Gigabit Fibre Channel PCI Adapter
2-Gigabit Fibre Channel PCI Adapter

Installation and Using Guide

Contents

Safety Information

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.**
>
> **Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.**
>
> **When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.**
>
> **Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
>
> **During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.**

Laser Safety Information

Laser Compliance

All Lasers are certified in the U.S. to conform to the requirements of DHHS 21 CFR Subchapter J for class 1 laser products. Outside the U.S., they are certified to be in compliance with the IEC 825 (first edition 1984) as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

CAUTION:
All IBM laser modules are designed so that there is never any human access to laser radiation above a class 1 level during normal operation, user maintenance, or prescribed service conditions. Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. Only trained service personnel should perform the inspection or repair of optical fiber cable assemblies and receptacles.

Handling Static-Sensitive Devices

Attention: Static electricity can damage this device and your system unit. To avoid damage, keep this device in its anti-static protective bag until you are ready to install it. To reduce the possibility of electrostatic discharge, follow the precautions listed below:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or other printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its anti-static package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body).
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective package. (If your device is an adapter, place it component-side up). Do not place the device on your system unit cover or on a metal table.
- Take additional care when handling devices during cold weather, as heating reduces indoor humidity and increases static electricity.

About This Book

This book provides information about installing the Gigabit Fibre Channel PCI Adapter (Type 4-S) and the 2-Gigabit Fibre Channel PCI Adapter (Type 4-W). Use this book with your specific system unit and operating system documentation.

ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

Related Publications

The following publications contain related information:

- System unit documentation for information specific to your hardware configuration
- Operating system documentation for information specific to your software configuration
- *PCI Adapter Placement Reference*, SA38-0538 (for the latest version, you may need to contact your marketing representative)
- *Fibre Channel Storage Manager Installation and User's Guide*, SC26-7290 (for the latest version, you may need to contact your marketing representative)

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- AIX
- RS/6000
- SP

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Chapter 1. Overview

Use a Gigabit Fibre Channel PCI Adapter (Type 4-S) to make high-speed connections between stand-alone system units and storage servers on a fibre channel network at speeds up to a Gigabit per second. This adapter requires a PCI 2.1, 32-bit, 33 MHz slot.

Use a 2-Gigabit Fibre Channel PCI Adapter (Type 4-W) to make high-speed connections between stand-alone system units and storage servers on a fibre channel network at speeds up to two gigabits per second. This adapter requires a PCI 2.2, 64-bit, 66 MHz slot.

Adapter Features

Gigabit Fibre Channel PCI Adapter (Type 4-S)

- 1062Mb/s Fibre Channel Interface
- PCI Bus Compatible (32-bit slot)
- Supports Short Wave Optics (non-OFC)
- Upgradable microcode (See your System User's Guide or contact your service representative)
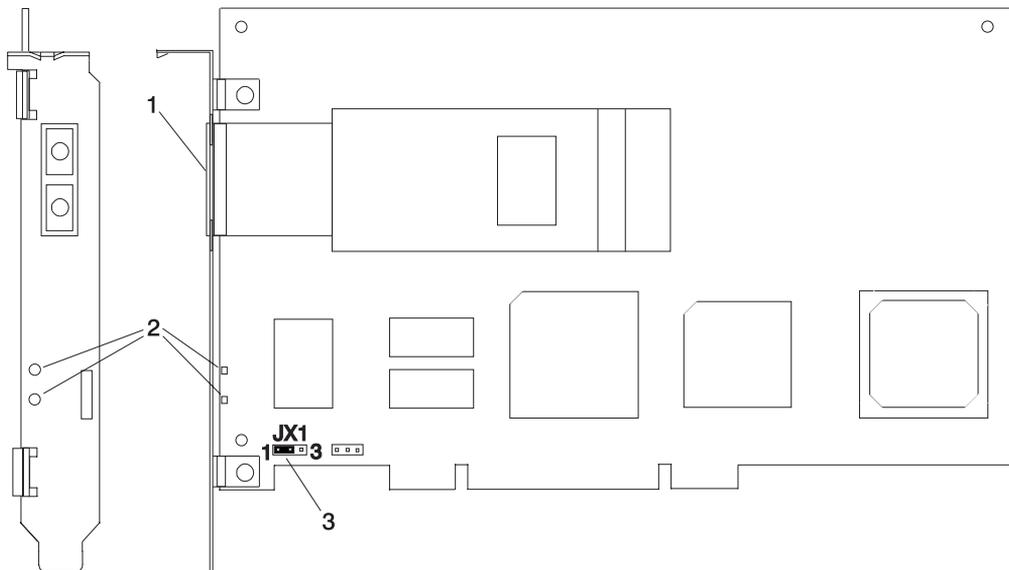
1. Multimode Fiber SC Connector
2. Data Link Status LEDs
3. Jumper JX1, Pins 1 to 2 only

2-Gigabit Fibre Channel PCI Adapter (Type 4-W)

