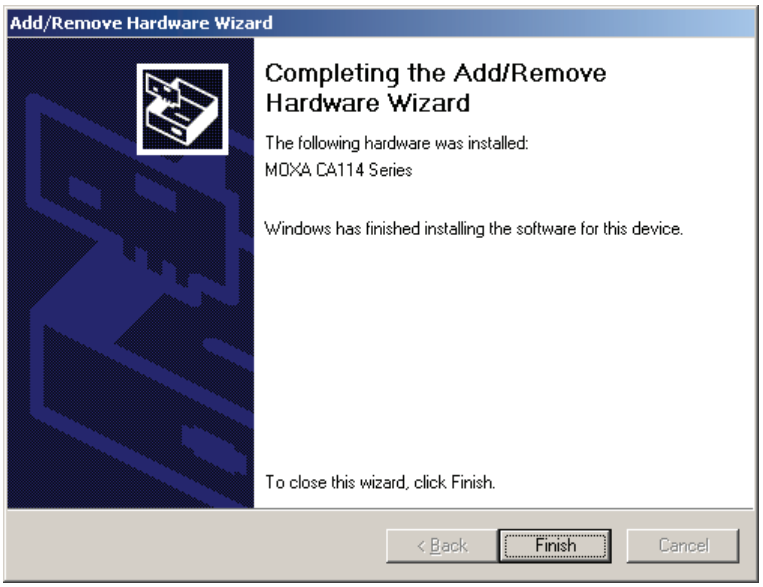
11. To begin installing the module, click **Next**.



12. If you see a warning that the Microsoft digital signature was not found, click **Yes** to proceed with the installation.



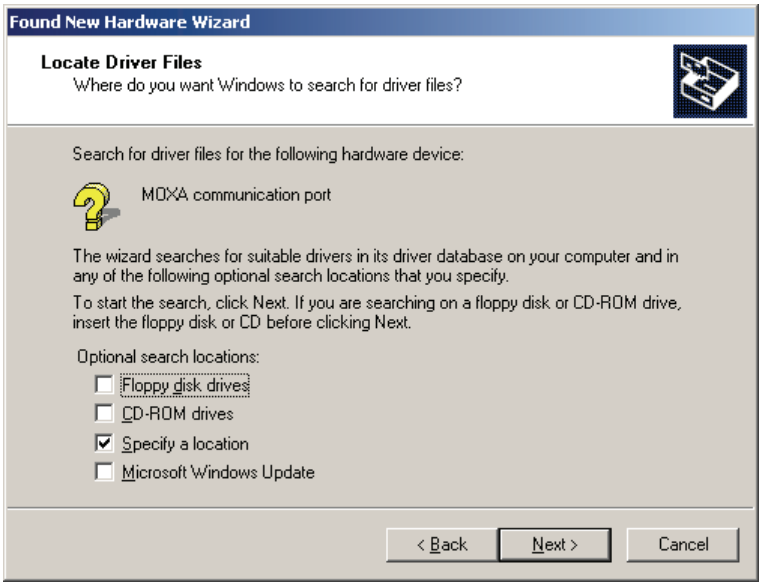
13. Windows will install the drivers. When the installation is complete, click **Finish**.



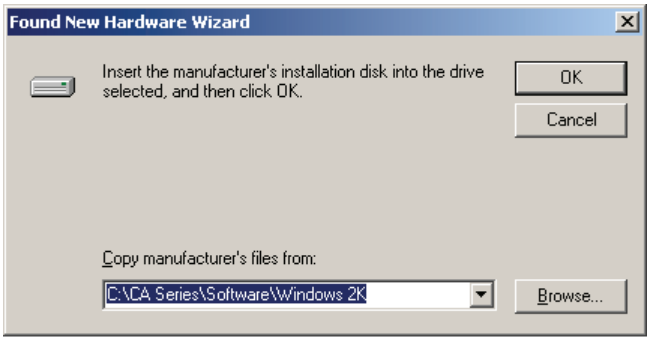
14. After the module is installed, you will be prompted to install the new serial ports. A **Found New Hardware Wizard** window will open for the first serial port, port 0. Click **Next** to proceed.

15. Select **Search for a suitable driver for my device [recommended]** and click **Next**.

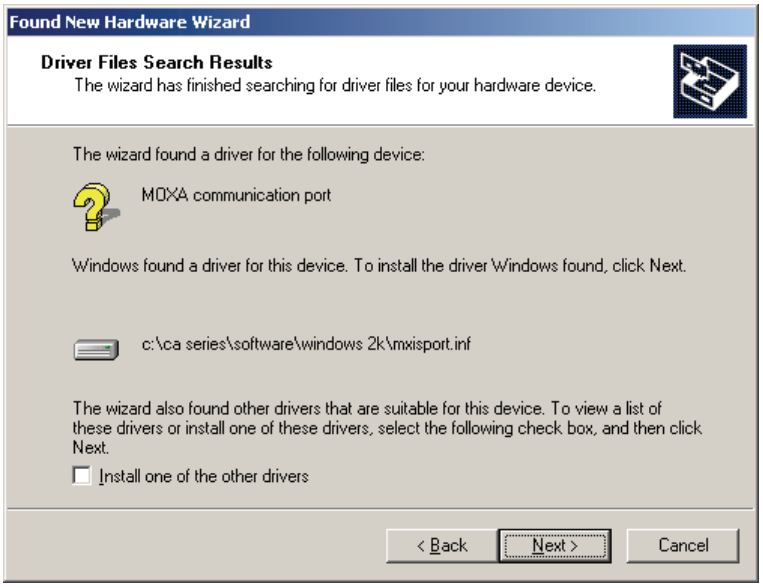
16. Select **Specify a location** and click **Next**.



17. Select the **\CA Series\Software\Windows 2K** folder on the CD and click **Next**.



18. When the driver has been found, click **Next** to proceed.



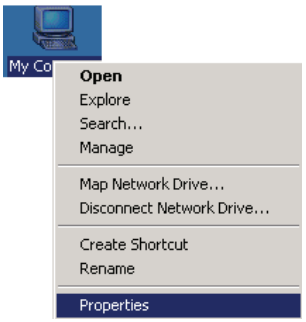
19. Windows will install the necessary drivers. After the installation is complete, click **Finish**.

The remaining serial ports will be installed automatically in the background.

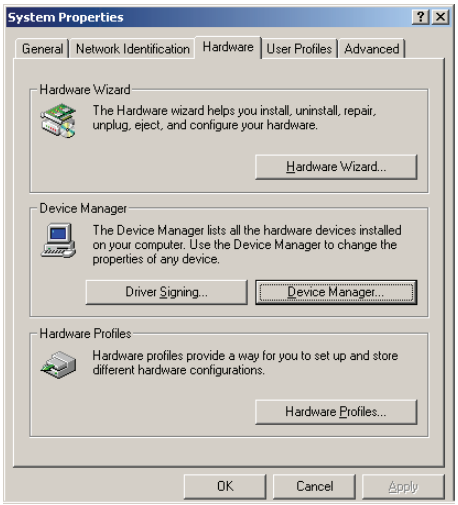
Using Device Manager to Verify Installation

You can use Windows Device Manager to verify proper installation of the CA Series module. In the following instructions, the CA-114 is used as an example.

