Allen-Bradley

ControlNet Communication Card

1784-PCC

Installation Manual

Rockwell Automation

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss

Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests. For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the Allen-Bradley publication Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

This equipment is classified as open equipment and must be mounted in an enclosure during operation to provide safety protection.

Summary of Changes

This release of the 1784-PCC installation instructions contain new and updated information about Windows 2000 and Windows Me (Millenium Edition), as well as additional third-party PC card controller vendors for Windows NT. You will see change bars, as shown to the left of this paragraph, throughout this manual to help you quickly identify revisions.

Other information was revised extensively. For those chapters that contain all new information, or extensively revised information, you will find a change bar in the margin of the chapters.

Notes:

About the Manual

Use this manual to install and use the ControlNet® PC card (PCMCIA interface), catalog number 1784-PCC. This interface enables a system to communicate on a ControlNet network.

Audience

The information in this manual is intended for users who are:

- familiar with Windows® 2000, Windows NT™, Windows® Me, Windows 98®, Windows 95®
- experienced with one or more of these Allen-Bradley products: PLC-5®, ControlLogix, or SLC-500™ family of programmable controllers, or any other products that communicate with the PCC card
- experienced with ControlNet configuration software and the ControlNet network

Refer to the following table for the version of RSLinx you will need for your operating system.

Operating System	Version of RSLinx
Windows 95/98/Me	2.0 or later
Windows NT	2.1 or later
Windows 2000	2.2 or later

Conventions

In this manual, anything that you can select, click on, or type on a screen is shown in **bold** type.

Rockwell Automation Support

Rockwell Automation offers support services worldwide, with over 75 sales/support offices, over 500 authorized distributors, and 260 authorized systems integrators located throughout the United States alone, plus Rockwell Automation representatives in every major country around the world. Contact your local Rockwell Automation representative for:

- sales and order support
- product technical training
- warranty support
- support service agreements

Obtain Pre-Sales Product Support

If you need to contact Rockwell Automation for pre-sales product support, try one of the following methods:

- Call your local Rockwell Automation representative
- Network pre-sales support line, 1.440.646.3638 (3NET)
- Pre-Sales e-mail, RACle3net@ra.rockwell.com

Obtain Technical Product Support

If you need to contact Rockwell Automation for technical assistance, try one of the following methods:

Type of technical support:	Access at:
Personalized Service	Call your local Rockwell Automation representative
Post-sales Technical Support	1.440.646.5800
Email your questions to	racleasktheexpert@ra.rockwell.com
Internet site	www.ab.com, then select Product Support or www.ab.com/support/products/pccards.html **Note:** You can access Rockwell Automation Knowledge documents from this internet address.

Abbreviations

Throughout this manual, we abbreviate some terms. Use the following table to become familiar with our terminology.

This abbreviation	Means
PCMCIA	Personal Computer Memory Card International Association.
IRQ	Interrupt Request
PC	Personal Computer.

IMPORTANT Driver and firmware versions that appear in the screen captures in this manual are not necessarily the latest version available. The version you use should be the version that appears in the screen capture or a later version.

In this document, we refer to the ControlNet PC card as the 1784-PCC card.

Notes:

Chapter 4
Install and Use the 1784-PCC Card in Windows NT

Chapter 5
Install and Use the1784-PCC Card in Windows 2000

Chapter 6
Run the 1784-PCC Test Utility in Windows 95/98/Me, NT and 2000

Chapter 7
Insert and Remove the 1784-PCC Card

Chapter 8
Connect the 1784-PCC Card to the Network

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Specifications

Glossary

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About the 1784-PCC Card

What is in This Chapter?

Read this section to familiarize yourself with PC card technology and the 1784-PCC card. The following table describes what this chapter contains and where to find specific information.

What is PCMCIA?

The Personal Computer Memory Card International Association (PCMCIA) developed a standard for credit-card size personal computer (PC) cards. The PCMCIA standard defines an architecture and communication method for these PC cards.

PC cards developed under Release 1.0 of the PCMCIA standard are used for data storage. PC cards developed under Release 2.0 of the PCMCIA standard can be used for both I/O and data storage.

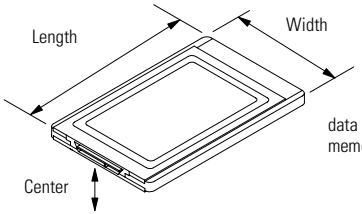
What is a PC Card?

Since personal computers have become smaller, a need for smaller storage media developed. The PC card is a small form-factor adapter that can add memory, storage, and I/O capabilities to these smaller computers.

All PC cards measure the same length and width (54 mm x 85.6 mm), but differ in thickness at the center. The thickness at the connector end and along the rails is the same for all types of PC cards.

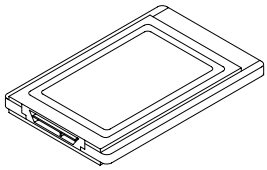
Architecture

Currently there are three types of PC cards:



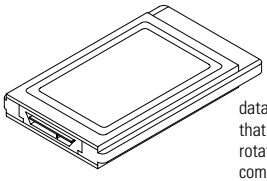
Type I
3.3 mm thick

data storage, such as Flash memory cards



Type II
5.0 mm thick

I/O such as modem, LAN, and host communications (the Allen-Bradley 1784-PCD, -PCMK, and -PCC cards are Type II cards)



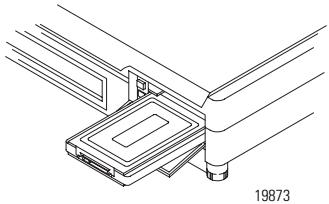
Type III
10.5 mm thick

data storage or I/O capabilities that require more space, such as rotating media and wireless communication devices

19911

IMPORTANT If the PCMCIA slot in your computer is thick enough to accommodate a Type III card, then it can also accommodate a Type I or II card.

All three types of PC cards use the same 68–pin connector. The pins are in two parallel rows of 34 pins. When inserted into the PCMCIA slot on your computer, the connector mates with a single molded socket.



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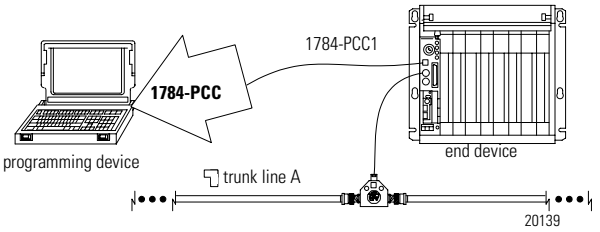
What is the PCC Card?

The ControlNet communication card (1784-PCC) allows you to connect a programming device to any intelligent device (i.e., workstation, PLC®, processor, scanner, or adapter) on a ControlNet network through the Network Access Port ( ).



IMPORTANT Your computer must be PCMCIA 2.1 compliant to support the 1784-PCC card. To verify that your computer is PCMCIA 2.1 compliant, see your computer's user manual.

Notes:

Pre-Installation Procedures

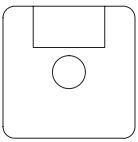
What is in This Chapter?

The following table describes what this chapter contains and where to find specific information.

Verify Your Package Contents

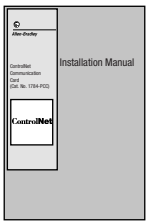
Be certain that you have these items before you discard any packing material. If an item is missing or incorrect, contact your local sales representative.

1784-PCC card



1784-PCC installation utility disk

1784-PCC1 cable



installation manual
(publication 1784-IN034C-EN-P)

30185-M

System Requirements

operating system	Microsoft® Windows 95/98/Me, 2000, or NT 4.0
application software	RSNetWorx for ControlNet software RSLinx 2.0 or later for Windows 95/98/Me RSLinx 2.1 or later for Windows NT RSLinx 2.2 or later for Windows 2000
memory for computer resources	at least 8 MB
memory for card resources	4KB
IRQ	1 available IRQ
diskette drive	One 3.5" diskette drive
hard disk space	300K
PCMCIA slot	one Type II slot

ATTENTION

Windows NT users:

If you have a 1784-PCC series A interface card, you will need to perform a flash upgrade to upgrade to series B. Refer to Publication 1784-PCC-RN1 for details. To access this information, visit www.ab.com\support. Click on the PC Cards link and download the PCC_Upgrade.exe file. This file contains both the upgrade utility and the publication (1784-PCC-RN1) containing the instructions for completing the upgrade.

Find the 1784-PCC Driver

When you install drivers for your operating systems, you must be certain to install the correct files. Windows 95/98/Me systems require a Virtual Device Driver (VxD), which contains .inf and .vxd files. Windows NT requires an NT driver, which uses setup.exe, Unpccnt.exe and pcc_config.exe files. Windows 2000 requires a Windows Driver Model (WDM), which contains .inf and .sys files. Refer to the table below to be sure you are installing the correct driver files.

ATTENTION

Failure to install the correct driver files could result in unpredictable system operation.

Source (where the driver is loaded from)	Driver location (for each operating system)		
	Windows 95/98/Me	**Windows NT**	**Windows 2000**
installation disk (shipped with the 1784-PCC card)	A:\Rsipcc.inf A:\Rsipcc.vxd where A:\ is the floppy drive letter	A:\setup.exe A:\Unpccnt.exe A:\pcc_config.exe where A:\ is the floppy drive letter	A:\Win2K\PccWdm.inf A:\Win2K\PccWdm.sys where A:\ is the floppy drive letter
RS-Linx 2.2 or later product CD	E:\PnP_Drivers\Win9x\Rsipcc.inf E:\PnP_Drivers\Win9x\Rsipcc.vxd where E:\ is the CD-ROM drive letter	Not distributed on RSLinx product CD	E:\PnP_Drivers\Win2K\PccWdm.inf E:\PnP_Drivers\Win2K\PccWdm.sys where E:\ is the CD-ROM drive letter
internet	www.ab.com/support/products/pccards.html You can also access Rockwell Automation Knowledge documents at this site.		

Notes:

Install and Use the 1784-PCC Card in Windows 95/98/Me

What is in This Chapter?

Read this chapter to learn how to operate the 1784-PCC card on Windows 95/98/Me. The following table describes what this chapter contains and where to find specific information.

IMPORTANT The screen captures in this chapter are taken from Windows 95/B. If you are using another version of Windows 95,98, or Me, your screens may be different.

Locate the 1784-PCC Windows 95/98/Me Driver

When you install drivers for your operating systems, you must be certain to install the correct files. Windows 95/98/Me systems require a Virtual Device Driver (VxD), which contains .inf and .vxd files. Refer to the table below to be sure you are installing the correct driver files.

ATTENTION

Failure to install the correct driver files could result in unpredictable system operation.

