

**IBM PCI Hot Plug Services and
Fault Tolerant Management Interface
Version 3.0a**

User Guide

Note

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 12.

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What are the IBM PCI Hot Plug Solution and Fault Tolerant Management Interface?

The IBM PCI Hot Plug solution for Windows NT 4.0 ensures High Availability on PCI Hot Plug-compatible IBM servers. With IBM PCI Hot Plug, you can use:

- Hot Add to install and configure a new adapter while the server is running
- Hot Swap to replace a faulty standalone or redundant adapter while the system is running
- The IBM PCI Hot Plug Applet to monitor the status of Hot Plug PCI slots on your server

IBM PCI Hot Plug includes two wizards, IBM PCI Hot Plug and Play and IBM PCI Hot Swap. These wizards provide clear, step-by-step guidance while you are adding or swapping an adapter.

The IBM Fault Tolerant Manager Interface (FTMI) for Windows NT 4.0 allows you to manage the failover operation on Hot Plug-compatible servers. It provides an integrated view of network machines that require failover management. With FTMI, you can:

- Monitor the status of every Fault Tolerant group on the network.
- Force a failover remotely from an active adapter to its backup.
- Replace a faulty standalone or redundant adapter while the system is running using Hot Swap
- Monitor the status of Hot Plug PCI slots on Hot Plug-compatible servers on the network.

IBM Fault Tolerant Manager Interface includes the IBM PCI Hot Swap wizard. This wizard provides clear, step-by-step guidance while you are swapping an adapter.

Systems Requirements

IBM Netfinity 5500 M20

Software Requirements

- Microsoft Windows NT 4.0 SP4 and SP5
- IBM PCI Hot Plug Package which includes: Intel DMI agent
This agent automatically installs DMI services on your system.
 - IBM PCI Hot Plug Solution (Won't Install on Non-Hot Plug System)
 - IBM PCI Hot Plug Applet
 - IBM PCI Hot Plug Systray
 - IBM PCI Hot Plug and Play Wizard
 - IBM PCI Hot Swap Wizard
 - IBM Fault Tolerant Management Interface
 - IBM Fault Tolerant Management Interface
 - Hot Plug Adapters Software
Look for a list of the supported adapters on www.ibm.com/pc/support/netfinity

Adapters Supported for Hot Plug

You can obtain a list of the supported adapters and download the most current versions of the adapter device drivers and programs from the following IBM pages on the World Wide Web:
<http://www.pc.ibm.com/support>

<http://www.pc.ibm.com/us/compat/hotplug/>
For additional information about future support, contact your IBM marketing representative.

Installing IBM PCI Hot Plug and Fault Tolerant Management Interface

You must use the following software to provide IBM PCI Hot Plug and Fault Tolerant Management support for hot plug-capable IBM Netfinity systems. You can download this software from www.ibm.com/pc/support/netfinity.

- Intel DMI Agent
- IBM PCI Hot Plug Services and Fault Tolerant Management Interface
- IBM Fault Tolerant Device Drivers

You can install the same components on a non Hot Plug systems in order to support the following:

- Monitor the status of every Fault Tolerant group on the network.
- Force a failover remotely from an active adapter to its backup.
- Monitor the status of Hot Plug PCI slots on Hot Plug-compatible servers on the network.

Step 1: Installing Windows NT4.0 SP3 or later

You must install Windows NT4.0SP3 or later in order to proceed to the next steps.

You can find system configuration information on the following IBM page on the World Wide Web:

<http://www.pc.ibm.com/support>

Step 2: Installing Intel DMI agent

This software will install DMI version 2.0 on your system. You must install the DMI agent before you can install the IBM PCI Hot Plug Services.

If DMI is already installed on your system, proceed to installing IBM PCI Hot Plug Services.

1. Download the *DMI Agent* exe file from the web page and extract the files onto a diskette.
2. Insert the diskette into the floppy drive.
3. From the Start menu, select Run.
4. Type A:\Setup.exe in the Open box.
5. Click OK. The Setup wizard opens.
6. Check both “DMI 2.0 Service Provider” and “DMI 2.0 DCE Client” items.
7. Follow the instructions on the setup wizard until the program is installed.
8. Reboot.