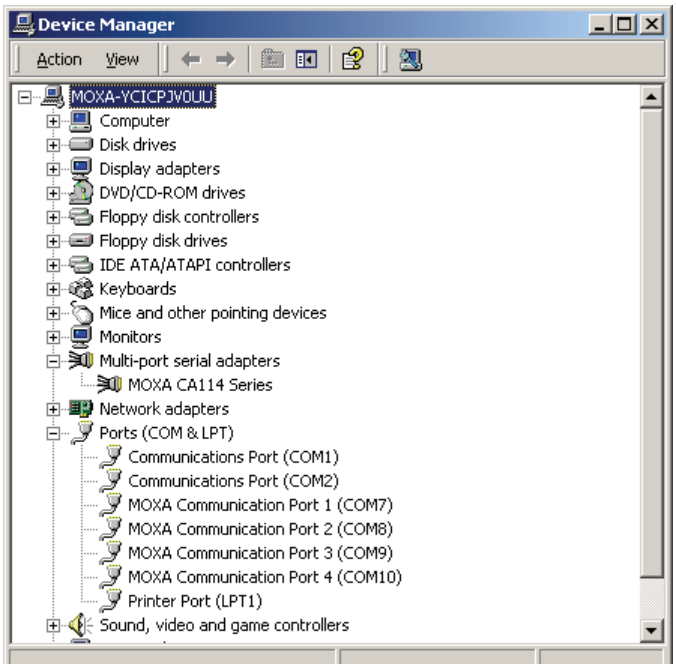
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.



3. In the **Device Manager** window, you should see your CA Series module under M**ulti-port serial adapters**. You should also see MOXA communication ports under **Ports (COM & LPT)**.

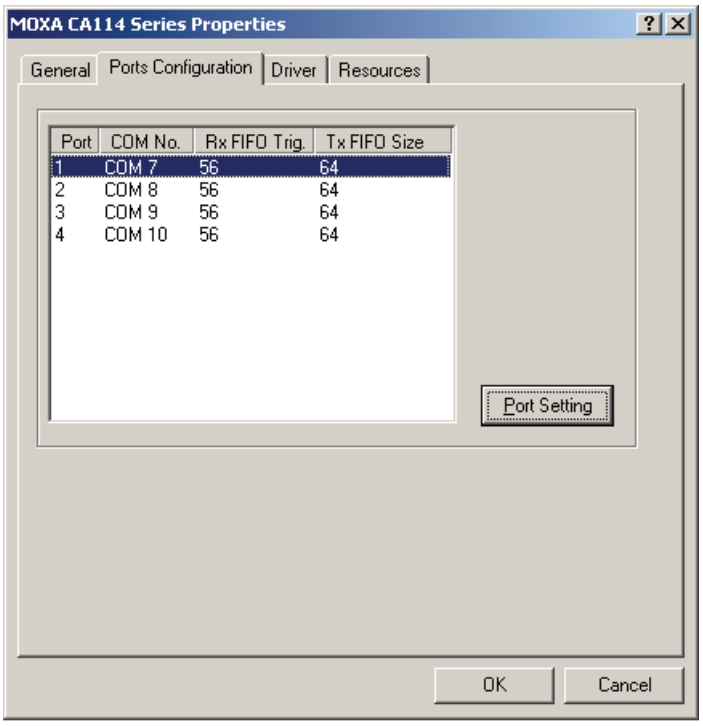


4. If you see any special marks, such as a question mark or an exclamation mark, next to the MOXA items, the installation of your module or serial ports was not successful. You can check the Windows event log for details.

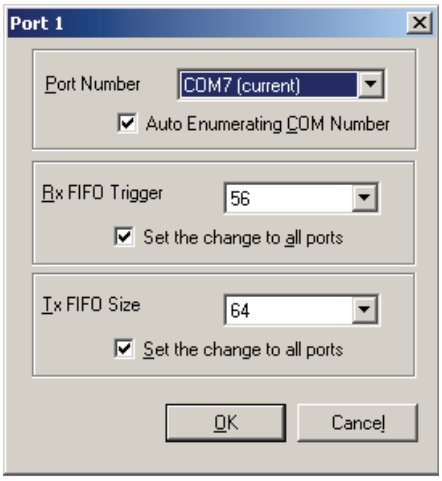
Port Configuration

After the driver is installed, a CA Series Properties window will appear. The system will map the serial ports automatically. It will prompt you to take care of port configuration if another CA Series module has been installed on the PC.

1. Select a specific port under the **Port Configuration** tab and click **Port Setting.**



2. Under **Port Number**, select a COM number to assign to the serial port.



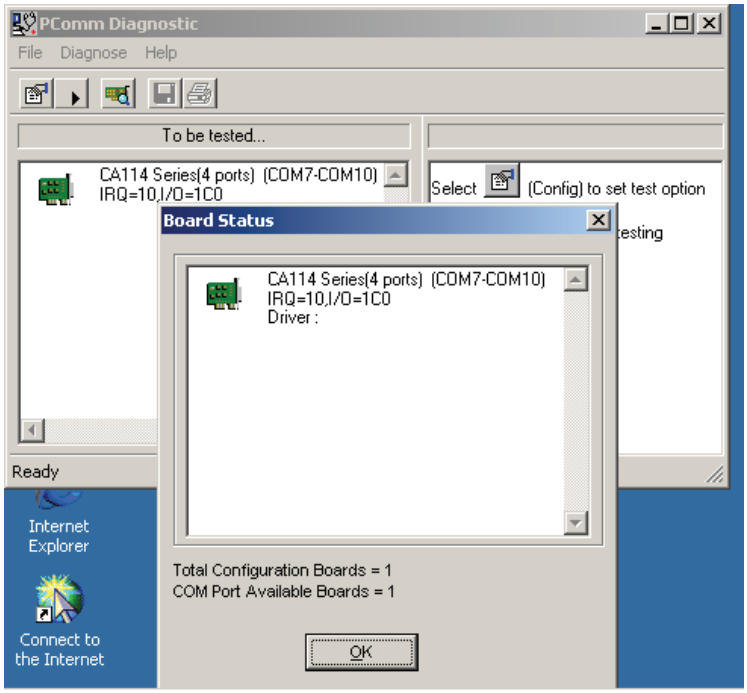
Select **Auto Enumerating COM Number** to map subsequent ports in numerical order. For example, if COM 3 is assigned to Port 1, then COM 4 will be automatically assigned to Port 2.

3. Select an **Rx FIFO Trigger.** The default value is 56 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

4. Select a **Tx FIFO Size**. The default value is 64 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.
5. Click **OK** to approve the port settings. Click **OK** again to close the **CA Series Properties** window and apply the new port settings.

Using PComm

PComm Diagnostic is a useful program for checking the module's status. It provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, and other items. You can use PComm Diagnostic to verify that the module and serial ports are working properly.



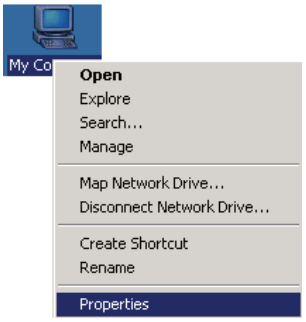
The free version of PComm is available at Moxa's website (www.moxa.com).