- 2-Gigabit per second Fibre Channel Interface
- PCI Bus Compatible (64-bit slot)
- Supports Short Wave Optics (non-OFC)
- Upgradable microcode (See your System User's Guide or contact your service representative)
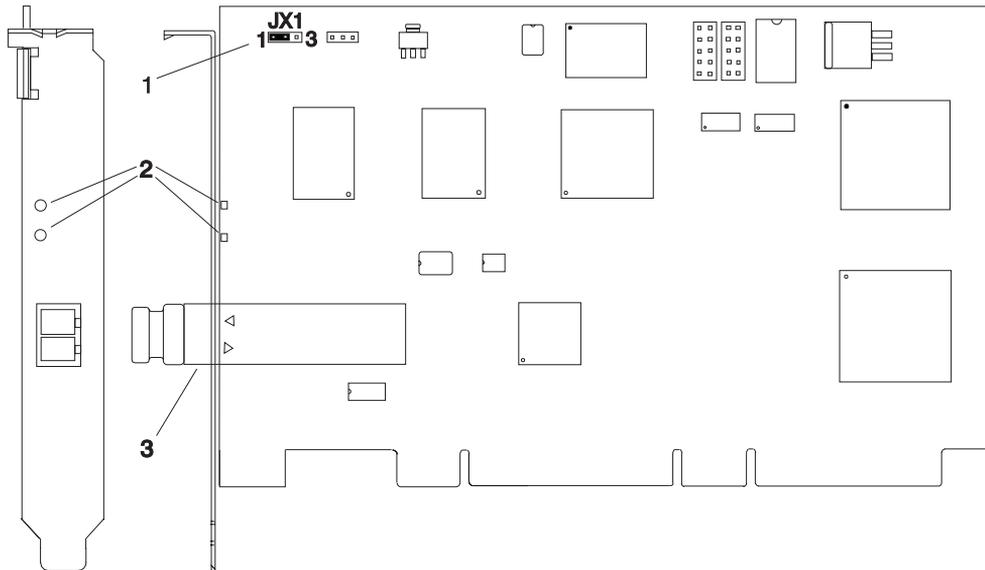
1. Jumper JX1, Pins 1 to 2 only
2. Data Link Status LEDs
3. Multimode Fiber LC Connector

Software Requirements

The Gigabit Fibre Channel PCI Adapter (Type 4-S) and the 2-Gigabit Fibre Channel PCI Adapter (Type 4-W) are supported on AIX Version 4.3.3 and later.

Environmental Requirements

- Operating temperature: 5 degrees C to 40 degrees C
- Operating humidity: 0 to 90% (non-condensing)
- Barometric operating pressure: 86 to 106 kPascals
- Maximum tolerance in power supply variation: +5% to -5%

Chapter 2. Preparing to Install a Gigabit Fibre Channel PCI Adapter

This chapter helps you prepare to install a Gigabit Fibre Channel PCI Adapter.

Note: If AIX is not installed on your system unit, install your adapter before you install the operating system. (See "Chapter 5. Installing the Gigabit Fibre Channel PCI Adapter" on page 21) When you install AIX, your device driver software automatically installs.

If AIX is operating on your system, install your device driver software before you install your adapter. (See "Chapter 3. Installing Device Driver Software" on page 5)

Checking Prerequisites

To install a Gigabit Fibre Channel PCI Adapter, you need the following on hand:

- The system unit documentation
- The operating system documentation
- A flat-blade screwdriver
- Media containing device driver software

Chapter 3. Installing Device Driver Software

The instructions in this chapter pertain to the AIX operating system. If you have another operating system installed, refer to your operating system documentation for information about installing the device software and configuring your system.

Installing the Software

This section contains instructions for installing the device driver software.

Gigabit Fibre Channel PCI Adapter (Type 4-S)

To install the device driver software, do the following:

1. Be sure you have read "Chapter 2. Preparing to Install a Gigabit Fibre Channel PCI Adapter" on page 3 to determine:
   - If you should install your device driver software first, go to step 2 and continue with this section.
   - If you should install your hardware first, go to chapter 5, ″Installing Hardware″. When you install AIX, your adapter device driver automatically installs.
2. Turn on the system unit power.
3. At the system prompt, log in as **root** user.
4. Insert the media containing the device driver software (example: CD-ROM) into the appropriate media device.
5. To start SMIT, type:

       smitty devinst

   Press Enter.
6. The Install Additional Device Software screen highlights the **INPUT device/directory for software** option.
7. Select or type your input device:
   - Press F4 to display the input device list. Select the name of the device (example: CD-ROM) that you are using and press Enter.
     OR
   - In the Entry Field, type the name of the input device you are using and press Enter.
8. The Install Additional Device Software panel highlights the **SOFTWARE to install** option.
9. Press F4 to display a list of the device software you can install.
10. To display the Find window, type:

        /
11. Type:

        devices.pci.df1000f7

Press Enter. The system finds and highlights this device driver software and displays output similar to the following example:

```
4.3.3.0 devices.pci.df1000f7          ALL
```

12. Press PF7 to select the device software, and press Enter.

13. The Install Additional Device Software screen displays. Entry data fields are automatically updated. Press Enter to accept the data.

14. The ARE YOU SURE window displays. Press Enter to accept the data.

15. The COMMAND STATUS window appears.

- The term `RUNNING` is highlighted to indicate that the install and configure command is in progress.

- When `RUNNING` changes to `OK`, scroll down to the bottom of the page and locate the Installation Summary.

- After a successful installation, `SUCCESS` displays in the Result column of the summary at the bottom of the page.

16. Remove the installation media from the drive.

17. Press F10 to exit SMIT.

18. Go to the adapter installation procedure, "Chapter 5. Installing the Gigabit Fibre Channel PCI Adapter" on page 21.

2-Gigabit Fibre Channel PCI Adapter (Type 4-W)

To install the device driver software, do the following:

1. Be sure you have read "Chapter 2. Preparing to Install a Gigabit Fibre Channel PCI Adapter" on page 3 to determine:

- If you should install your device driver software first, go to step 2 and continue with this section.

- If you should install your hardware first, go to chapter 5, ″Installing Hardware″. When you install AIX, your adapter device driver automatically installs.

2. Turn on the system unit power.

3. At the system prompt, log in as **root** user.

4. Insert the media containing the device driver software (example: CD-ROM) into the appropriate media device.

5. To start SMIT, type:

```
smitty devinst
```

Press Enter.

6. The Install Additional Device Software screen highlights the **INPUT device/directory for software** option.

7. Select or type your input device:

- Press F4 to display the input device list. Select the name of the device (example: CD-ROM) that you are using and press Enter.

OR

- In the Entry Field, type the name of the input device you are using and press Enter.

8. The Install Additional Device Software panel highlights the **SOFTWARE to install** option.

9. Press F4 to display a list of the device software you can install.

10. To display the Find window, type:

    /

11. Type:

    ```
    devices.pci.df1000f9
    ```

    Press Enter. The system finds and highlights this device driver software and displays output similar to the following example:

    ```
    4.3.3.0 devices.pci.df1000f9              ALL
    ```

12. Press PF7 to select the device software, and press Enter.

13. The Install Additional Device Software screen displays. Entry data fields are automatically updated. Press Enter to accept the data.

