

# Managing PCI Adapters



REFERENCE  
86 A1 58EV 04



# ESCALA

## Managing PCI Adapters

**Hardware**

November 2008

BULL CEDOC  
357 AVENUE PATTON  
B.P.20845  
49008 ANGERS CEDEX 01  
FRANCE

**REFERENCE**  
**86 A1 58EV 04**

The following copyright notice protects this book under Copyright laws which prohibit such actions as, but not limited to, copying, distributing, modifying, and making derivative works.

Copyright IBM, 2007-2008  
Copyright © Bull SAS 2007-2008

Printed in France

## **Trademarks and Acknowledgements**

We acknowledge the rights of the proprietors of the trademarks mentioned in this manual.

All brand names and software and hardware product names are subject to trademark and/or patent protection.

Quoting of brand and product names is for information purposes only and does not represent trademark misuse.

*The information in this document is subject to change without notice. Bull will not be liable for errors contained herein, or for incidental or consequential damages in connection with the use of this material.*

---

## Contents

<b>Safety notices</b> . . . . .	<b>vii</b>
<b>About this publication</b> . . . . .	<b>ix</b>
How to send your comments . . . . .	ix
<b>Chapter 1. Managing PCI adapters</b> . . . . .	<b>1</b>
<b>Chapter 2. 10 Gigabit Ethernet-SR PCI Express Adapter (FC 5771; CCIN 576D)</b> . . . . .	<b>5</b>
<b>Chapter 3. 10 Gigabit Ethernet-LR PCI Express Adapter (FC 5772; CCIN 576E)</b> . . . . .	<b>11</b>
<b>Chapter 4. 10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter (FC 5721; CCIN 573A)</b> . . . . .	<b>13</b>
<b>Chapter 5. 10 Gb Ethernet-LR PCI-X 2.0 DDR Adapter (FC 5722; CCIN 576A)</b> . . . . .	<b>19</b>
<b>Chapter 6. 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 1983, 1990, 5706; CCIN 5706)</b> . . . . .	<b>23</b>
<b>Chapter 7. Dual port gigabit Ethernet-SX PCI-X Adapter (FC 5707; CCIN 5707)</b> . . . . .	<b>25</b>
<b>Chapter 8. Gigabit Ethernet-SX PCI-X Adapter (FC 6800, 5700; CCIN 5700)</b> . . . . .	<b>27</b>
<b>Chapter 9. 4-Port 10/100 Base-TX Ethernet PCI Adapter (FC 4961)</b> . . . . .	<b>29</b>
<b>Chapter 10. 4-Port 10/100/1000 Base-TX PCI-X Adapter (FC 5740, 1954)</b> . . . . .	<b>31</b>
<b>Chapter 11. 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter (FC 5767; CCIN 5767)</b> . . . . .	<b>37</b>
<b>Chapter 12. 2-Port Gigabit Ethernet-SX PCI Express Adapter (FC 5768; CCIN 5768)</b> . . . . .	<b>43</b>
<b>Chapter 13. 4-Port 10/100/1000 Base-TX PCI Express Adapter (FC 5717; CCIN 5717)</b> . . . . .	<b>49</b>
<b>Chapter 14. 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 1959, 1979, 5701, 6801; CCIN 5701)</b> . . . . .	<b>55</b>
<b>Chapter 15. 10/100 Mbps Ethernet PCI Adapter II (FC 4962; CCIN 4962)</b> . . . . .	<b>57</b>
<b>Chapter 16. PCI-X DDR Dual –x4 Port SAS RAID Adapter (FC 5902; CCIN 572B)</b> . . . . .	<b>59</b>
<b>Chapter 17. PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and Cable Card (FC 5909; CCIN 57B9)</b> . . . . .	<b>61</b>
<b>Chapter 18. PCI-X DDR External Dual – x4 Port SAS Adapter (FC 5900 and 5912; CCIN 572A)</b> . . . . .	<b>65</b>
<b>Chapter 19. 8 Gigabit PCI Express Dual Port Fibre Channel Adapter (FC 5735; CCIN 577D)</b> . . . . .	<b>69</b>

<b>Chapter 20. 4 Gigabit PCI Express Single Port Fibre Channel Adapter (FC 5773; CCIN 5773)</b> . . . . .	<b>73</b>
<b>Chapter 21. 4 Gigabit PCI Express Dual Port Fibre Channel Adapter (FC 5774; CCIN 5774)</b> . . . . .	<b>79</b>
<b>Chapter 22. 2 Gigabit Fibre Channel PCI-X Adapter (FC 1957, 1977, 5716; CCIN 574C)</b>	<b>85</b>
<b>Chapter 23. 2 Gigabit Fibre Channel PCI and PCI-X Adapters (FC 6228, 6239)</b> . . . . .	<b>87</b>
<b>Chapter 24. 4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter (FC 1905, 5758, 5761; CCIN 1910, 280D)</b> . . . . .	<b>89</b>
<b>Chapter 25. 4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter (FC 1910, 5759; CCIN 1910, 5759)</b> . . . . .	<b>91</b>
<b>Chapter 26. PCI-X Ultra RAID Disk Controller (FC 2757; CCIN 2757)</b> . . . . .	<b>93</b>
<b>Chapter 27. PCI-X Ultra4 RAID Disk Controller (FC 0627, 0641, 2780; CCIN 2780)</b> . . . . .	<b>95</b>
<b>Chapter 28. PCI-X DDR Dual-Channel Ultra320 SCSI Adapter (FC 0647, 1912, 5736, 5775; CCIN 571A)</b> . . . . .	<b>97</b>
<b>Chapter 29. PCI-X DDR Dual-Channel Ultra320 SCSI RAID Adapter (FC 5737, 5776; CCIN 571B)</b> . . . . .	<b>99</b>
<b>Chapter 30. Auxiliary-write cache IOA (FC 5580, 5581; CCIN 5708)</b> . . . . .	<b>101</b>
<b>Chapter 31. 1 Gigabit iSCSI TOE PCI-X Adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)</b> . . . . .	<b>105</b>
<b>Chapter 32. POWER GXT145 PCI Express Graphics Accelerator (FC 5748)</b> . . . . .	<b>129</b>
<b>Chapter 33. POWER GXT135P graphics PCI Adapter (FC 2848)</b> . . . . .	<b>135</b>
<b>Chapter 34. POWER GXT135P graphics PCI Adapter (FC 2849; CCIN 2849)</b> . . . . .	<b>137</b>
<b>Chapter 35. PCI IOP (FC 2843, CCIN 2834)</b> . . . . .	<b>139</b>
<b>Chapter 36. PCI IOP (FC 2844, CCIN 2844)</b> . . . . .	<b>141</b>
<b>Chapter 37. PCI IOP for SAN Load Source (FC 2847, CCIN 2847)</b> . . . . .	<b>143</b>
<b>Chapter 38. PCI Audio Adapter (FC 8244)</b> . . . . .	<b>145</b>
<b>Chapter 39. 2-port USB PCI Adapter (FC 2738; CCIN 28EF)</b> . . . . .	<b>147</b>
<b>Chapter 40. 4-Port USB PCI Express Adapter (FC 2728; CCIN 57D1)</b> . . . . .	<b>149</b>
<b>Chapter 41. ARTIC960Hx 4-Port Selectable PCI Adapter (FC 2947)</b> . . . . .	<b>151</b>
<b>Chapter 42. 2-Port Asynchronous EIA-232 PCI Adapter (FC 5723)</b> . . . . .	<b>155</b>

<b>Chapter 43. 8-Port asynchronous EIA-232E/RS-422A PCI Adapter (FC 2943)</b>	<b>157</b>
<b>Chapter 44. 64-bit/66MHz PCI ATM 155 UTP Adapter (FC 4953)</b>	<b>159</b>
<b>Chapter 45. PCI-X Cryptographic Coprocessor (FC 4764; CCIN 4764)</b>	<b>161</b>
<b>Chapter 46. Cryptographic Accelerator (FC 4960; CCIN 2058).</b>	<b>169</b>
<b>Chapter 47. PCI Cryptographic Coprocessor (FC 4963)</b>	<b>171</b>
<b>Chapter 48. Replacing RAID disk-controller cache battery packs</b>	<b>173</b>
Replacing the cache battery pack on the 571B adapter . . . . .	173
Replacing the cache battery pack on the 2757 controller . . . . .	173
Replacing the cache battery pack on the 571F and 575B adapters . . . . .	174
Replacing the cache battery pack on the 571E, 574F, 2780, or 5708 adapters. . . . .	175
<b>Appendix. Accessibility features</b>	<b>177</b>
<b>Notices</b>	<b>179</b>
Trademarks . . . . .	180
Electronic emission notices . . . . .	180
Class A Notices. . . . .	180
Terms and conditions. . . . .	184





---

## Safety notices

Safety notices may be printed throughout this guide.

- **DANGER** notices call attention to a situation that is potentially lethal or extremely hazardous to people.
- **CAUTION** notices call attention to a situation that is potentially hazardous to people because of some existing condition.
- **Attention** notices call attention to the possibility of damage to a program, device, system, or data.

### World Trade safety information

Several countries require the safety information contained in product publications to be presented in their national languages. If this requirement applies to your country, a safety information booklet is included in the publications package shipped with the product. The booklet contains the safety information in your national language with references to the U.S. English source. Before using a U.S. English publication to install, operate, or service this product, you must first become familiar with the related safety information in the booklet. You should also refer to the booklet any time you do not clearly understand any safety information in the U.S. English publications.

### Laser safety information

The servers can use I/O cards or features that are fiber-optic based and that utilize lasers or LEDs.

#### 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 IEC 60825 as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

#### CAUTION:

**This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:**

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

#### CAUTION:

**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. (C027)**

#### CAUTION:

**This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)**

#### CAUTION:

**Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following information: laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam. (C030)**

## Power and cabling information for NEBS (Network Equipment-Building System) GR-1089-CORE

The following comments apply to the servers that have been designated as conforming to NEBS (Network Equipment-Building System) GR-1089-CORE:

The equipment is suitable for installation in the following:

- Network telecommunications facilities
- Locations where the NEC (National Electrical Code) applies

The intrabuilding ports of this equipment are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of this equipment *must not* be metalically connected to the interfaces that connect to the OSP (outside plant) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metalically to OSP wiring.

**Note:** All Ethernet cables must be shielded and grounded at both ends.

The ac-powered system does not require the use of an external surge protection device (SPD).

The dc-powered system employs an isolated DC return (DC-I) design. The DC battery return terminal *shall not* be connected to the chassis or frame ground.

---

## About this publication

This publication contains reference information that information technology (IT) personnel and service representatives can use to learn about using and managing Peripheral Component Interconnect (PCI) adapters. You can also find specifications and installation notes for specific adapters in this publication.

For information about the accessibility features of this product, for users who have a physical disability, see “Accessibility features,” on page 177.

---

## How to send your comments

Your feedback is important in helping to provide the most accurate and highest quality information. If you have any comments about this publication, send your comments to us. Be sure to include the name of the book and the specific location of the text you are commenting on (for example, a page number or table number).



---

# Chapter 1. Managing PCI adapters

Learn about using and managing Peripheral Component Interconnect (PCI) adapters. Find specifications and instructions for specific adapters.

The adapter information shown here is used during nondirected service activities. This information is used to:

- Identify an adapter
- Find specific technical information about an adapter
- Where applicable, show special installation or cabling instructions
- Show signal names for the output pins of the adapter connectors
- Where applicable, show the settings for switches or jumpers

Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.