Step 3: Installing IBM PCI Hot Plug Services and Fault Tolerant Management Interface

1. Download the *IBM PCI Hot Plug Services and Fault Tolerant Management Interface* exe file from the web page and extract the files onto a diskette.
2. Log in to Windows NT as a user in the Administrator group.
3. Insert the diskette into the floppy drive.
4. From the Start menu, Select Run.
5. Type A:\SETUP.EXE in the Open box.
6. Click OK. The Setup wizard opens.
7. Follow the instructions on the setup wizard until the program is installed.

Notes:

If you have an older version of IBM PCI Hot Plug Services on your system a message box will prompt you to upgrade. Otherwise, click Yes and the Setup wizard will guide you through the rest of the installation.

Step 4: Installing Hot Plug Adapters Software

Please read the adapter's user manual for specific Hot Plug and Fault Tolerant support.

To insure that any of the Hot Plug features work properly, you must install the Hot Plug aware drivers. If you already have an adapter configured on your system make sure that the drivers are Hot Plug aware. In the case of an old version of the driver, those must be removed and replaced with the latest. A reboot will be required.

1. Download the driver .exe file from the web page and extract the files onto a diskette.
2. Place the diskette into the floppy drive.
3. Proceed with the normal upgrade of the adapter drivers. Please consult the documentation that came with your adapter or contact the manufacturer of the adapter for further information.

(Note: Most of the time, you will need to remove the old driver and reinstall the adapter with the new one)

4. Reboot

Step 5: Tips to know before using PCI Hot Plug features and Fault Tolerant Management Interface

Hot Plug Aware Drivers

To insure that any of the Hot Plug features work properly, you must install the Hot Plug aware drivers. If you already have an adapter configured on your system make sure that the drivers are Hot Plug aware. In the case of an old version of the driver, those must be removed and replaced with the latest. A reboot will be required.

Hot Add of an Adapter previously removed

When an administrator attempts to Hot-Add a SCSI or RAID adapter on a Hot Plug system on which the adapter has already been installed and removed, the Hot Add will fail.

The administrator is strongly advised to mark all SCSI drivers which have no device as "DISABLED" via the Devices Control Applet. This will prevent the driver from being started and allow the Hot Add to proceed normally.

MAC address incorrect (all zeros) for Hot Added card

After a Hot Add of an NIC Card, the MAC addresses are being returned as all zeros (000000000000). This does not affect the abilities of the adapter.

Hot Remove

Hot Remove is the ability to remove an adapter completely. This feature is NOT supported.

Best Time to perform PCI Hot Plug action

It is highly recommended to perform any of the PCI Hot Plug features during low traffic.

Reboot Message

After Hot Adding an adapter, the Windows NT applications (Network Applet and SCSI Applet) will ask the user to Reboot. DO NOT REBOOT!

Event Log Message " CreateFile failed to \\.\pipe\hotsrv "

Event ID: 1007

Source: ipssvc

Type: error

Category : none

This behavior is logged in the Event Viewer as a step to trace events. The Hot Swap wizard may log such error if the system is unable to fulfill the request at the time. Since the Hot Swap wizard retries 5 times before giving up. If the Hot Swap worked correctly, you can ignore this message.

Fault Tolerant Management Interface Limitations

- When managing a server remotely, there may be a few minutes where DMI events on a remotely managed machine could be missed by the FTMI service on the managing machine.
- Under heavy stress, FTMI may take up to several minutes to refresh adapters status.

DHCP will only bind to the first NIC adapter in an NT system.

While Hot Adding an adapter in a DHCP server, clients attached to that Hot Added NIC will not receive an IP address from the DHCP.

Same Network

It is not recommended to add two stand alone NIC adapters connected to the same network.

Hot Adding a New Adapter

Hot Add allows you to install and configure an adapter while the server is running. To Hot Add a new adapter:

1. Log on to Windows NT as a user within the Administrator group.
2. Open the server cabinet carefully in order to access the PCI Hot Plug slots.
3. Locate an empty PCI Hot Plug slot. (Make sure the power to the slot is Off.)
4. Open the adapter retention latch.
5. Lift the black tab.
6. Remove the expansion slot cover.
7. Insert the adapter firmly into the slot. Use the plastic guides to ensure the adapter is properly seated.
8. Connect any applicable adapter cables.
9. Lower the tab and close the adapter retention latch.

