

IBM Active PCI Manager



# Installation and User's Guide, Version 1.1



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**Note:** Before using this information and the product it supports, be sure to read the general information under “Notices” on page 21.

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## Chapter 1. Introduction

IBM® Active™ PCI Manager is an extension of IBM Director that helps administrators manage peripheral component interconnect (PCI) and peripheral component interconnect-extended (PCI-X) adapters in managed systems. Specifically, Active PCI Manager offers the following tools:

- Graphical user interface
- Analyze function
- Add Card wizard
- Lock functions
- Blink function
- Refresh function

Active PCI Manager consists of three components: Server, Console, and Agent. During installation, you designate which of these components you want to install in a system. For more information, see the discussion of components in “Installing IBM Active PCI Manager” on page 6.

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### The Active PCI Manager interface

The Active PCI Manager Console window displays information about how the PCI and PCI-X adapters are connected in the system chassis and any input/output (I/O) expansion drawers of a managed system. A Windows Management Instrumentation (WMI) provider gathers the needed information from the basic I/O system (BIOS) code on supported target systems. When new PCI data is available, the IBM Active PCI Alert Driver (Alert Driver) notifies the WMI provider, which in turn gathers the new information and notifies the Active PCI Manager Console.

The interface presents the system information through icons in the Slot view and Tree view and through a text table in the Table view. For details, see “The Active PCI Manager interface” on page 12.

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### Analyze function

The Analyze function looks at several aspects of the system PCI bus and slot layout. Using the layout, along with the abilities of the adapters already installed in the system, the Analyze function runs a PCI optimization algorithm to determine the performance of the layout.

If the Analyze function determines that the adapters are not arranged to maximize system PCI performance, it displays the performance issues it found and, if possible, displays a solution in the Optimization Steps window. The goal of the Analyze function is to have each adapter in the system running in its best mode of operation and at its highest bus speed. For details, see “PCI performance analysis” on page 17.

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### Add Card wizard

The Add Card wizard works with the Analyze function to determine the most suitable slot in which to insert a new adapter. You can select from a list of supported adapters or define the specifications of the new adapter yourself. For details, see “Adding adapters” on page 20.

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## Lock functions

You can use the Lock functions to lock specific adapter slots. The Analyze function cannot relocate an adapter from or to a locked slot. After you right-click a slot in the Slot view or Tree view page of the Active PCI Manager Console, you can access the Lock functions from the menu.

For details about using the Lock functions, see the Active PCI Manager help. To do so, click **Help** → **Contents** in the Active PCI Manager Console window. Then, click the **Lock functions** topic under the **Wizards and functions** heading.

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## Blink function

You can use the Blink function to flash the physical Attention light-emitting diode (LED) associated with any slot in a system chassis or in an I/O expansion drawer. The Blink function works only for those slots that support the Attention LED feature. After you click a slot in the Slot view or Tree view page of the Active PCI Manager Console, you can access the Blink function on the **Tools** menu. Alternatively, you can right-click a slot to access the Blink function.

For details about using the Blink function, see the Active PCI Manager help. To do so, click **Help** → **Contents** in the Active PCI Manager Console window. Then, click the **Blink function** topic under the **Wizards and functions** heading.

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## Refresh function

You can use the Refresh function to manually request an update of the system information shown in the Active PCI Manager Console window. By default, the system information shown in the Active PCI Manager window is refreshed automatically whenever an event occurs or when a slot flashes or turns off. Example events include hot add or hot eject operations. With the Refresh function, you can force a refresh request rather than waiting for a system-generated event to occur.

Run the Refresh function by clicking **Tools** → **Refresh** in the Active PCI Manager Console. You can access the Refresh function from any of the views (Slot, Tree, or Table) of the Active PCI Manager Console.



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## Chapter 2. Installation

Active PCI Manager provides its own installation program; the IBM Director installation program does not install Active PCI Manager. The Active PCI Manager installation program installs any combination of Active PCI Manager components (Server, Console, and Agent). The installation of the Server component requires installation of the Console component.

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### Installation prerequisites

Before installing Active PCI Manager, ensure that the following prerequisites have been met:

- Install the IBM Director 3.1 components (Server, Console, or Agent) that you want before installing the corresponding component of Active PCI Manager.
- On the target system, install IBM Active PCI Software for Microsoft® Windows® 2000, version 5.0.2.0 or later.

IBM Active PCI Software provides a complete PCI hot-plug solution on Windows 2000. The IBM Active PCI Software consists of the IBM Active PCI Filter Driver, the IBM Active PCI Alert Driver, and the IBM Active PCI Alert Service. The Agent component of Active PCI Manager works with the Active PCI Software to provide the necessary PCI information to the Console component.

- The login performing the installation must have at least local Administrator authority on the target system.
- If the Active PCI Manager Setup program detects that an older version is already installed, the Setup program asks if you want to upgrade to the new version. You no longer need to uninstall any older versions of Active PCI Manager. Only one version of Active PCI Manager is supported at a time.

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### Supported servers

The Agent component of Active PCI Manager supports the following IBM xSeries™ servers and I/O expansion drawers:

- xSeries 360
- xSeries 440
- xSeries 255
- xSeries 360 with one RXE-100 Remote Expansion Enclosure
- xSeries 440 with one RXE-100 Remote Expansion Enclosure

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### Supported adapters

The Add Card wizard in Active PCI Manager supports the following PCI and PCI-X adapters. Adapters not listed can be manually defined in the Add Card wizard.

- 10/100 Fast EtherLink XL Adapter by 3Com®
- IBM 10/100 Gigabit Ethernet Adapter
- IBM Gigabit Ethernet SX Server Adapter
- IBM ServeRAID™-4H Ultra160 SCSI Controller
- IBM ServeRAID-4L Ultra160 SCSI Controller
- IBM ServeRAID-4M Ultra160 SCSI Controller
- IBM ServeRAID-4Lx Ultra160 SCSI Controller
- IBM ServeRAID-4Mx Ultra160 SCSI Controller

- PRO/1000 XT Server Adapter by Intel®

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## Supported operating systems

The following table shows the operating systems that are supported by the three components (Server, Console, and Agent) of Active PCI Manager.