Adapters can be identified by their feature code (FC) or their custom-card identification number (CCIN). Normally, the CCIN number is labeled on the adapter.

The FRU part number (P/N) of your adapter may not match the FRU P/N listed in this document. When this occurs verify the CCIN is the same. If the CCIN is same, the adapter has the same function and can be used in the same way.

Adapters must be placed in specific PCI, Peripheral Component Interconnect-X (PCI-X), or PCI Express (PCIe) slots in order to function correctly or perform optimally. See the PCI adapter placement or PCI adapter placement for system-specific information on which slots are available and which adapters can be placed in those slots.

## PCI Express

PCI Express (PCIe) adapters use a different type of slot than PCI and PCI-X adapters. If you attempt to force an adapter into the wrong type of slot, you may damage the adapter or the slot. A PCI adapter can be installed in a PCI-X slot, and a PCI-X adapter can be installed in a PCI adapter slot. A PCIe adapter cannot be installed in a PCI or PCI-X adapter slot, and a PCI or PCI-X adapter cannot be installed in a PCIe slot. The following illustration shows an example of a PCI-X adapter (A) next to a PCIe x4 (B) adapter.

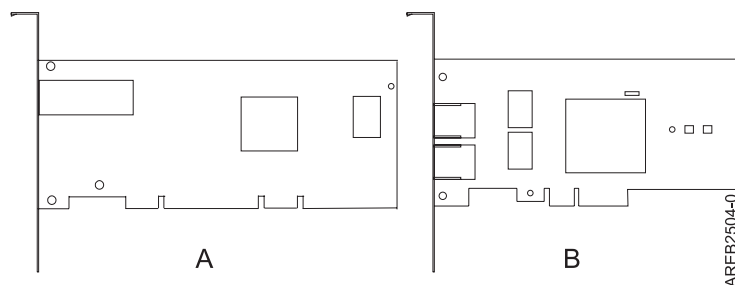


Figure 1. PCI-X adapter and PCIe x4 adapter

PCIe adapters and slots come in 4 different sizes: x1, x4, x8 and x16. Smaller size adapters will fit in larger slots, but larger size adapters will not fit in smaller slots. The following table shows PCIe slot compatibility.

Table 1. PCIe slot compatibility

	x1 slot	x4 slot	x8 slot	x16 slot
x1 adapter	Supported	Supported	Supported	Supported
x4 adapter	Not supported	Supported	Supported	Supported
x8 adapter	Not supported	Not supported	Supported	Supported
x16 adapter	Not supported	Not supported	Not supported	Supported

## Safety information

Observe the follow precautions in order to avoid electric shock when working on or around the system.

### DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the provided power cord. Do not use the provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

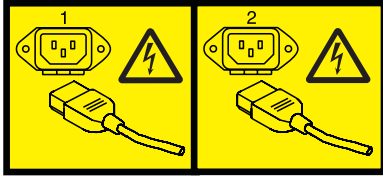
(D005a)

### DANGER

To prevent a possible shock from touching two surfaces with different protective ground (earth), use one hand, when possible, to connect or disconnect signal cables. (D001)

**Note:** This system might be equipped with a second power supply. Before continuing with this procedure, ensure that the power source to the system has been completely disconnected.

(L003)



or



## Handling static-sensitive devices

Electronic boards, adapters, media drives, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags to prevent this damage. Take the following precautions to prevent damage to these devices from static electricity discharge.

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
- When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system.
- With the device still in its antistatic bag, touch it to the metal frame of the system.
- Grasp cards and boards by the edges. Avoid touching the components and gold-edge connectors on the adapter.

- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system at the same time.
- Handle the devices carefully to prevent permanent damage.



---

## Chapter 2. 10 Gigabit Ethernet-SR PCI Express Adapter (FC 5771; CCIN 576D)

Learn about the features, operating system requirements, and installation notes for the 5771 adapter.

### Overview

The 10 Gigabit Ethernet-SR PCI Express Adapter is a low-profile, fiber, network interface controller (NIC). This adapter is based on the dual port 82598 EB 10 GbE controller. The product conforms to the IEEE 802.3 standard and supports standards for system manageability and power management. Additionally, it conforms to the 802.3ae 10GBASE-SR specification for Ethernet transmissions over 850 nm multimode fiber optic cable for distances up to 300 meters.

The following figure shows the adapter LEDs and network connector.

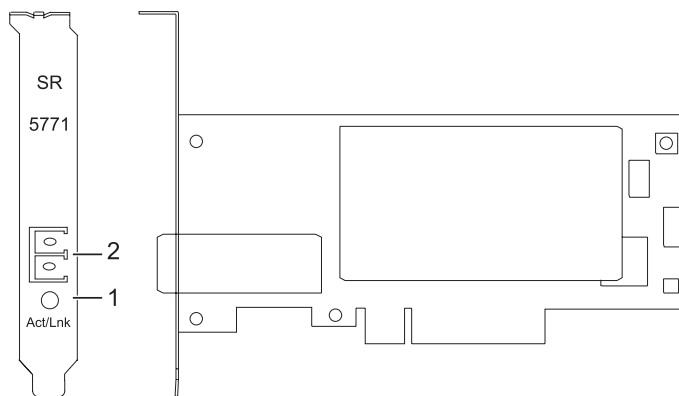


Figure 2. 10 Gigabit Ethernet-SR PCI Express Adapter

- 1 Activity/link LED
- 2 Multimode fiber LC receptacle

To learn more about the adapter LED, see “Adapter LEDs” on page 9

### Specifications

#### Item Description

#### FRU number

10N9033 (Designed to comply with RoHS requirement.)

#### I/O bus architecture

PCI-Express V1.1 and v2.0 (gen 1 only)

#### Busmaster

Yes

#### Maximum number

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

#### Adapter size

PCIe short form

#### Connector information

LC multimode fiber optic

## Wrap plug

LC fiber optic, part number 12R9314

## Cables

Customers supply the cables. Optional LC-SC 62.5 micron converter cable, part number 12R9322, FC 2459, is available. For 50 micron LC-SC connections, use converter cable part number 12R9321, FC 2456.

## Operating system or partition requirements

The 10 Gigabit Ethernet-SR PCI Express Adapter and 10 Gigabit Ethernet-LR PCI Express Adapter are supported on the following versions of the AIX® operating system:

- AIX 5L™ Version 5.3 with the 5300-07 Technology Level and Service Pack 4, or later
- AIX 5L Version 5.3 with the 5300-08 Technology Level, or later
- AIX Version 6.1 with the 6100-00 Technology Level and Service Pack 5, or later
- AIX Version 6.1 with the 6100-01 Technology Level, or later

## Preparing for installation

This section helps you prepare to install your 10 Gigabit Ethernet-SR PCI Express Adapter or 10 Gigabit Ethernet-LR PCI Express Adapter. Preparing to install the adapter involves the following tasks:

- Verifying your hardware requirements
- Verifying your software requirements
- Gathering tools and documentation

If you are installing your operating system at this time, install your adapter before you install the operating system. See “Installing the adapter” on page 8 for instructions.

If you are installing only the device driver for this adapter, install your device driver software before you install the adapter. See “Installing the device driver software” on page 7 for instructions.

## Verifying your hardware requirements

The adapter requires the following hardware:

- If you are running the total diagnostics package you will need a wrap plug for the multimode fiber connector used on the SR adapter, or a wrap plug for the single mode fiber connector used on the LR adapter.
- To connect to a network you will need a shortwave (850 nm) 50/62.5 micron multimode fiber network attachment for the SR adapter or a 1310 nm single mode fiber network attachment for the LR adapter.

The following tables indicate the allowable cable lengths from the adapter to the gigabit Ethernet switch, including patch cables:

Table 2. 10 Gigabit Ethernet-SR PCI Express Adapter cable information

Fiber cable type	Connector type	Minimum modal bandwidth at 850 nm (MHz x km)	Operating range in meters
62.5 µm MMF	LC	160	2 to 26
		200	2 to 33
50 µm MMF	LC	400	2 to 66
		500	2 to 82
		2000	2 to 300

Table 3. 10 Gigabit Ethernet-LR PCI Express Adapter cable information

Fiber cable type	Connector type	Operating range in meters
9 $\mu$ m SMF	LC	10 Km

## Verifying your software requirements

Ensure that your operating system supports this adapter before you install it. See “Operating system or partition requirements” on page 6.

## Gathering tools and documentation

To install the SR or LR adapter, make sure you have access to the following items:

- The adapter
- The operating system documentation
- The system unit documentation
- The PCI adapter placement information for the system unit
- Wrap plugs
- A flat-blade screwdriver
- The operating system CD, which includes the device driver, or the device driver CD-ROM

## Installing the device driver software

This section explains how to install device driver software for the 10 Gigabit Ethernet-SR PCI Express Adapter and 10 Gigabit Ethernet-LR PCI Express Adapter. The device driver is provided for the AIX operating system.

Be sure you have read “Preparing for installation” on page 6 to determine which of the following tasks to do:

- If you should install your device driver software first, go to step 1 of this section.
- If you should install your adapter hardware first, go to “Installing the adapter” on page 8. When you install AIX, your adapter device driver is automatically installed.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
  2. Insert the media that contains the device driver software (for example, a CD-ROM) into the appropriate media device.
  3. Type the following System Management Interface Tool (SMIT) fast path: `smitty devinst`
  4. Press Enter. The Install Additional Device Software screen highlights the INPUT device/directory for software option.
  5. Select or type your input device:
    - Press F4 to display the input device list.
    - Select the name of the device (for 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.
  - The Install Additional Device Software window highlights the SOFTWARE to install option.
6. Press F4 to display the SOFTWARE to install window.
  7. Type the following to display the Find window: `/`
  8. Type one of the following device package names:
    - For the 10 Gigabit Ethernet-SR PCI Express Adapter, type `devices.pciex.8680c71014107f03.rte`

- For the 10 Gigabit Ethernet-LR PCI Express Adapter, type `devices.pciex.8680c71014108003.rte`
9. Press Enter. The system finds and highlights this device driver software.
  10. Press F7 to select the highlighted device driver software.
  11. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE window is shown. The entry fields are automatically updated.
  12. Press Enter to accept the information. The ARE YOU SURE window is shown.
  13. Press Enter to accept the information. The COMMAND STATUS window is shown.
    - The term RUNNING is highlighted to indicate that the installation and configuration command is in progress.
    - When RUNNING changes to OK, scroll to the bottom of the page and locate the Installation Summary.
    - After a successful installation, SUCCESS is displayed in the Result column of the Installation Summary at the bottom of the page.
  14. Remove the installation media from the drive.
  15. Press F10 to exit SMIT.
  16. Go to the adapter installation procedure, "Installing the adapter."

### Verify AIX software installation

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

1. If necessary, log in as root user.
2. At the command line, type one of the following commands:
  - For the 10 Gigabit Ethernet-SR PCI Express Adapter, type `lslpp -l devices.pciex.8680c71014107f03.rte`
  - For the 10 Gigabit Ethernet-LR PCI Express Adapter, type `lslpp -l devices.pciex.8680c71014108003.rte`
3. Press Enter.

If the adapter device driver is installed, the following is an example of the data that is displayed on the window:

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pciex.8680c71014107f03.rte	5.3.8.0	COMMITTED	10 Gigabit Ethernet-SR PCI Express Adapter Software
Path: /usr/lib/objrepos devices.pciex.8680c71014108003.rte	5.3.8.0	COMMITTED	10 Gigabit Ethernet-LR PCI Express Adapter Software

Verify that the filesets are installed at the AIX version level you are running. Level 5.3.8.0 is an example. If the correct information is displayed, continue to the next section, Installing the adapter. If no data is displayed on your screen, the adapter device driver did not install correctly. Try reinstalling the driver.