The power LED next to the slot turns ON and the Hot Plug and Play Wizard starts.

10. Follow the instructions on the Hot Plug and Play Wizard. Before the wizard completes, you may have to configure the adapter. For configuration instructions, refer to the documentation for your adapter.
11. Click Finish to close the wizard and complete the installation.

DO NOT REBOOT! (See the section “warnings” for exceptions)

If a problem occurs during installation, refer to the Event Viewer (System Log) for information about the install session.

Warnings:

- Modifications to Domain Name, Computer Name, Protocols, Services or existing Net card bindings while running the Hot Add Wizard on a Network Card will require a reboot.
- Currently the Hot Plug Wizard does not support the creation of a fault tolerant pair.
 - To create a Network Fault Tolerant pair finish the Hot Add wizard without making the pair and the wizard will start the driver for the newly added Net Card. After the wizard completes, go back into Network Properties and form the Fault Tolerant Pair in following the adapter driver instructions. A reboot will then be required.
- Do NOT perform a Hot Add during peak hours—current connections may be interrupted.

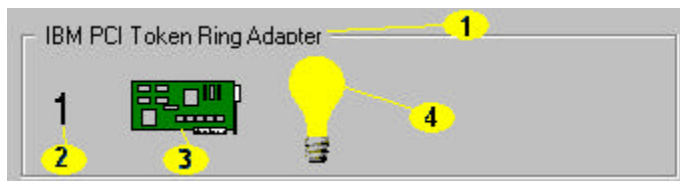
<p>Helpful Tip: You can Hot Add a Logic Analyzer card and a PCI Bus Analyzer card to the PCI Bus without impacting existing adapters. When finished, simply power off the slot using the IBM PCI Hot Plug Applet and remove the analyzer from the system. These procedures may be useful in gathering data for I/O performance analysis.</p>

The IBM PCI Hot Plug Applet

This applet helps you monitor and control the status of Hot Plug slots on your server.

Checking the Power Status of a Slot:

1. Open the applet by right-clicking the Hot Plug Icon in the Taskbar notification area on the right side of the Taskbar. (You can also open the applet by selecting Hot Plug Controls from the Control Panel.)
2. Select the tab designating the slot you want to check status on. The following portion of the property page is displayed:



- 1 Displays the name of the adapter in the slot.
- 2 Displays the Logical Slot Number. This number matches the slot in the back panel of the server.
- 3 Indicates whether there is an adapter in the slot. If an adapter is present, the card is green. If an adapter is not present, the card is gray.
- 4 Indicates whether the slot has power. If the light bulb is yellow, the power is on. If the light bulb is gray, the power is off.

Changing the Power Status of a Slot

1. Open the applet by right-clicking the Hot Plug Icon in the Taskbar notification area on the right side of the Taskbar. (You can also open the applet by selecting Hot Plug Controls from the Control Panel.)
2. Select the tab designating the slot you want to modify.
3. If you want to turn on the power for the selected slot, click On. If you want to turn off the power for the selected slot, click Off.
4. Click Apply. The power status of the slot is changed.

Note: The off button will be grayed out when an active adapter is present in the slot.

Warning: Do not remove power from a slot with an adapter being used by the server—it may hang your machine. To ensure the slot is Off, open the IBM PCI Hot Plug Applet. If the light bulb is gray, the power is off. You can also check the Power LED in back of the server. If the Power LED is not lit, the power to the slot is Off.

The IBM PCI Hot Plug Systray

The Hot Plug Systray gives you quick access to information about the PCI Hot Plug slots on the server.

To access the Hot Plug Systray, click the Hot Plug icon (🔥) in the Taskbar “systray,” located on the right side of the Taskbar. The menu appears as follows and contains the labeled characteristics:



- 1** Slot contains an adapter that is pending installation—adapters with this status are marked by a black dot next to the adapter name. A pending adapter is not fully configured and requires user interaction to finish the installation. To complete configuration for this adapter, click the adapter name to start the IBM Hot Plug and Play wizard.
- 2** Empty slot
- 3** Slot contains a fully configured, supported adapter.