Using Event Log

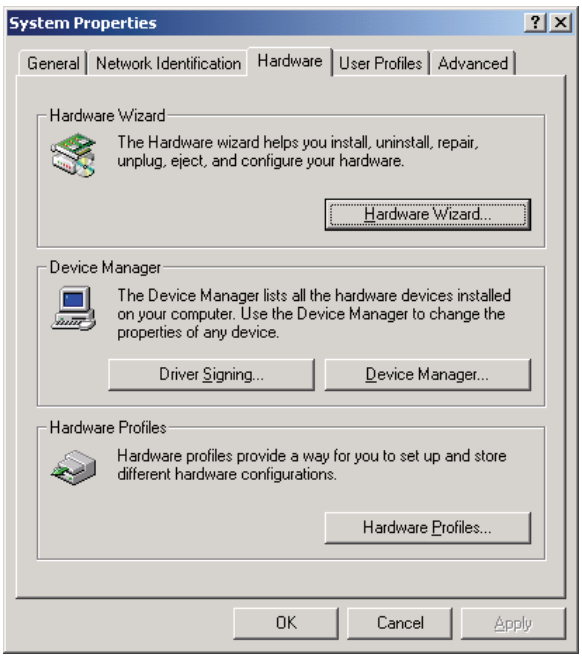
You may refer to the Windows event log to verify operation of the module. To view the event log, open Event Viewer, which is located under Administrative Tools in the Control Panel. Information about the module will be located under the System category.

Disabling the Module

1. Right-click **My Computer** and select **Properties** in the context menu.



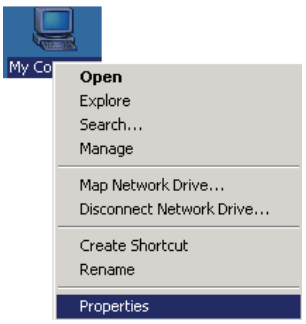
2. In the **Hardware** tab, click **Device Manager**.



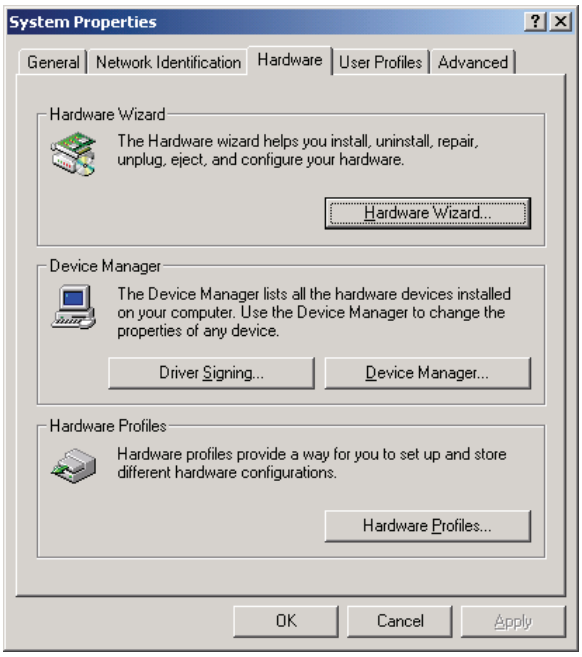
3. In **Device Manager**, right-click your module under **Multi-port serial adapters** and select **Disable** in the context menu. This will disable the module.

Uninstalling the Module

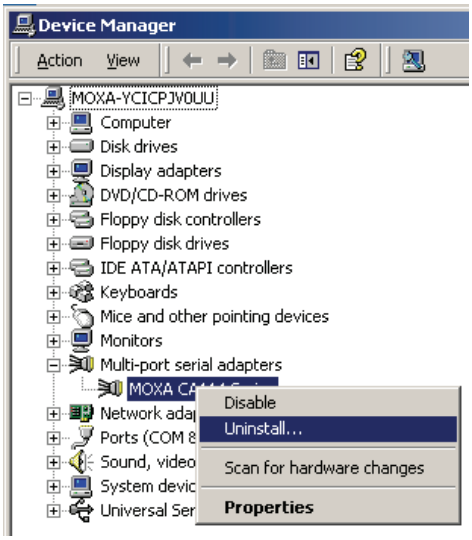
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.



3. Right-click your module under **Multi-port serial adapters** and select **Uninstall** in the context menu.



4. A confirmation dialog will appear. Click **OK** to uninstall the device.

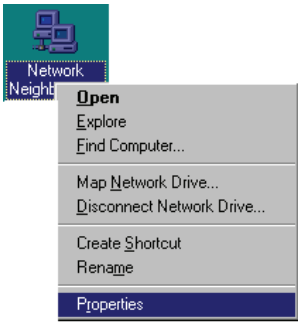
Windows NT

The Windows NT drivers conform to the Win32 COMM API standard and support the CA-104 V2, CA-104-T V2, CA-132 V2, CA-132-T V2, CA-132I V2, and CA-132I-T V2. The CA-108, CA-114, and CA-134I models are not supported under Windows NT.

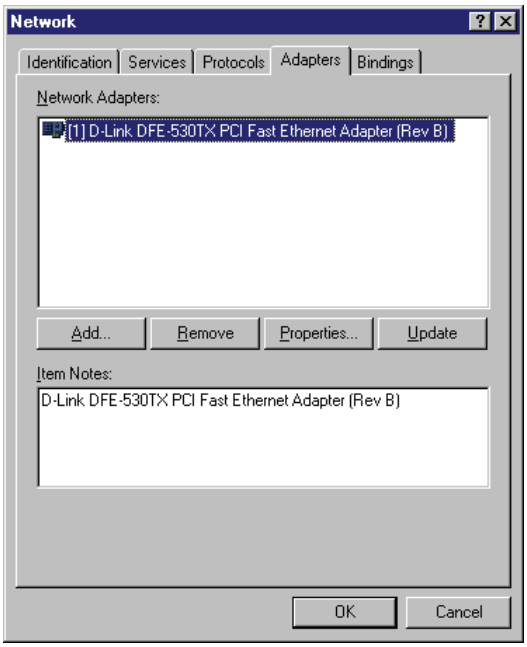
In the following instructions, the CA-104 V2 is used as an example.

Installing the Driver

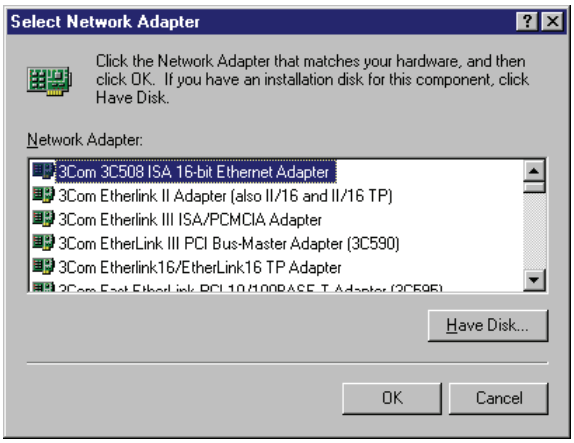
1. Right-click **Network Neighborhood** and select **Properties** in the context menu.



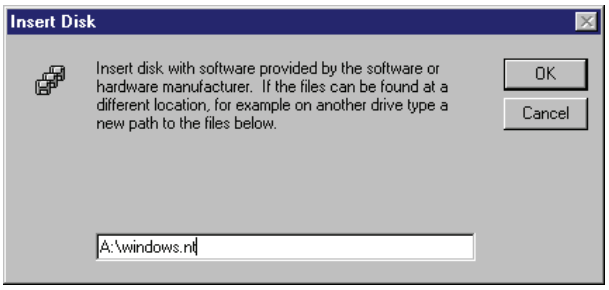
2. Under the **Adapters** tab, click **Add…**.