Operating system	Server	Console	Agent
Windows 2000 Server, with Service Pack 2 or later	Yes	Yes	Yes
Windows 2000 Advanced Server, with Service Pack 2 or later	Yes	Yes	Yes
Windows 2000 Professional, with Service Pack 2 or later	No	Yes	No

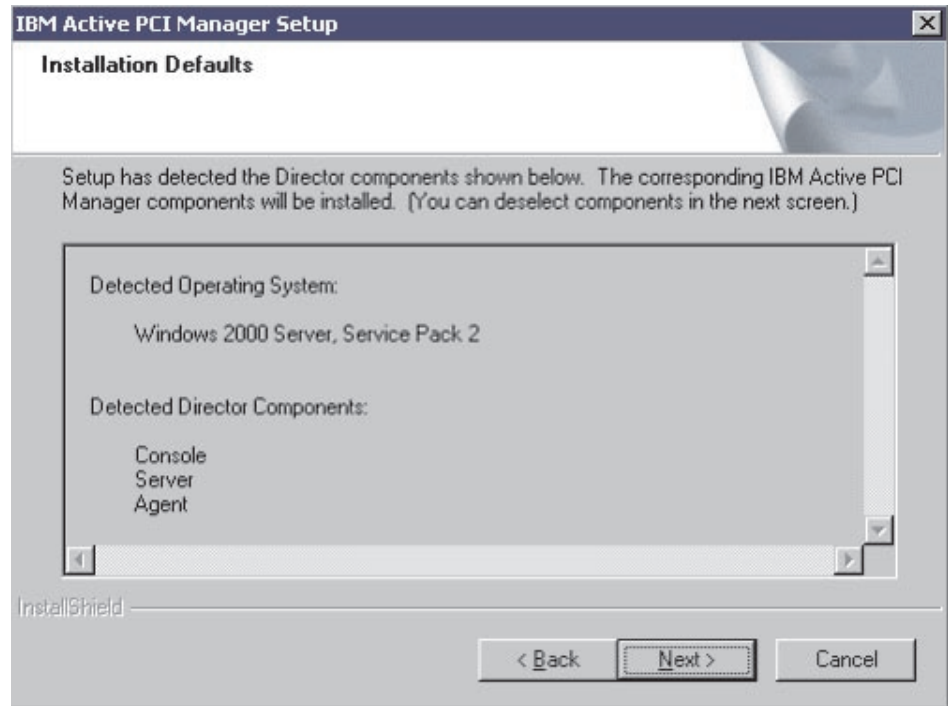
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## Installing IBM Active PCI Manager

Complete the following steps to install the Active PCI Manager components (Server, Console, and/or Agent). If the systems involved have a previous version of Active PCI Manager already installed, refer to “Modifying or repairing Active PCI Manager” on page 9 later in this chapter.

1. Locate the Active PCI Manager download page within the IBM Support and Downloads Web site, <http://www.ibm.com/support/>.
2. Download Active PCI Manager as instructed on the Web page.
3. If necessary, copy the downloaded file to a shared network disk so you can access the file from the necessary Console, Agent, and Server systems.
4. Close the IBM Director Management Console. The Active PCI Manager Setup program will not run when the Director Console is open.
5. From the system on which you want to install an Active PCI Manager component, run the file that you downloaded. The Active PCI Manager Setup program starts.
6. If applicable, review the License Agreement and click **Yes** to accept the License Agreement.  
The Welcome window opens.
7. Click **Next** to continue.

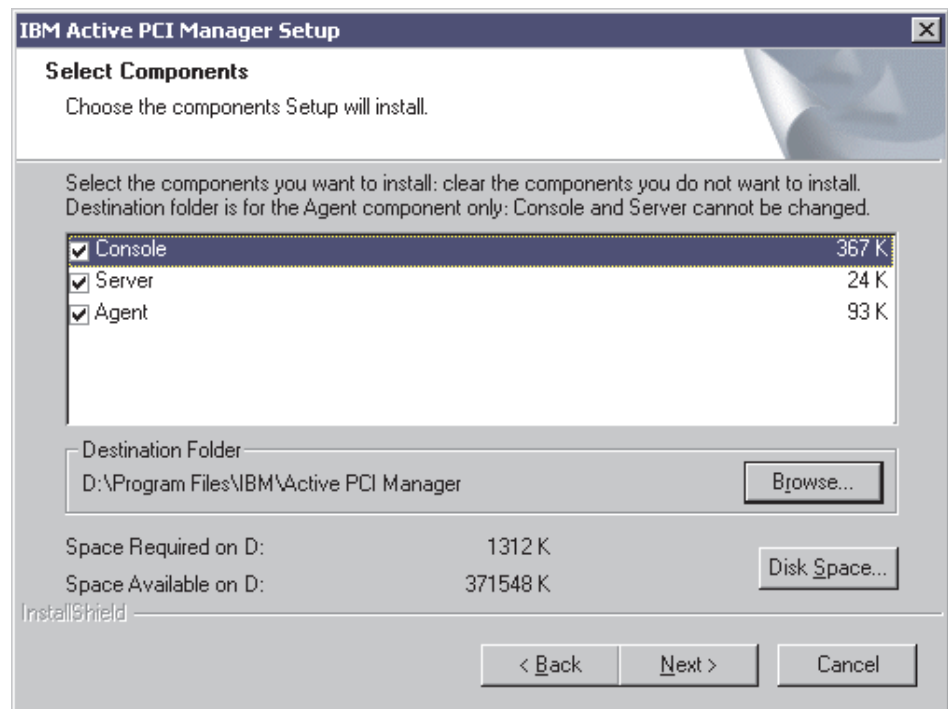
The Installation Defaults window opens.



The Installation Defaults window is for informational purposes only. It displays the currently running operating system and the installed IBM Director components that were detected by the Active PCI Manager Setup program.

8. Click **Next** to continue.

The Select Components window opens.



In the Select Components window, you can select the Active PCI Manager components that you want to install. By default, the Setup program installs all Active PCI Manager components that correspond to the detected Director components.

9. Click the check box next to an Active PCI Manager component to select or deselect that component.

Active PCI Manager consists of three components: Server, Console, and Agent. The Active PCI Manager components are as follows:

<b>Server</b>	Select this choice to install the Server component of Active PCI Manager. When you install the Server component, the Setup program automatically installs the Console component as well.  The Server component provides the Analyze function of Active PCI Manager.
<b>Console</b>	Select this choice to install the interface for Active PCI Manager.  The Console component queries the Windows 2000 Common Information Model (CIM) database for information about the target system. When the Console component receives information about the target system, the console then graphically illustrates the information that was received.
<b>Agent</b>	Select this choice to install the Active PCI Manager agent on the target system.  The Agent component is a CIM provider that supplies information about the target system to the Windows 2000 CIM database.

10. If you are installing the Agent component, you can designate an alternative destination folder for the installation. To do so, click **Browse** and select a different directory.