## Installing the adapter

For instructions on how to install PCI adapters, refer to the PCI adapters topic.

### Verifying the adapter installation

To verify that your system unit recognizes the PCI adapter, do the following steps:

1. If necessary, log in as root user.
2. At the command line, type: `lsdev -Cs pci`

3. Press Enter.

A list of PCI devices are displayed. If the adapter is installed correctly, an Available status for each port indicates that the adapter is installed and ready to use. If the message on your screen indicates that any of the ports are DEFINED instead of AVAILABLE, shut down your server and verify that the adapter was installed correctly.

## Connecting to an Ethernet network

This section explains how to connect the 10 Gigabit Ethernet-SR PCI Express Adapter and 10 Gigabit Ethernet-LR PCI Express Adapter to the multimode fiber network. Refer to your local procedures for information about connecting the adapter to your Ethernet network.

**Note:** Only one type of network can be attached to the adapter at one time.

To connect the adapter to a multimode fiber network, do the following steps:

1. Insert the male fiber LC connector of the fiber cable into the adapter LC connector.
2. Insert the male fiber LC connector of the other end of the cable into the network switch.

### Notes:

- The 10 Gigabit Ethernet-SR PCI Express Adapter requires a 850 nm multimode fiber optic cable. See Table 2 on page 6.
- The 10 Gigabit Ethernet-LR PCI Express Adapter requires a 1310 nm single-mode fiber optic cable. See Table 3 on page 7.
- If your switch has an SC receptacle, you need an LC-SC converter cable.
- It is necessary to configure an IP network interface to enable the adapter to detect a link and to illuminate the link LED.

## Adapter LEDs

The LEDs on the 10 Gigabit Ethernet-SR PCI Express Adapter and 10 Gigabit Ethernet-LR PCI Express Adapter provide information about the operation status of the adapter. The LEDs are visible through the mounting bracket and, when lit, indicate the following conditions:

*Table 4. Adapter LEDs*

LED	Light	Description
Activity/Link	Green	Good link, no activity
	Blinking	Transmit activity
	Off	No link <sup>*</sup>

<sup>\*</sup>The absence of a link could be the result of a defective cable, a defective connector, or a configuration mismatch.



---

## Chapter 3. 10 Gigabit Ethernet-LR PCI Express Adapter (FC 5772; CCIN 576E)

Learn about the features, operating system requirements, and installation notes for the 5772 Adapter.

### Overview

The 10 Gigabit Ethernet-LR PCI Express Adapter is a low-profile, fiber network interface controller (NIC). This adapter is based on the dual port 82598EB 10 GbE controller. The product conforms to the IEEE 802.3 standard and supports standards for system manageability and power management. Additionally, it conforms to the 802.3ae 10GBASE-LR specification for Ethernet transmissions over 1310 nm single-mode fiber optic cable for distances up to 10 kilometers.

The following figure shows the adapter LEDs and network connector.

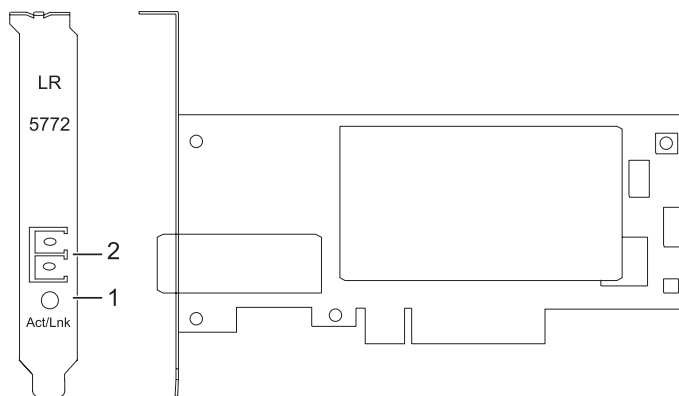


Figure 3. 10 Gigabit Ethernet-LR PCI Express Adapter

- 1 Activity/Link LED
- 2 Multimode fiber LC receptacle

### Specifications

#### Item Description

#### FRU number

10N9034 ( Designed to comply with RoHS requirement.)

#### I/O bus architecture

PCI-Express V1.1 and v2.0 (gen 1 only)

#### Busmaster

Yes

#### Maximum number

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

#### Adapter size

PCIe short form

#### Connector information

LC multimode fiber optic

#### Wrap plug

LC fiber optic, part number 12R9313

## Cables

Customers supply the cables.

## Operating system or partition requirements

The 10 Gigabit Ethernet-SR PCI Express Adapter and 10 Gigabit Ethernet-LR PCI Express Adapter are supported on the following versions of the AIX operating system:

- AIX 5L Version 5.3 with the 5300-07 Technology Level and Service Pack 4, or later
- AIX 5L Version 5.3 with the 5300-08 Technology Level, or later
- AIX Version 6.1 with the 6100-00 Technology Level and Service Pack 5, or later
- AIX Version 6.1 with the 6100-01 Technology Level, or later

## Installing the adapter

The procedures for installing the adapter, and other additional information, can be found in Chapter 2, “10 Gigabit Ethernet-SR PCI Express Adapter (FC 5771; CCIN 576D),” on page 5. See the following sections as needed. These sections apply to both the 10 Gigabit Ethernet-LR PCI Express Adapter and 10 Gigabit Ethernet-SR PCI Express Adapter.

- “Preparing for installation” on page 6
- “Installing the device driver software” on page 7
- “Installing the adapter” on page 8
- “Connecting to an Ethernet network” on page 9
- “Adapter LEDs” on page 9



---

## Chapter 4. 10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter (FC 5721; CCIN 573A)

Learn about the features, operating system requirements, and installation notes for the 10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter.

### Overview

The 10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter is designed to provide a PCI-X based server connection. The adapter conforms to the IEEE 802.3ae 10 Gigabit Ethernet standard and supports jumbo frames.

The 10 Gb Ethernet-SR PCI-X supports the following distances:

- Up to 33m using 62.5 um multimode fiber with 200 MHz\*km minimum modal bandwidth at 850 nm
- Up to 300m using 50 um multimode fiber with 2000 MHz\*km minimum modal bandwidth at 850 nm

The adapter is designed to run in standard PCI-X v2.0 and PCI-X v1.0a compliant systems with 64-bit PCI-X BusMaster slots at 133 Mode 1 or Mode 2. The adapter draws power from the PCI-X 3.3 V supplies and is keyed to fit only into a 3.3 V slot. The adapter supports 1M x 8 bit boot FLASH ROM and has a 240 KB on-chip TX packet buffer and a 32 MB on-chip RX packet buffer.

The FRU part numbers for the adapter are:

- Adapter, 03N4590 (Designed to comply with RoHS requirement.)
- Wrap plug, 11P3847

The adapter provides the following features:

- Single-slot, short form factor, 6.6 by 4.2 inch, half-length PCI cards
- 64-bit Direct Bus Mastering on the PCI-X bus
- Dual Address Cycle for access to 64-bit addresses
- PCI-X split transactions
- DMA engine for movement of command, status, and network data across PCI-X
- 240 KB on-chip TX packet buffer
- 32 MB on-chip RX packet buffer
- 1 MB Boot Flash ROM
- Jumbo frames (9 KB)
- Interrupts coalescing
- 802.1q VLAN tagging and stripping
- Conforms to IEEE 802.3ae 10 Gigabit Ethernet standard

### Operating system or partition requirements

AIX 5L Version 5.3 with the 5300-04 Technology Level

AIX 5L Version 5.2 with the 5200-08 Technology Level

Red Hat Enterprise Linux® version 4 U2

SUSE Linux Enterprise Server 9 SP3

## Preparing for installation

This section helps you prepare to install your adapter. Preparing to install the adapter involves the following tasks:

- Verifying your hardware requirements
- Verifying your software requirements
- Gathering tools and documentation

If you are installing your operating system at this time, install your adapter before you install the operating system. See “Installing the adapter” on page 16 for instructions.

If you are installing only the device driver for this adapter, install your device driver software before you install the adapter. See “Installing the device driver software” for instructions.

### Verifying your hardware requirements

The 10 Gigabit Ethernet-SR PCI-X 2.0 DDR adapter requires the following hardware:

- A wrap plug for the multimode fiber connector, if you are running the total diagnostics package
- Shortwave (850 nm) 50/62.5 micron multimode fiber network attachment

The following table indicates the allowable cable lengths from the adapter to the gigabit Ethernet switch, including patch cables:

*Table 5. Adapter cable information*

Cable type	Physical connector type	Maximum range (meters)
62.5 m MMF	LC	33
50 m MMF	LC	300

### Verifying your software requirements

Ensure that your operating system supports this adapter before you install it. See “Operating system or partition requirements” on page 13.

### Gathering tools and documentation

To install the adapter, make sure you have access to the following items:

- The 10 Gb Ethernet-SR PCI-X 2.0 DDR adapter
- The operating system documentation
- The system unit documentation
- The PCI adapter placement information for the system unit
- Wrap plug
- A flat-blade screwdriver
- AIX 5L Base Operating System CD, which includes the device driver, or the AIX 5L device driver CD-ROM

## Installing the device driver software

This section explains how to install device driver software. The device driver is provided for the AIX 5L operating system.

Be sure you have read “Preparing for installation” to determine:

- If you should install your device driver software first, go to step 1 of this section.
- If you should install your adapter hardware first, go to “Installing the adapter” on page 16. When you install AIX 5L, your adapter device driver automatically installs.

If you already have a supported level of AIX 5L installed, the device driver is already installed and you can go to “Installing the adapter” on page 16. Otherwise, install the device driver.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example; CD-ROM) into the appropriate media device.
3. Type the following System Management Interface Tool (SMIT) fast path: `smitty devinst`
4. Press Enter. The Install Additional Device Software screen highlights the INPUT device/directory for software option.
5. Select or type your input device, and do the following steps:
  - Press F4 to display the input device list.
  - Select the name of the device (for 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.
  - The Install Additional Device Software window highlights the SOFTWARE to install option.
6. Press F4 to display the SOFTWARE to install window.
7. Type the following to display the Find window: `/`
8. For the adapter, type the following device package name: `devices.pci.1410EB02`
9. Press Enter. The system finds and highlights this device driver software.
10. Press F7 to select the highlighted device driver software.
11. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE screen displays. The entry fields are automatically updated.
12. Press Enter to accept the information. The ARE YOU SURE window displays.
13. Press Enter to accept the information. The COMMAND STATUS screen displays.
  - The term RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the Installation Summary.
  - After a successful installation, SUCCESS displays in the Result column of the Installation Summary at the bottom of the page.
14. Remove the installation media from the drive.
15. Press F10 to exit SMIT.
16. Go to the adapter installation procedure, “Installing the adapter” on page 16.

### Verify AIX software installation

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

1. If necessary, log in as root user.
2. At the command line, type: `lslpp -l devices.pci.1410EB02.rte`
3. Press Enter.

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

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pci.1410EB02.rte	5.2.xx	COMMITTED	Ethernet adapter software

Verify that the **devices.pci.1410EB02.rte** filesets are installed at the AIX 5L version 5.2 with the 5200-08 Recommended Maintenance package or later level. If this information displays but you continue to have problems, go to “Installing the adapter.”

If no data displays on your screen, the adapter device driver did not install correctly. Try reinstalling the driver.

## Installing the adapter

For instructions on how to install PCI adapters, refer to the PCI adapters topic.