14. The ARE YOU SURE window displays. Press Enter to accept the data.

15. The COMMAND STATUS window appears.

    • The term RUNNING is highlighted to indicate that the install and configure command is in progress.

    • When RUNNING changes to OK, scroll down to the bottom of the page and locate the Installation Summary.

    • After a successful installation, SUCCESS displays in the Result column of the summary at the bottom of the page.

16. Remove the installation media from the drive.

17. Press F10 to exit SMIT.

18. Go to the adapter installation procedure, "Chapter 5. Installing the Gigabit Fibre Channel PCI Adapter" on page 21.

Chapter 4. Installing the Device Driver on the RS/6000 SP System

For an SP system, the installation tasks must be performed on each node. You must make the installation files available and then install them on all the relevant nodes. This chapter discusses the following tasks to enable you to install the device driver on the RS/6000 SP System:

- Checking System Prerequisites
- Installing Software on the Control Workstation (*if* the device driver is not in the lppsource directory)
- Installing Device Drivers on the SP Nodes (*if* the device driver and additional software are not already installed)

Perform the following tasks on the Control Workstation. If you are unfamiliar with the **dsh** command, refer to one of the following Parallel System Support Program (PSSP) publications:

- *Parallel System Support Program for AIX: Administration Guide*
- *Parallel System Support Program for AIX: Command and Technical Reference*

If you cannot use the **dsh** command because of the setup at your site, then use the **telnet** command to each node. Then perform the steps below, beginning with step 5, and omitting the dsh prefix.

For information about installing the device driver for the Gigabit Fibre Channel PCI Adapter (Type 4-S), see "SP Device Driver Installation for Gigabit Fibre Channel PCI Adapter (Type 4-S)", below.

For information about installing the device driver for the 2-Gigabit Fibre Channel PCI Adapter (Type 4-W), see "SP Device Driver Installation for 2-Gigabit Fibre Channel PCI Adapter (Type 4-W)" on page 14.

SP Device Driver Installation for Gigabit Fibre Channel PCI Adapter (Type 4-S)

Checking System Prerequisites

Do the following to check system prerequisites:

__ 1. Log into the Control Workstation as a root user.

__ 2. Go to a temporary directory by typing the following at the system prompt:

```
cd /tmp
```

Press Enter.

__ 3. Make a ″working collective″ file containing a list of the relevant nodes on which you want to perform the update. Type the following, pressing Enter after each line:

```
cat > group1
nodename1
nodename2
nodename3......
CTRL-D
export WCOLL=/tmp/group1
```

__ 4. Test the working collective file by typing the following:

```
dsh date
```

Press Enter. The results should look similar to the following:

```
nodename1:    Wed Apr 10 10:37:46 EDT 1999
nodename2:    Wed Apr 10 10:37:46 EDT 1999
nodename3:    Wed Apr 10 10:37:47 EDT 1999
nodename4:    Wed Apr 10 10:37:48 EDT 1999
```

If not, examine your nodelist file **/tmp/group1** to ensure that the node names are correct. Also ensure that the Kerberos ticket is current to permit **rsh** to be performed. If not, you may need to refresh it. Contact your system administrator for assistance with Kerberos initialization. If the system administrator is unable to help you, consult your support center.

An alternative way to specify a working collective is by using the **-w** flag with the **dsh** command. If you need to install only a few nodes, use the `dsh -w host1,` `host2,` `host3`...command format to explicitly reference groups of nodes.

__ 5. Determine if the AIX operating system on each relevant node is at the required level by typing the following at the prompt:

```
 dsh oslevel
```

OR

```
 dsh -w <host1,host2> oslevel
```

Press Enter. `<host1,host2>` is a list of the host names for the nodes on which the adapter will be installed. The required AIX level is: 4.3.3 or later.

If the nodes are *not* at a supported AIX level, upgrade the AIX level on the nodes. Contact the system administrator for assistance.

__ 6. Determine if the PSSP level on each node is at the required level by typing the following:

```
 /usr/lpp/ssp/bin/splstdata -G -b
```

Press Enter. The results display for all nodes and are in a form similar to the following:

```
 node#          hostname  hdw_enet_addr srvr      response     install_disk
 last_install_image  last_install_time  next_install_image lppsource_name
                                                                    pssp_ver
 -----------------------------------------------------------------------
```

```
1 eion01.ppd.pok.i   08005A75A6D4    0          disk              hdisk0
              default Thu_Dec__4_09:07:23             default  <lppsource>
                                                               <pssp level>
```

<lppsource> is the lppsource name for the node. <pssp level> is the PSSP
level installed on the node. The required PSSP level is 3.1.1 or later.

If the nodes are *not* at a supported PSSP level, upgrade the PSSP level on the
nodes. Contact the system administrator for assistance.

__ 7. Record the name that appears below `lppsource_name` for each node on which
the adapters are being installed. You will use this information later.

__ 8. Verify that the device driver is installed in the lppsource directory by typing the
following at the system prompt:

```
cd spdata/sys1/install/<lppsource_name>/lppsource
```

<lppsource_name> was recorded in the previous step. Once you are in this
directory, verify that the fileset is in the lppsource directory by typing the
following at the prompt:

```
ls devices.pci.14100401*
```

If the device driver is not in the lppsource directory, proceed to section
"Installing Software on the Control Workstation" on page 12 to install the
software.

__ 9. Update the SPOT (Shared Product Object Tree) by doing the following:

__ a. Type the following at the system prompt:

```
smitty nim_res_op
```

The Resource Name screen displays with the following highlighted:

```
boot           resources    boot
```

__ b. Move the cursor down until the *SPOT resource* is highlighted. The *SPOT
resource* should look similar to:

```
spot_AIX433    resources    spot
```

The format of the spot name is: spot_<lppsource_name>.
<lppsource_name> was the name you recorded in a previous step.