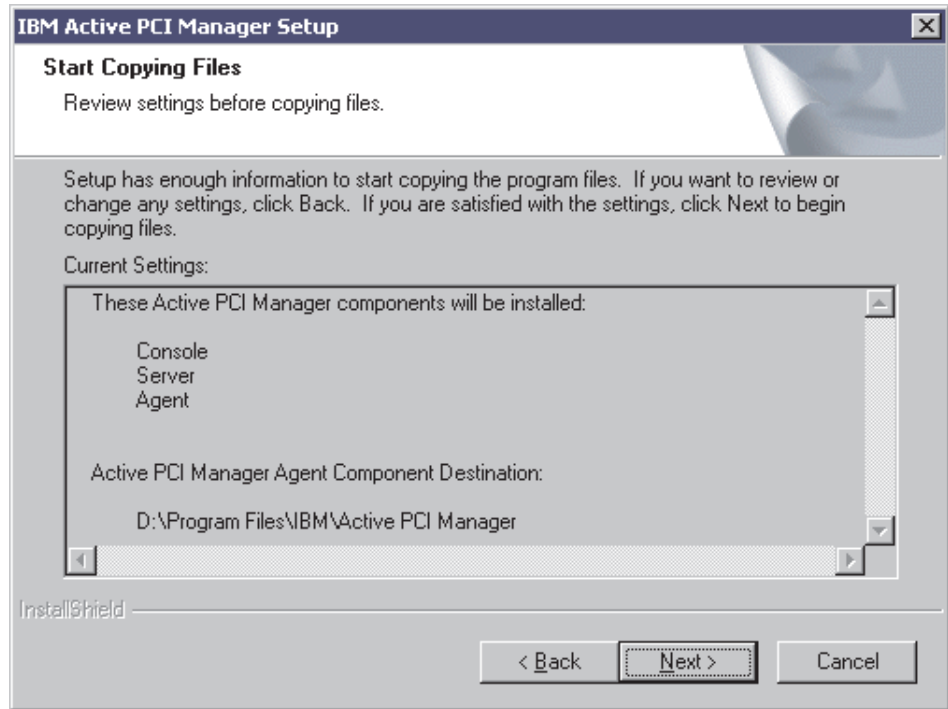
If you select a destination folder that is on a different drive than that displayed on the Select Components window, you can click **Disk Space** to check the disk space of that drive. Note that if you do not change the destination folder first, the Setup program reports zero disk space available.

You cannot change the destination directory for the installation of the Server and Console components of Active PCI Manager. The Setup program must install these two components into the existing directory structure for IBM Director.

11. Click **Next** to continue the installation.

The Active PCI Manager Setup program checks for available disk space for all selected components.

- If there is not enough disk space, the Setup program displays a message to that effect, and the installation returns to the Select Components window. To continue with the installation, you must select fewer components or a different location for the Agent component installation and click **Next** again.
- If there is enough available disk space for the selected components, the Start Copying Files window opens.



12. Review the information in the Start Copying Files window. To begin to copy files, click **Next**. If you want to make any changes to the information shown in this window, click **Back**.

When the installation continues, the following activities take place:

- The Setup program stops the IBM Director Support Program before it copies files and restarts it after copying is complete.
  - If you install the Agent component, the Setup program stops the Windows Management Instrumentation (WMI) service before it copies files and restarts it after copying is complete.
  - The Setup program creates or updates a Windows registry entry for Active PCI Manager.
13. When the installation is complete, you can optionally choose to display the README.txt file for Active PCI Manager. To do so, click **View the README.txt file**.  
The Setup program installs the README.txt file in \Program Files\IBM\Active PCI Manager by default. If you installed the Agent component to a different location, then the Setup program installs the README.txt file to that new location on the target system.
  14. Click **Finish** to end the Setup program.

After the Setup program has installed all three Active PCI Manager components, you can begin to use the Active PCI Manager Console. See Chapter 3, “Using Active PCI Manager Console” on page 11 for details about starting and using the interface.

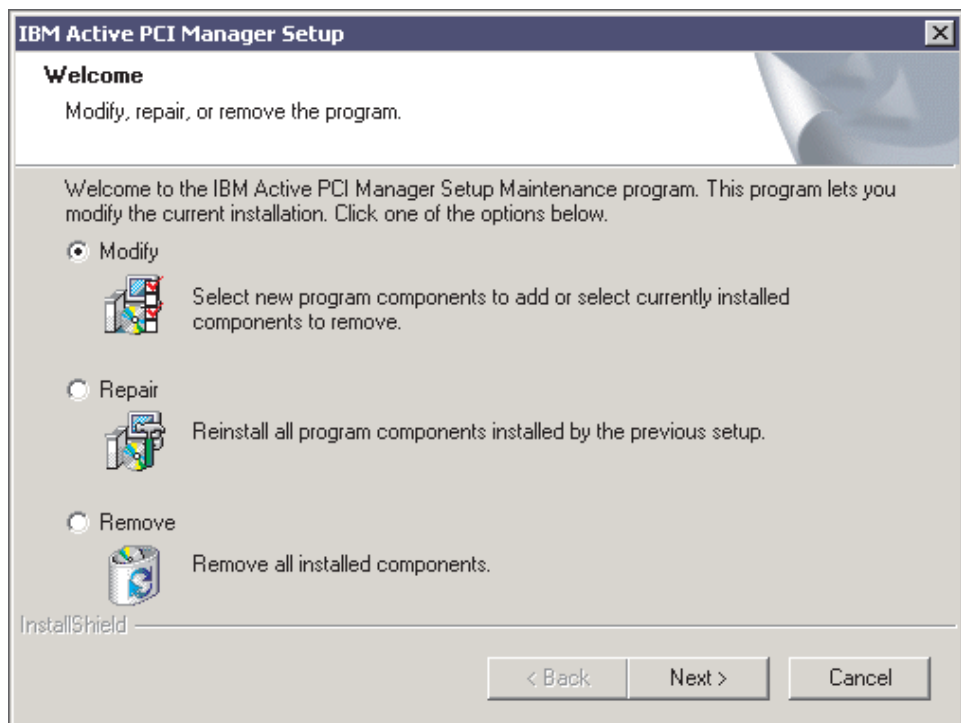
You do not need to start the Active PCI Manager Server component or Agent component. IBM Director and Windows will start these components of Active PCI Manager as needed.

## Uninstalling Active PCI Manager

You should uninstall Active PCI Manager before you uninstall IBM Director.

Complete the following steps to uninstall Active PCI Manager:

1. Close the IBM Director Management Console. The Active PCI Manager Setup program will not run when the Director Console is open.
2. Click **Start** → **Settings** → **Control Panel**, and then double-click **Add/Remove Programs**.
3. Click **IBM Active PCI Manager** in the list of installed programs.
4. Click **Change/Remove**. The Active PCI Manager Setup program runs, and the Welcome window opens.