The IBM PCI Hot Plug and Play Wizard

The IBM PCI Hot Plug and Play Wizard automatically starts after the insertion of a new adapter. This wizard will guide you through the configuration and startup of the adapter.

If you choose to cancel the adapter configuration, you can restart this wizard with the IBM PCI Hot Plug Systray.

See [Hot Adding a New Adapter](#) for information about adding an adapter.

Hot Swapping an Adapter

IBM PCI Hot Plug allows you to hot-swap standalone and redundant adapters. You must swap the adapter with an adapter of the same hardware level; in other words you cannot upgrade the existing adapter in the swap.

Please look at the adapter's user manual for special requirements for Hot Swapping

Hot Swapping a Standalone Adapter

Use this procedure to replace a standalone adapter. (Note that this feature cannot be supported for network adapters) It is recommended to stop any activity to the drives as it may cause errors during the swap.

1. Log on to Windows NT as a Domain Administrator.
2. Open the Hot Swap Wizard (From the FTMI directory tree, right-click the adapter you want to swap and select Hot Swap Wizard from the menu or From the Start menu, select IBM Hot Plug PCI Applications, then IBM Hot Swap PCI.)
3. When the wizard prompts you to swap the adapter, open the server cabinet carefully in order to access the PCI Hot Plug slots. Refer to your server's user guide for details about PCI Hot Plug Slots.
4. Locate the slot with the adapter needing to be swapped. The Attention LED for this slot will be flashing.
5. Open the adapter retention latch.
6. Lift the black tab.
7. Remove the adapter.
8. Insert the adapter firmly into the slot. Use the plastic guides to ensure the adapter is properly seated.
9. Connect any applicable adapter cables.
10. Lower the tab and close the adapter retention latch. The wizard will keep running until the adapter configuration is complete.

Note The IBM PCI Hot Swap wizard will not allow you to proceed if the swapped adapters are not the same hardware version.

11. Click Finish to close the wizard and complete the installation.

Hot Swapping an Adapter in a Fault Tolerant Pair

Note that you can Hot Swap an adapter only if it is the passive adapter in a fault tolerant pair.

If the active adapter has failed, please do the following:

1. Log on to Windows NT as a Domain Administrator.
2. Open the Hot Swap Wizard (From the FTMI directory tree, right-click the adapter you want to swap and select Hot Swap Wizard from the menu or From the Start menu, select IBM Hot Plug PCI Applications, then IBM Hot Swap PCI.)
3. When the wizard prompts you to swap the adapter, open the server cabinet carefully in order to access the PCI Hot Plug slots. Refer to your server's user guide for details about PCI Hot Plug Slots.
4. Locate the slot with the adapter needing to be swapped. The Attention LED for this slot will be flashing.
5. Open the adapter retention latch.
6. Lift the black tab.
7. Remove the adapter.
8. Insert the adapter firmly into the slot. Use the plastic guides to ensure the adapter is properly seated.
9. Connect any applicable adapter cables.
10. Lower the tab and close the adapter retention latch. The wizard will keep running until the adapter configuration is complete.

Note: The IBM PCI Hot Swap wizard will not allow you to proceed if the swapped adapters are not the same hardware version.

11. Click Finish to close the wizard and complete the installation. The wizard will prompt you to fail back.
12. Click Yes.

Hot Swap Wizard

Use this wizard when swapping an adapter. It will guide you through the Hot Swap process. To start the Hot Swap Wizard, select IBM Hot Plug PCI Applications, then IBM Hot Swap PCI from the Start menu or right-click the adapter you want to swap in FTMI and select Hot Swap Wizard from the menu.

See Hot Swapping an Adapter for more information about Hot Swap.

See Fault Tolerant Management Interface (FTMI) for more information about FTMI.

Fault Tolerant Management Interface (FTMI)

The Fault Tolerant Management Interface is located in the Control Panel.