__ c. When the *SPOT resource* is highlighted, press Enter to select this option.
The Network Install Operation to Perform screen displays with the **reset**
option highlighted for selection.

__ d. Move the cursor until the **cust** option is highlighted and press Enter to
select this option. The Customize a SPOT screen displays with the
Source of Install Images highlighted for selection.

__ e. Press F4 to display the list of installation images and select the
appropriate lppsource.

__ f. Move the cursor until the appropriate lppsource is displayed. For
example:

```
lppsource_AIX433     resources     lpp_source
```

Press Enter.

  g. Move the cursor until *Fileset Names* is highlighted. Type the following fileset name:

```
devices.pci.14100401*
```

  h. Press Enter to start the SPOT update. This operation can take up to 15 minutes.

  10. Verify that the device driver is already installed by typing the following at the system prompt:

```
dsh "lslpp -l devices.pci.14100401* 2>&1" |more
```

  11. If the device driver is already installed on the node, contact your service provider to have the adapter installed.

OR

If the device driver is not installed on the node, proceed to section "Installing Device Drivers on the SP Nodes" on page 13.

Installing Software on the Control Workstation

Note: If your system is *partitioned*; that is, there are more than one operating system among the nodes, you may *only* install this adapter in nodes that have AIX 4.3.3 or later.

  1. If you are not logged into the Control Workstation as a root user, log in now. You may also need to export the working collective. Refer to "Checking System Prerequisites" on page 9.

  2. Select the appropriate CD-ROM for the operating system, as follows:
   - AIX 4.3.x - Additional Device Software

  3. Insert the installation media into the drive of the Control Workstation.

  4. Transfer the files to the Control Workstation's lppsource, as follows:

  a. Type the following, and then press Enter.

```
smitty bffcreate
```

  b. Select the input device/directory. Press F4. Then move the cursor to the appropriate input device and press Enter.

  c. Move the cursor to the **SOFTWARE package to copy** option and press F4 to select the software to be installed. Use the F7 key to select the following device driver(s) at the system prompt:

```
devices.pci.14100401
```

Press Enter.

  d. Move the cursor down to **DIRECTORY for storing software package** and enter the appropriate lppsource destination directory:

```
/spdata/sys1/install/<lppsource_name>/lppsource
```

Use the <lppsource_name> you recorded earlier.

e. Press Enter to begin copying the files.

> **Note:** This step may take several minutes while the directory table of contents is updated.

__ 5. Update the SPOT (Shared Product Object Tree) by doing the following:

a. Type the following at the system prompt:

```
smitty nim_res_op
```

The Resource Name screen displays with the following highlighted:

```
boot            resources    boot
```

b. Move the cursor down until the *SPOT resource* is highlighted. The *SPOT resource* should look similar to:

```
spot_AIX433    resources    spot
```

The format of the spot name is: spot_<lppsource_name>. <lppsource_name> was the name that you recorded in a previous step.

c. When the *SPOT resource* is highlighted, press Enter to select this option. The Network Install Operation to Perform screen displays with the **reset** option highlighted for selection.

d. Move the cursor until the **cust** option is highlighted, and press Enter to select this option. The Customize a SPOT screen displays with the **Source of Install Images** highlighted for selection.

e. Press F4 to display the list of installation images and select the appropriate lppsource.

f. Move the cursor until the appropriate **lppsource** is displayed. For example:

```
lppsource_AIX433    resources    lpp_source
```

Press Enter.

g. Move the cursor down until *fileset names* is highlighted. Type the following fileset name:

```
devices.pci.14100401
```

h. Press Enter to start the SPOT update. This operation can take up to 15 minutes.

__ 6. Proceed to step 9 on page 11.

Installing Device Drivers on the SP Nodes

Do the following to install device drivers on the SP nodes:

__ 1. Make sure that the lppsource directory is exported to the nodes by typing the following at the system prompt:

```
 showmount -e
```

If the directory is exported to the nodes, the result should look similar to the following:

```
 /spdata/sys1/install/AIX433/lppsource (everyone)
```

  __ 2. If the directory is not exported, you may temporarily export the directory by typing the following:

```
exportfs -i /spdata/sys1/install/<lppsource_name>/lppsource
```

  __ 3. Perform an NFS mount of the lppsource directory by typing the following:

```
dsh mount <controlwks>:
/spdata/sys1/install/<lppsource_name>/lppsource /mnt
```

       `<controlwks>` is the name of the Control Workstation recognized by the nodes. `<lppsource_name>` is the name you recorded earlier in "Checking System Prerequisites" on page 9.

  __ 4. Perform a preview of the files to be installed on the nodes by typing the following at the system prompt:

```
dsh "installp -p -acqXd /mnt device driver 2>&1" | more
```

       device driver is the fileset that must be installed for the adapter. The list includes:

       • devices.pci.14100401

  __ 5. Install the device driver by typing the following at the system prompt:

```
dsh "installp -acqXd /mnt device driver  2>&1" | more
```

       device driver is defined in the previous step.

       After the device driver is installed on the node, contact your service provider to have the adapter installed.

SP Device Driver Installation for 2-Gigabit Fibre Channel PCI Adapter (Type 4-W)

Checking System Prerequisites

Do the following to check system prerequisites:

  __ 1. Log into the Control Workstation as a root user.

  __ 2. Go to a temporary directory by typing the following at the system prompt:

```
cd /tmp
```

       Press Enter.

  __ 3. Make a ″working collective″ file containing a list of the relevant nodes on which you want to perform the update. Type the following, pressing Enter after each line:

```
cat > group1
nodename1
nodename2
nodename3......
CTRL-D
export WCOLL=/tmp/group1
```

  __ 4. Test the working collective file by typing the following:

```
dsh date
```

Press Enter. The results should look similar to the following:

```
nodename1:   Wed Apr 10 10:37:46 EDT 1999
nodename2:   Wed Apr 10 10:37:46 EDT 1999
nodename3:   Wed Apr 10 10:37:47 EDT 1999
nodename4:   Wed Apr 10 10:37:48 EDT 1999
```

If not, examine your nodelist file **/tmp/group1** to ensure that the node names are correct. Also ensure that the Kerberos ticket is current to permit **rsh** to be performed. If not, you may need to refresh it. Contact your system administrator for assistance with Kerberos initialization. If the system administrator is unable to help you, consult your support center.