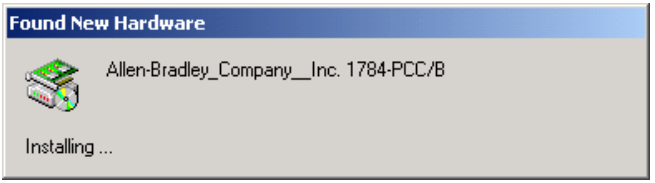
Source (where the driver is loaded from)	Driver location (for Windows 95/98/Me operating systems)
installation disk (shipped with the 1784-PCC card)	A:\Rsipcc.inf A:\Rsipcc.vxd where A:\ is the floppy drive letter
RS-Linx 2.2 or later product CD	E:\PnP_Drivers\Win9x\Rsipcc.inf E:\PnP_Drivers\Win9x\Rsipcc.vxd where E:\ is the CD-ROM drive letter
internet	www.ab.com/support/products/pccards.html You can also access Rockwell Automation Knowledge documents at this site.

Install the 1784-PCC Driver

Follow the procedures below to install the Windows 95/98/Me driver for the 1784-PCC Series A or B card.

1. In Windows 95/98/Me, insert the card into the PCMCIA slot by following the directions in Chapter 7, “Insert and Remove the 1784-PCC Card”.

   After you insert the PCC card, the system detects the hardware and begins to build the driver information needed to run the hardware. Because the driver has not been loaded, Windows 95/98/Me displays a new hardware dialog box and the following message:



You see:

2. Insert the installation disk into the floppy disk drive.

3. Click **Next** to begin the install.

   You see a message telling you that the system is searching for a driver for the new device.

   Once Windows 95/98/Me finds the driver, you should see:

ATTENTION

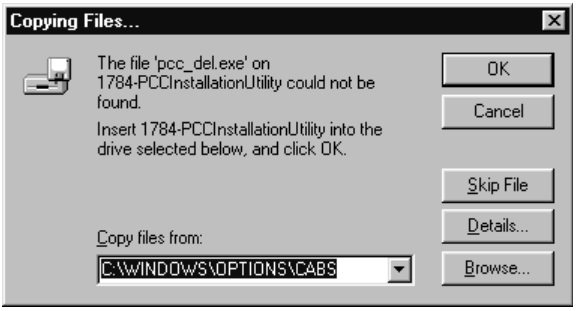
If you do not see the message that Windows has found a driver (as shown in the screen above), click the **Other Locations** button on the screen and select the appropriate 95/98/Me driver. Refer to the table on page 3-2 for the correct driver file to install.

4. Click **Finish** to install/upgrade the driver.

   You may see the following message:

   a. If you have not already done so, insert the diskette into the floppy disk drive and press **Enter** or click **Ok**.

You see:



b. In the Copy files from box, specify the drive (usually **A:**) that corresponds to your floppy disk drive.

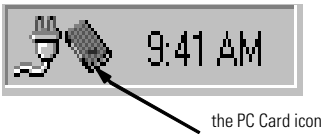
c. Press **Enter** or click **Ok**.

After the system has finished copying files, you should hear two upward tones that indicate the card is ready to use. If you do not hear these tones, check to see that your speakers/sound are enabled.

5. Run the 1784-PCC test utility as described in Chapter 6 to verify your installation. If the test fails, refer to the section entitled Troubleshoot the Card Installation on page 3-10 of this manual.

Stop the Card

In Windows 95/98/Me, before you remove the 1784-PCC card from its sockets, you should stop the communication to it. To do this:



1. Click with your right mouse button on the PC Card icon in the taskbar. If the icon is not there, refer to the section entitled Enable the PC Card Icon on the Taskbar on page 3-8 of this manual.

2. Select **Adjust PC Card Properties**.

3. In the list of PC cards, click on the 1784-PCC card you want to stop.

4. Click **Stop**.

5. When you see the window that states that you may safely remove this device, press **Enter** or click **Ok**.

6. Remove the 1784-PCC card from the PCMCIA slot.

Alternately, to stop the card, you can do the following:

1. Click with your left mouse button on the PC Card icon in the taskbar.

2. Click on the 1784-PCC card you want to stop in the list of PC cards.

3. Click **Stop**.

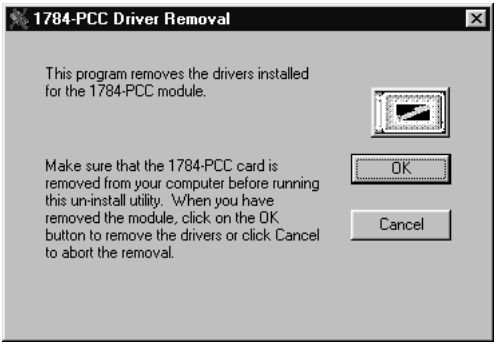
4. When you see the window that states that you may safely remove this device, press **Enter** or click **Ok**.

Remove and Uninstall the 1784-PCC Driver

You can access the uninstaller through the Windows 95/98/Me Add/Remove programs applet to remove the card's driver from your system.

1. Stop the PCC card as described on page 3-6.
2. Access the Control Panel by selecting **Start ⇒Settings ⇒Control Panel**.
3. Double-click on the **Add/Remove Programs** icon.
4. Select **Allen-Bradley 1784-PCC Driver**.

5. Click the **Add/Remove** button.
   You see:



6. Remove the 1784-PCC card before continuing. The system gives you the opportunity to cancel the operation before deleting any files.

7. Press **Enter** or click **Ok** to remove the driver.

Enable the PC Card Icon on the Taskbar

The PC card icon in the Taskbar lets you know the status of your PC card, and lets you stop processing before you remove or change PC cards. You can display this icon within the Taskbar on your Windows 95/98/Me desktop. You will see this icon only when there is one or more PC card(s) installed in the computer.

To set up the PC card icon within the Taskbar:

1. Access the Control Panel by selecting **Start ⇒Settings ⇒Control Panel**.

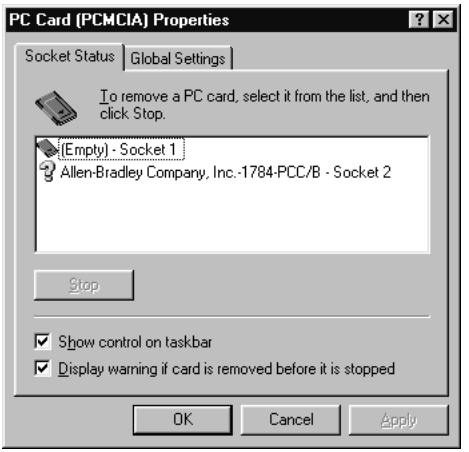
2. Double-click the PC card (PCMCIA) icon.

TIP

If you find that there is no PC card icon in the Control Panel, this could be an indication that the PCMCIA socket hardware or drivers were not installed properly. This situation prevents Windows 95/98/Me from locating the PC card. To resolve this problem, contact the computer manufacturer.

3. When the PC card Properties dialog box appears, click Show control on the taskbar.

   If you do not see these dialog boxes, contact the computer manufacturer.

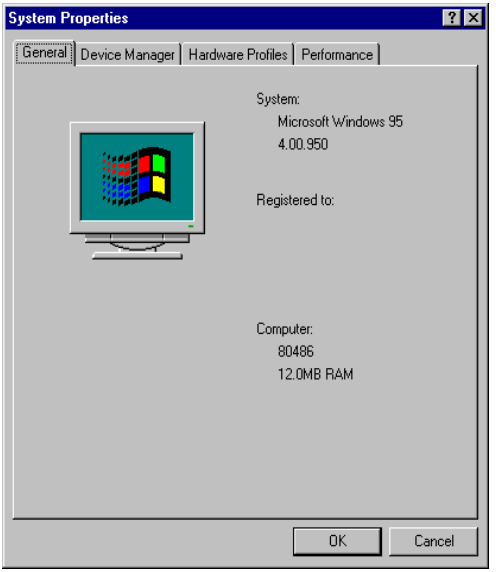


4. Press **Enter** or click **Ok**. The PC card icon appears in the Taskbar.

Troubleshoot the Card Installation

To resolve card installation issues:

1. Insert your 1784-PCC card into your system.
2. Click the **My Computer** icon with the right mouse button.
3. Select **Properties** from the menu. The System Properties dialog box appears.



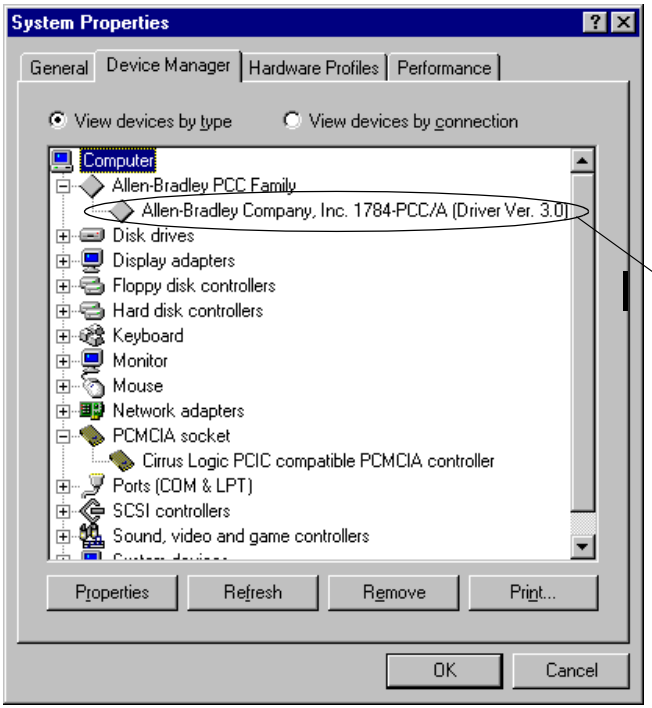
4. Click the **Device Manager** tab.

   All of the devices within the system are displayed.

5. Scroll through the devices and search for the Allen–Bradley PCC Family line.

   If this line has a plus sign, click the plus sign to expand the item.

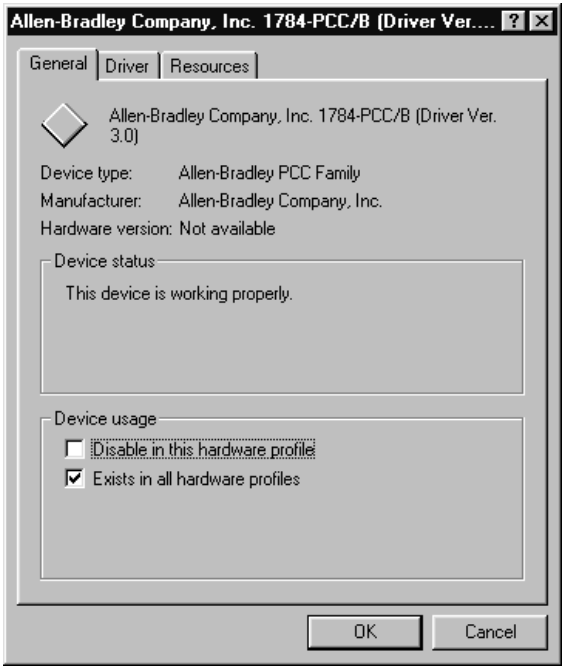
The Allen-Bradley 1784-PCC card should be listed.