Procedures

A. Adding a Machine to FTMI

1. Log in as a Domain Administrator.
2. Open FTMI from the Control Panel.
3. From the Insert Menu, select Machine.
4. In the Machine Name box, type the name of the machine you wish to add.
If you don't know the exact name of the machine you are adding, click Browse to search for the machine.
5. Click OK. The new machine is added to the Root tree.

B. Removing a machine from FTMI

1. Log in as a Domain Administrator.
2. Open FTMI from the Control Panel.
3. From the Edit menu, select Delete.
4. From the Machine to Delete box, select the machine you wish to remove from FTMI.
5. Click OK. The machine is removed from the Root tree.

C. Forcing a FailOver

FTMI can help you force the failure from an active adapter to an inactive adapter.

To force a failover from an active adapter to a passive adapter:

1. The FTMI directory tree, right-click the adapter you want to force a failover on and select Properties. The Failover Adapter Properties window opens.
2. Select the Control tab.
3. Select the Force Failover option. (This will be grayed out if the passive adapter has been selected)
4. Click Apply. The data on the active adapter is transferred to the passive adapter.
5. Click OK.

D. Refreshing system properties

Click the  button to refresh the status of the systems managed by FTMI.

To refresh properties at the following levels, either select Refresh from the View menu or right-click the Machine, Group, or Adapter and select Refresh from the menu.

- | | |
|----------------|--|
| Machine | Selecting this command at a machine level, refreshes only the selected machine and its components. When you select refresh at this level, FTMI deletes the machine from the tree then adds it back to the tree. The failover group and the adapter get a fresh copy of the machines attributes from DMI. |
| Group | Selecting this command at a group level refreshes only the group and its components. |
| Adapter | Selecting this command at an adapter level refreshes only the selected adapter. |

FTMI Properties

A. Machine Properties

To access machine properties, right-click the machine name in the FTMI directory tree and select Properties.

FO Groups

Specifies the number of failover groups for the selected machine.

FO Components

Specifies whether any failover component is registered in DMI.

Slots

Specifies the number of logical slots for the selected machine.

DMI Service Provider

Specifies whether the machine is registered with DMI services.

Failover Component

Specifies whether the failover component is registered with DMI services.

Hot Plug Component

Specifies whether Hot Plug services are registered with DMI services

System Management Component

Specifies whether the IBM Netfinity System Service component is registered with DMI.

Events

Specifies whether the IBM FTMI Service has subscribed for events through DMI for this machine.

B. Failover Group Properties

To access the properties for a failover group, right-click the group name in the FTMI directory tree and select Properties.

Group Index

Specifies the Group number.

Adapters in Group

Specifies the number of adapters in the selected failover group.

Component Name

Specifies the name of the DMI component for this failover group.

Machine Name

Specifies the name of the machine that contains the selected failover group.

C. Failover Adapter Properties

To access the properties for a failover adapter, double-click the adapter name in the FTMI directory tree. This property screen contains four tabs:

Menu and Toolbar and Icons

A. Menu Command

File	<i>Exit</i>	Use this command to close the program
Edit	<i>Delete</i>	Use this command to delete a machine from the FTMI directory tree. See Removing a Machine from FTMI for more information.
Insert	<i>Machine</i>	Use this command to add a machine to the FTMI directory tree. See Adding a Machine for more information.
View Menu	<i>Toolbar</i>	Use this command to display or hide the toolbar.
	<i>Large Icons</i>	Use this command to display large icons in the List view.
	<i>Small Icons</i>	Use this command to display small icons in the List view
	<i>List</i>	Use this command to list the nodes for a machine in the right panel of the FTMI window.
	<i>Report</i>	Use this command to see machine details in the right panel of the FTMI window. You can sort the list in ascending or descending order by clicking the column header. At this time only the node name will appear in the panel, but future releases will provide additional columns of information.
	<i>Refresh</i>	Use this command to refresh the status of the systems managed by FTMI. See Refreshing System Properties for more information.
	<i>Log</i>	Use this command to open the Programs, Administrative Tools and Event Viewer for the local machine.
Help	<i>Help</i>	Use this command to open this help file.
	<i>About ...</i>	Use this command to view version and copyright information about the FTMI.

B. Toolbar



Click this button to add a machine to the FTMI directory tree. See Adding a Machine for more information.