An alternative way to specify a working collective is by using the **-w** flag with the **dsh** command. If you need to install only a few nodes, use the dsh -w host1, host2, host3...command format to explicitly reference groups of nodes.

___ 5. Determine if the AIX operating system on each relevant node is at the required level by typing the following at the prompt:

```
dsh oslevel
```

OR

```
dsh -w <host1,host2> oslevel
```

Press Enter. <host1,host2> is a list of the host names for the nodes on which the adapter will be installed. The required AIX level is: 4.3.3 or later.

If the nodes are *not* at a supported AIX level, upgrade the AIX level on the nodes. Contact the system administrator for assistance.

___ 6. Determine if the PSSP level on each node is at the required level by typing the following:

```
/usr/lpp/ssp/bin/splstdata -G -b
```

Press Enter. The results display for all nodes and are in a form similar to the following:

```
node#          hostname  hdw_enet_addr srvr      response     install_disk
last_install_image  last_install_time  next_install_image lppsource_name
                                                                 pssp_ver
-----------------------------------------------------------------------
1 eion01.ppd.pok.i   08005A75A6D4    0           disk            hdisk0
        default Thu_Dec__4_09:07:23              default  <lppsource>
                                                             <pssp level>
```

<lppsource> is the lppsource name for the node. <pssp level> is the PSSP level installed on the node. The required PSSP level is 3.1.1 or later.

If the nodes are *not* at a supported PSSP level, upgrade the PSSP level on the nodes. Contact the system administrator for assistance.

___ 7. Record the name that appears below `lppsource_name` for each node on which the adapters are being installed. You will use this information later.

___ 8. Verify that the device driver is installed in the lppsource directory by typing the following at the system prompt:

```
cd spdata/sys1/install/<lppsource_name>/lppsource
```

<lppsource_name> was recorded in the previous step. Once you are in this directory, verify that the fileset is in the lppsource directory by typing the following at the prompt:

```
ls devices.pci.df1000f9*
```

If the device driver is not in the lppsource directory, proceed to section "Installing Software on the Control Workstation" on page 17 to install the software.

___ 9. Update the SPOT (Shared Product Object Tree) by doing the following:

    ___ a. Type the following at the system prompt:

```
smitty nim_res_op
```

       The Resource Name screen displays with the following highlighted:

```
boot            resources    boot
```

    ___ b. Move the cursor down until the *SPOT resource* is highlighted. The *SPOT resource* should look similar to:

```
spot_AIX433     resources    spot
```

       The format of the spot name is: spot_<lppsource_name>. <lppsource_name> was the name you recorded in a previous step.

    ___ c. When the *SPOT resource* is highlighted, press Enter to select this option. The Network Install Operation to Perform screen displays with the **reset** option highlighted for selection.

    ___ d. Move the cursor until the **cust** option is highlighted and press Enter to select this option. The Customize a SPOT screen displays with the **Source of Install Images** highlighted for selection.

    ___ e. Press F4 to display the list of installation images and select the appropriate lppsource.

    ___ f. Move the cursor until the appropriate lppsource is displayed. For example:

```
lppsource_AIX433    resources    lpp_source
```

       Press Enter.

    ___ g. Move the cursor until *Fileset Names* is highlighted. Type the following fileset name:

```
devices.pci.df1000f9*
```

    ___ h. Press Enter to start the SPOT update. This operation can take up to 15 minutes.

___ 10. Verify that the device driver is already installed by typing the following at the system prompt:

```
dsh "lslpp -l devices.pci.df1000f9* 2>&1" |more
```

___ 11. If the device driver is already installed on the node, contact your service provider to have the adapter installed.

OR

If the device driver is not installed on the node, proceed to section "Installing Device Drivers on the SP Nodes" on page 18.

Installing Software on the Control Workstation

Note: If your system is *partitioned*; that is, there are more than one operating system among the nodes, you may *only* install this adapter in nodes that have AIX 4.3.3 or later.

___ 1. If you are not logged into the Control Workstation as a root user, log in now. You may also need to export the working collective. Refer to "Checking System Prerequisites" on page 9.

___ 2. Select the appropriate CD-ROM for the operating system, as follows:

- AIX 4.3.x - Additional Device Software

___ 3. Insert the installation media into the drive of the Control Workstation.

___ 4. Transfer the files to the Control Workstation's lppsource, as follows:

a. Type the following, and then press Enter.

```
smitty bffcreate
```

b. Select the input device/directory. Press F4. Then move the cursor to the appropriate input device and press Enter.

c. Move the cursor to the **SOFTWARE package to copy** option and press F4 to select the software to be installed. Use the F7 key to select the following device driver(s) at the system prompt:

```
devices.pci.df1000f9
```

Press Enter.

d. Move the cursor down to **DIRECTORY for storing software package** and enter the appropriate lppsource destination directory:

```
/spdata/sys1/install/<lppsource_name>/lppsource
```

Use the <lppsource_name> you recorded earlier.

e. Press Enter to begin copying the files.

Note: This step may take several minutes while the directory table of contents is updated.

___ 5. Update the SPOT (Shared Product Object Tree) by doing the following:

a. Type the following at the system prompt:

```
smitty nim_res_op
```

The Resource Name screen displays with the following highlighted:

```
boot              resources   boot
```

b. Move the cursor down until the *SPOT resource* is highlighted. The *SPOT resource* should look similar to:

```
spot_AIX433    resources   spot
```

The format of the spot name is: spot_<lppsource_name>. <lppsource_name> was the name that you recorded in a previous step.

c. When the *SPOT resource* is highlighted, press Enter to select this option. The Network Install Operation to Perform screen displays with the **reset** option highlighted for selection.

d. Move the cursor until the **cust** option is highlighted, and press Enter to select this option. The Customize a SPOT screen displays with the **Source of Install Images** highlighted for selection.

e. Press F4 to display the list of installation images and select the appropriate lppsource.

f. Move the cursor until the appropriate **lppsource** is displayed. For example:

```
lppsource_AIX433    resources    lpp_source
```

Press Enter.

g. Move the cursor down until *fileset names* is highlighted. Type the following fileset name:

```
devices.pci.df1000f9
```

h. Press Enter to start the SPOT update. This operation can take up to 15 minutes.