3. When prompted to select a network adapter, click **Have Disk**.

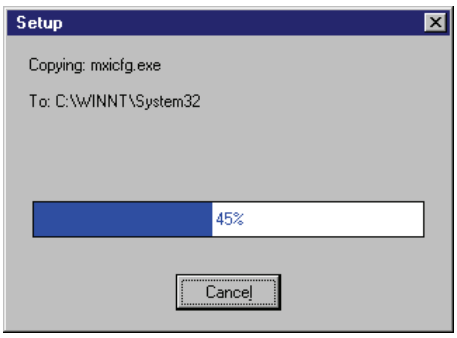


4. At the prompt, insert the installation disk provided with your module.

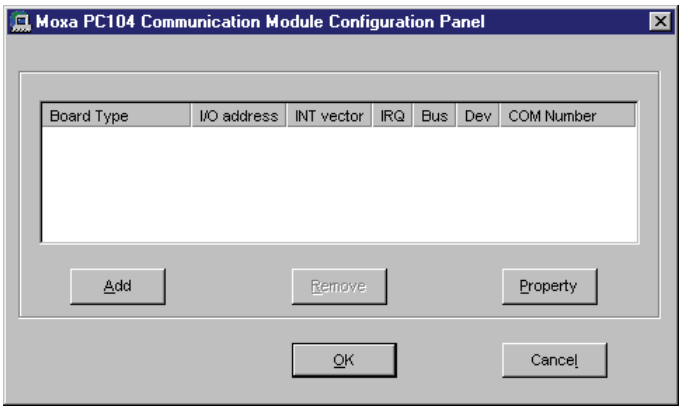


For the location, enter **A:\windows.nt**. Click **OK** to continue.

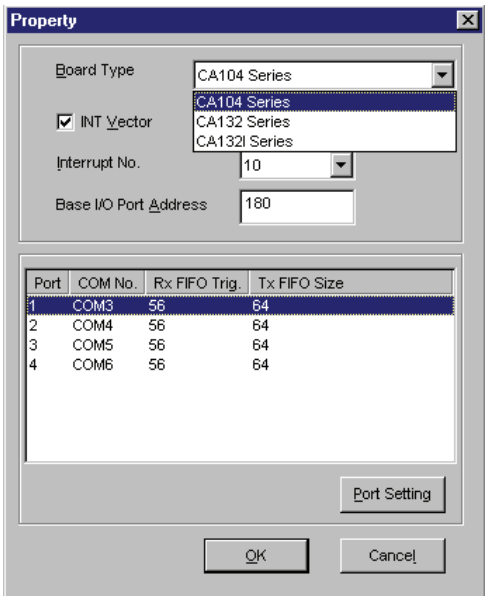
5. Windows will install the drivers.



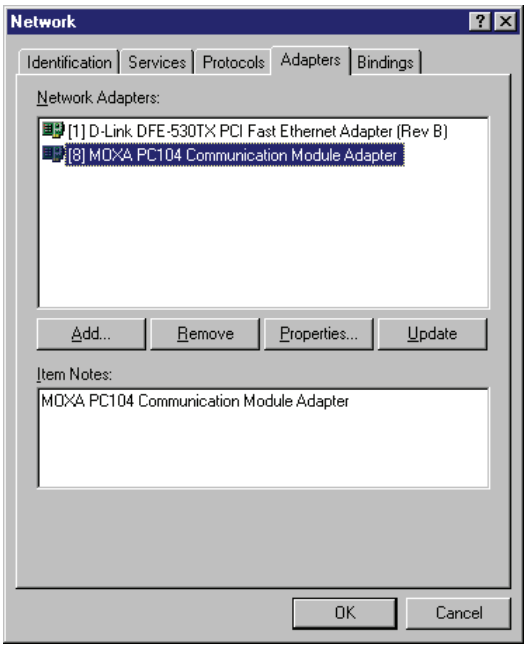
6. After the files have been installed, a configuration panel will open. Click **Add** to continue.



7. Under **Board Type**, select your CA Series model. The window will show the COM port numbers that will be assigned to the CA Series serial ports, as well as other settings. Click **OK** to continue.

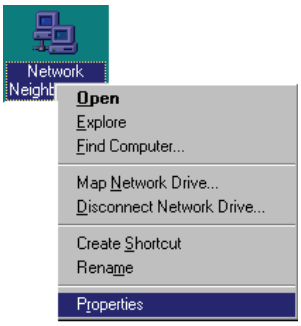


8. The CA Series module will appear as a network adapter. Click **OK** to complete installation of the module.

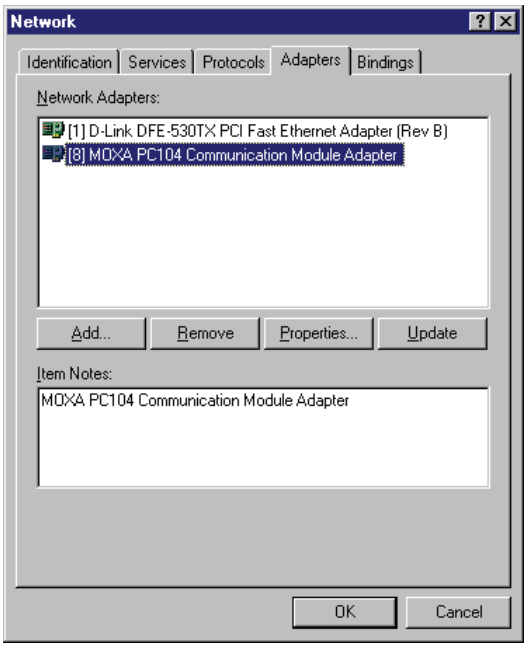


Uninstalling the Module

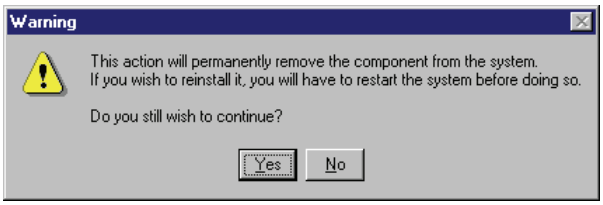
1. Right-click **Network Neighborhood** and select **Properties** in the context menu.



2. In the **Adapters** tab, select your CA Series module and click **Remove**.



3. A confirmation dialog will appear. Click **OK** to uninstall the device.



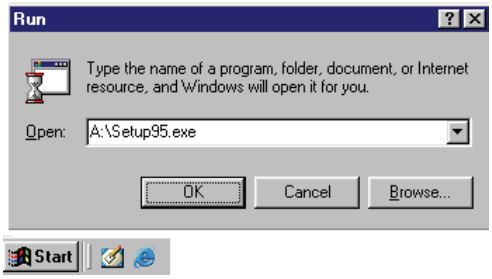
Windows 95, 98, ME

The Windows 95/98/ME drivers conform to the Win32 COMM API standard and support the CA-104 V2, CA-104-T V2, CA-132 V2, CA-132-T V2, CA-132I V2, and CA-132I-T V2. The CA-108, CA-114, and CA-134I models are not supported under Windows 95, 98, or ME.