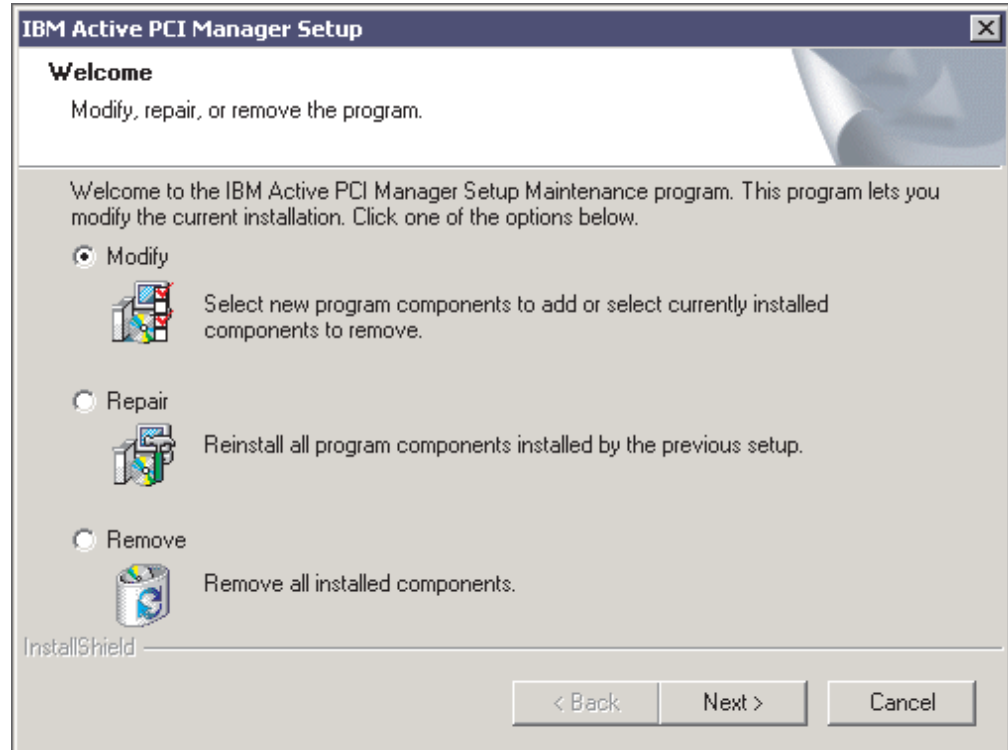
5. Click **Remove** to remove all Active PCI Manager components, and then click **Next**.  
To remove only some Active PCI Manager components, do not click **Remove**. Instead, see “Modifying or repairing Active PCI Manager” on page 9 for details.
6. In the Confirm Uninstall window, click **OK** to uninstall all components of Active PCI Manager, or click **Cancel** to quit.  
The Setup program detects the installed components and removes them from the system. Additionally, it removes the CIM classes that were created by IBM Active PCI Manager and removes the registry entries that were created during installation. The uninstall program is automatic and prompts you when the process is complete.
7. When the process is complete, click **Finish**.  
In rare cases, an Active PCI Manager file remains locked, and the Setup program is unable to remove the file. When this occurs, the Setup program reports this fact and states that it will be necessary to restart the system after the uninstallation. The Setup program will prompt you whether to restart the server now or restart it later. If you click **Restart Now**, the system shuts down

and restarts immediately. If you click **Restart Later**, the Setup program closes, and you must manually restart the system to complete the uninstallation.

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## Modifying or repairing Active PCI Manager

If you run the Active PCI Manager Setup program after you have already installed Active PCI Manager, in the Welcome window, you can modify or repair the current installation or upgrade to a new installation.



**Note:** Any component changes made to an Active PCI Manager installation are done with the version of files contained in the Setup program that installed those files. For example, if you run the Setup program from **Add/Remove Programs**, you will be running the same Setup program that was last used and no version changes will occur. If you run the Setup program any other way and the Setup program is a different version than the one that last installed the Active PCI Manager files, the newer Setup program will change the installation of the files to the new version contained in that newer Setup program.

Select one of these choices as appropriate:

### Modify

Select this choice to add new Active PCI Manager components, remove one or more installed Active PCI Manager components, or to upgrade Active PCI Manager while also adding or removing components.

For example, if you previously installed only the Server component, select **Modify** to add the Agent component. If you are running the Setup program that originally installed the existing Server component, this option ensures that the version of the added Agent component is the same as that of the Server component already installed.

If you previously installed Active PCI Manager v1.0 and are now running a newer version of the Setup program, for example, the one distributed with Active PCI Manager v1.1, then the Setup program prompts whether or not to upgrade the installation and enables you to add or remove components during the upgrade.

Similarly, if you are running an older version of the Setup program while a newer version of Active PCI Manager is installed, then the Setup program prompts whether or not to regress the installation.

You cannot use the **Modify** option to uninstall all Active PCI Manager components. Instead, select **Remove**.

### **Repair**

Select this choice to reinstall all Active PCI Manager components or to upgrade Active PCI Manager. Select **Repair** when you suspect that the installation is damaged.

If you previously installed Active PCI Manager v1.0 and are now running a newer version of the Setup program, for example, the one distributed with Active PCI Manager v1.1, then the Setup program prompts whether or not to upgrade the installation. If you continue, the Setup program upgrades all installed components. You cannot add or remove components with this option.

Similarly, if you are running an older version of the Setup program while a newer version of Active PCI Manager is installed, then the Setup program prompts whether or not to regress the installation.

### **Remove**

Select this choice to remove all installed Active PCI Manager components. For more information, see “Uninstalling Active PCI Manager” on page 8.



## Chapter 3. Using Active PCI Manager Console

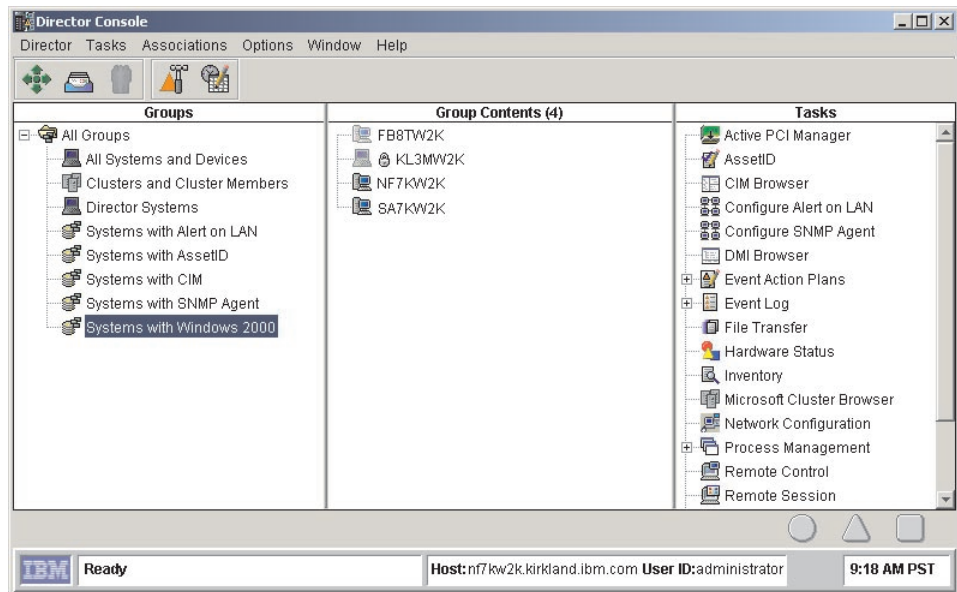
Although Active PCI Manager is an extension of IBM Director, it provides its own Java™-based graphical user interface. This chapter describes how to start the Active PCI Manager Console, describes its various parts, and explains the tasks you can perform.

### Starting Active PCI Manager Console

Complete the following steps to start the Active PCI Manager Console:

1. Start the IBM Director Console by clicking **Start → Programs → Director → Management Console**. After the console starts, the IBM Director login window opens.
2. Type the name of your IBM Director server, your user ID, and your password. The Director Management Console can communicate with only one Director server at a time. However, you can open multiple Director Management Consoles at the same time, each communicating with the same Director server or a different Director server.

After the Director Server validates your login information, the Director Management Console opens and displays a window similar to the following.