### Verifying the adapter installation

To verify that your system unit recognizes the PCI adapter, do the following steps:

1. If necessary, log in as root user.
2. At the command line, type: `lsdev -Cs pci`
3. Press Enter.

A list of PCI devices displays. If the adapter is installed correctly, an Available status for each port indicates that the adapter is installed and ready to use. If the message on your screen indicates that any of the ports is DEFINED instead of AVAILABLE, shut down your server and verify that the adapter was installed correctly.

## Connecting to an Ethernet network

This section explains how to connect the adapter to the multimode fiber network. Refer to your local procedures for information about connecting the adapter to your Ethernet network.

**Note:** Only one type of network can be attached to the adapter at one time.

To connect the adapter to a multimode fiber network, do the following steps:

1. Insert the male fiber LC connector of the fiber cable into the adapter LC connector.
2. Insert the male fiber LC connector of the other end of the cable into the network switch.

### Note:

- If your switch has an SC receptacle, you need an LC-SC converter cable.
- It is necessary to configure an IP network interface to enable the adapter to detect link and illuminate the LINK LED.

### Adapter LEDs

The LEDs on the adapter provide information about the card’s operation status. The LEDs are visible through the card’s mounting bracket and, when lit, indicate the following conditions:

*Table 6. Adapter LEDs*

LED	Light	Description
TX	Off	No activity
	Blinking green	Transmit activity

Table 6. Adapter LEDs (continued)

LED	Light	Description
RX	Off	No activity
	Blinking green	Receive activity
Link	Off	No link
	Green	Link established



---

## Chapter 5. 10 Gb Ethernet-LR PCI-X 2.0 DDR Adapter (FC 5722; CCIN 576A)

Learn about the features, operating system requirements, and installation notes for the 10 Gb Ethernet-LR PCI-X 2.0 DDR Adapter.

### Overview

The 10 Gb Ethernet-LR PCI-X 2.0 DDR Adapter is designed to provide a PCI-X based server connection. The adapter conforms to the IEEE 802.3ae 10 Gigabit Ethernet standard and supports Jumbo frames.

The FRU part numbers for the adapter are:

- Adapter, 03N4588 (Designed to comply with RoHS requirement.)
- Wrap plug, 12R6249

The adapter provides the following features:

- Single-slot, short form factor, 6.6 by 4.2 inch, half-length PCI cards
- 64-bit Direct Bus Mastering on the PCI-X bus
- Dual Address Cycle for access to 64-bit addresses
- PCI-X split transactions
- DMA engine for movement of command, status, and network data across PCI-X
- 240 KB on-chip TX packet buffer
- 32 MB on-chip RX packet buffer
- 1 MB Boot Flash ROM
- Jumbo frames (9 KB)
- Interrupts coalescing
- 802.1q VLAN tagging and stripping
- Conforms to IEEE 802.3ae 10 Gigabit Ethernet standard

### Operating system or partition requirements

AIX 5L Version 5.3 with the 5300-04 Technology Level

AIX 5L Version 5.2 with the 5200-08 Technology Level

Red Hat Enterprise Linux version 4 U2

SUSE Linux Enterprise Server 9 SP3

### Preparing for installation

This section helps you prepare to install your adapter. Preparing to install the adapter involves the following tasks:

- Verifying your hardware requirements
- Verifying your software requirements
- Gathering tools and documentation

If you are installing your operating system at this time, install your adapter before you install the operating system. See “Installing the adapter” on page 22 for instructions.

If you are installing only the device driver for this adapter, install your device driver software before you install the adapter. See “Installing the device driver software” for instructions.

### Verifying your hardware requirements

The 10 Gb Ethernet-LR PCI-X 2.0 DDR adapter requires the following hardware:

- A wrap plug for the single mode fiber connector, if you are running the total diagnostics package
- Longwave (1310 nm) 9/50 micron single-mode fiber network attachment

The following table indicates the allowable cable lengths from the adapter to the gigabit Ethernet switch, including patch cables:

*Table 7. Adapter cable information*

Cable type	Physical connector type	Maximum range (meters)
9 m SMF	SC	10 km

### Verifying your software requirements

Ensure that your operating system supports this adapter before you install it. See Operating system or partition requirements.

### Gathering tools and documentation

To install the adapter, make sure you have access to the following items:

- The 10 Gb Ethernet-LR PCI-X 2.0 DDR adapter
- The operating system documentation
- The system unit documentation
- The PCI adapter placement information for the system unit
- Wrap plug
- A flat-blade screwdriver
- AIX 5L Base Operating System CD, which includes the device driver, or the AIX 5L device driver CD-ROM

### Installing the device driver software

This section explains how to install device driver software. The device driver is provided for the AIX 5L operating system.

Be sure you have read “Preparing for installation” on page 19 to determine:

- If you should install your device driver software first, go to step 1 of this section.
- If you should install your adapter hardware first, go to “Installing the adapter” on page 22. When you install AIX 5L, your adapter device driver automatically installs.

If you already have a supported level of AIX 5L installed, the device driver is already installed and you can go to “Installing the adapter” on page 22. Otherwise, install the device driver.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.



2. Insert the media containing the device driver software (for example; CD-ROM) into the appropriate media device.
3. Type the following System Management Interface Tool (SMIT) fast path: `smitty devinst`
4. Press Enter. The Install Additional Device Software screen highlights the INPUT device/directory for software option.
5. Select or type your input device by doing one of the following actions:
  - Press F4 to display the input device list and select the name of the device (for 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. The Install Additional Device Software window highlights the SOFTWARE to install option.
6. Press F4 to display the SOFTWARE to install window.
7. Type the following to display the Find window: /
8. For the adapter, type the following device package name: `devices.pci.1410EC02`
9. Press Enter. The system finds and highlights this device driver software.
10. Press F7 to select the highlighted device driver software.
11. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE screen displays. The entry fields are automatically updated.
12. Press Enter to accept the information. The ARE YOU SURE window displays.
13. Press Enter to accept the information. The COMMAND STATUS screen displays.
  - The term RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the Installation Summary.
  - After a successful installation, SUCCESS displays in the Result column of the Installation Summary at the bottom of the page.
14. Remove the installation media from the drive.
15. Press F10 to exit SMIT.
16. Go to the adapter installation procedure, "Installing the adapter" on page 22.

### Verify AIX software installation

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

1. If necessary, log in as root user.
2. At the command line, type: `lslpp -l devices.pci.1410EC02.rte`
3. Press Enter.

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

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pci.1410EC02.rte	5.2.0.85	COMMITTED	Ethernet adapter software

Verify that the **devices.pci.1410EC02.rte** filesets are installed at the AIX 5L Version 5.2 with the 5200-08 Technology Level or later level. If this information displays but you continue to have problems, go to "Installing the adapter" on page 22.

If no data displays on your screen, the adapter device driver did not install correctly. Try reinstalling the driver.

## Installing the adapter

Refer to the customer-installable features publication for instructions on installing PCI adapters. After you have installed the adapter, continue on to Verifying the adapter installation.

### Verifying the adapter installation

To verify that your system unit recognizes the PCI adapter, do the following steps:

1. If necessary, log in as root user.
2. At the command line, type: `lsdev -Cs pci`
3. Press Enter.

A list of PCI devices displays. If the adapter is installed correctly, an Available status for each port indicates that the adapter is installed and ready to use. If the message on your screen indicates that any of the ports is DEFINED instead of AVAILABLE, shut down your server and verify that the adapter was installed correctly.

## Connecting to an Ethernet network

This section explains how to connect the adapter to the multimode fiber network. Refer to your local procedures for information about connecting the adapter to your Ethernet network.

**Note:** Only one type of network can be attached to the adapter at one time.

To connect the adapter to a multimode fiber network, do the following steps:

1. Insert the male fiber SC connector of the fiber cable into the adapter SC connector.
2. Insert the male fiber SC connector of the other end of the cable into the network switch.

**Note:** It is necessary to configure an IP network interface to enable the adapter to detect link and illuminate the LINK LED.

### Adapter LEDs

The LEDs on the adapter provide information about the card's operation status. The LEDs are visible through the card's mounting bracket and, when lit, indicate the following conditions.

Table 8. Adapter LEDs

LED	Light	Description
TX	Off	No activity
	Blinking green	Transmit activity
RX	Off	No activity
	Blinking green	Receive activity
Link	Off	No link
	Green	Link established

---

## Chapter 6. 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 1983, 1990, 5706; CCIN 5706)

Learn about the specifications and LEDs for the 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter.

The 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter is a full duplex, dual ported, gigabit Ethernet adapter that can be configured to run each port at 10, 100, or 1000 Mbps data rates. The adapter connects to the system using a PCI or PCI-X bus and connects to a network using standard unshielded twisted pair (UTP) cable for distances of up to 100 meters. AIX Network Installation Management (NIM) boot capability is supported with this adapter. The adapter conforms to the IEEE 802.3ab 1000 Base-T standard. The adapter also supports jumbo frames when running at the 1000 Mbps speed.

### Adapter LED

The LEDs on the adapter provide information about the card's operation status. The LEDs are visible through the adapter's mounting bracket and, when lit, indicates the following conditions:

LED	Light	Description
Link Speed	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps
Link	Green	Good link
	Off	No link: could indicate a bad cable, bad connector, configuration mismatch, or not selected
	Blinking	Indicates data activity

The following figure shows the adapter LEDs and RJ-45 connector.

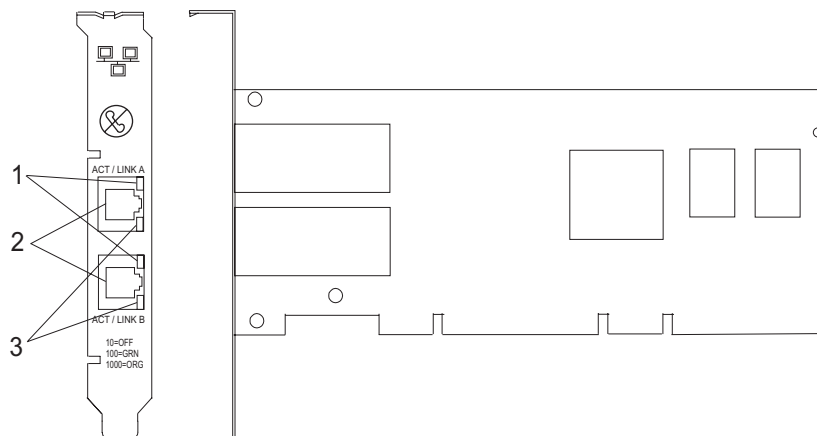


Figure 4. 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter

- 1 ACT/LNK LED
- 2 RJ-45 connector
- 3 Link Speed LED

## Adapter Specifications

Item	Description
------	-------------

<b>FRU number</b>	
-------------------	--

	5706 is 03N5297* or 00P6131**
--	-------------------------------

	1983 is 03N5298* or 80P6450**
--	-------------------------------

	1990 is 03N5531* or 03N4701** (low profile bracket)
--	---

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

<b>I/O bus architecture</b>	
-----------------------------	--

	PCI 2.2 and PCI-X V1.0a compliant
--	-----------------------------------

<b>Busmaster</b>	
------------------	--

	Yes
--	-----

<b>Maximum number</b>	
-----------------------	--

	For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement. .
--	--

<b>Adapter size</b>	
---------------------	--

	PCI short form
--	----------------

<b>Connector information</b>	
------------------------------	--

	RJ-45
--	-------

<b>Wrap plug</b>	
------------------	--

	RJ-45, part number 03N6070
--	----------------------------

<b>Cables</b>	
---------------	--

	For best performance, use cables that meet Cat 5e cabling standards, or later.
--	--

## Chapter 7. Dual port gigabit Ethernet-SX PCI-X Adapter (FC 5707; CCIN 5707)

Learn about the specifications and LEDs for the dual port gigabit Ethernet-SX PCI-X Adapter.