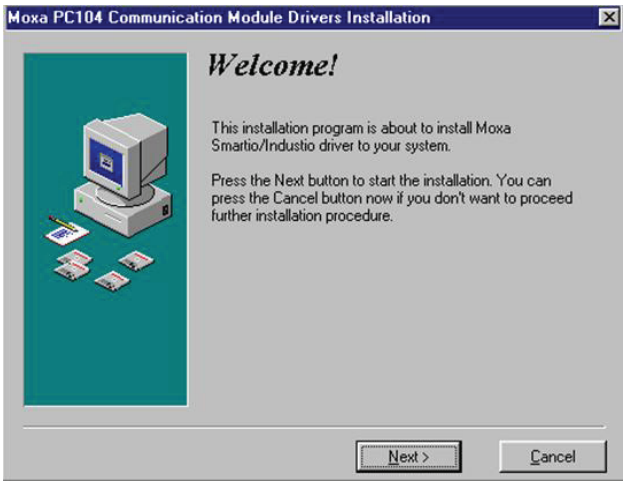
In the following instructions, the CA-104 is used as an example.

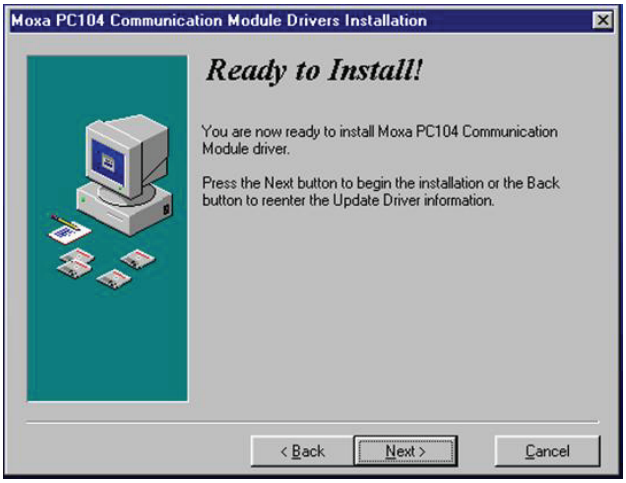
Installing the Driver

1. Insert the CA Series installation disk and run **Setup95.exe** through **Start menu → Run**.

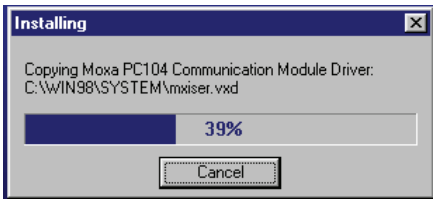


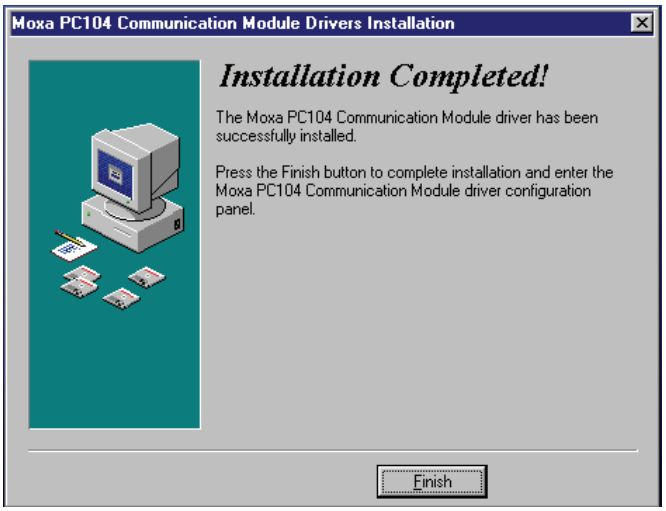
2. Click **Next** to proceed through the welcome screens.



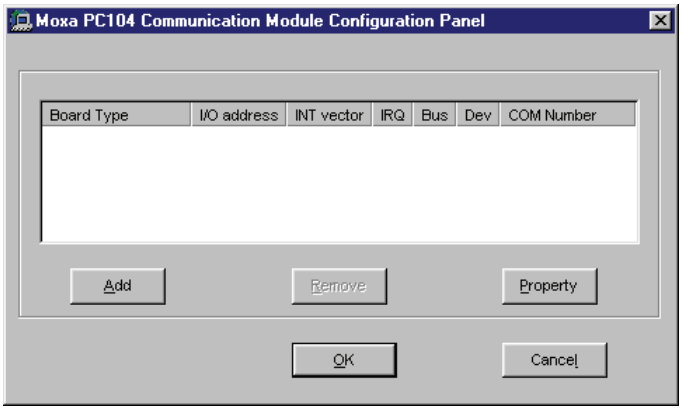


3. Windows will install the drivers. When the installation is complete, click **Finish**.

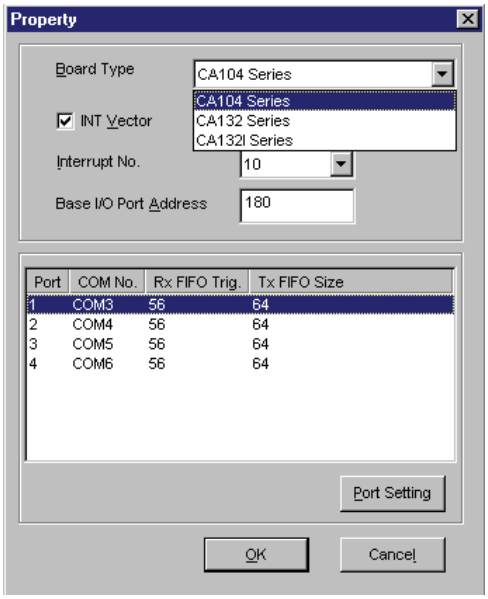




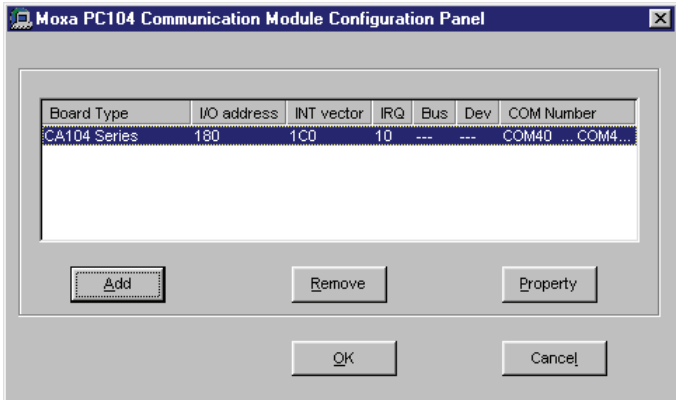
4. After the files have been installed, a configuration panel will open. Click **Add** to continue.



5. Under **Board Type**, select your CA Series model. The window will show the COM port numbers that will be assigned to the CA Series serial ports, as well as other settings. Click **OK** to continue.



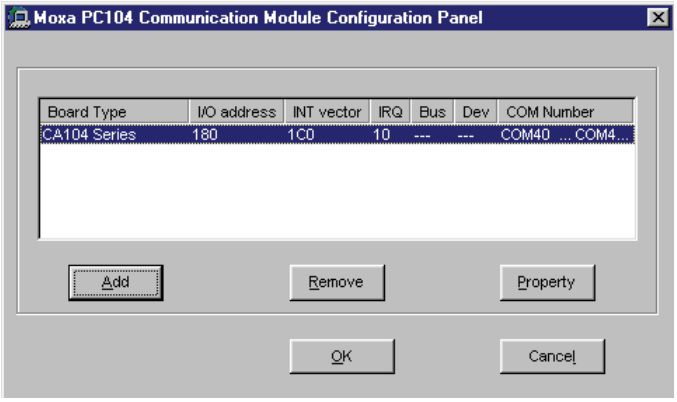
6. The CA Series module will now appear in the configuration panel. Click **OK** to complete installation of the module.