__ 6. Proceed to step 9 on page 16.

Installing Device Drivers on the SP Nodes

Do the following to install device drivers on the SP nodes:

__ 1. Make sure that the lppsource directory is exported to the nodes by typing the following at the system prompt:

```
showmount -e
```

If the directory is exported to the nodes, the result should look similar to the following:

```
/spdata/sys1/install/AIX433/lppsource (everyone)
```

__ 2. If the directory is not exported, you may temporarily export the directory by typing the following:

```
exportfs -i /spdata/sys1/install/<lppsource_name>/lppsource
```

__ 3. Perform an NFS mount of the lppsource directory by typing the following:

```
dsh mount <controlwks>:
/spdata/sys1/install/<lppsource_name>/lppsource /mnt
```

<controlwks> is the name of the Control Workstation recognized by the nodes. <lppsource_name> is the name you recorded earlier in "Checking System Prerequisites" on page 14.

__ 4. Perform a preview of the files to be installed on the nodes by typing the following at the system prompt:

```
dsh "installp -p -acqXd /mnt device driver 2>&1" | more
```

device driver is the fileset that must be installed for the adapter. The list includes:

- devices.pci.df1000f9

__ 5. Install the device driver by typing the following at the system prompt:

```
dsh "installp -acqXd /mnt device driver  2>&1" | more
```

device driver is defined in the previous step.

After the device driver is installed on the node, contact your service provider to have the adapter installed.

Chapter 5. Installing the Gigabit Fibre Channel PCI Adapter

This chapter provides instructions for installing the Gigabit Fibre Channel PCI Adapter.

Attention: Be sure you have read "Handling Static-Sensitive Devices" on page vii before handling your Gigabit Fibre Channel PCI Adapter. Do not remove the Gigabit Fibre Channel PCI Adapter from its anti-static package at this time.

Installing the Adapter

To install the adapter, do the following:

1. Be sure you have read "Chapter 2. Preparing to Install a Gigabit Fibre Channel PCI Adapter" on page 3 to determine:
   - If you should install your adapter hardware first
   - If you should install your device driver software first
2. If you should install your adapter hardware first, go to step 4 and continue with this section.
3. If you should install your device driver software first, go back to "Chapter 3. Installing Device Driver Software" on page 5. Return here to install your hardware.
4. Refer to the system unit documentation that shipped with your system unit to perform the following:
   a. Shut down your system unit.
   b. Install the adapter into your system unit in any primary PCI bus.
5. After the installation is complete, connect the cable to the adapter.
6. Turn on your system unit. Go to "Verifying Hardware Installation", below.

Verifying the Installation

Verify the initial installation by using the following procedures:
- Verify Hardware Installation (lsdev)
- Verify AIX Software Installation (lslpp)

Verifying Hardware Installation

To verify your system unit recognizes the Gigabit Fibre Channel PCI Adapter, do the following:

1. If necessary, log in as **root**.
2. Type:

   ```
   lsdev -C s grep fcs0
   ```

   If more than one fibre channel device is installed, the value *fcs0* may vary.
3. Press Enter.

   Possible results are as follows:

- If the adapter did install, the following is an example of the data that displays on your screen:

```
fcs0 Available 20-60
```

- If the message on your screen indicates your adapter is `Defined` instead of `Available`, shut down your machine. Check the adapter to ensure that it is installed correctly. Go to "Chapter 5. Installing the Gigabit Fibre Channel PCI Adapter" on page 21, and return to "Verifying Hardware Installation" on page 21 and repeat steps 1-3.

    Note: If the message on your screen indicates your adapter is `Defined` a second time, it may be necessary to contact your service representative.

- If no data displays on your screen, two possible problems exist:
    – Device drivers did not install. Go to "Verify AIX Software Installation".
    – Adapter did not install correctly. Go to "Chapter 5. Installing the Gigabit Fibre Channel PCI Adapter" on page 21, and return to "Verifying Hardware Installation" on page 21 and repeat steps 1-3.

        If that is not the problem, check your adapter installation. Go to "Chapter 3. Installing Device Driver Software" on page 5.

Verify AIX Software Installation

To verify that the device driver for the adapter is installed, do the following:

1. If necessary, log in as **root** user.
2. Type:

    ```
    lslpp -h s grep -p df1000f7
    ```

3. Press Enter.

    Possible results are as follows:

    - If the device driver is installed, the following is an example of the data that displays on your screen:

    ```
    devices.pci.df1000f7.rte  4.3.x.x COMMITTED IBM PCI Adapter
    devices.pci.df1000f7.com  4.3.x.x COMMITTED IBM PCI Adapter
    devices.fcp.disk.array.rte  4.3.x.x COMMITTED IBM PCI Adapter
    devices.pci.df1000f7.diag 4.3.x.x COMMITTED IBM PCI
                                      Adapter (df1000f7) Diagnostics
    devices.fcp.disk.array.diag 4.3.x.x COMMITTED IBM PCI Adapter
    ```

        If this displays on your screen but you continue to have problems, go to "Chapter 5. Installing the Gigabit Fibre Channel PCI Adapter" on page 21.
    - If no data displays on your screen, the adapter device driver did not install correctly. Return to "Chapter 3. Installing Device Driver Software" on page 5.

Using SMIT to Configure Options for AIX 4.3.3 and AIX 5.1

This section provides instructions for configuring options for the Gigabit Fibre Channel adapter.