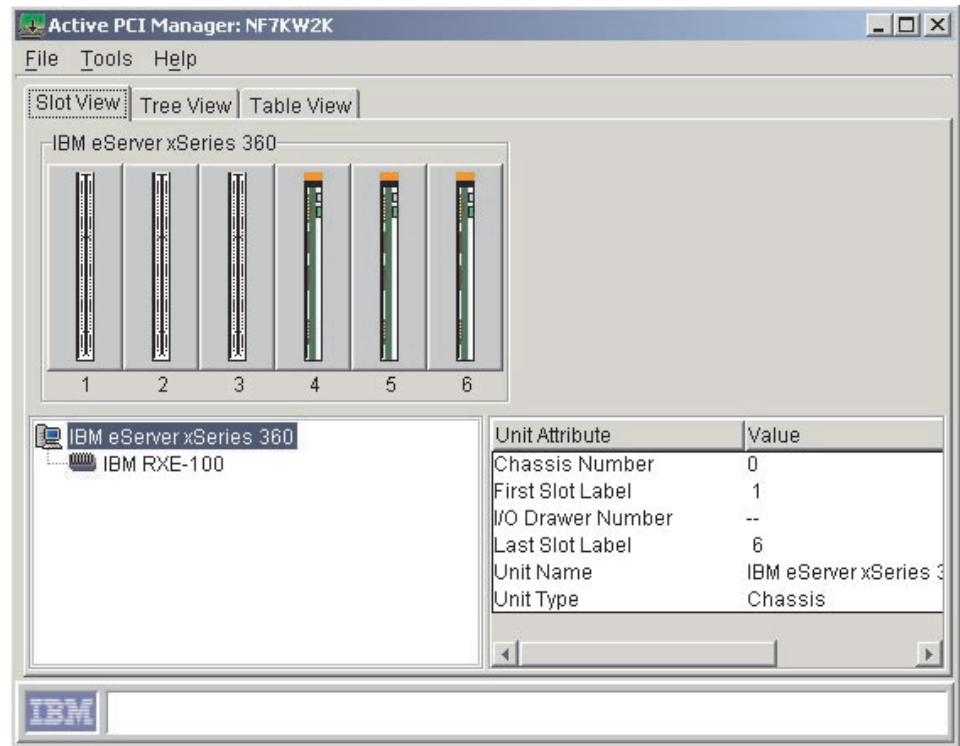


3. Click **Systems with Windows 2000** in the **Groups** pane of the Director Console.

The Director Console window updates the **Group Contents** pane with the names of the systems in the selected group.

4. In the **Tasks** pane of the Director Console window, drag and drop the Active PCI Manager icon onto a managed-system icon in the **Group Contents** pane. Alternatively, in the **Group Contents** pane, drag and drop the managed system onto the Active PCI Manager icon in the **Tasks** pane.

The Active PCI Manager Console opens for the selected managed system.




## The Active PCI Manager interface

The Active PCI Manager Console window has tabs to display target system information in each of the three views: Slot view, Tree view, and Table view. Each view provides detailed information about the adapters and slots in the system chassis or in any I/O expansion drawers. Active PCI Manager uses the IBM product name to identify the system chassis and I/O expansion drawer. Similarly, it displays adapter names and slot labels for each slot.

**Note:** The Active PCI Manager Console window does not display information about on-board adapters and the service-processor slot. Active PCI Manager does not use these adapters or slots to optimize the system.

The Slot view and Tree view pages use a combination of icons and text to display information about the target system. The Table view displays information solely in a text table. For a list of the icons used in the Slot view and Tree view, see the Active PCI Manager online help information. Click **Help** → **Contents** in the Active PCI Manager Console window. Then, click **Icons** topic under the **Graphical User Interface** heading.

As events occur that change the PCI layout on the target system, the WMI provider supplies the information to the Windows 2000 CIM database on that target system. The Active PCI Manager Console reads the CIM database and updates accordingly. These events include hot-adding an adapter, hot-ejecting an adapter, and changes in Hardware Attention LED error status.

The help pages for Active PCI Manager are displayed through the Director Console help interface. Each page is identified by the  icon which is used in the Director

Management Console to identify Active PCI Manager. The **Index** and **Search** buttons in the Director Console help interface apply only to the Director Console help. Use the links at the bottom of each page to navigate the Active PCI Manager help.

## Slot view

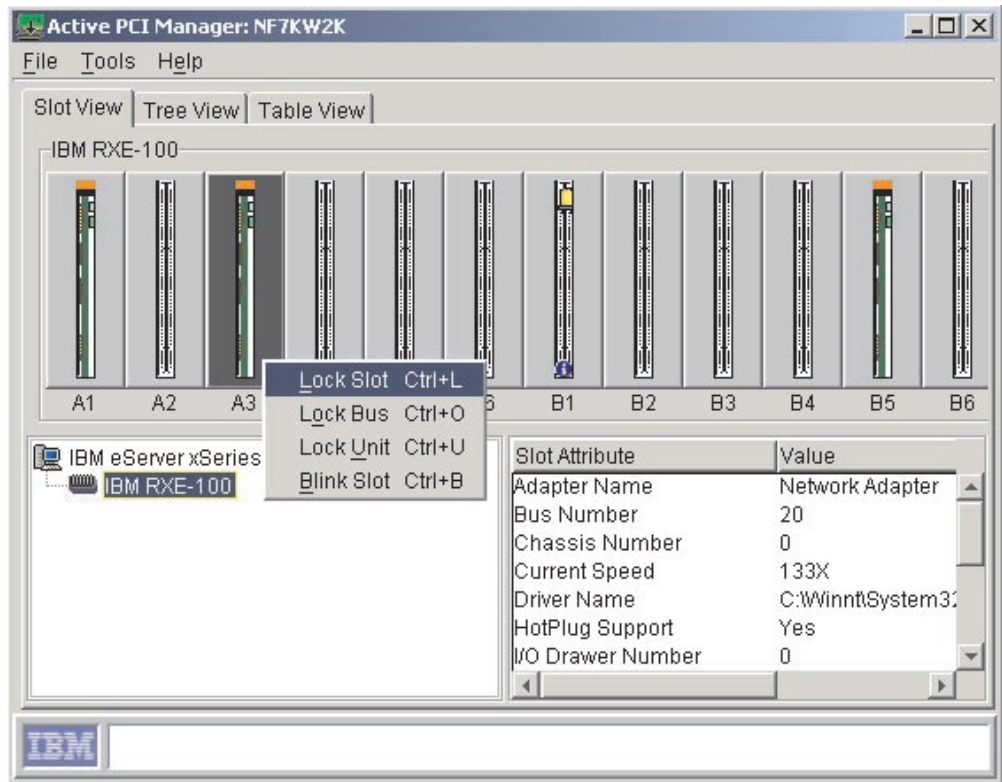
The Slot view page of Active PCI Manager shows a graphical representation of the slots in the supported system chassis and any optional I/O expansion drawers. The top portion of the page shows the slots graphically in a left-to-right order that corresponds to the numbers on the back of the system chassis. An icon represents each slot, and Active PCI Manager displays different slot icons depending on the state of the slot (locked, unlocked, empty, full, Attention LED on, and so forth). Below each slot icon, Active PCI Manager displays the slot label for that slot.