The dual port gigabit Ethernet-SX PCI-X Adapter is a high-performance, highly integrated, universal, Ethernet LAN adapter for PCI-X and PCI systems. The adapter presents one electrical load but appears as two independent devices to software. The adapter provides 1000 Mbps throughput on a standard shortwave (850nm) 50/62.5 micron multimode optical cable and conforms to the IEEE 802.3z standard and supports distances of 260m for 62.5u MMF and 550m for 50.0u MMF.

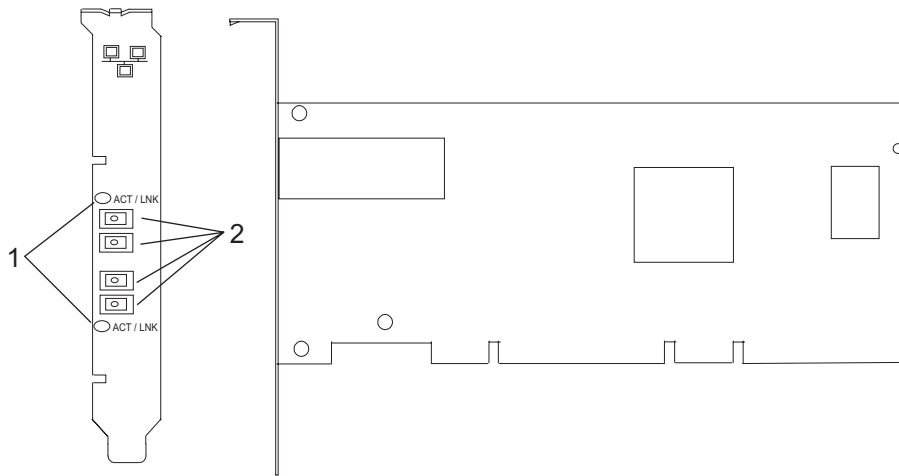


Figure 5. Feature 5707

- 1 LED
- 2 Multimode Fiber LC Receptacle

### Understanding the adapter LED

The LED on the Dual Port Gigabit Ethernet-SX PCI-X Adapter provides information about the card's operation status. The LED is visible through the card's mounting bracket and, when lit, indicates the following conditions:

LED	Status
Off	No Link/No Activity
On (Green)	Link, No Activity
Flashing (Green)	Link, Activity

### Specifications

**Item Description**

**FRU number**

03N6973\* or 80P6451\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

**I/O bus architecture**

PCI 2.2 and PCI-X V1.0a compliant

**Busmaster**

Yes

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

**Adapter size**

PCI short form

**Connector information**

LC fiber optic

**Wrap plug**

LC fiber optic, part number 12R9314

**Cables**

Customer supplied. Optional LC-SC converter cables are available.

- LC-SC 62.5 micron converter cable , part number 12R9322, FC 2459
- LC-SC 50 micron use converter cable, part number 12R9321, FC 2456

## Chapter 8. Gigabit Ethernet-SX PCI-X Adapter (FC 6800, 5700; CCIN 5700)

Learn about the specifications and LEDs for the Gigabit Ethernet-SX PCI-X Adapter.

The Gigabit Ethernet-SX PCI-X Adapter is a high-performance, highly integrated, universal, Ethernet LAN adapter for PCI-X and PCI systems. The adapter provides 1000 Mbps throughput on a standard shortwave (850 nm) 50 or 62.5 micron multimode optical cable and conforms to the IEEE 802.3z standards and supports distances of 260 meters for 62.5u MMF and 550 meters for 50.0u MMF. The adapter is designed to run in standard PCI-X V1.0a compliant systems with 32 or 64-bit PCI-X Bus Master slots at 66 or 133 MHz, and in PCI 2.2 compliant systems with 32 or 64-bit PCI bus master slots at 33 or 66 MHz. The adapter runs on 5.0 V.

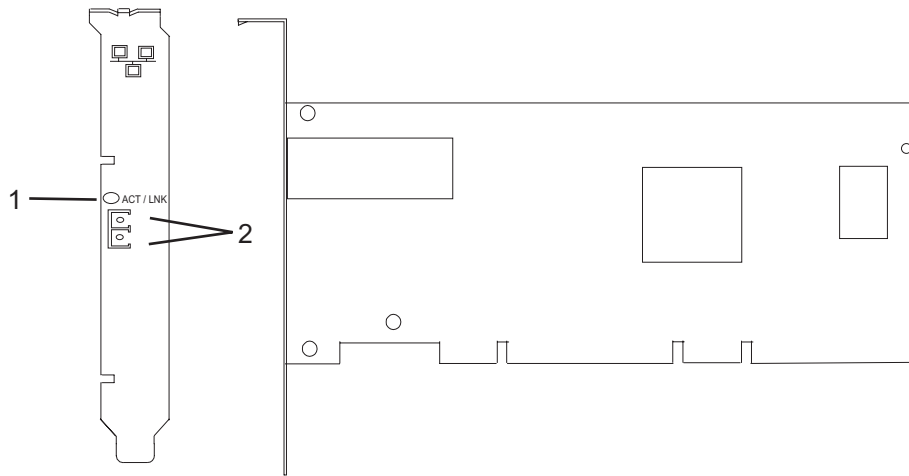


Figure 6. Feature 5700

- 1 LED
- 2 Multimode Fiber LC Receptacle

The LED on the Gigabit Ethernet-SX PCI-X Adapter provides information about the adapter's operation status. The LED is visible through the adapter's mounting bracket and, when lit, indicates the following conditions:

LED	Status
Off	No Link/No Activity
On (Green)	Link, No Activity
Flashing (Green)	Link, Activity

### Gigabit Ethernet-SX PCI-X adapter specifications

Item	Description
<b>FRU number</b>	10N8586 (Designed to comply with RoHS requirement.)
<b>I/O bus architecture</b>	PCI 2.2 and PCI-X V1.0a compliant
<b>Busmaster</b>	Yes

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement. .

**Adapter size**

PCI short form

**Connector information**

LC fiber optic

**Wrap plug**

LC fiber optic, part number 12R9314

**Cables**

Customer supplied. Optional LC-SC converter cables are available:

- LC-SC 62.5 micron converter cable , part number 12R9322, FC 2459
- LC-SC 50 micron use converter cable, part number 12R9321, FC 2456



---

## Chapter 9. 4-Port 10/100 Base-TX Ethernet PCI Adapter (FC 4961)

Learn about specifications and LEDs for the 4-Port 10/100 Base-TX Ethernet PCI Adapter.

The 4-Port 10/100 Base-TX Ethernet PCI Adapter provides attachment at 10 Mbps or 100 Mbps to a carrier sense multiple access/collision detection (CSMA/CD) Ethernet local area network (LAN) for systems designed to operate with the PCI bus interface. The adapter uses the IEEE-802.3u standard for communications. The adapter will occupy a single slot but will appear to the system to be four unique 10/100 Ethernet adapters.

The adapter supports connections to 10BaseT or 100BaseTx on unshielded twisted pair networks through an RJ-45 connector.

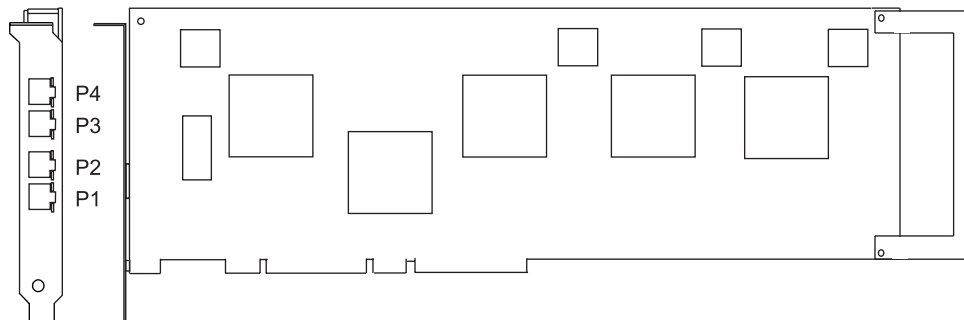


Figure 7. Feature 4961

### 4-Port 10/100 Base-TX Ethernet PCI adapter specifications

Item	Description
------	-------------

<b>FRU number</b>	
-------------------	--

	09P1421 (Not designed to comply with RoHS requirement.)
--	---

<b>I/O bus architecture</b>	
-----------------------------	--

	PCI
--	-----

<b>Busmaster</b>	
------------------	--

	Yes
--	-----

<b>Connector information</b>	
------------------------------	--

	8-position RJ-45
--	------------------

<b>Cables:</b>	
----------------	--

	Customer supplied (use Y type connection)
--	---

<b>For 10 Mbps</b>	
--------------------	--

	Use category 3, 4, or 5 unshielded twisted pair
--	---

<b>For 100 Mbps</b>	
---------------------	--

	Use category 5 only unshielded twisted pair
--	---

<b>Wrap plug</b>	
------------------	--

	Twisted-pair, part number 00G2380
--	-----------------------------------

### Viewing the LEDs

The adapter has two LEDs for each port to provide status on the adapter's operation. The LEDs are visible on the mounting bracket at each port's connector. They indicate the following conditions when lit:

- Green LED (1) - indicates 100 Mbps operation
- Yellow LED (2) - indicates transmit or receive activity

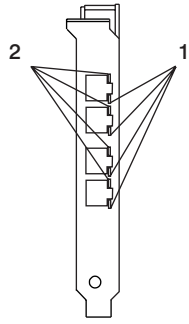


Figure 8. Adapter LEDs

---

## Chapter 10. 4-Port 10/100/1000 Base-TX PCI-X Adapter (FC 5740, 1954)

Learn about the features, operating system requirements, and installation notes for the 4-Port 10/100/1000 Base-TX PCI-X Adapter.

### Overview

The 4-Port 10/100/1000 Base-TX PCI-X Adapter is a 64-bit Ethernet card. It is a full height PCI-X 1.0a adapter, which supports four gigabit ports on a single adapter delivering increased bandwidth for PCI-X slot-constrained systems. It provides high connectivity and reliability using two integrated, dual-port gigabit Ethernet controllers and a PCI-X bridge chip. The adapter connects the system to an Ethernet LAN at speeds of 10, 100, or 1000 Mbps.

The FRU part numbers for the adapter are:

- FC 5740, 03N5444\* or 03N5446\*\*
- FC 1954, 03N5444\* or 03N5446\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

The 4-Port 10/100/1000 Base-TX PCI-X adapter provides the following features:

- 3.3 volts, 64-bit, 133 MHz with 64-bit Direct Bus Mastering on the PCI-X bus
- IEEE 802.3ab 1000Base-T compliant
- IEEE 802.3u 100Base-TX compliant
- IEEE 802.3 10Base-T compliant
- 802.1q VLAN tagging
- Two Intel® 82546GB Gigabit Controllers
- Interrupt Moderation
- TCP Segmentation offload and encapsulation in hardware
- Checksum offloading of IP, TCP, and UDP frame
- Remote Management Support (WfM, RIS, SNMP/DMI)
- Increased connectivity while significantly reducing CPU utilization
- Four RJ-45 ports
- Two LED adapter status indicators per port for link activity and speed
- Boot ROM on two ports
- Advanced cable diagnostics
- Compliant with European Union Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment.