Use SMIT to configure options as follows:

1. Log in as **root** user.
2. To start SMIT, type:

   ```
   smit
   ```

   Press Enter.
3. Select **Devices**.

Gigabit Fibre Channel Adapter Configuration

To configure the Gigabit Fibre Channel (FC) Adapter, do the following:

1. Select the **FC Adapter** section.

   FC Adapter Configurable Options are displayed on the screen.
2. Select **Change/Show Characteristics**.

   A list of configurable FC Adapter options is displayed.

```
                  Change/Show Characteristics of a FC Adapter

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                            [Entry Fields]
  FC Adapter                                 fcs0
  Description                                FC Adapter
  Status                                     Available
  Location                                   20-58
  Maximum number of COMMANDS to queue to the adapter [200]+#
  Maximum Transfer Size                      [0x100000]+
  Preferred AL_PA                            [0x1]+
  INIT Link flags                            [al]+
  Apply change to DATABASE only              no+
```

Configuration Options
The FC Adapter has the following configuration options:

- Maximum Number of Commands to Queue to the Adapter
- Maximum Transfer Size
- Preferred AL_PA
- INIT Link Flags (AIX Version 5.1 only)

Maximum Number of Commands to Queue to the Adapter: Use this option to adapt to various memory/system conditions. The default is 200, but you can conserve memory at the expense of performance by reducing this number to as little as 20. If you

have sufficient memory, the maximum is 1024 for a Gigabit Fibre Channel PCI Adapter (Type 4-S). The maximum is 2048 for a 2-Gigabit Fibre Channel PCI Adapter (Type 4-W).

If the SCSI target device is connected to the host through a SAN Data Gateway (SDG), then this parameter cannot exceed the SDG limit of 240 (SAN Data Gateway is a SCSI-to-Fibre Channel bridge).

Maximum Transfer Size: The default is 256 kilobytes, which is the largest single transfer size. For tape, transfers of 2 megabytes or more are possible. The range is 256 kilobytes to 16 megabytes.

Preferred AL_PA: The preferred AL_PA (Arbitrated Loop Physical Address) value is the address that the adapter requests at the beginning of every LIP (Loop Initialization Process). This configuration option must be used to set a unique AL_PA for each adapter in an Arbitrated Loop.

No two devices on a loop should have the same Preferred AL_PA. The outcome of arbitration would be random and would result in Permanent I/O Errors.

Every device on a loop must have unique AL_PAs. To maximize efficiency, hosts must have low AL_PAs for higher loop priorities. Targets must have higher AL_PAs for lower priorities.

INIT Link Flags: This option is available for AIX 5.1 and later. This must be configured for AL (Arbitrated Loop) mode.

Applying Changes to Database Only

The default is No for the Apply Changes to Database Only field. If the field is No, the ODM database is changed and the device is unconfigured and reconfigured.

If the field is Yes, only the ODM database is changed. Configuration changes are not applied to the device until it is unconfigured and reconfigured, or the system is rebooted.

Information Fields

The rest of the FC Adapter's Change/Show Characteristics screen contains the following information:

FC Adapter: Parent FC adapter driver instance's identification.

Description: Description of the parent FC adapter driver.

Status: Parent adapter driver's current status. 'Available' indicates that the driver and its adapter are functioning.

Location: Location code of the FC adapter driver. The parent adapter driver instance *fcsX* will have for its location code the first two values of this three-value location code. For example, if the parent FC adapter driver instance (fcs0) has a location code of 20-58, all children will have the location code of 20-58-01.

Fibre Channel SCSI Protocol Driver Configuration

To configure the Fibre Channel (FC) SCSI protocol driver, do the following:

1. Select the **FC SCSI Protocol Driver** section.

   FC SCSI Protocol Driver Options are displayed on the screen.

2. Select **Change/Show Device Characteristics**.

   A list of configurable FC SCSI Protocol Device options is displayed.

```
            Change/Show Characteristics of a FC SCSI Protocol Device

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                [Entry Fields]
  FC SCSI virtual device                        fscsi0
  Description                                   FC SCSI I/O Controller
  Status                                        Available
  Location                                      20-58-01
  Adapter SCSI ID                               0x1
  How this adapter is CONNECTED                 al
  FC Class for Fabric                           [3]+
  Apply change to DATABASE only                 no+
```

Configuration Options

The FC SCSI Protocol Device has the following configuration option:

FC Class for Fabric: This option is available for AIX 5.1 and later. The default is for class 3 operation. Class 2 is not currently supported. The FC Class for Fabric is the only configurable field.

Applying Changes to Database Only

The default is No for the Apply Changes to Database Only field. If the field is No, the ODM database is changed and the device is unconfigured and reconfigured.

If the field is Yes, only the ODM database is changed. Configuration changes are not applied to the device until it is unconfigured and reconfigured, or the system is rebooted.

Information Fields

The rest of the FC SCSI Protocol Device's Change/Show Characteristics screen contains the following information:

FC SCSI virtual device: Adapter's identification as a virtual device.

Description: Description of the virtual device.

Status: Virtual device's current status. 'Available' means the device is functioning.

Location: Location code of the FC SCSI Protocol Driver. All children of this protocol device will have the same value for location. The parent adapter driver instance *fcsX* instance will have for its location code the first two values of this three-value location

code. So, for example, if Location is 20-58-01 for fscsi0, all children will have the location code of 20-58-01, and the parent FC adapter driver instance (for example, fcs0) will have a location code of 20-58.

Adapter SCSI ID: This is the adapter's SCSI ID (identical to the N_Port ID in the Fibre Channel).

How this adapter is CONNECTED: This field indicates either *al* if connected to an arbitrated loop, *sw* if connected to a switch.

Chapter 6. Gigabit Fibre Channel PCI Adapter Interface

The Gigabit Fibre Channel PCI Adapter (Type 4-S) and the 2-Gigabit Fibre Channel PCI Adapter (Type 4-W) connect host systems to a storage subsystem through a fibre channel interface.