6. Select the **Allen-Bradley Company, Inc. 1784-PCC card**.

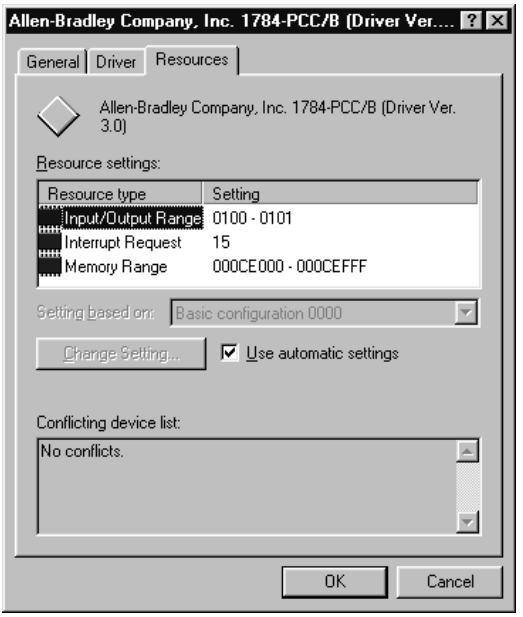
7. Click the **Properties** button.

You see:



If Code 10 (conflicting memory resources) is reported in the Device status dialog box, continue with the following steps.

8. In the Properties dialog box, click the **Resources** tab.



Verify that there are no resource conflicts listed in the Conflicting Device list. You also should verify that you have assigned an interrupt to the 1784-PCC card. If you have not, then you need to do so. You may have to disable a device to make an interrupt available.

9. If there are conflicts, you may need to alter the settings of devices involved in the conflict to get the 1784-PCC card to function properly.

Try unchecking the **Use automatic settings** box and then changing the conflicting I/O, interrupt, or memory resources.

IMPORTANT The option of unchecking the **Use automatic settings** box is Not always available in Windows 98. It depends on how the operating system was installed and configured.

If there are no conflicts, continue with the following steps.

10. Return to the Device Manager and scroll through the list to find PCMCIA sockets.

11. Double-click **PCMCIA sockets** to expand it.

12. Click on the **PCMCIA controller** used by your system.

13. Click **Properties**. Verify that the socket controller is enabled in the hardware profile you are using.

If	Then
the device status says, "This device is not present, not working properly, or does not have all drivers installed, code 10."	• click the **Resources** tab and check the Conflicting Device list for possible hardware conflicts; or you may want to verify that the **Use Automatic Settings** option is enabled. • you may have a general PCMCIA problem. You should contact your computer manufacturer for a resolution.

Install and Use the 1784-PCC Card in Windows NT

What is in This Chapter?

Read this chapter to learn how to operate the 1784-PCC card on Windows NT. The following table describes what this chapter contains and where to find specific information.

Before You Begin

Read the following **before** you install your 1784-PCC card, Series B or later.

ATTENTION

If you have a 1784-PCC series A interface card, you will need to perform a flash upgrade to upgrade to series B. Refer to Publication 1784-PCC-RN1 for details. To access this information, visit www.ab.com\support. Click on the PC Cards link and download the PCC_Upgrade.exe file. This file contains both the upgrade utility and the publication (1784-PCC-RN1) containing the instructions for completing the upgrade.

ATTENTION

The 1784-PCC series B interface card and NT Driver are designed for use in notebook PCs equipped with NT 4.0 from the original manufacturer and certified by Microsoft.

If your PC is not certified, it may not be compatible for use with the 1784-PCC series B card under NT 4.0.

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IMPORTANT

Before you can install the driver for the 1784-PCC/B card, you must be logged in as an administrator of the machine. Being an administrator gives you permission to install or make changes to the machine software. If you try to install the driver without being an administrator, you will get error messages and the driver will not install.

- You must be running Windows NT 4.0 with Service Pack 3 or later.
- You can use only one 1784-PCC card at a time in Windows NT.
- You must have RSLinx 2.1 or greater.

Do You Have Any of the Following Third-Party Plug-and-Play PC Card Controller Software Installed?

If	Then
you do have third-party plug-and-play PC card controller software	a PC card icon (circled in this illustration) will appear on the Windows task bar 
you do not have third-party plug-and-play PC card controller software	go to page 4-5 and continue with the driver installation.

TIP

To find the version of your third-party plug-and-play software, you can usually do the following:

1. Double-click on the PC card icon in the taskbar.
2. When a dialog box appears, click **Help ⇒About**.

SystemSoft's CardWizard

The 1784-PCC Windows NT driver does not work with SystemSoft's CardWizard versions prior to 5.10.06.

If you have SystemSoft's CardWizard, you must upgrade the PC Card Controller Software to version 5.10.06 or later for the 1784-PCC driver to function.

For more information on obtaining the CardWizard upgrade for use with the 1784-PCC card, contact your computer manufacturer or SystemSoft:

- Internet: www.systemsoft.com
- Phone: 1.800.796.0088 or 508.651.0088 (ask for sales)

Phoenix/Softex's Card Executive

If you have Phoenix/Softex's Card Executive, you must upgrade the PC Card Controller Software to version 2.35 or later for the 1784-PCC Driver to function.

For more information on obtaining the Card Executive upgrade for use with the 1784-PCC card, contact your computer manufacturer or Phoenix/Softex:

- Internet: www.softexinc.com or www.phoenix.com/platform/cardexec.html
- Phone: 512.452.8836
- Fax: 512.795.8702

TIP

If you have a version of Card Executive between 2.24 and 2.35, contact Rockwell Automation Technical Support at 440.646.5800 for a free patch.

IMPORTANT

When using Card Executive, do not access the Windows Control Panel (**Start ⇒Settings ⇒Control Panel**; double-click the **PC card icon**). Instead, access the Phoenix/Softex Control Panel by double-clicking the **PC card icon** in the taskbar.

Unicore's CardWare

Contact your computer manufacturer for the recommended version.

For more information, contact Unicore:

- Internet: www.unicore.com/products/CardWare/CardWarent.cfm
- Phone: 978.686.6468

IMPORTANT

The PCC_Config utility (described on page 4-11) does not work with CardWare. If you have an unresolved resource conflict, contact your computer manufacturer.

Locate the 1784-PCC Driver for Windows NT

When you install drivers for your operating systems, you must be certain to install the correct files. Windows NT systems require an NT Driver. Refer to the table below to be sure you are installing the correct driver files.

ATTENTION

Failure to install the correct driver files could result in unpredictable system operation.

Source (where the driver is loaded from)	Driver location (for Windows NT operating systems)
installation disk (shipped with the 1784-PCC card)	A:\setup.exe A:\Unpccnt.exe A:\pcc_config.exe where A:\ is the floppy drive letter
internet	www.ab.com/support/products/pccards.html You can also access Rockwell Automation Knowledge documents at this site.

Install the 1784-PCC Driver

Follow the procedure below to install the Windows NT driver for the 1784-PCC/B card.

IMPORTANT

You are required to insert the 1784-PCC card in order for the installation to work properly. We recommend that you insert the 1784-PCC card only when your system is not powered. Once you have installed the driver and you insert the 1784-PCC card into the slot, we do not recommend that you remove the 1784-PCC card while Windows NT is running.

1. Start the install process with your machine off.
2. Insert the 1784-PCC/B card.

3. Turn your machine on and log on with administrative rights.

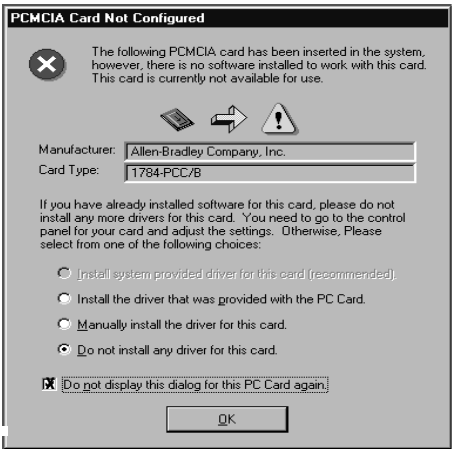
IMPORTANT Remember, in order for the installation process to run correctly, you must have administrator privileges to install the software.

We strongly recommend that you exit all Windows programs before running this utility. We cannot guarantee that data will not be lost.

If	Then
you do have third-party plug-and-play PC card controller software	go to Step 4 on page 4-6
you do not have third-party plug-and-play PC card controller software	go to Step 5 on page 4-8

4. If you have third-party plug-and-play PC card controller software, do the following. otherwise, skip to Step 5 on page 4-8.

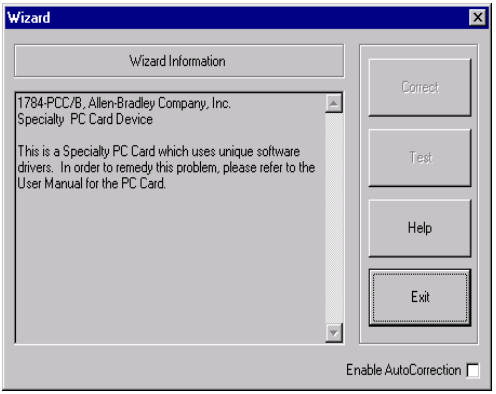
- If you have Phoenix/Softex's Card Executive on your system, you may see the following message:



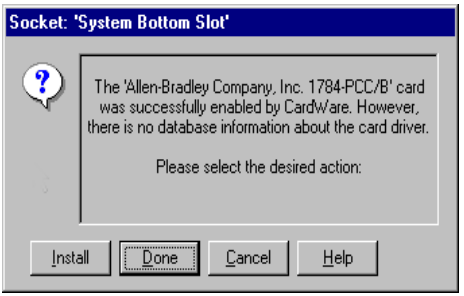
If you get this message, do the following:

a. Choose the **Do not install any driver for this card** radio button.
b. Check the **Do not display this dialog for the PC card again** checkbox.
c. Press **Enter** or click **Ok**. You still need to install the driver. Continue on with this procedure.

- If you have SystemSoft's CardWizard, you may get the following message. Click **Exit**.



- If you have Unicore's CardWare, you may get the following message. Click **Done**.



TIP

Be sure to click **Done** at this screen. If you do not, you will see this screen every time you reboot your pc.

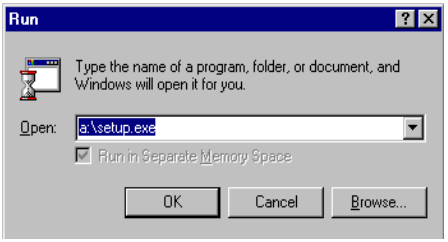
5. Insert the installation diskette into the floppy disk drive.

6. Access the Run window by selecting **Start ⇒Run**.

7. In the Run dialog box, type the path

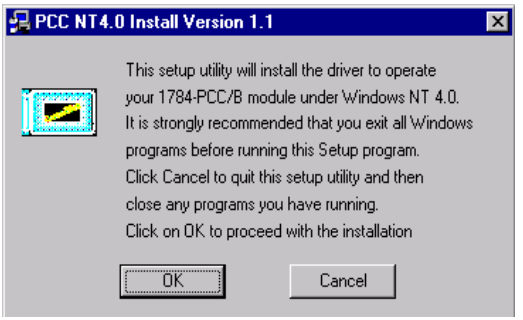
   A:\setup.exe.

   where A:\ is the drive letter of your floppy disk drive.