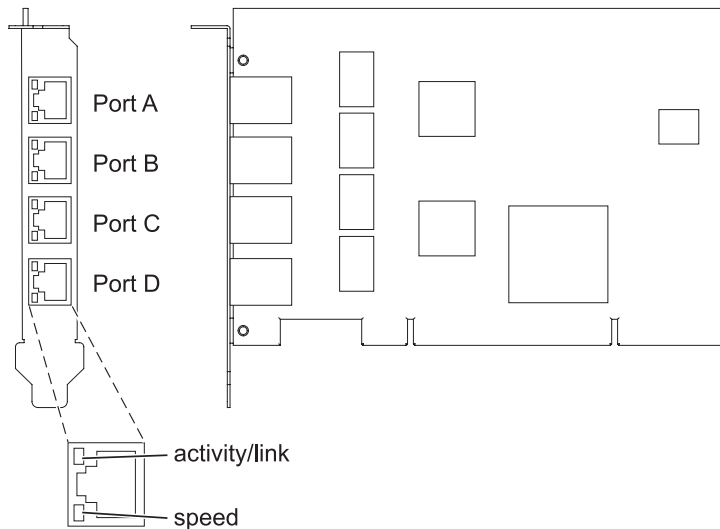


Figure 9. 4-Port 10/100/1000 Base-TX PCI-X adapter

## Operating system or partition requirements

AIX 5L Version 5.3 with the 5300-04 Technology Level, or later

AIX 5L Version 5.2 with the 5200-08 Technology Level, or later

Red Hat Enterprise Linux version 4 U2, or later

SUSE Linux Enterprise Server 9 SP3, or later

## Preparing for installation

This section helps you prepare to install your 4-Port 10/100/1000 Base-TX PCI-X adapter. Preparing to install the adapter involves the following tasks:

- Verifying your hardware requirements
- Verifying your software requirements
- Gathering tools and documentation

### Note:

- If you are installing your operating system at this time, install your adapter before you install the operating system. See “Installing the adapter” on page 34 for instructions.
- If you are installing only the device driver for this adapter, install your device driver software before you install the adapter. See “Installing the device driver software” on page 33 for instructions.

## Verifying Your Hardware Requirements

The 4-Port 10/100/1000 Base-TX PCI-X adapter requires the following hardware:

- A wrap plug for the RJ-45 connector, if you are running the total diagnostics package
- Customer-supplied, unshielded twisted pair (UTP) cables:
  - Cat 5e (or higher) cables for 1000 Mbps network attachment
  - Cat 5 or Cat 3 cables for 100 Mbps or 10 Mbps network attachment

**Restriction:** The cable can be no longer than 100 meters (including patch cables) from the adapter to the local switch.

## Verifying Your Software Requirements

Ensure that your operating system supports this adapter before you install it. See “Operating system or partition requirements” on page 32.

## Gathering tools and documentation

To install the 4-Port 10/100/1000 Base-TX PCI-X adapter, make sure you have access to the following steps:

- The 4-Port 10/100/1000 Base-TX PCI-X adapter
- The operating system documentation
- The system unit documentation
- The PCI adapter placement information for the system unit.
- Wrap plug
- A flat-blade screwdriver
- AIX Base Operating System CD, which includes the device driver, or the AIX device driver CD-ROM

## Installing the device driver software

This chapter explains how to install device driver software. The device driver is provided for the AIX operating system.

Be sure you have read “Preparing for installation” on page 32 to determine:

- If you should install your device driver software first, go to step 1 of this section.
- If you should install your adapter hardware first, go to “Installing the adapter” on page 34. When you install AIX, your adapter device driver automatically installs.

If your installed AIX operating system (AIX 5.2.0.85 or later; AIX 5.3.0.40 or later) supports the 4-Port 10/100/1000 Base-TX PCI-X adapter and you already have this adapter installed, the device driver is already installed and you can install the adapter. Go to “Installing the adapter” on page 34 for instructions. Otherwise, install the device driver.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example; CD-ROM) into the appropriate media device. If your system does not have a CD-ROM drive, refer to your system documentation for performing a NIM (Network Installation Management) installation.
3. Type the following System Management Interface Tool (SMIT) fast path: `smitty devinst`
4. Press Enter. The Install Additional Device Software screen highlights the INPUT device/directory for software option.
5. Select or type your input device by doing one of the following actions:
  - Press F4 to display the input device list and select the name of the device (for 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. The Install Additional Device Software window highlights the SOFTWARE to install option.
6. Press F4 to display the SOFTWARE to install window.
7. Type the following to display the Find window: `/`
8. For the 4-Port 10/100/1000 Base-TX PCI-X adapter, type the following device package name:  
`devices.pci.14101103`
9. Press Enter. The system finds and highlights this device driver software.

10. Press F7 to select the highlighted device driver software.
11. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE screen displays. The entry fields are automatically updated.
12. Press Enter to accept the information. The ARE YOU SURE window displays.
13. Press Enter to accept the information. The COMMAND STATUS screen displays.
  - The term RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the Installation Summary.
  - After a successful installation, SUCCESS displays in the Result column of the Installation Summary at the bottom of the page.
14. Remove the installation media from the drive.
15. Press F10 to exit SMIT.
16. Go to the adapter installation procedure, "Installing the adapter."

### Verify AIX software installation

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

1. If necessary, log in as root user.
2. At the command line, type: `lslpp -l devices.pci.14101103.rte`
3. Press Enter.

If the 4-Port 10/100/1000 Base-TX PCI-X adapter device driver is installed, the following is an example of the data that displays on your screen:

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pci.14101103.rte	5.2.0.0	COMMITTED	4-Port 10/100/1000 Base-TX PCI-X Adapter Software

Verify that the **devices.pci.14101103.rte** filesets are installed at the AIX 5.2.0.0 (or later level) or AIX 5L 5.3.0.0 (or later level). If this information displays but you continue to have problems, go to "Installing the adapter."

If no data displays on your screen, the 4-Port 10/100/1000 Base-TX PCI-X adapter device driver did not install correctly. Try reinstalling the driver.

### Installing the adapter

For instructions on how to install PCI adapters, refer to the PCI adapters topic.

After you have installed the adapter, continue on to Verifying the adapter Installation .

### Verifying the adapter installation

To verify that your system unit recognizes the PCI adapter, do the following steps:

1. If necessary, log in as root user.
2. At the command line, type: `lsdev -Cs pci`
3. Press Enter.

A list of PCI devices displays. If the 4-Port 10/100/1000 Base-TX PCI-X adapter is installed correctly, an available status for each port indicates that the adapter is installed and ready to use. If the message on your screen indicates that any of the ports is DEFINED instead of AVAILABLE, shut down your server and verify that the adapter was installed correctly.

## Connecting to an Ethernet network

This section explains how to connect the adapter to the UTP network. Refer to your local procedures for information about connecting the 4-Port 10/100/1000 Base-TX PCI-X adapter to your Ethernet network.

To connect the adapter to an unshielded twisted-pair (UTP) network, do the following steps:

1. Insert the RJ-45 jack of the UTP cable into one of the RJ-45 connectors on the adapter.
2. Insert the RJ-45 jack of the other end of the UTP cable into the network switch.

### Adapter LEDs

The LEDs on the 4-Port 10/100/1000 Base-TX PCI-X adapter provide information about the card's operation status. The LEDs are visible through the card's mounting bracket and, when lit, indicate the following conditions:

Table 9. Adapter LEDs

LED	Light	Description
ACT/LNK	Green	Good link
	Off	No link (The absence of a link could be the result of a bad cable, a bad connector, or a configuration mismatch)
	Blinking	Data activity
Link Speed	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps

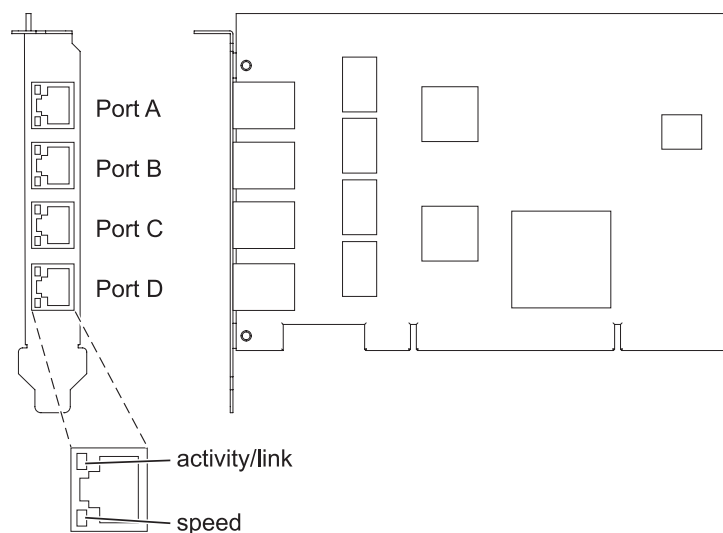


Figure 10. 4-Port 10/100/1000 Base-TX PCI-X adapter





---

## Chapter 11. 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter (FC 5767; CCIN 5767)

Learn about features, requirements, and specifications for the 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter.

The 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter is a full duplex, dual ported, gigabit Ethernet adapter. This adapter can be configured to run each port at 10, 100, or 1000 Mbps data rates. The adapter connects to a network using unshielded twisted pair (UTP) cable for distances of up to 100 meters. The adapter supports AIX Network Installation Management (NIM) boot capability. The adapter conforms to the IEEE 802.3ab 1000Base-T standard. The adapter supports jumbo frames when running at the 1000 Mbps speed.

The adapter provides the following features:

- Supports interrupt moderation to deliver increased performance while significantly reducing CPU utilization
- Supports dual port operation in almost any PCIe slot, except x1
- Supports auto-negotiation, full-duplex only
- Supports integrated media-access control (MAC) and physical layer (PHY)
- Supports Fast EtherChannel (FEC) with the existing software
- Supports gigabit EtherChannel (GEC) with the existing software
- Supports IEEE 802.3ad (Link Aggregation control protocol)
- Supports IEEE 802.1Q VLANs
- Supports IEEE 802.3 z, ab, u, x flow control support
- Supports IEEE 802.1p
- Supports IEEE 802.3ab for TX
- Supports TCP checksum offload transmission control protocol (TCP), user datagram protocol (UDP), Internet protocol (IP) for IPv4 and IPv6
- Supports TCP segmentation or large send offload
- Supports EEPROM-SPI and single EEPROM
- Supports interrupt levels INTA and MSI
- Hardware certifications FCC B, UL, CE, VCCI, BSMI, CTICK, MIC
- Network Controller (MAC) Intel 82571EB
- Compliant with European Union Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

### Adapter specifications

Item	Description
------	-------------

FRU number	
------------	--

	10N6845*
--	----------

\*Designed to comply with RoHS requirement

I/O bus architecture	
----------------------	--

- |  |   |
|--|---|
|  | <ul style="list-style-type: none"><li>• PCI Express V1.0a compliant</li><li>• Bus width x4 lane PCI Express, operable in x4, x8, x16 slots</li><li>• Bus speed (x4, encoded rate) 10 Gbps unidirectional; 20 Gbps bidirectional</li></ul> |
|--|---|

Busmaster	
-----------	--

	Yes
--	-----

### Maximum number

For system-specific adapter placement, see the PCI adapter placement or PCI adapter placement.