You can open the configuration panel again through **Start → Programs → Moxa Utilities → MOXA PC104 Communication Module Configuration Panel**.

Uninstalling the Module

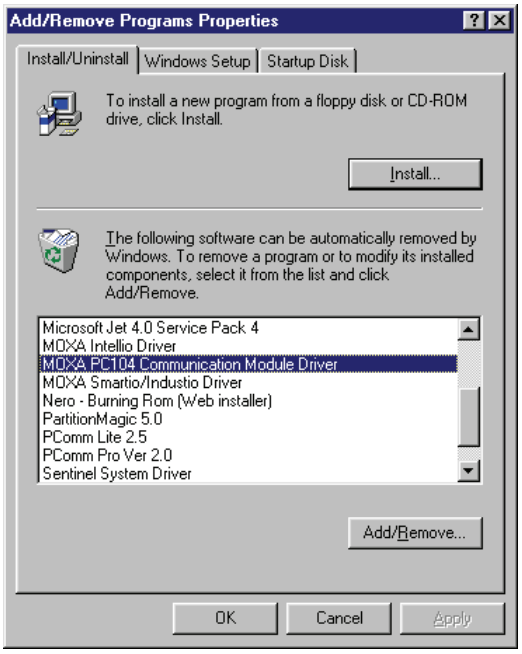
1. Open the configuration panel through **Start → Programs → Moxa Utilities → MOXA PC104 Communication Module Configuration Panel**. Select your CA Series module and click **Remove**.



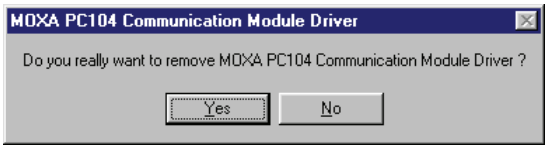
2. A confirmation dialog will appear. Click **Yes** to uninstall the device.

3. To remove the driver from the system, open **Add/Remove Programs** in the **Control Panel**.

4. In the **Install/Uninstall** tab, select **MOXA PC104 Communication Module Driver** and click **Add/Remove**.



5. A confirmation dialog will appear. Click **Yes** to remove the driver.



6. After the driver is removed, click **OK** to close the window.

Linux

1. Execute the following commands from the Linux prompt:

   #mount /dev/cdrom /mnt/cdrom
   #cd /
   #mkdir moxa
   #cd moxa
   #cp /mnt/cdrom/<driver directory>/mxpcdrv.tgz .
   #tar xvfz mxpcdrv.tgz

2. #cd mxpcdrv
   # make clean; make install

3. #cd /moxa/mxpcdrv/driver
   #./mpmknod

4. Install the module driver using the hardware settings that you selected. For example, for an I/O address of 0x180, an INT vector of 0x1C0, and an IRQ of 10, execute the following command:
   #modprobe mxpcdrv ioaddr=0x180 iovect=0x1C0 irq=10

5. You can use the Moxa diagnostic utility to verify the driver's status:
   #cd /moxa/mxpcdrv/utility/diag
   #./msdiag

6. You can use the Moxa terminal utility to test the TTY ports:
   #cd /moxa/mxpcdrv/utility/term
   #./msterm

DOS

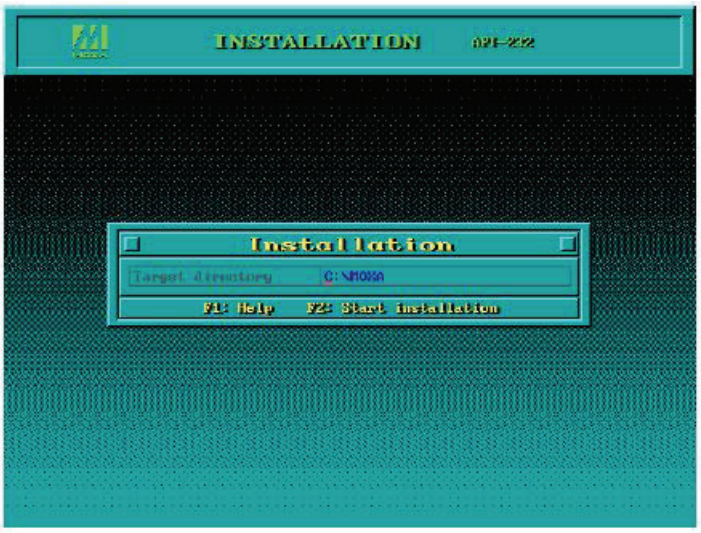
MOXA DOS API-232 is a software package that can help you develop or debug serial communications programs. This section will explain how to install the package, set up the driver, and load or unload the driver. For additional information about the API-232 library and utilities, please refer to Chapter 4.

The DOS drivers support the CA-104 V2, CA-104-T V2, CA-132 V2, CA-132-T V2, CA-132I V2, and CA-132I-T V2. The CA-108, CA-114, and CA-134I models are not supported under DOS.

In the following instructions, the CA-104 is used as an example.

Installing the Driver

Run the installation program, **DOSINST.EXE**, in the DOS folder. Specify the target directory for the API-232 files (e.g., **C:\MOXA**). Press **F2** to start the installation.



After installation is complete, you will be prompted to set up the board and driver initial values. We strongly recommended that you do so.

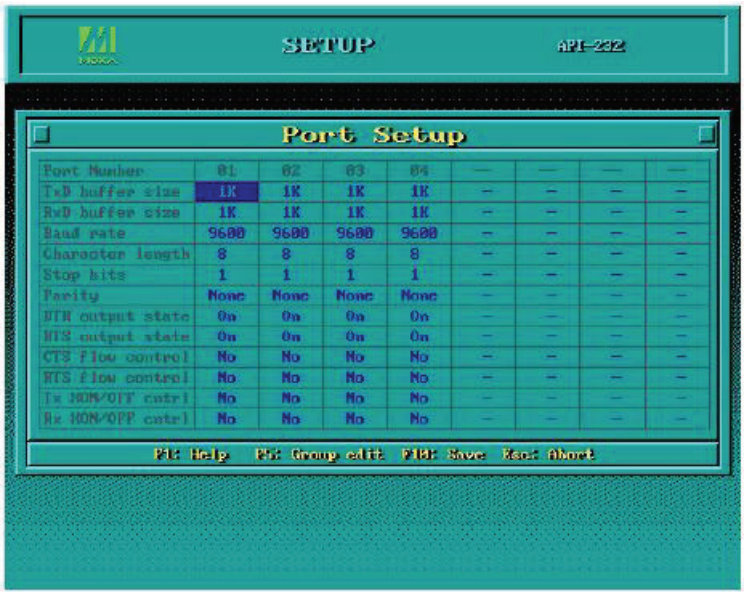
Driver Setup

The following instructions are not intended to illustrate every function of the setup program. For more detailed information, please refer to the help files by pressing F1 in the setup program.