Click this button to delete a machine from the FTMI directory tree. See Removing a Machine from FTMI for more information.



Click this button to refresh the status of the systems managed by FTMI. For more information about Refresh options, see Refreshing System Properties



Click this button to display large icons in the List view.



Click this button to display small icons in the List view.



Click this button to list the nodes for a machine in the right panel of the FTMI window.



Click this button to see machine details Report view in the right panel of the FTMI window. At this time only the node name will appear in the panel, but future releases will provide additional columns of information.



Click this button to open this help file.

C. FTMI Directory Tree

The following icons appear in the FTMI directory tree:



Denotes a machine in the directory tree.



Denotes the failover group for a machine.



Denotes the active adapter in a failover group. The active adapter name appears to the right of the icon in boldface type.



Denotes the passive adapter in a failover group.



Denotes a failed adapter.

The following items appear in the directory tree context menu;

- Refresh** Use this command to refresh the status of the systems managed by FTMI. See Refreshing System Properties for more information.
- Properties** Use this command to view property pages for the selected machine (except Root), failover group, or adapter.
- Hot Swap Wizard** Use this command to start the IBM PCI Hot Swap Wizard. This menu item is available only when an adapter is selected.
- View Log** Use this command to open the Programs, Administrative Tools and Event Viewer for the local machine

Fault Tolerant Adapters

Setting up a Fault Tolerant pair

Read the adapter's user manual for configuration information.

Replacing a Failed Adapter in a Fault Tolerant Pair

When an active adapter fails, you can Hot Swap the failed adapter. To do this, open the Hot Swap Wizard, choose that adapter and follow the instructions. The adapter must be swapped with an adapter of the same hardware level. See Hot Swapping an Adapter for more information.

Recommended Configuration on the Netfinity 5500

We suggest that you place the active adapter in the PCI Hot Plug slot and use the on-board adapter as the passive adapter.

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Year 2000 Readiness and Instructions

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A product is Year 2000 Ready if the product, when used in accordance with its associated documentation, is capable of correctly processing, providing and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange date data with it.

This IBM PC hardware product has been designed to process four-digit date information correctly within and between the 20th and 21st centuries. If your IBM computer is on when the century changes, you should turn it off and then back on again once, or restart the operating system, to ensure that the internal clock resets itself for the new century.

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Glossary

active adapter

The active adapter in a fault tolerant pair

adapter retention latch

This latch rests on top of the adapter slot. It rotates clockwise and counterclockwise, allowing you to fasten or release the tab over the slot.

Attention LED

Each hot plug PCI slot has an Attention LED that is visible from the rear of the server and one that is visible from the inside of the server. When the Attention LED is flashing, it signifies that the adapter requires some sort of user intervention.

expansion slot cover

The metal bar covering an empty slot.

fault tolerance

This technology allows you to configure two adapters into a fault tolerant pair. Once installed and configured the fault tolerant pair will provide access to data (disk and network) even after an adapter failure.

fault tolerant pair

Two adapters logically grouped together in order to provide continual access to data, even after an adapter failure. In the pair, one adapter is active and the other is passive.

Hot Add

This IBM PCI Hot Plug feature allows you to add and configure an adapter to a Hot Plug-compatible server while the server is running.

Hot Removal

Allows you to remove a faulty adapter while the server is running. This feature is NOT supported for this release of IBM PCI Hot Plug.

Hot Swap

This IBM PCI Hot Plug feature allows you to replace a faulty standalone or redundant adapter while the server is running.

IBM PCI Hot Plug and Play Wizard

This wizard guides you through the configuration of a new Hot Plug adapter.

IBM PCI Hot Plug Applet

This applet allows you to monitor and control PCI Hot Plug slots on your server.

IBM PCI Hot Swap Wizard

This wizard helps you replace a faulty Hot Plug adapter.

passive adapter

The passive adapter in a fault tolerant pair.

Power LED

This LED is on when the hot plug slot has power. When this LED is off, the slot has no power. Do not add or remove an adapter from the slot when the Power LED is on.

tab

The black plastic piece on top of the slot. If you open the adapter retention latch, you can lift the tab to add or remove an adapter or an expansion slot cover.