8. Press **Enter** or click **Ok**.

   You see:

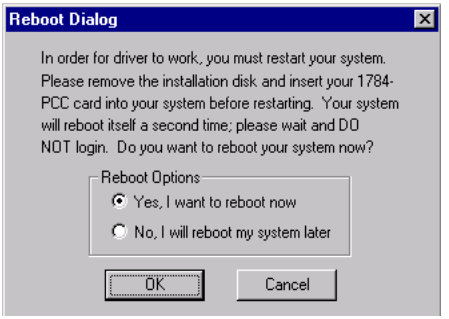


IMPORTANT If you have programs running, click **Cancel** to exit the installation process and exit the programs. After you exit the programs, re-start the install process.

9. If you have CardWare installed, you may see the following screen. Press **Enter** or click **Ok** to continue with the installation.

10. Click **Ok**.

When this portion of the installation is complete, you see:



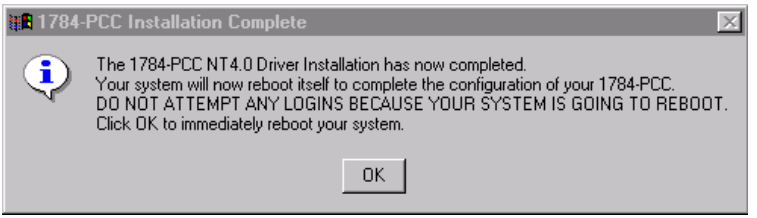
11. Remove the driver installation diskette from your floppy drive.

12. Select **Yes** or click **Ok** to reboot your system.

IMPORTANT Wait for the logon screen to appear. Do not log on. Depending on the speed of your machine, your wait could be 5 minutes or more.

13. Ignore any third-party plug-and-play software messages that may appear here.

14. Click **Ok**. Your system will automatically reboot. The driver installation is complete.



IMPORTANT If you have Unicore's CardWare, you may see a screen that tells you the driver has not been started. Click Yes to start the driver.

15. Run the 1784-PCC test utility as described in Chapter 6 to verify the installation.

    If installation fails, refer to Troubleshoot the Card Installation on page 4-11.

Troubleshoot the Card Installation

Use the following sections to determine why the test utility failed.

Check for Resource Conflicts

When you run the PCC setup utility in Windows NT, the utility tries to assign free resources to the PCC card. If your card used to work, and has now stopped working, it is probably because the resources originally assigned to the card are now being used by another device you recently added, such as an Ethernet card. Try re-running the card's setup utility. Refer to Locate the 1784-PCC Driver for Windows NT on page 4-5. The utility may be able to automatically find other resources to assign to the card.

If you do this, and the test utility still fails, you will need to check for resource conflicts. To view and change your resource locations, you will need to view all of your resource allocations to determine which resouces are free.

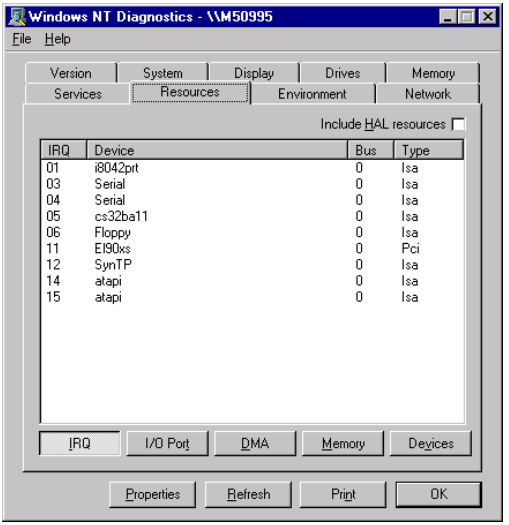
To access and change resouce locations:

1. Do one of the following:

   - access Windows NT diagnostics (**Start ⇒Programs ⇒Administrative Tools ⇒Windows NT Diagnostics**), or
   - Select **Start ⇒Run** and type **WINMSD** in the Run dialog box. Press **Enter** or click **Ok**.

2. Click on the **Resources** tab.

You see:

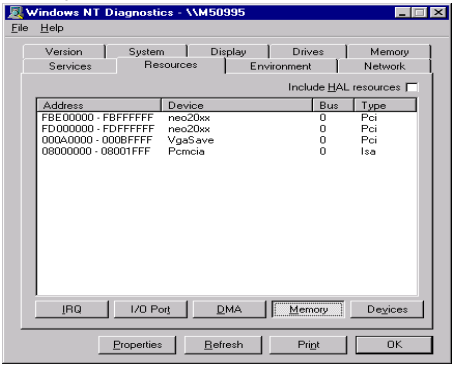


3. View your resource assignments.

If you have any devices that have the same IRQ location, run the PCC Configuration Utility described on page 4-13 and change the IRQ location of the PCC card.

If there are no IRQ conflicts, you might have a Memory conflict.

4. Click the **Memory** button.



5. View your resource assignments.

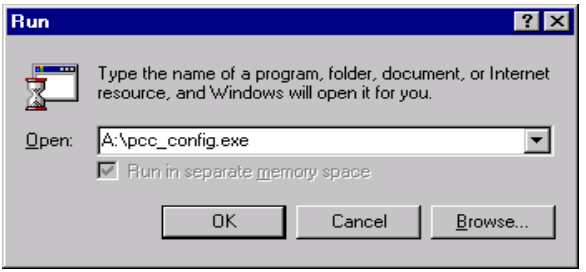
If you have any devices that have the same memory location, run the PCC Configuration Utility described on page 4-13 and change the memory location of the PCC card.

Run the 1784-PCC Configuration Utility for Windows NT

To view and change your PCC card resource configurations, run the configuration utility that we provide on the installation utility disk.

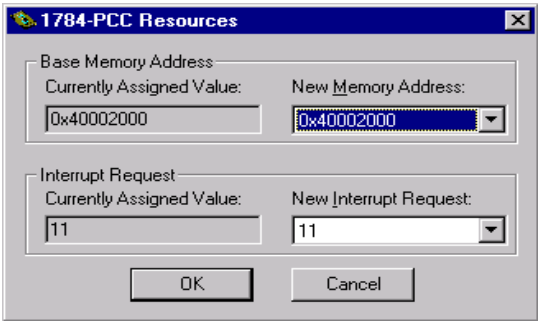
IMPORTANT The PCC_Config utility does not work with CardWare. If you have an unresolved resource conflict, contact your computer manufacturer.

1. Select **Start ⇒Run**.



2. In the window that appears, type **pcc_config.exe** and press **Enter** or click **Ok**. The utility runs.

   The configuration utility displays:



At this point you can view your card's current settings. You can change the card's memory address and interrupt request.

TIP

We recommend that you only make the changes if you have another device that needs a dedicated address and/or the interrupt is the same as the PCC card's installation default. We do not recommend that you change these settings unless absolutely necessary. Simply use the defaults that the system assigns to the card.

Figure 4.1 Example of New Interrupt Request drop down selections

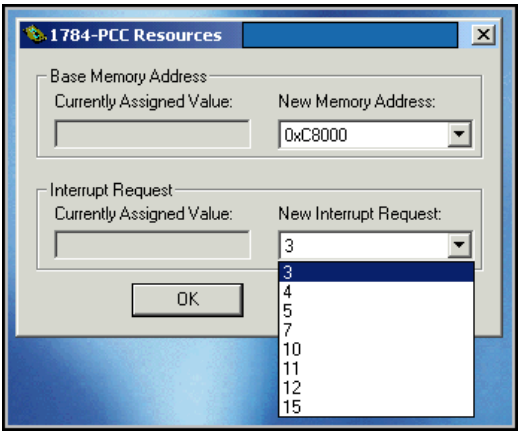
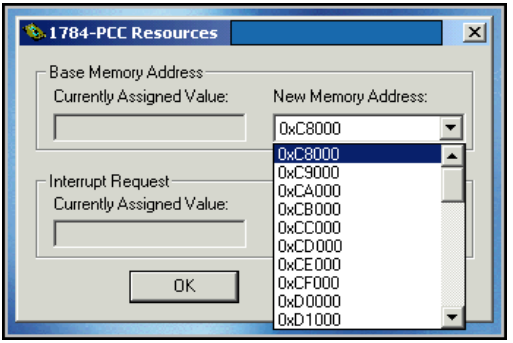
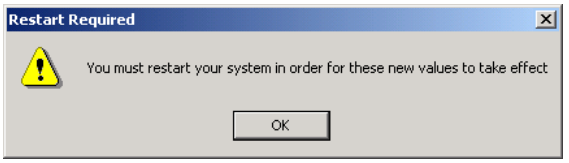


Figure 4.2 Example of New Memory Address drop down selections



If you change the settings and click **Ok**, you need to restart your computer for the new settings to take effect.



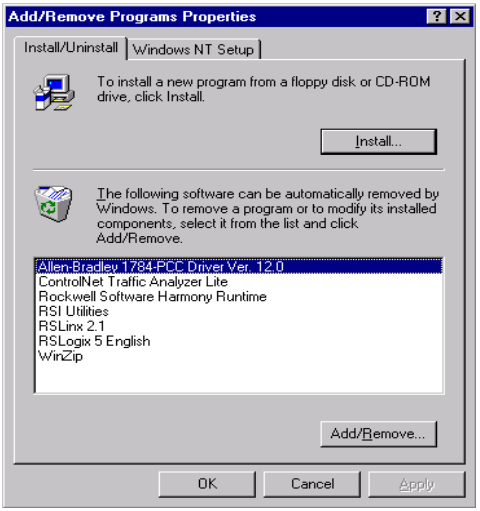
Remove the 1784-PCC Driver

You can access the uninstaller through the Windows NT Add/Remove programs applet to remove the card's drivers from your system.

TIP

In addition to the following procedure, you can also use the unpccnt.exe utility provided with the 1784-PCC driver to uninstall the 1784-PCC card.

1. Access the Control Panel by selecting **Start ⇒Settings ⇒Control Panel**.
2. Double-click the **Add/Remove Programs** icon.
3. Select **Allen-Bradley 1784 PCC Driver**.



4. Click the **Add/Remove** button.

You see:

You do not have to remove the card. The system gives you the opportunity to cancel the operation before deleting any files.

5. Click **Ok** to uninstall the driver.

6. Close the Control Panel.

Install and Use the1784-PCC Card in Windows 2000

What is in This Chapter?

Read this chapter to learn how to operate the 1784-PCC card on Windows 2000. The following table describes what this chapter contains and where to find specific information.

In order to follow the instructions in this chapter, you must:

- have Windows 2000 loaded
- have the Windows 2000 driver for the PCC card

IMPORTANT You can have one 1784-PCC card configured in Windows 2000. If you insert more than one 1784-PCC card into your PC, only one of the cards will be available for use.