1. Run the setup program, **BIN\SETUP.EXE**.
2. Select your CA Series model and press **Enter**.

3. You must set the Port No., I/O Address, IRQ and INT Vector properly. These settings must match your module's hardware configuration.

4. Press **PgDn** to view advanced port setup options. Your module's configuration will be displayed along with other settings such as port number, buffer size, etc.
5. Verify the settings and make any necessary changes.

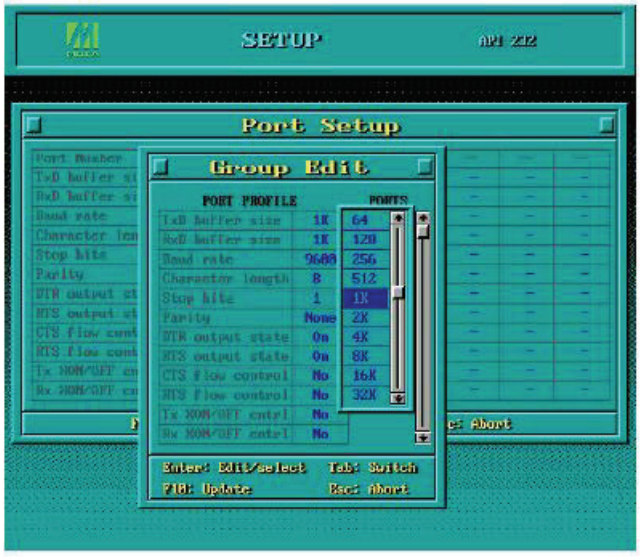


Port number: This is the port ID of each port. Application software will refer to a port by its port number (ID). Port numbers must be unique; duplicate port numbers are not allowed. The port ID can range from 0 to 127 as long as it does not overlap with another port. Generally, you should consider the convenience of programming when specifying the port number.

TxD buffer size: This is the transmission (output) buffer allocated in the system for each port.

RxD buffer size: This is the receiving (input) buffer allocated in the system for each port.

F5: Group Edit: This allows you to configure several ports simultaneously as a group.



6. Press **F10** to save the latest configuration and exit the setup program.

Loading the Driver

After setting up the driver, you must load the driver in order to gain access to the serial ports on the module. Run **BIN\DPC-DRV.EXE** at the DOS prompt. The driver will detect your CA Series module automatically. You should see messages indicating successful detection of your module, such as the following:

```
PC/104 Communication Module DOS driver Version 1.0
Setup driver …
CA-104 series OK!
Device driver setup O.K.
```

At this point, you can execute applications that support API-232 functions, or start developing applications using the API-232 library.

Unloading the Driver

To unload or release the CA Series driver from memory, enter **DPC-DRV/Q** at the DOS prompt.

4

Serial Programming Tools

MOXA provides Windows serial programming libraries and troubleshooting utilities that are easy to use and powerful. You can use these tools to reduce software development time.

The serial communication library is useful for developing applications for data communications, remote access, data acquisition, and industrial control. It provides a simpler solution compared to the more complex Windows Win32 COMM API.

PComm is a professional serial communication tool for Windows PCs. PComm includes the following features:

- Useful utilities for diagnostics, port monitoring, and terminal emulation
- Sample programs
- Comprehensive help files

The following topics are covered in this chapter:

- **Serial Programming Library**
- **PComm Utilities**
  - Installation
  - PComm Diagnostic
  - PComm Monitor
  - PComm Terminal Emulator

Serial Programming Library

The serial programming library assists you in developing serial communications programs for any COM port that complies with the Microsoft Win32 API. It facilitates the implementation of multi-process and multi-thread serial communication programs and can remarkably reduce development time.

The library provides a complete set of functions as well as various sample programs for Visual C++, Visual Basic, and Delphi. To view detailed descriptions of the available functions and sample programs, go to **Start → Program → PComm Lite** and select **PComm Lib Help**, **PComm Porting Notes**, or **PComm Programming Guide**. You may also refer to the sample programs in the PComm directory.

PComm Utilities

This sections provides brief descriptions of the PComm utilities. For more information about these utilities, please refer to the help files or to the API-232.txt file for DOS.

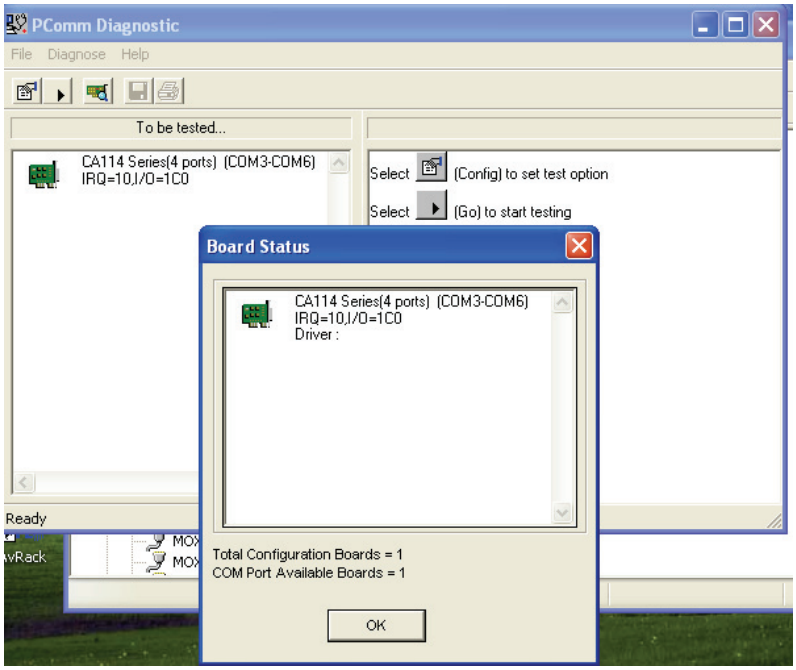
Installation

To install PComm, run **Setup.exe** from the installation diskette. Please note that the PComm diagnostic and monitor utilities are for MOXA boards only. These two utilities will not work with other serial boards.

PComm Diagnostic

PComm Diagnostic is designed for MOXA boards only. It provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, DTR/DCD, and other items. You can use PComm Diagnostic to check the operation of both software and hardware.

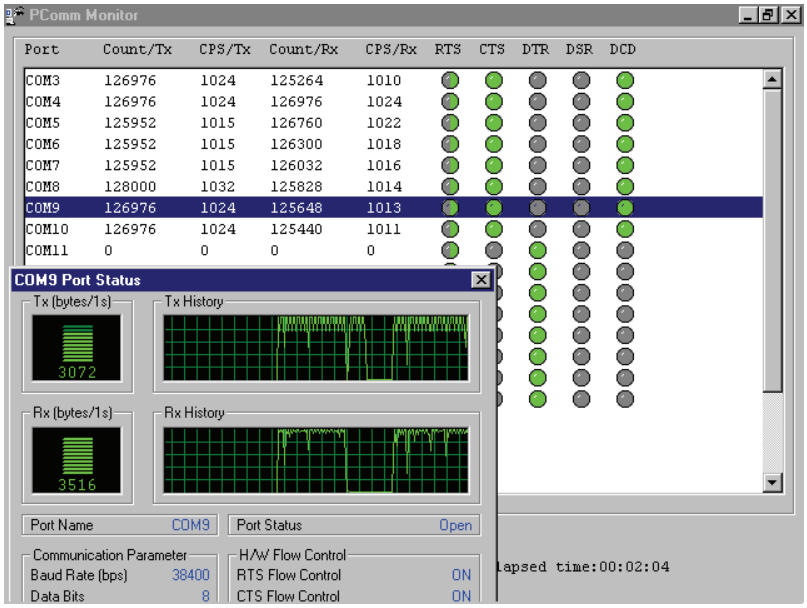
To run the Diagnostic program, go to **Start → Program → PComm Lite → Diagnostic**.