**Note:** Active PCI Manager displays the slots in lowest-to-highest order, from left to right. However, the actual system chassis could have the lowest slot value on the right. In this case, the display in Active PCI Manager is opposite from the actual system chassis.


When you click a slot icon, Active PCI Manager populates the Slot Attribute pane in the lower-right portion of the window with information about that slot. If the slot has an adapter, the Slot Attribute pane also displays information about the adapter in that slot.

The lower-left portion of the Slot view shows the selected target system that you plan to view and analyze. Click a system chassis icon or an I/O expansion drawer icon to graphically show the current slot configuration in the top portion of the Slot view. Additionally, Active PCI Manager updates the Slot Attribute pane to show detailed information about the system chassis or I/O expansion drawer that you have selected.

The following illustration shows a typical Slot view page.



In this example, the IBM RXE-100 Remote Expansion Enclosure is selected in the lower-left panel. The RXE-100 has 12 slots, and the example shows all 12 slots graphically and shows that three of those slots have adapters installed. Additionally, the Slot view shows that one empty slot (B1) has a blue circle with an "i" in it 

along with an Attention (non-flashing) icon . These two icons indicate that the slot has an LED error status and that additional information is available. See "LED error status" on page 16 for a list of the possible LED error status messages. When a slot has an LED error status, the icon for the slot shows a blue circle with an "i" in it along with an Attention (non-flashing) icon.

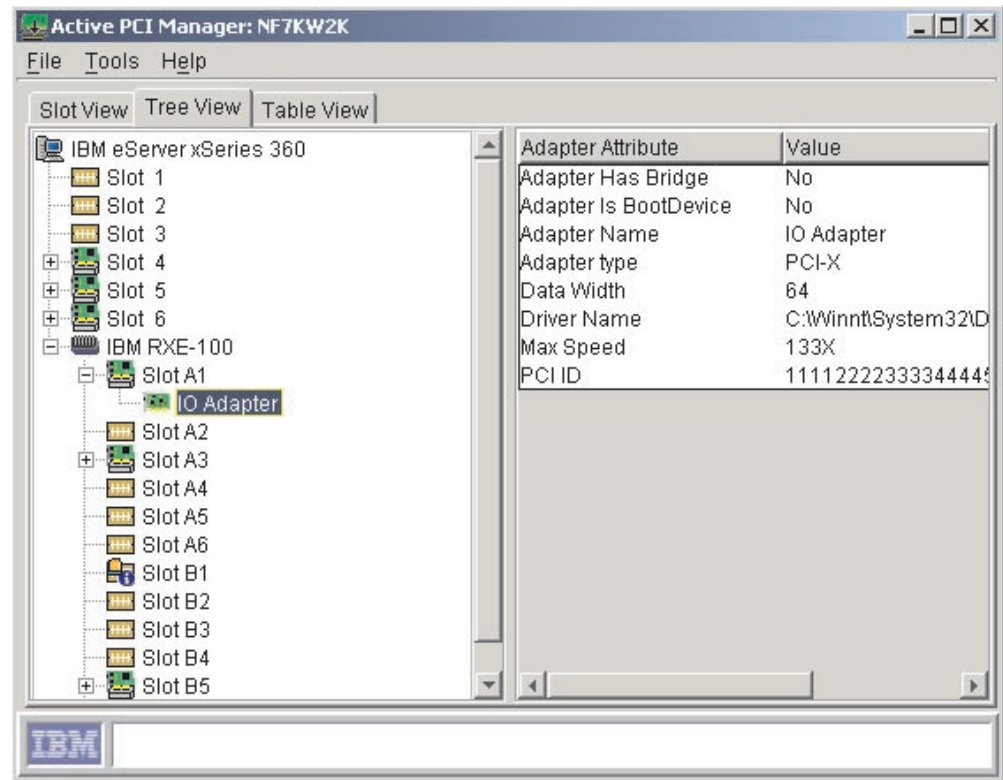
## Tree view

The Tree view page of Active PCI Manager shows a graphical tree hierarchy of the slots in the supported system chassis and any optional I/O expansion drawers.

The left pane of the window shows a tree hierarchy that represents the system chassis, I/O expansion drawers, slots, and adapters in the target system. You can expand and collapse the tree hierarchy by clicking the plus sign (+) or minus sign (-) next to each icon. Active PCI Manager presents the slots in the tree in a lowest-to-highest order that corresponds to the numbers on the back of the system chassis.

The right pane of the window shows the attributes for the item (system chassis, I/O expansion drawer, slot, or adapter) currently selected in the graphical tree hierarchy. To view attributes for a different item, click that item in the graphical tree hierarchy.

The following illustration shows a typical Tree view page.



## Table view

The Table view page of Active PCI Manager provides a table of all slots in the supported system chassis and any optional I/O expansion drawers. This table contains columns that identify the various slot and adapter attributes.

The table is ordered on the Slot Label column. Click a different column name to sort the table in an ascending order on that column. When you click the column name again, the Table view sorts the table in a descending order on that column. Active PCI Manager does not keep any changes you make to the sort order after you exit the program.

The following illustration shows a typical Table view page.

Chassis	I/O Drawer	Slot Label	Slot Speed	Slot Max S...	Slot Type	Hot-Plug Sl..
0	--	1	33	133X	PCI-X	No
0	--	2	33	100X	PCI-X	No
0	--	3	33	66X	PCI-X	No
0	--	4	33	66X	PCI-X	No
0	--	5	33	66X	PCI-X	No
0	--	6	33	66X	PCI-X	No
0	0	A1	33	133X	PCI-X	Yes
0	0	A2	33	133X	PCI-X	Yes
0	0	A3	33	133X	PCI-X	Yes
0	0	A4	33	133X	PCI-X	Yes
0	0	A5	33	133X	PCI-X	Yes
0	0	A6	33	133X	PCI-X	No
0	0	B1	33	133X	PCI-X	Yes
0	0	B2	33	133X	PCI-X	Yes
0	0	B3	66X	133X	PCI-X	Yes

## Menus

Active PCI Manager has two menus that provide access to all the Active PCI Manager functions and wizards.

In the Slot view and Tree view, the **Tools** menu provides access to the Blink function, Analyze function, Add Card wizard, and Refresh function. The Blink function is available only when you click a slot to select it. The Table view has a similar **Tools** menu, but it does not provide access to the Blink function.

The Slot view and Tree view also have a menu that you open by right-clicking a slot icon. You can use this menu to flash or lock slots. The Table view does not have any icons so it does not have this menu.

For details about using the Blink function, Lock functions, or the Refresh function, see the Active PCI Manager online help information. To do so, click **Help → Contents** in the Active PCI Manager Console window. Then, click the appropriate topic under the **Wizards and functions** heading.



For details about the Analyze function, see “PCI performance analysis” on page 17.

For details about the Add Card wizard, see “Adding adapters” on page 20.