Locate the 1784-PCC Windows 2000 Driver

When you install drivers for your operating systems, you must be certain to install the correct files. Windows 2000 systems require a Windows Driver Model (WDM), which contains .inf and .sys files. Refer to the table below to be sure you are installing the correct driver files.

ATTENTION

Failure to install the correct driver files could result in unpredictable system operation.

Source (where the driver is loaded from)	Driver location (for Windows 2000 operating systems)
installation disk (shipped with the 1784-PCC card)	A:\Win2K\PccWdm.inf A:\Win2K\PccWdm.sys where A:\ is the floppy drive letter
RS-Linx 2.2 or later product CD	E:\PnP_Drivers\Win2K\PccWdm.inf E:\PnP_Drivers\Win2K\PccWdm.sys where E:\ is the CD-ROM drive letter
internet	www.ab.com/support/products/pccards.html You can also access Rockwell Automation Knowledge documents at this site.

Install the Driver

Follow the instructions in Chapter 7 to insert your card in your laptop.

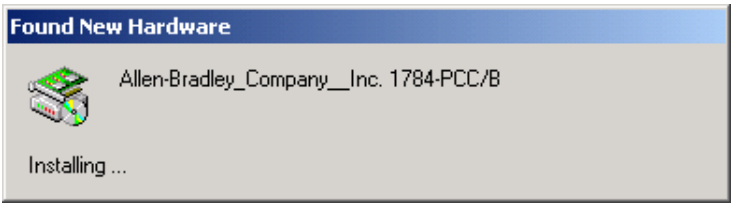
IMPORTANT

Before you can install the driver for the 1784-PCC card, you must be logged in as an administrator of the machine. Being an administrator gives you permission to install or make changes to the machine software. If you try to install the driver without being an administrator, you will get error messages and the driver will not install.

Hearing Multiple Tones

If you insert multiple PC Cards, you may hear more than one tonal notification per card. Windows 2000 detects devices during the power up process, and adjusts the device resources accordingly. This results in sounding multiple tones. When the system changes settings (for example, when removing a card), the tones will sound again for each change.

1. After you insert the PCC card, the system detects the hardware and begins to build the driver information needed to run the hardware. Because the driver has not been loaded, Windows 2000 displays a new hardware dialog box and the following message:

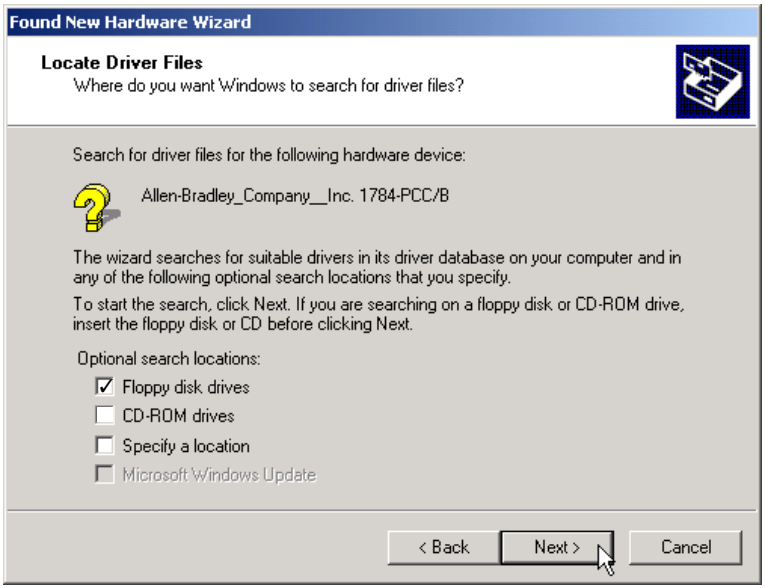


Windows 2000 displays:

2. Click **Next**.

Windows 2000 displays:

3. Select the **Search for a suitable driver for my device** radio button and click **Next**.



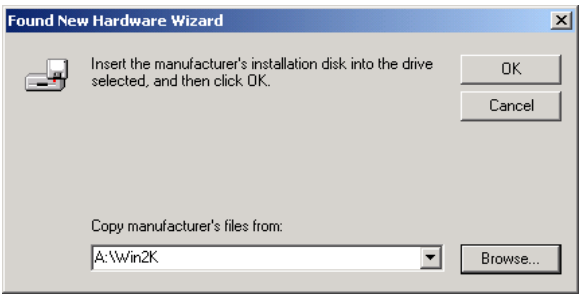
At this point you need to select where the file is located.

4. Select one of the following checkboxes:

   - **Floppy disk drives** if you are going to use the floppy that ships with the 1784-PCC card
   - **CD-ROM drives** if you are going to get the file from the RSLinx CD-ROM Version 2.2 or later
   - **Specify a location** if you downloaded the driver file from www.ab.com.

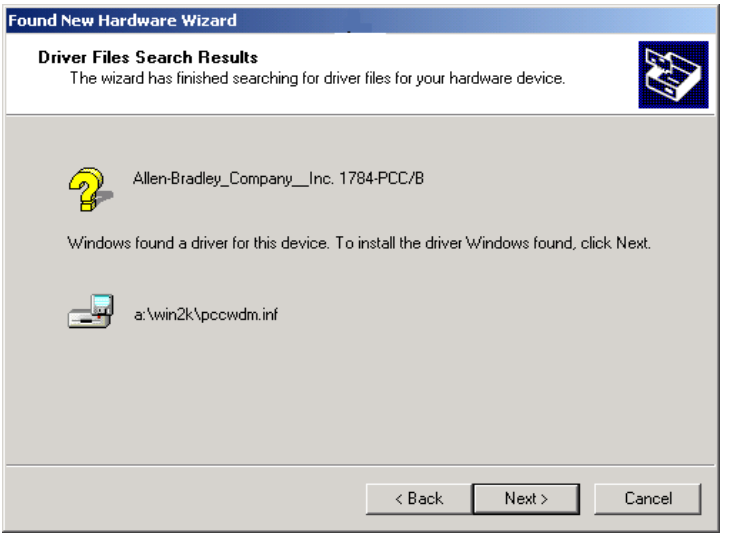
If you select:	Then:
Floppy disk drives	insert the PnP drivers disk into the drive and click **Next**. Windows 2000 will search for the appropriate driver. Continue with Step 6.
CD-ROM drives	insert the RSLinx CD into the drive and click **Next**. Windows 2000 will search for the appropriate driver. Continue with Step 6.
Specify a location	use this selection if you have downloaded the driver from www.ab.com. You will be prompted for the location path of the driver. Click **Next** and Continue with Step 5.

5. If you select the **Specify a location** radio button in Step 4, Windows 2000 will prompt you to provide a location for the driver, as shown below:

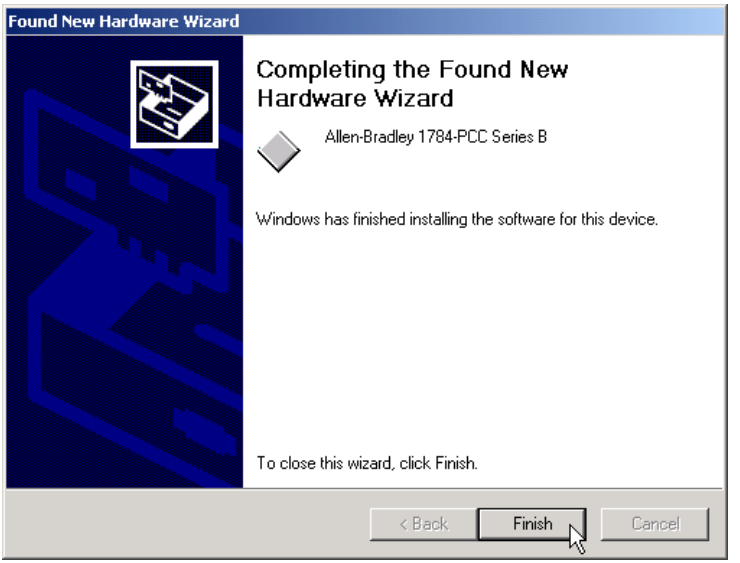


Type the location of the Windows 2000 driver and click **Ok**.

6. Click **Next**.



7. Once Windows 2000 installs the driver, the following displays.



8. Click **Finish**.
   You may be prompted to restart you computer for the driver to take effect.

9. Run the 1784-PCC test utility as described in Chapter 6 to verify the installation. If the test utility fails, refer to Troubleshoot the Card Installation on page 5-12.

1784-PCC Hardware Properties

Windows 2000 provides properties dialog boxes for removable devices. The properties dialog boxes provide the following:

- general information such as device status, manufacturer and card location
- device driver information such as driver version and buttons for you to uninstall and update the driver
- resource information such as interrupt request settings and memory range settings

We recommend you verify that the card is running properly after you install the 1784-PCC card and the driver. Refer to Troubleshoot the Card Installation on page 5-12.

Stop and Eject the 1784-PCC Card

Before you remove the PCC card from its slot, you need to stop the communication to the card. To stop the card:

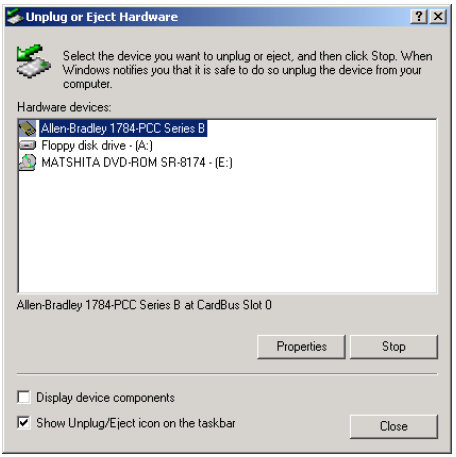
1. Double-click on the **Unplug/eject Hardware icon** on your taskbar.

.

TIP

If you don't have the icon on your taskbar, refer to Show the Card Unplug/Eject Icon on the Taskbar on page 5-20.

2. Click on the PCC card you want to stop.



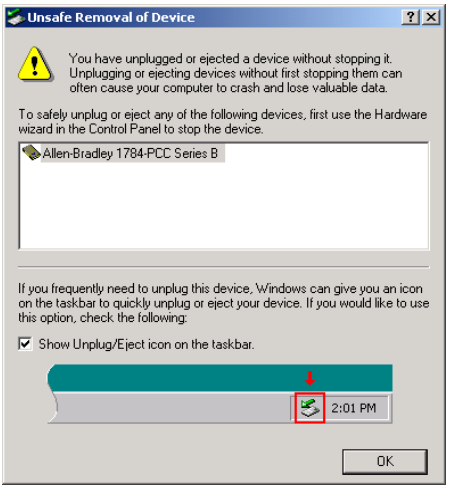
3. Click **Stop**.

4. When you see the window that states you may safely remove this device, click **Ok**.

5. Remove the card.

Unsafe Removal of Card

If you do not stop the communication to your card before you remove a card from your computer, Windows 2000 displays:



1. To stop the card, refer to Stop and Eject the 1784-PCC Card on page 5-7.

IMPORTANT Use the Unplug/eject icon on the taskbar to insure you do not damage your card.