PComm Monitor

PComm Monitor is designed for MOXA board in Windows NT only. It allows you to monitor data transmission of selected MOXA COM ports. It monitors data transmission, throughput, and line status at regular intervals. Click on a specific port to view that port's communication parameters and status.

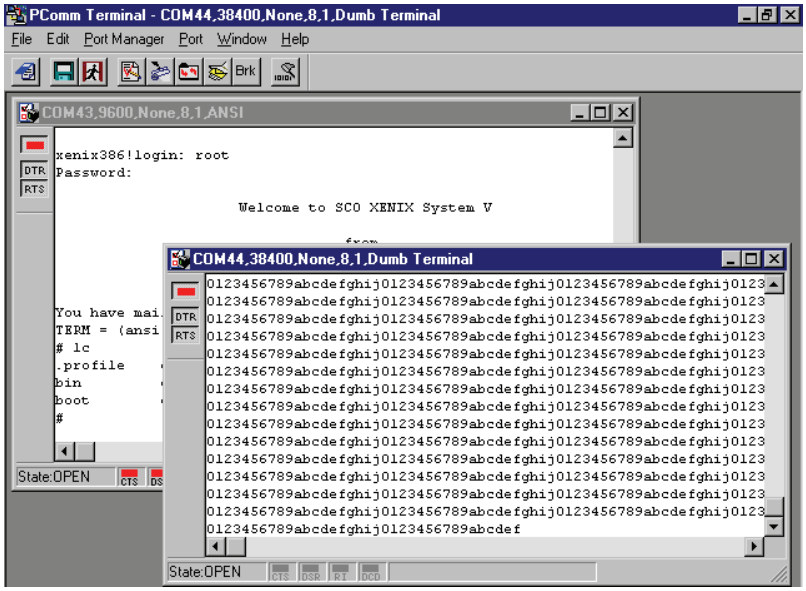
To run PComm Monitor, go to **Start → Program → PComm Lite → Monitor**.



PComm Terminal Emulator

PComm Terminal Emulator can be used to connect to a serial port to verify that data transmission is functioning correctly. It supports multiple windows and both VT100 and ANSI terminal types. You can interactively transfer data, periodically send patterns, and transfer files using ASCII, XMODEM, YMODEM, ZMODEM, and KERMIT protocols.

To run PComm Terminal Emulator, go to **Start → Program → PComm Lite → Terminal Emulator**.



5

Pin Assignments

The box header connector(s) on the module is used to connect to serial devices. Optional cables are available that provide DB9 or DB25 connectors. The pin assignments of the box header connectors and available cables are provided below.

Box Header Pin Assignments

RS-232

These pin assignments apply to the CA-108, CA-114, and CA-104 V2. Note that there are two 40-pin box header connectors on the CA-108, each of which connects to 4 serial ports.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	DCD0	11	DCD1	21	DCD2	31	DCD3
2	DSR0	12	DSR1	22	DSR2	32	DSR3
3	RxD0	13	RxD1	23	RxD2	33	RxD3
4	RTS0	14	RTS1	24	RTS2	34	RTS3
5	TxD0	15	TxD1	25	TxD2	35	TxD3
6	CTS0	16	CTS1	26	CTS2	36	CTS3
7	DTR0	17	DTR1	27	DTR2	37	DTR3
8	---	18	---	28	---	38	---
9	GND0	19	GND1	29	GND2	39	GND3
10	---	20	---	30	---	40	---

RS-422, 4-wire RS-485

These pin assignments apply to the CA-132 V2, CA-132I V2, CA-114, and CA-134I. Pins 21 to 40 apply to the CA-114 and CA-134I only.

Pin	Signal	Pin	Signal	Pin*	Signal*	Pin*	Signal*
1	TxD0-(A)	11	TxD1-(A)	21	TxD2-(A)	31	TxD3-(A)
3	TxD0+(B)	13	TxD1+(B)	23	TxD2+(B)	33	TxD3+(B)
5	RxD0+(B)	15	RxD1+(B)	25	RxD2+(B)	35	RxD3+(B)
7	RxD0-(A)	17	RxD1-(A)	27	RxD2-(A)	37	RxD3-(A)
9	GND0	19	GND1	29	GND2	39	GND3

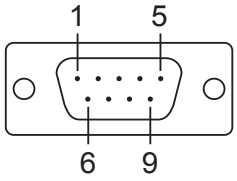
2-wire RS-485

These pin assignments apply to the CA-132 V2, CA-132I V2, CA-114, and CA-134I. Pins 21 to 40 apply to the CA-114 and CA-134I only.

Pin	Signal	Pin	Signal	Pin*	Signal*	Pin*	Signal*
5	Data0+(B)	15	Data1+(B)	25	Data2+(B)	35	Data3+(B)
7	Data0-(A)	17	Data1-(A)	27	Data2-(A)	37	Data3-(A)
9	GND0	19	GND1	29	GND2	39	GND3

Serial Cable Pin Assignments

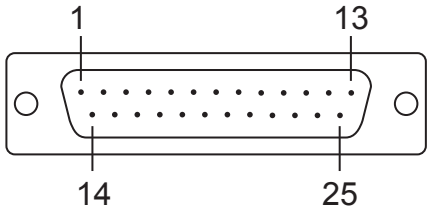
DB9(M) Connectors



The CBL-F40M9x4-50 and CBL-F20M9x4-50 cables provide DB9(M) connectors for each serial port, with pin assignments as follows:

Pin	RS-232	RS-422 4-wire RS-485	2-wire RS-485
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		

DB25(M) Connectors



The CBL-F40M25x4-50 and CBL-F20M25x4-50 cables provide DB25(M) connectors for each serial port, with pin assignments as follows:

Pin	RS-232	RS-422 4-wire RS-485	2-wire RS-485
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)

A

Service Information

This appendix shows you how to contact Moxa for information about this and other products, and how to report problems.

In this appendix, we cover the following topics.

- **MOXA Internet Services**
- **Problem Report Form**
- **Product Return Procedure**

MOXA Internet Services

Customer satisfaction is our number one concern, and to ensure that customers receive the full benefit of our products, Moxa Internet Services has been set up to provide technical support, driver updates, product information, and user's manual updates.

The following services are provided

E-mail for technical support: .....support@moxa.com

Website for product information: .....http://www.moxa.com

Problem Report Form

MOXA CA Series PC/104 Multiport Serial Module

Customer name:	
Company:	
Tel:	**Fax:**
Email:	**Date:**

1. Moxa Product: ☐ CA-108 ☐ CA-114 ☐ CA-134I ☐ CA-104 V2
☐ CA-132 V2 ☐ CA-132I V2

2. Serial Number: _____

Problem Description: Please describe the symptoms of the problem as clearly as possible, including any error messages you see. A clearly written description of the problem will allow us to reproduce the symptoms, and expedite the repair of your product.

Product Return Procedure

For product repair, exchange, or refund, the customer must:

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