### Adapter size

PCIe short form

### Connector information

- Two RJ-45 ports
- Two LED adapter status indicators per port, for link activity and speed

### Wrap plug

RJ-45, part number 10N7405

### Cabling

Customers supply their own cables. For best performance, use cables that meet Cat 5e cabling standards, or later.

## Adapter LED states

The LEDs on the adapter provide information about the adapter's operation status. The LEDs are visible through the adapter's mounting bracket. 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter shows the location of the LEDs. Table 10 describes the different LED states and what those states indicate.

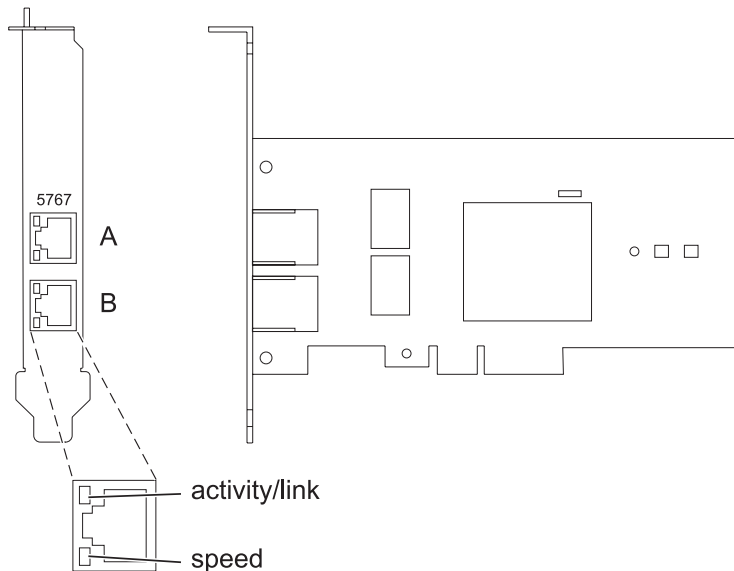


Figure 11. 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter

Table 10. Adapter LEDs and descriptions

LED	Light	Description
Activity/link	Green	Active link
	Off	No link The absence of a link can indicate a defective cable, defective connector, or a configuration mismatch.
	Blinking	Data activity
Speed	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps

## Operating system or partition requirements

The adapter is supported under the following operating systems:

- AIX 5L Version 5.3 with the 5300-06 Technology Level or later
- AIX 5L Version 5.2 with the 5200-10 Technology Level or later
- Red Hat Enterprise Linux version 4, update 5
- Red Hat Enterprise Linux version 5
- SUSE Linux Enterprise Server 9, SP4
- SUSE Linux Enterprise Server 10, SP1

If you are using another release of AIX, ensure that the adapter is supported on that release before you install the adapter. Contact service and support for assistance.

## Preparing for installation

If you are installing the operating system at this time, install the adapter before you install the operating system. See “Installing the adapter” on page 41 for instructions.

If you are installing only the device driver for this adapter, install the device driver software before you install the adapter. See “Installing the device driver software” on page 40 for instructions.

If you already have one of these adapters installed and working with your AIX operating system and you are preparing to install additional adapters, the device driver is already installed and you do not need to reinstall the device drive.

## Verifying the hardware requirements

The adapter requires the following hardware:

- A wrap plug for the RJ-45 connector, if you are running the total diagnostics package
- Cat 5e (or later) UTP cables for 1000 Mbps network attachment
- Cat 5 or Cat 3 UTP cables for 100 Mbps or 10 Mbps network attachment

**Restriction:** The cables can be no longer than 100 meters (including patch cables) from the adapter to the local switch.

## Verifying the software requirements

You can use the adapter on operating systems shown in “Operating system or partition requirements.”

## Gathering tools and documentation

To install the adapter, make sure you have access to the following items:

- The adapter
- The operating system documentation
- The system unit documentation for removing and replacing features
- The PCI adapter placement or PCI adapter placement
- A flat-blade screwdriver
- The AIX base operating system CD, which includes the device driver, or the AIX device driver CD

## Installing the device driver software

This section explains how to install device driver software. The device driver is provided for the AIX 5L operating system on the AIX base operating system CD, which includes the device driver, or the AIX device driver CD.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example, the CD) into the media device.  
If your system does not have a CD-ROM drive, refer to your system documentation for performing a Network Installation Management (NIM) installation.
3. Type the following System Management Interface Tool (SMIT) fast path command: `smit devinst`
4. Press Enter. The Install Additional Device Software window highlights the **INPUT device / directory for software** option.
5. Type the name of the input device that you are using, or press F4 to select the input device from a list.
6. Press Enter. The Install Additional Device Software window highlights the SOFTWARE to install option.
7. Press F4 to select List.
8. Type / to display the Find window.
9. Type the device package name `devices.pciex.14104003`.
10. Press Enter. The system finds and highlights this device driver software.
11. Press F7 to select the highlighted device driver software.
12. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE window displays. The entry fields are automatically updated.
13. Press Enter to accept the information. The ARE YOU SURE window displays.
14. Press Enter to accept the information. The COMMAND STATUS window displays.
  - The message RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the installation summary.
  - After a successful installation, SUCCESS displays in the Result column of the installation summary at the bottom of the page.
15. Remove the installation media from the drive.
16. Press F10 to exit SMIT.

## Verifying the AIX software installation

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

1. If necessary, log in as root user.
2. Type `lslpp -l devices.pciex.14104003.rte` and press Enter.

If the device driver is installed, the following table is an example of the data that appears.

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pciex.14104003.rte	5.x.0.0	COMMITTED	<i>adapter description</i>

3. Confirm that the `devices.pciex.14104003.rte` filesets are installed. If no data displays in the window, reinstall the driver.

## Installing the adapter

This section explains how to install the adapter. If you are installing the operating system at this time, install the adapter before you install the operating system. If the operating system is already installed and you need to install the device driver for this adapter, install the device driver software before you install the adapter.

**Attention:** Before installing an adapter, review the precautions in “Safety information” on page 2 and “Handling static-sensitive devices” on page 3. Do not remove the adapter from its anti-static package until you are ready to place it in the system unit.

To install the adapter, follow these steps:

1. Determine the PCIe slot in which to place the adapter.  
The adapter has an x4 PCIe connector and can be placed in a x4, x8 or x16 slot. See the PCI adapter placement or PCI adapter placement for information about the PCIe slots on your system unit.
2. Install the adapter using the instructions in the system unit service guide.

## Verifying the adapter installation

To verify that the system unit recognizes the adapter, type `lsdev -Cs pci` at the command line and press Enter.

A list of PCI devices displays. If the adapter is installed correctly, an available status for each port indicates that the adapter is installed and ready to use. If a message indicates that any of the ports are DEFINED instead of AVAILABLE, shut down the server and verify that the adapter was installed correctly.



---

## Chapter 12. 2-Port Gigabit Ethernet-SX PCI Express Adapter (FC 5768; CCIN 5768)

Learn about features, requirements, and specifications for the 5768 adapter.

The 2-Port Gigabit Ethernet-SX PCI Express Adapter provides two 1 Gbps (1000 Base-SX) full-duplex Ethernet LAN connections. The adapter connects to a network using a standard shortwave multimode optical cable that conforms to the IEEE 802.3z standard. The adapter supports distances of 260 m for 62.5 micron Multi Mode Fiber (MMF) and 550 m for 50.0 micron MMF. AIX Network Installation Management (NIM) boot capability is supported with this adapter.

The adapter provides the following features:

- Supports interrupt moderation to deliver increased performance while significantly reducing CPU utilization
- Supports dual port operation in almost any PCIe slot, except x1
- Supports auto-negotiation, full-duplex only
- Supports integrated media-access control (MAC) and physical layer (PHY)
- Supports Fast EtherChannel (FEC) with the existing software
- Supports gigabit EtherChannel (GEC) with the existing software
- Supports IEEE 802.3ad (Link Aggregation control protocol)
- Supports IEEE 802.1Q VLANs
- Supports IEEE 802.3 z, ab, u, x flow control support
- Supports IEEE 802.1p
- Supports IEEE 802.3ab for TX
- Supports TCP checksum offload transmission control protocol (TCP), user datagram protocol (UDP), Internet protocol (IP) for IPv4 and IPv6
- Supports TCP segmentation or large send offload
- Supports EEPROM-SPI and single EEPROM
- Supports interrupt levels INTA and MSI
- Hardware certifications FCC B, UL, CE, VCCI, BSMI, CTICK, MIC
- Network Controller (MAC) Intel 82571EB
- Compliant with European Union Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

### Adapter specifications

Item	Description
------	-------------

FRU number	
------------	--

	10N6846*
--	----------

\*Designed to comply with RoHS requirement

I/O bus architecture	
----------------------	--

- |  |   |
|--|---|
|  | <ul style="list-style-type: none"><li>• PCI Express V1.0a compliant</li><li>• Bus width x4 lane PCI Express, operable in x4, x8, x16 slots</li><li>• Bus speed (x4, encoded rate) 10 Gbps unidirectional; 20 Gbps bidirectional</li></ul> |
|--|---|

Busmaster	
-----------	--

	Yes
--	-----

Maximum number	
----------------	--

	For system-specific adapter placement, see the PCI adapter placement or PCI adapter placement.
--	--

### Adapter size

PCIe short form

### Connector information

Two fiber optic ports, LC connector

LED status indicators for link activity and speed

### Wrap plug

LC fiber optic, part number 12R9314

### Cabling

Optional LC-SC converter cables are available:

- LC-SC 62.5 micron converter cable , part number 12R9322, FC 2459.
- LC-SC 50 micron use converter cable, part number 12R9321, FC 2456.

## Adapter LED states

The LEDs on the adapter provide information about the adapter's operation status. The LEDs are visible through the adapter's mounting bracket. Figure 12 shows the location of the LEDs. Table 11 describes the different LED states and what those states indicate.

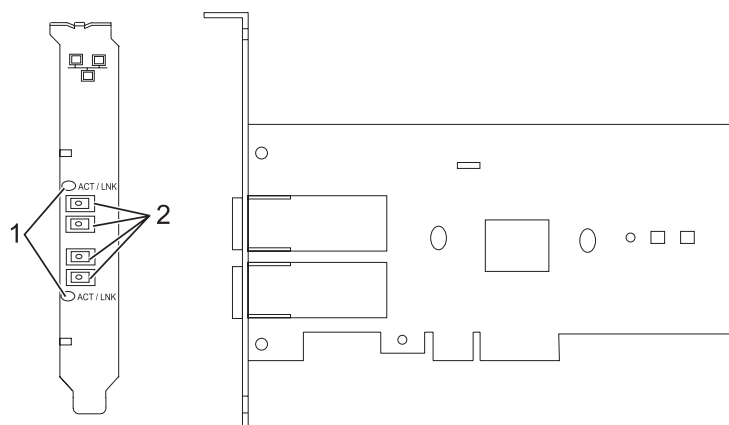


Figure 12. 2-Port Gigabit Ethernet-SX PCI Express Adapter

- 1 LEDs
- 2 Multimode Fiber LC receptacles

Table 11. Adapter LEDs and descriptions

LED	Description
Off	No link (The absence of a link could indicate a bad cable, bad connector, or a configuration mismatch.)
Green	Good link, no activity
Flashing Green	Good link, data activity

## Operating system or partition requirements

The adapter is supported under the following operating systems:

- AIX 5L Version 5.3 with the 5300-06 Technology Level or later
- AIX 5L Version 5.2 with the 5200-10 Technology Level or later
- Red Hat Enterprise Linux version 4, update 5
- Red Hat Enterprise Linux version 5
- SUSE Linux Enterprise Server 9, SP4



- SUSE Linux Enterprise Server 10, SP1

If you are using another release of AIX, ensure that the adapter is supported on that release before you install the adapter. Contact service and support for assistance.