2. Once you have stopped the card, use the Unplug/eject icon on the taskbar to remove the card.

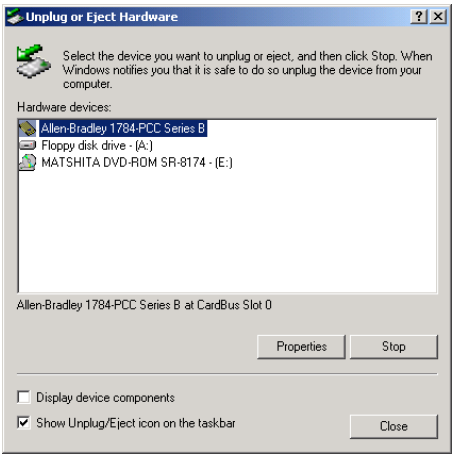
Remove the 1784-PCC Plug-and-Play Driver

Follow this procedure to remove the 1784-PCC driver.

1. Double-click on the **Unplug/eject hardware** icon  in the taskbar.

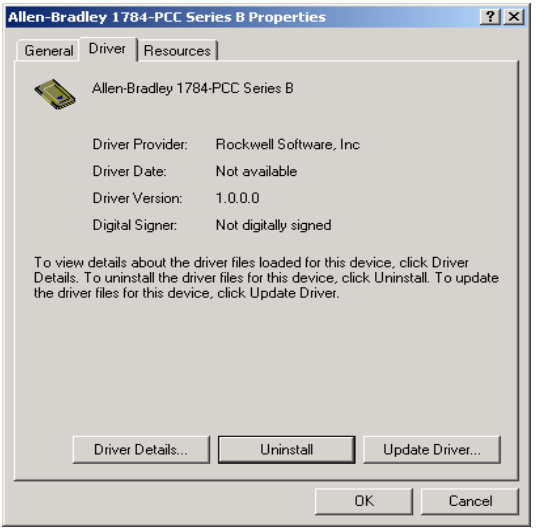
TIP

If you don't have the icon on your taskbar, refer to Show the Card Unplug/Eject Icon on the Taskbar on page 5-20.



2. Select the card.

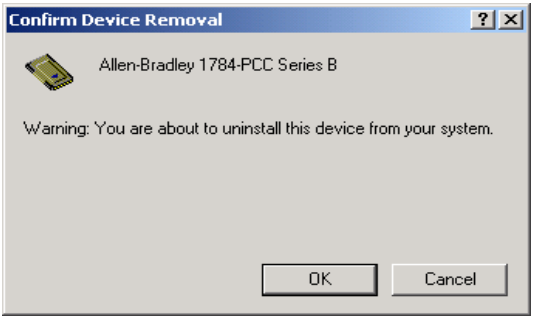
3. Click **Properties**.



4. Click the **Drivers** tab.

5. Click **Uninstall**.

6. Press **Enter** or click **Ok**. You see this screen:



7. Press **Enter** or click **Ok** to confirm device removal.

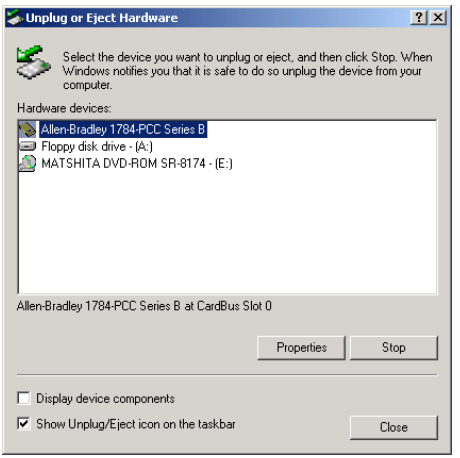
8. Remove the 1784-PCC card from your system.

Troubleshoot the Card Installation

To access Hardware Properties and verify that the 1784-PCC card is working properly, follow the steps below.

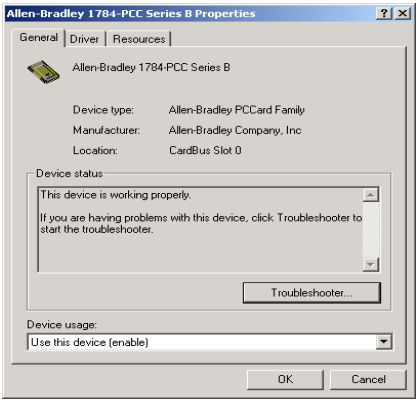
1. Double-click on the Unplug/eject hardware icon  in the taskbar.

TIP If you don't have the icon on your taskbar, refer to Show the Card Unplug/Eject Icon on the Taskbar on page 5-20.



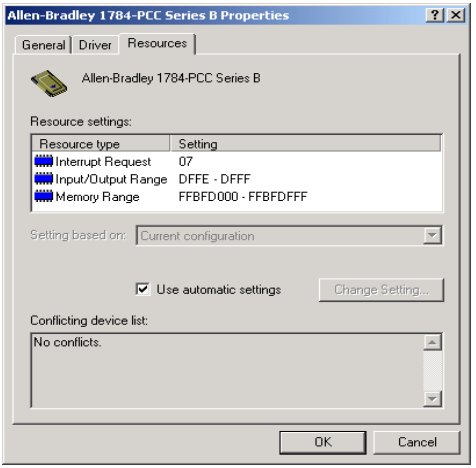
2. Select the card.

3. Click **Properties**.



If:	Then:
the Device status field says "This device is not present, not working properly, or does not have all drivers installed."	click on the **Resources** tab and check the Conflicting Device list for possible hardware conflicts, or you may want to try disabling the **Automatic Settings** option. Refer to Click on the Resources tab. on page 5-14.

4. Click on the **Resources** tab.



TIP

The majority of the time, we recommend that you use the automatic settings. The card will assign an interrupt (memory location) for you. An interrupt must be assigned to the 1784-PCC card. Verify that there is an interrupt assigned and no resource conflicts display in the Conflicting Device list.

5. In the unlikely event that you have a resource conflict, you may need to assign a specific interrupt to free the resource for another device. To manually assign an interrupt:
   a. Deselect (uncheck) the **Use automatic settings** checkbox.
   b. Click on **Interrupt Request**.

c. Click **Change Setting**... and select an interrupt location.

TIP

Most systems have 15 interrupt locations available for you to assign. If you have more than 15 devices that need an interrupt location, you may need to disable another device, such as an unused serial or parallel port to make an interrupt available for the PCC card.

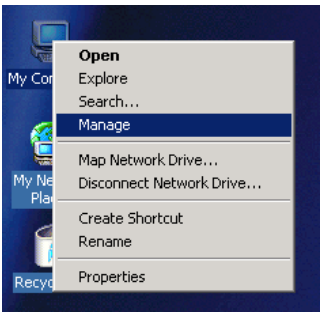
d. In some cases, a device other than the 1784-PCC card may be determined to use the interrupt that the PCC card wants. If this happens, let the other device have the interrupt and assign the 1784-PCC card another interrupt location.

Navigate to Device Manager

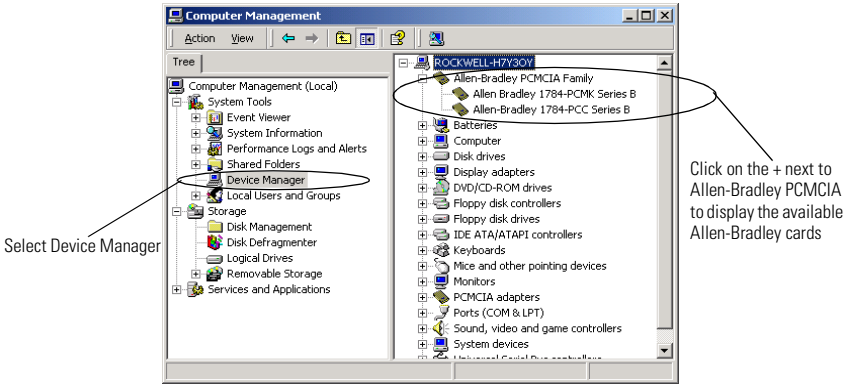
Here is a second way to find your way to the hardware properties so you can verify that your card is working properly.

1. Right-click on **My Computer**.

2. Select **Manage**.



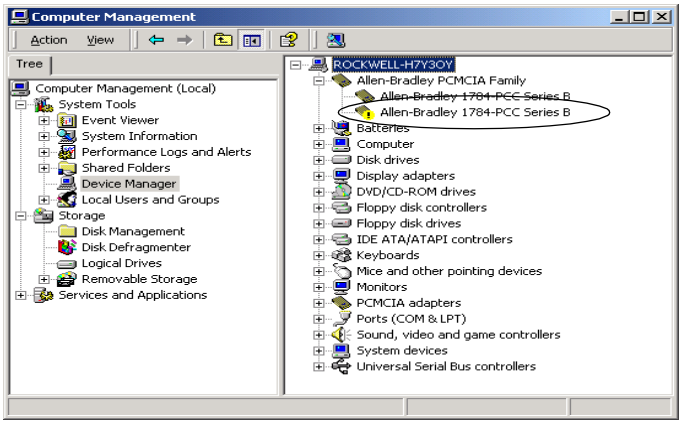
3. On the Computer Management window that appears, select **Device Manager**.



4. Click on the **+** next to **Allen-Bradley PCMCIA** to display the available Allen-Bradley cards.

IMPORTANT

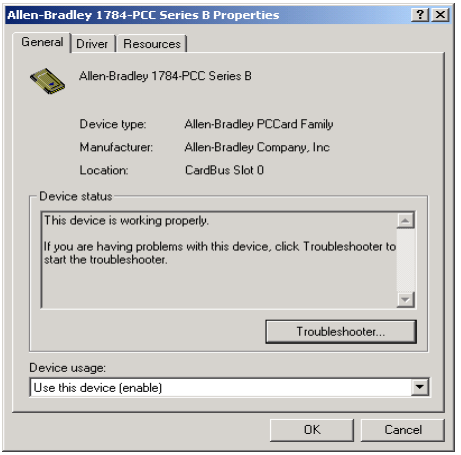
If you insert two PCC cards, only one of the cards that you insert is available for use. The Device Manager windows looks like this:



The card that displays this icon

! Allen-Bradley 1784-PCC Series B is unavailable for use. We do not recommend that you have more than one 1784-PCC card installed in your system.

5. Double-click on **1784-PCC Series B**.

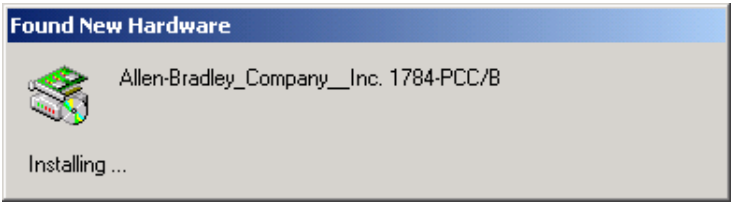


Update the 1784-PCC Plug-and Play-Driver

Perform these steps if you need to re-install or update the driver.