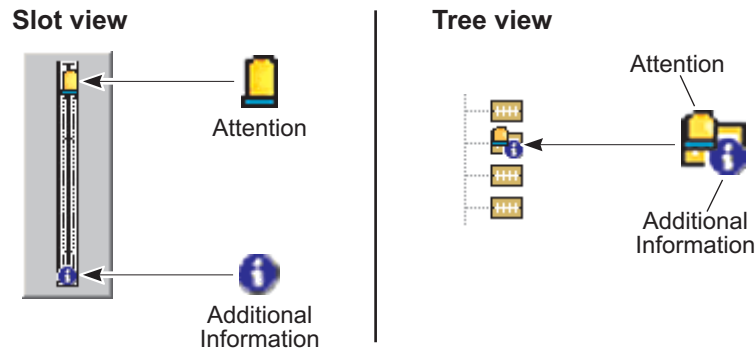
## LED error status

The Slot Attributes pane in the Slot view and Tree view displays the current LED error status for the selected slot. Additionally, the slot icons in the Slot view and Tree view indicate whether the slot has an Attention LED error status. In the Table view, the **Attn LED Status** column displays the current LED error status for the selected slot. The status can be any of the following:

- OK (no error)
- Hot eject successful
- Bus speed mismatch
- Power fault on card in slot
- Surprise removal occurred
- Slot disabled at current speed
- Too many adapters on bus
- Bus connection error

When a slot has an LED error status, the icon for the slot shows a blue circle icon with an "i" in it  along with an Attention (non-flashing) icon . These two icons indicate that the slot has an LED error status and that additional information is available. The hardware can turn on the Attention (non-flashing) LED for several hardware reasons, but Active PCI Manager cannot turn off an Attention (non-flashing) LED. Note that Active PCI Manager shows the same Attention (non-flashing) icon for all reasons.

The following illustration shows examples of the slot icons in the Slot view and Tree view that indicate an LED error status.



When a slot has a Bus speed mismatch LED error status, the hardware turns off the slot. This prevents Active PCI Manager from detecting enough PCI information about the adapter to offer any solutions.

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## PCI performance analysis

The primary function of Active PCI Manager is to analyze the PCI performance of a supported target system. The Analyze function provides this PCI performance analysis. It runs a PCI optimization algorithm that compares the way the PCI and PCI-X adapters are arranged in a system. If the Analyze function determines that the adapters are arranged in such a way that the system has major or moderate performance issues, it displays information about these performance issues. If possible, it also provides a solution that describes recommended actions to optimize or improve the location of adapters. For example, it can describe where to move the adapters, what slots you can use, and what adapters to place into those slots.

To run the PCI performance analysis on the target system, click **Tools → Analyze** from any view (Slot, Tree, or Table) of the Active PCI Manager Console window.

## Analyze function

In determining the PCI optimization of the target system, the Analyze function examines all slots in the system chassis and any optional I/O expansion drawers. This examination includes locked slots as well as turned-off slots. However, if a slot is locked, the Analyze function will not create a solution that attempts to relocate an adapter from or to the locked slot. Active PCI Manager locks all slots that contain boot devices, such as disk adapters. This avoids solutions that change the order of the boot devices, which can cause problems with starting the system or with disk drive letter assignments. Additionally, Active PCI Manager locks any slots that have an LED error status of Bus connection error.

You can manually lock individual slots, all slots on a bus, or all slots in the system chassis or an I/O expansion drawer. For details about how to lock slots, click **Help → Contents** in the Active PCI Manager Console window. Then, click the **Lock functions** topic under the **Wizards and functions** heading.

Furthermore, the PCI optimization routine that is used by the Analyze function is run on the Director Server. This routine can use large amounts of memory depending on the complexity of the slots and adapters. For this reason, the number of entries that are allowed in the possible solution list is limited. When the PCI optimization routine reaches the limit, it stops generating new entries and tries to find one solution from the current incomplete list. This incomplete list might not contain a solution, but the limit safeguards the memory usage on the Director Server.

## Potential performance issues

Several factors can affect the system PCI performance, such as incompatible operating speeds between buses and adapters or exceeding the recommended number of adapters on a bus. The Analyze function categorizes these issues as major and moderate performance issues depending on the effect of the issue on system PCI performance.

If the PCI optimization routine used by the Analyze function finds no major or moderate performance issues, the configuration is considered optimum. In this case, the Analyze function returns a message stating that no changes to the system are needed.

The major and moderate performance issues that the PCI optimization routine can detect are described in the following sections.

### Major performance issues

The Analyze function determines that there are major performance issues when one or more of the following scenarios occur on the system being analyzed:

- The adapters installed on any bus segment are not capable of operating at the same speed.
- A bus is exceeding the number of adapters it can support at a given bus speed. For example, a bus might have four slots but only two slots that can run at 66 MHz. If all four slots contain 66 MHz adapters, the bus will be forced to run at a slower speed (in a PCI-backward-compatible mode) for all four adapters to work. The Analyze function will detect this and report that the bus cannot be optimized with the current number of cards installed.
- A bus has adapters in unsupported slots. At higher speeds, some systems have restrictions regarding which slots you can populate. For example, a bus segment that has two slots might require that you populate only the first slot at a speed above 100 MHz. Not only must the bus not be overloaded, but also the adapters present on that bus must be in the appropriate slots.
- A bus is operating at a speed or mode slower than the maximum capability of any adapter installed on that bus.

This is a major performance issue only when the current speed and mode of the buses are included as a factor. This scenario occurs when you are attempting to determine if the root configuration is optimum and which buses will require resetting after the configuration has changed.



## Moderate performance issues

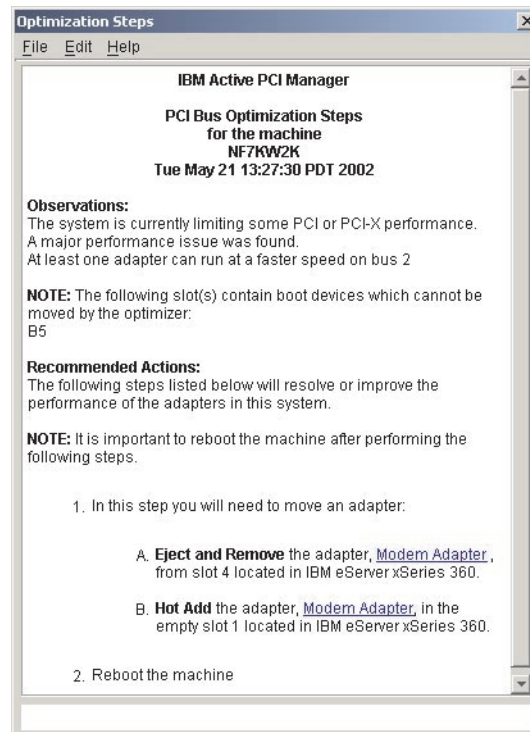
The Analyze function determines that there are moderate performance issues when one or more of the following scenarios occur on the system being analyzed:

- A 32-bit wide bus contains a 64-bit adapter.
- All adapters installed on any bus segment are not capable of the same operating mode (for example, PCI-X versus conventional mode).