Adapter LEDs

The adapters have two LEDs: green and yellow located near the connectors. These LEDs can be used to determine the state of the adapter.

Green LED	Yellow LED	State
OFF	OFF	Wake up failure (dead board)
OFF	ON	POST failure (dead board)
OFF	slow blink (1HZ)	wake up failure
OFF	fast blink (4HZ)	Failure in POST
OFF	flashing (irregularly)	POST processing in progress
ON	OFF	failure while functioning
ON	ON	failure while functioning
ON	slow blink (1HZ)	Normal - inactive
ON	flashing (irregularly)	normal - active
ON	fast blink (4HZ)	normal - busy
slow blink	OFF	normal - link down or not yet started
slow blink	slow blink (1HZ)	off-line for download
slow blink	fast blink (4HZ)	restricted off-line mode (waiting for restart)

Product Descriptions

The Fibre Channel-PCI Host Adapters (PCIHA) are configured for fibre media by the installed Gigabit Link Module (GLM).

Product Summaries

Gigabit Fibre Channel PCI Adapter (Type 4-S)

Host Interface
PCI 32-bit, 5V or 3.3V signaling

Fiber Channel Interfaces
FC-PH compliant, optical short wave, multimode: Non-OFC, 1062.5Mb/s-SC connectors

Compatible Cables
Multimode 50/125 micron fiber with SC connectors: 1062.5Mb/s:2m - 500m
Multimode 62.5/125 micron fiber with SC connectors: 1062.5Mb/s:2m - 175m

2-Gigabit Fibre Channel PCI Adapter (Type 4-W)

Host Interface
PCI 64-bit, 5V or 3.3V signaling

Fiber Channel Interfaces
FC-PH/PI compliant, optical short wave, multimode: Non-OFC, LC connectors

Compatible Cables

Multimode 50/125 micron fiber with LC connectors: 1062.5Mb/s:2m - 500m
Multimode 62.5/125 micron fiber with LC connectors: 1062.5Mb/s:2m - 175m
Multimode 50/125 micron fiber with LC connectors: 2 Gb/s:2m - 300m
Multimode 62.5/125 micron fiber with LC connectors: 2 Gb/s:2m - 150m
FC 2456, IBM FRU PN 11P1373, LC-SC Convertor Cable

Cables

The following tables provide FRU part numbers for various Fibre Channel cable length
and connector combinations.

Multimode 50 micron LC to LC Cables

Part Number	EC	Description	Vendor	Cable Rating
11P1336	H24870	Cable Asm: 2 meter	CCI/Fujikura	Riser
11P1337	H24870	Cable Asm: 7 meter	CCI/Fujikura	Riser
11P1338	H24870	Cable Asm: 13 meter	CCI/Fujikura	Riser
11P1339	H24870	Cable Asm: 22 meter	CCI/Fujikura	Riser
11P1340	H24870	Cable Asm: 31 meter	CCI/Fujikura	Riser
11P1341	H24870	Cable Asm: 46 meter	CCI/Fujikura	Riser
11P1342	H24870	Cable Asm: 61 meter	CCI/Fujikura	Riser
11P1343	H24870	Cable Asm: Custom Length	CCI/Fujikura	Riser

Multimode 50 micron LC to SC Cables

Part Number	EC	Description	Vendor	Cable Rating
11P1344	H24870	Cable Asm: 2 meter	CCI/Fujikura	Riser
11P1345	H24870	Cable Asm: 7 meter	CCI/Fujikura	Riser
11P1346	H24870	Cable Asm: 13 meter	CCI/Fujikura	Riser
11P1347	H24870	Cable Asm: 22 meter	CCI/Fujikura	Riser
11P1348	H24870	Cable Asm: 31 meter	CCI/Fujikura	Riser
11P1349	H24870	Cable Asm: 46 meter	CCI/Fujikura	Riser
11P1350	H24870	Cable Asm: 61 meter	CCI/Fujikura	Riser
11P1351	H24870	Cable Asm: Custom Length	CCI/Fujikura	Riser

Appendix A. Communications Compliance Summary

The Gigabit Fibre Channel PCI Adapter (Type 4-S) is a Class B device. For complete details, see "Gigabit Fibre Channel PCI Adapter (Type 4-S) Communications Statements", below.

The 2-Gigabit Fibre Channel PCI Adapter (Type 4-W) is a Class A device. For complete details, see "2-Gigabit Fibre Channel PCI Adapter (Type 4-W) Communications Statements" on page 33.

Gigabit Fibre Channel PCI Adapter (Type 4-S) Communications Statements

The Gigabit Fibre Channel PCI Adapter (Type 4-S) is a Class B device.

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from authorized dealers. Neither the provider nor the manufacturer are responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:
- International Business Machines Corporation
- New Orchard Road
- Armonk, New York 10504
- Telephone: (919) 543-2193

FC

Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe B est conform à la norme NMB-003 du Canada.

Canadian Department of Communications Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

VCCI Statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に
基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的
としていますが、この装置がラジオやテレビジョン受信機に近接して使用される
と、受信障害を引き起こすことがあります。
　取扱説明書に従って正しい取り扱いをして下さい。

The following is a summary of the VCCI Japanese statement in the box above.

This product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). This product is aimed to be used in a domestic environment. When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

2-Gigabit Fibre Channel PCI Adapter (Type 4-W) Communications Statements

The 2-Gigabit Fibre Channel PCI Adapter (Type 4-W) is a Class A device.

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer is responsible for any

radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22 / European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Canadian Department of Communications Compliance Statement

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

VCCI Statement

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

The following is a summary of the VCCI Japanese statement in the box above.

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

The following is a summary of the EMI Taiwan statement above.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user will be required to take adequate measures.

Radio Protection for Germany

Dieses Gerät ist berechtigt in Übereinstimmung mit Dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

Hinweis

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

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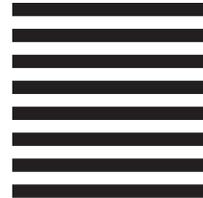Fold and Tape   **Please do not staple**   Fold and Tape

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