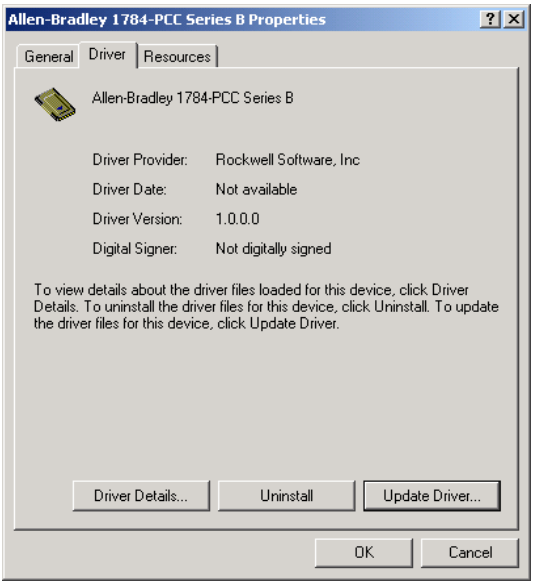
1. Insert the PCC card into a PCMCIA slot in your computer.

   Once you insert the PCC card, the system will detect the hardware and begin to build the driver information needed to run the hardware. Because the driver has not been loaded, Windows 2000 displays a new hardware dialog box and the following message:



2. Right-click on **My Computer**.
3. Select **Properties**.
4. Select **Hardware**.

5. Select **Device Manager**.
6. Expand **Allen-Bradley Communication Cards**.
7. Highlight **1784-PCC card**.
8. Right-click on **1784-PCC card**.
9. Select **Properties**.
10. Select the **Driver** tab.
11. Select **Update Driver**.



12. Click **Next**.
13. Select **Search for suitable driver** and click Next.
14. Select a location and click **Next**.
15. Type the path location to the 1784-PCC Windows 2000 driver and click **Ok**.
16. Click **Next** to verify driver file search results.

17. Click **Finish**.

18. Click **Close**.

Show the Card Unplug/Eject Icon on the Taskbar

If you frequently need to unplug the device, be sure to check the Show Unplug/Eject icon on the taskbar checkbox on the Completing the Add/Remove Hardware wizard screen. You can check the box the first time you install the card. The next time you want to unplug or eject the device, you can use the icon on the taskbar instead of the Add/Remove Hardware wizard.

If the icon is not on your taskbar, you can find the checkbox in the Add/Remove Hardware Wizard. You must finish the process of removing the card from the slot in order for the checkbox to take effect. You are not given the opportunity to back out of the hardware Wizard once you get to the location of the checkbox.

1. Double-click **My Computer**.

2. Double-click **Control Panel**.

3. Double-click **Add/Remove Hardware**.

4. Click **Next**.

5. Check **Uninstall/Unplug a device** and click **Next**.

6. Check **Unplug/Eject a device** and click **Next**.

7. Select the **1784-PCC card** and click **Next**.

8. Confirm the device and click **Next**.

9. Check the **Show Unplug/Eject icon** on the taskbar.

10. Click **Finish**.

11. Remove your card.

Run the 1784-PCC Test Utility in Windows 95/98/Me, NT and 2000

What is in This Chapter?

Read this chapter to learn how to run the 1784-PCC test utility. The following table describes what this chapter contains and where to find specific information.

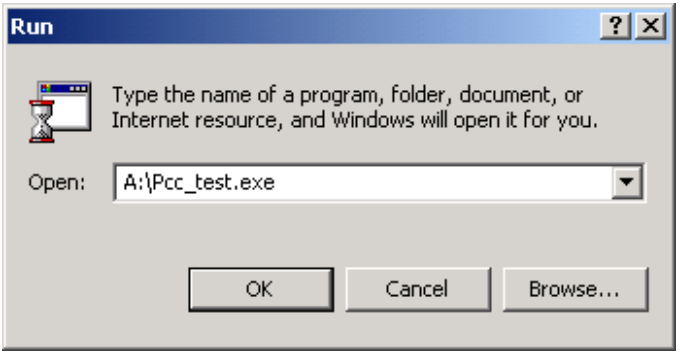
In order to follow the instructions in this chapter, you must:

- have Windows 95/98/Me, NT, or 2000 loaded.
- have the appropriate drivers loaded for the PCC card

Run the 1784-PCC Installation Test Utility

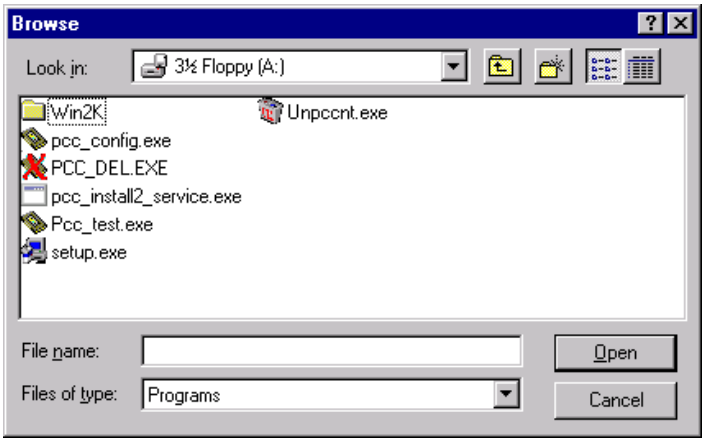
The installation test utility is compatible with Windows 95/98/Me, NT, and 2000. To test your installation, run the utility that we provide on the installation utility disk.

1. Select **Start ⇒Run**.



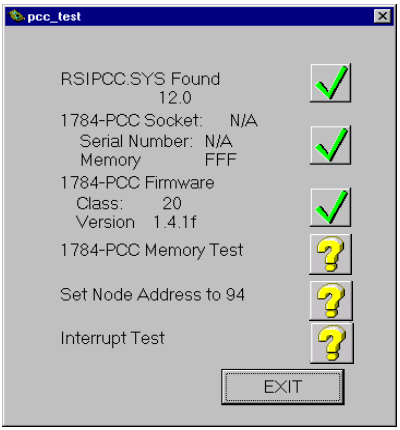
2. In the window that appears, type **A:\Pcc_test.exe** and press **Enter** or click **Ok**.

a. If you choose **Browse** on the A:\ drive, you will see:

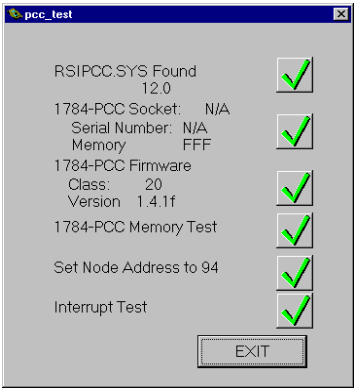


b. Double-click on the **Pcc_test.exe** file to start the PCC test utility.

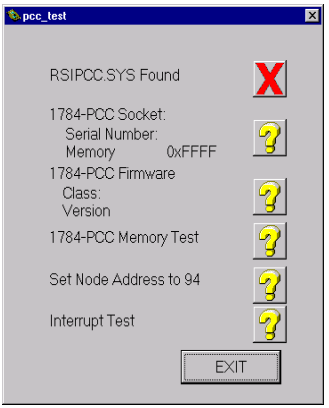
The utility runs through a series of tests.

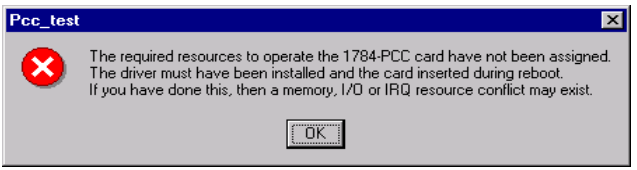


The 1784-PCC installation test utility automatically looks for your card and begins the tests. As the tests are completed, a green check mark appears, illustrating that the particular test was successful.



If there is an error, you will see a red X and an explanation.

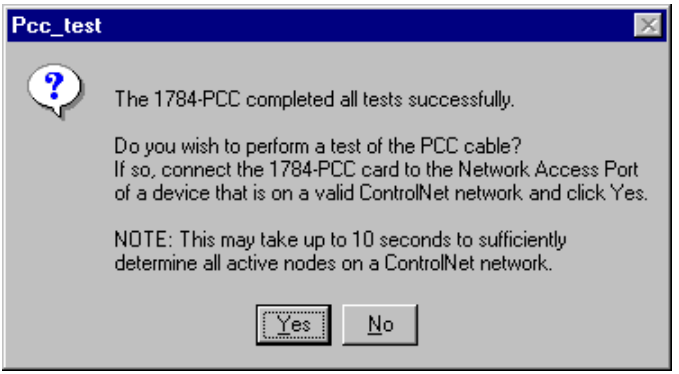




.

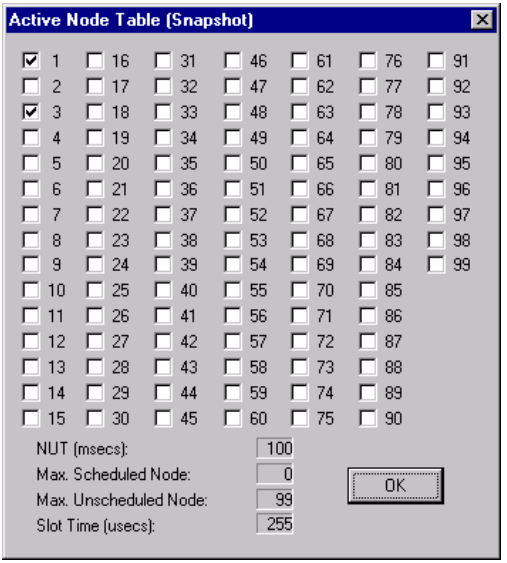
If you:	Then:
do not see six green check marks or you do not see the message stating that the 1784-PCC completed all tests successfully	• In Windows NT, restart your computer and run the setup utility again. • In Windows 95/98/Me and 2000, go to Device Manager and adjust resources.
are still getting an error	• Review the chapter for your operating system. • Follow the instructions again. If you are still having problems, contact your Rockwell Automation service representative for assistance. • Refer to the Preface of this manual for information on Rockwell Automation Support.

3. Once the tests are finished and successful, you see:



4. Click **Yes** or **No**.

When you click Yes and you are properly connected to your network, the test utility will browse your network to find active nodes. You will see a node table with the active nodes checked.



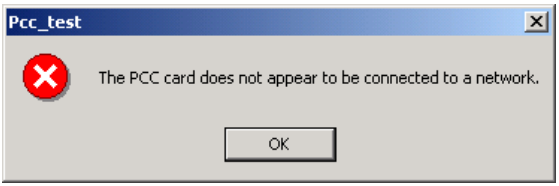
5. Click **Ok**.

The utility also provides information about:

- NUT (Network Update Time, in msecs)
- maximum scheduled node
- maximum unscheduled node
- slot time (µsecs)

IMPORTANT Be certain that the address assigned to the PCC card in RSLinx is less than the Maximum Unscheduled Node shown in the PCC test utility.

If you see this screen, check to see if the cable is connected properly to your network.



Notes:

Insert and Remove the 1784-PCC Card

What is in This Chapter?