## Optimization solution

The Optimization Steps window displays the results of the performance analysis from the Analyze function. If the PCI optimization algorithm finds major or moderate performance issues, the Optimization Steps window displays these issues and, if possible, provides instructions on how best to rearrange the adapters. The recommended solution attempts to optimize the system so that the adapters are operating at their best performance.

The following illustration shows a typical Optimization Steps window.



In the steps of the recommended actions, the adapter names are underlined. When clicked, Active PCI Manager updates the corresponding slot icon in the Slot view or Tree view to indicate the recommended action. For example, step 1A indicates that the adapter should be removed from slot 4. In this case, clicking the adapter name in step 1A causes the slot icon for slot 4 to change to indicate that it needs to be removed. For samples of the different icons used in the Slot view, see the Active PCI Manager online help information. Click **Help** → **Contents** in the Active PCI Manager Console window. Then, click the **Icons** topic under the **Graphical User Interface** heading.

**Important**

In some cases, the Optimization Steps window will include a step to turn off the system before following the optimization steps. This can happen when the solution recommends that you move an adapter to a bus that is running at a speed at which the adapter cannot run. If you do not turn off the system in such cases, the system can return unexpected errors such as a Bus Speed Mismatch LED error status for the suggested slot.

The Optimization Steps window provides a Print option, and a Copy option so you can paste the solution into a text-processing application. Active PCI Manager does not keep a history of solutions, so you must either print or copy the solution if you want to retain it.

---

## Adding adapters

Active PCI Manager has an Add Card wizard that works with the Analyze function to determine the most suitable slot in which to insert a new adapter. To start the Add Card wizard, click **Tools** → **Add Card Wizard** from any view (Slot, Tree, or Table) of the Active PCI Manager Console window.

**Note:** Before using the Add Card wizard, you must run the Analyze function and correct any noted performance issues. The Add Card wizard cannot determine a solution if there are any major or moderate performance issues.

The Add Card wizard comes with specifications for certain adapters. In the first window of the wizard, you can select from a list of supported adapters. If you are using an adapter that is not in the list, use the second window of the wizard to provide the specifications of the adapter. After you have selected or defined the adapter you plan to use, the wizard runs the Analyze function. When the analysis is complete, the Add Card wizard displays a suggested slot number to which the adapter can be added. If the Add Card wizard cannot find a suitable slot, it displays a message to that effect.

The Add Card wizard will not suggest a slot if using that slot for the new adapter would make the system performance suboptimal. Further, the Add Card wizard will not suggest that other adapters be moved to add the new adapter. Regardless, you must decide whether to add the new adapter to available slots in the system.

**Note:** Active PCI Manager cannot validate the information gathered by the Add Card wizard against the physical adapter until the adapter is installed in the system. If the wrong adapter information is entered in the wizard, the adapter might not work properly in the suggested slot. Alternatively, the system might not be optimized if the adapter is used in the suggested slot.

For detailed information about the Add Card wizard windows and defining the adapter you want to install, see the Active PCI Manager online help information. Click **Help** → **Contents** in the Active PCI Manager Console window. Then, click the **Add Card wizard windows** topic under the **Graphical User Interface** heading.

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## Important notes

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

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# Glossary

## A

**adapter.** A circuit board that adds function to a computer.

## B

**blink.** To flash the physical Attention LED for a slot in the system chassis or in the I/O expansion drawer. By flashing the LED, you can correlate the slot in the Active PCI Manager interface to the actual physical slot. To flash the physical Attention LED, use the Blink function in the Slot view or Tree view.

## C

**CIM.** See Common Information Model.

**Common Information Model (CIM).** An implementation-neutral object-oriented schema for describing network management information. The Desktop Management Task Force, Inc. (DMTF) develops and maintains CIM specifications. For in-depth information about CIM, go to the Web address <http://www.dmtf.org/>.

## H

**hot add.** To add and configure a new adapter while the server is operational.

**hot-swappable.** Pertaining to a component that can be removed or replaced while the system is running.

## I

**input/output (I/O).** Pertaining to (a) input, output, or both or (b) a device, process, or channel involved in data input, data output, or both.

**I/O.** See input/output.

## L

**LED.** See light-emitting diode.

**light-emitting diode (LED).** A semiconductor chip that gives off visible or infrared light when activated.

**lock.** To prevent the Analyze function from relocating an adapter from or to a slot. The Analyze function still examines locked slots when running the PCI optimization task. The result is that the solution returned in the Optimization Steps window will not involve any of the slots that you have locked.

To lock slots, use the Lock functions in the Slot view or Tree view. The lock functions in Active PCI Manager do not physically lock the selected slots. They do not prevent you from performing operations such as eject and hot add or otherwise using the selected slots.

## O

**optimized.** A state in which no PCI or PCI-X adapter is required to run in a PCI backward-compatibility mode.

## P

**PCI.** See peripheral component interconnect.

**PCI-X.** Peripheral component interconnect-extended. See PCI-X I/O subsystem.

**PCI-X I/O subsystem.** Enterprise X-Architecture™ technology offers one of the first implementations designed to the 1.0 specification level of this new industry standard, including support for dozens of PCI-X buses. PCI-X provides a new generation of capabilities for the PCI bus, including more efficient data transfers, more adapters per bus segment and faster bus speeds for server systems. PCI-X enhances the PCI standard by doubling the throughput capability and providing new adapter-performance options while maintaining backward compatibility with PCI adapters.

PCI-X technology enables all current 66 MHz PCI adapters (either 32-bit or 64-bit) to operate normally on the PCI-X bus. PCI-X adapters take advantage of the 100 MHz and 133 MHz bus speeds, which enable a single 64-bit adapter to move as much as 1 GB of data per second (0.5 GBps in each direction simultaneously). (The next PCI-X specification [2.0] will support bus speeds of up to 266 MHz.) Additionally, PCI-X supports twice as many 66 MHz 64-bit adapters in a single bus as PCI does.

**PCI backward-compatibility mode.** A state in which a PCI or PCI-X adapter capable of running at a faster bus speed is forced to run at a lower bus speed because of the presence of a slower adapter on the bus. For example, a PCI-X adapter is running in PCI backward-compatibility mode when it is forced to run in PCI mode.

**PCI bus.** A collection of PCI slots that are physically connected and which all must run at the same speed and in the same mode.

**PCI optimization.** A task performed by the Analyze function that compares all PCI and PCI-X adapters in a system. The comparison is to see if they are forcing other PCI or PCI-X adapters, or they are themselves being forced by other PCI or PCI-X adapters, to operate

in a less-than-maximum state. The result is to identify a solution that would eliminate or lessen the need for adapters to run in a PCI backward-compatibility mode.

**Peripheral component interconnect.** A computer bus architecture that defines electrical and physical standards for electronic interconnection.

## S

**slot label.** The label or silk-screened number that identifies one slot from another. You can physically view this label from the outside of the unit. Active PCI Manager displays the slot label in various windows.

**solution.** The resulting suggestion from the PCI optimization task performed by the Analyze function. The provided solution could include adding an adapter into a specific slot, swapping adapters between a pair of slots, or moving an adapter to another slot in the system.

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