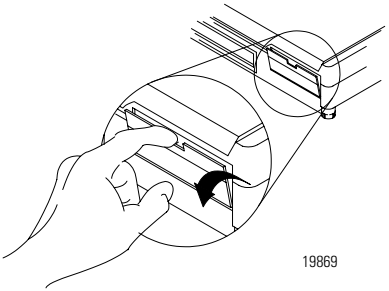
Read this chapter to understand how to insert and remove the card from your laptop computer. The following table describes what this chapter contains and where to find specific information.

Insert the Card

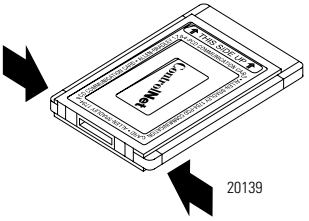
IMPORTANT If you are using Windows 95/98/Me, you can insert or remove the 1784-PCC card from a powered computer. If you are using Windows NT, shut down the computer before inserting or removing the card. If your are using Windows 2000 or another operating system, use the eject utility to turn off communication to the card before you remove it from your computer. In Windows 2000, you can insert the card while the system is on.

.

TIP The following diagrams show a PCMCIA 2.1 compliant system. If you are using another computer, your installation may be slightly different.

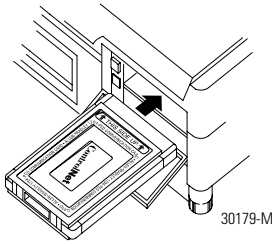


1. Open the door to the PCMCIA slot. Some slots do not have doors.



2. Grasp the card by the edges with the logo facing upward and the 68-pin connector facing into the PCMCIA slot.

IMPORTANT If you have more than one slot in your computer, you can insert the 1784-PCC card into any empty slot. Check your computer's documentation for the slot numbers. You can use the other available slots for other PC cards such as network or modem cards.



3. Insert the card into the PCMCIA slot and slide the card in until it is firmly seated in the connector. Some computers have an ejector button that pops out when the card is seated in the connector.

If the computer is configured properly, your sound/speaker is enabled, and you installed the 1784-PCC card successfully, you hear multiple tones when you insert a card or boot the computer.

Multiple Tones

If you insert multiple PC cards, you may hear more than one tonal notification per card. Windows 95/98/Me and 2000 detects devices during the power-up process, and adjusts the device resources accordingly. This results in sounding multiple tones. When the system changes settings, for example, when a card is removed, the tones will sound again for each change.

Remove the Card

IMPORTANT You should stop any software communicating with the card before removing the PC card. If you do not do this, the stray processes may halt the system's performance.

On most computers, you press the release button and remove the card from the slot. If this is not applicable to your computer, follow the instructions specified in your computer user manual.

You hear multiple tones for each card that you remove if your system is configured properly. These tones indicate the card is now disabled.

Notes:

Connect the 1784-PCC Card to the Network

What is in This Chapter?

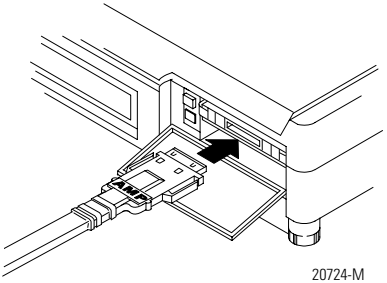
Read this chapter to connect the 1784-PCC card to the network and to understand network communication. The following table describes what this chapter contains and where to find specific information.

Connect the Card to the ControlNet Network

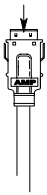
These instructions assume that you have:

- installed your application software
- inserted the card
- installed the 1784-PCC drivers
  Chapter 3: Windows 95/98/Me
  Chapter 4: Windows NT
  Chapter 5: Windows 2000

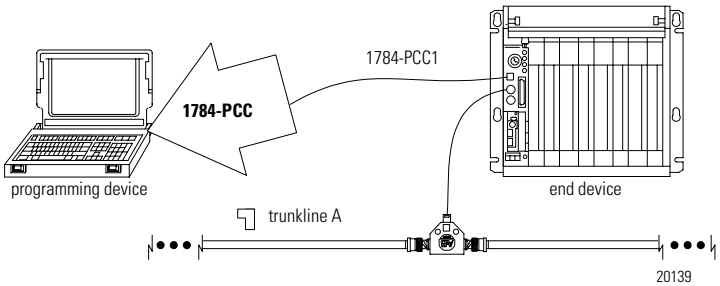
The following diagrams show a PCMCIA 2.1 compliant system. If you are using another computer, your installation may appear slightly different.



1. Attach the smaller end of the 1784-PCC1 cable to the 1784-PCC card.



The silver side should face upward as you connect the cable to the 1784-PCC card.



2. Attach the other end of the 1784-PCC1 cable to any intelligent device (i.e., workstation, PLC processor, scanner, or adapter) on ControlNet through its Network Access Port.

Communicate with the Card on the ControlNet Network

The 1784-PCC card communicates on the ControlNet network through a standard application programming interface (API) known as RSLinx™ from Rockwell Software, Inc. If you need additional information about this software package or about communicating on the ControlNet network, refer to the ControlNet Coax Media Planning and Installation Manual, publication number CNET-IN002A-EN-P, or contact your Rockwell Automation representative.

IMPORTANT Do not accidently plug the end of the 1784-PCC cable into the Ethernet port. This type of connection will generate noise on Ethernet and it will not work.

Refer to the following table for the version of RSLinx you will need for your operating system.

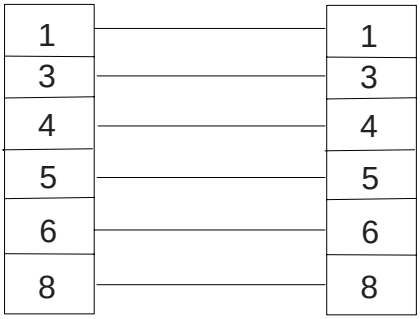
Operating System	Version of RSLinx
Windows 95/98/Me	2.0 or later
Windows NT	2.1 or later
Windows 2000	2.2 or later

Notes:

Specifications

1784-PCC Communication Card		
PCMCIA Type	Type II form-factor network adapter card	
PCMCIA Standard	Compliant to PCMCIA Standard, release 2.1	
Power Requirements	5V dc @ 225 mA maximum Class 2	
Conductor	Category 2[1]	
Environmental Conditions	Operating[2]	Non-operating
Slot Temperature	0-50° C (32-122° F)	-40-85° C (-40-185° F)
Humidity	5-95% without condensation	5-95% without condensation
Vibration	0-70 Hz constant.012" displacement 70-500 Hz, constant 2 G acceleration	N/A
Shock	30 G peak/11 ms	50 G peak/11 ms
Agency Certification (when product or packaging is marked)	• UL Recognized Component - Industrial Control Equipment • CE marked for all applicable directives	

1784-PCC1 Cable Specifications		
Total length of cable	120 cm	
Pin Assignments	PC card Plug	ControlNet Plug



[1]Refer to the ControlNet Cable System Planning and Installation Manual, publication CNET-IN002A-EN-P, when wiring your network. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1, for information about Category 2 wiring.

[2]The operating parameters describe the environment within the PCMCIA slot. Refer to the documentation for your computer for environmental requirements. The 1784-PCC card should not exceed those specifications.

Notes:

adapter

The hardware that connects the computer bus to the 68-pin PC card sockets in the PCMCIA slot. *See also* socket.

application programming interface (API)

The set of services that an operating system makes available to programs that run under it.

ControlNet network

A communication architecture that allows the exchange of messages between Allen-Bradley Company, Inc. products and certified third-party products.

connection

An opened communication path between two nodes on a ControlNet network.

ControlNet status indicators

Channel A and channel B indicators on your node indicating status on the ControlNet link.

enabler

Software used to control PC cards. There are three types of enablers: generic (which can control many different types of cards), specific (which is designed for a specific manufacturer's PC card), and point enabler (which is designed for a specific manufacturer's PC card but does not require Card and Socket Services).

drop cable

A cable that connects a node to the trunk cable. This is an integral part of Allen-Bradley 1786 taps.

link

A collection of nodes with unique addresses (in the range of 1-99). Segments connected by repeaters make up a link; links connected by bridges make up a network.

maximum scheduled node

The node with highest network address that can use *scheduled* time on a ControlNet link.

maximum unscheduled node

The node with highest network address that can be *unscheduled* time on a ControlNet link.

Network Access Port (NAP)

In a ControlNet network, NAP is a physical layer variant that allows a temporary node to be connected to the link by connection to the NAP of permanent node. It is an RJ45 connection between two cnet devices that is typically temporary between a programming device and the network.

network

A series of nodes connected by some type of communication medium. The connection paths between any pair of nodes can include repeaters, routers, bridges, and gateways.

network address

A node's address on the network.

node

The port of a physical device connected to the network that requires a network address to function on the network. A link may contain a maximum of 99 nodes.

NUI (Network Update Interval)

A single occurrence of the network update time (NUT).

NUT (Network Update Time)

Repetitive time interval in which data can be sent on the ControlNet network.

PC card

Credit-card size, 68-pin add-in cards that were designed to meet PCMCIA standards.

redundant media

A dual cable system that lets you receive the best signal over a network.

repeater

A two-part active physical-layer device that reconstructs and retransmits all traffic it hears on one segment to another segment.

segment

Trunk-cable sections connected via taps with terminators at each end; a segment does not include repeaters.

socket

The 68-pin physical connection in the PCMCIA slot in your computer that connects to the 68-pins on the PC card.

Socket Services

The software interface that manipulates the PC cards, sockets, and adapters. *See also* PC cards, sockets, adapters.

tap

A component that connects products to the ControlNet trunk cable. A tap is required for each node and for both sides of each repeater.

terminator

A 75-Ω resistor (mounted in a BNC plug) placed on the ends of segments to prevent reflections from occurring at the ends of cables.

trunk cable

The bus or central part of the ControlNet cable system.

trunk cable section

The length of trunk cable between any two taps.

type

Refers to the physical size of the PC card. There are three types of cards that have the same length and width (54 mm x 85.6 mm). The cards differ in thickness in the center, but have identical thickness at the connector end and long the rails. This lets you use all three types in the same PCMCIA slot, if the slot is thick enough in the center.

Type I

A 3.3 mm thick PC card that is used for memory enhancements, such as Flash memory cards. *See also* PC card.

Type II

A 5 mm thick PC card that is used for I/O features such as modem, LAN, and host communications. *See also* PC card.

Type III

A 10.5 mm thick PC card that is used for memory enhancements or I/O capabilities that require more space, such as rotating media and wireless communication devices. *See also* PC card.

Virtual Device Driver (VxD)

A Windows device driver that processes interrupts and carries out I/O operations for a given application without disrupting the execution of other applications. Used in 1784-PCC Windows 95/98/Me applications.

Windows Driver Model (WDM)

A Windows device drivers that use I/O Request Packets (IRPs) as a means for messaging and data transfer. Used in 1784-PCC Windows 2000 applications.

Numerics

A

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D

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R

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T

U

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