## Preparing for installation

If you are installing the operating system at this time, install the adapter before you install the operating system. See Installing the adapter for instructions.

If you are installing only the device driver for this adapter, install the device driver software before you install the adapter. See “Installing the device driver software” for instructions.

If you already have one of these adapters installed and working with your AIX operating system and you are preparing to install additional adapters, the device driver is already installed and you do not need to reinstall the device drive.

## Verify you hardware requirements

The adapter requires the following hardware:

- A wrap plug for the multimode fiber connector, if you are running the total diagnostics package
- Shortwave (850 nm) 50/62.5 micron multimode fiber network attachment

The following table indicates the allowable cable lengths from the adapter to the gigabit Ethernet switch, including patch cables.

*Table 12. Adapter cable information*

Cable type	Physical connector type	Maximum range
62.5 m MMF	LC	260 meters
50 m MMF	LC	550 meters

## Verify your software requirements

The adapter is supported on operating systems shown in Operating system or partition requirements. Ensure that your operating system supports this adapter before you install it. Contact service and support if you need assistance.

## Gather tools and documentation

To install the adapter, make sure you have access to the following items:

- The adapter
- The operating system documentation
- The system unit documentation for removing and replacing features
- The PCI adapter placement or PCI adapter placement
- A flat-blade screwdriver
- The AIX base operating system CD, which includes the device driver, or the AIX device driver CD

## Installing the device driver software

This section explains how to install device driver software. The device driver is provided for the AIX 5L operating system on the AIX base operating system CD, or the AIX device driver CD.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example, the CD) into the media device.  
If your system does not have a CD-ROM drive, refer to your system documentation for performing a Network Installation Management (NIM) installation.
3. Type the following System Management Interface Tool (SMIT) fast path command: `smit devinst`
4. Press Enter. The Install Additional Device Software window highlights the **INPUT device / directory for software** option.
5. Type the name of the input device that you are using, or press F4 to select the input device from a list.
6. Press Enter. The Install Additional Device Software window highlights the SOFTWARE to install option.
7. Press F4 to select List.
8. Type / to display the Find window.
9. Type the device package name `devices.pciex.14103f03`.
10. Press Enter. The system finds and highlights this device driver software.
11. Press F7 to select the highlighted device driver software.
12. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE window displays. The entry fields are automatically updated.
13. Press Enter to accept the information. The ARE YOU SURE window displays.
14. Press Enter to accept the information. The COMMAND STATUS window displays.
  - The message RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the installation summary.
  - After a successful installation, SUCCESS displays in the Result column of the installation summary at the bottom of the page.
15. Remove the installation media from the drive.
16. Press F10 to exit SMIT.

## Verify the AIX software installation

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

1. If necessary, log in as root user.
2. Type `lslpp -l devices.pciex.14103f03.rte` and press Enter.

If the device driver is installed, the following is an example of the data that is displayed.

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pciex.14103f03.rte	5.x.0.0	COMMITTED	2-Port Gigabit Ethernet-SX PCI Express Adapter software

3. Confirm that the `devices.pciex.14103f03.rte` filesets are installed. If no data displays, try reinstalling the driver.

## Installing the adapter

This section explains how to install the adapter. If you are installing the operating system at this time, install the adapter before you install the operating system. If the operating system is already installed and you need to install the device driver for this adapter, install the device driver software before you install the adapter.

**Attention:** Before installing an adapter, review the precautions in “Safety information” on page 2 and “Handling static-sensitive devices” on page 3. Do not remove the adapter from its anti-static package until you are ready to place it in the system unit.

To install the adapter, follow these steps:

1. Determine the PCIe slot in which to place the adapter.  
The adapter has an x4 PCIe connector and can be placed in a x4, x8 or x16 slot. See the PCI adapter placement or PCI adapter placement for information about the PCIe slots on your system unit.
2. Install the adapter using the instructions in the system unit service guide.

## Connecting to an Ethernet network

Refer to your local procedures for information about connecting the adapter to your Ethernet network.

### Notes:

- Only one type of network can be attached to the adapter at one time.
- If your switch has an SC receptacle, you need an LC-SC converter cable.
- You must configure an IP network interface to enable the adapter to detect the link and illuminate the link LED.

To connect the adapter to a multimode fiber network, do the following steps:

1. Insert the male fiber LC connector of the fiber cable into the adapter LC connector.
2. Insert the male fiber LC connector of the other end of the cable into the network switch.

## Verifying the adapter installation

To verify that the system unit recognizes the adapter, type `lsdev -Cs pci` at the command line and press Enter.

A list of PCI devices displays. If the adapter is installed correctly, an available status for each port indicates that the adapter is installed and ready to use. If a message indicates that any of the ports are DEFINED instead of AVAILABLE, shut down the server and verify that the adapter was installed correctly.



---

## Chapter 13. 4-Port 10/100/1000 Base-TX PCI Express Adapter (FC 5717; CCIN 5717)

Learn about features, requirements, and specifications for the 5717 adapter.

The 4-Port 10/100/1000 Base-TX PCI Express Adapter is a full duplex, four ported, Gigabit Ethernet adapter that can be configured to run either port at 1000, 100, or 10 Mbps data rate. This adapter interfaces to the system through a PCIe bus and connects to a network using a 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable for distances of up to 100 m. The adapter conforms to the IEEE 802.3ab 1000Base-T standard. The 5717 also supports jumbo frames when running at the 1000 Mbps speed.

The adapter provides the following features:

- Supports interrupt moderation to deliver increased performance while significantly reducing CPU utilization
- Allows quad-port operation in x4, x8, x16 slots, and each port operates without interfering with the other
- Each port operates without interfering with the other
- Auto-negotiation, full-duplex (half-duplex available for 10/100)
- Integrated media access control (MAC) and physical layer (PHY)
- Supports Fast EtherChannel (FEC) and Gigabit EtherChannel (GEC) when used with capable switch
- Supports IEEE 802.3ad Link Aggregation control protocol when used with capable switch
- IEEE 802.1Q VLANs, IEEE 802.3 (z, ab, u, x) flow control support, IEEE 802.1p
- TCP checksum offload -- transmission control protocol (TCP), Internet Protocol (IP) for IPv4
- TCP Segmentation Offload (TSO) / Large Send Offload (LSO)
- Bus width x4 lane; operable in x4, x8, or x16 slots
- Bus speed (x4, encoded rate) 10 Gbps unidirectional and 20 Gbps bidirectional
- EEPROM SPI and single EEPROM support
- Interrupt levels INTA and MSI (requires system and software support for MSI)
- IEEE 802.3ab
- Hardware certifications FCC B, UL, CE, VCCI, BSMI, CTICK, MIC
- Four RJ-45 connectors
- LEDs on each port identifying speed and link activity
- Compliant with European Union Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

### Adapter specifications

Item	Description
------	-------------

FRU number	
------------	--

	10N8556*
--	----------

\*Designed to comply with RoHS requirement

I/O bus architecture	
----------------------	--

- |  |   |
|--|---|
|  | <ul style="list-style-type: none"><li>• PCI Express V1.0a compliant</li><li>• Bus width x4 lane PCI Express, operable in x4, x8, x16 slots</li><li>• Bus speed (x4, encoded rate) 10 Gbps unidirectional; 20 Gbps bidirectional</li></ul> |
|--|---|

Busmaster	
-----------	--

	Yes
--	-----

### Maximum number

For system-specific adapter placement, see the PCI adapter placement or PCI adapter placement.

### Adapter size

PCIe short form

### Connector information

- Four RJ-45 ports
- Two LED adapter status indicators per port, for link activity and speed

### Wrap plug

RJ-45, part number 10N7405

### Cabling

Customers supply their own cables. For best performance, use cables that meet Cat 5e cabling standards, or later.

## Adapter LED states

The LEDs on the adapter provide information about the adapter's operation status. The LEDs are visible through the adapter's mounting bracket. 4-Port 10/100/1000 Base-TX PCI Express Adapter shows the location of the LEDs. Table 13 describes the different LED states and what those states indicate.

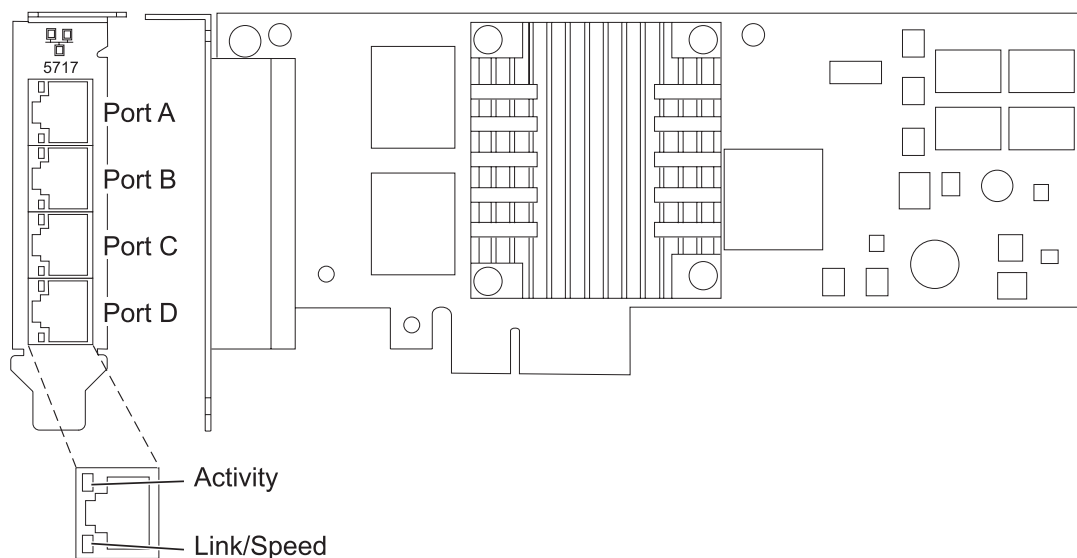


Figure 13. 4-Port 10/100/1000 Base-TX PCI Express Adapter

Table 13. Adapter LEDs and descriptions

LED	Light	Description
Activity/link	Green	Active link
	Off	No link  The absence of a link can indicate a defective cable, defective connector, or a configuration mismatch.
	Blinking	Data activity
Speed	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps

## Operating system or partition requirements

The adapter is supported under the following operating systems:

- AIX 5L Version 5.3 with the 5300-06 Technology Level or later
- AIX 5L Version 5.2 with the 5200-10 Technology Level or later
- Red Hat Enterprise Linux version 4, update 6
- Red Hat Enterprise Linux version 5, update 1
- SUSE Linux Enterprise Server 10, SP1

If you are using another release of AIX, ensure that the adapter is supported on that release before you install the adapter. Contact service and support for assistance.

## Preparing for installation

If you are installing the operating system at this time, install the adapter before you install the operating system. See “Installing the adapter” on page 53 for instructions.

If you are installing only the device driver for this adapter, install the device driver software before you install the adapter. See “Installing the device driver software” on page 52 for instructions.

If you already have one of these adapters installed and working with your AIX operating system and you are preparing to install additional adapters, the device driver is already installed and you do not need to reinstall the device drive.

## Verifying the hardware requirements

The adapter requires the following hardware:

- A wrap plug for the RJ-45 connector, if you are running the total diagnostics package
- Cat 5e (or later) UTP cables for 1000 Mbps network attachment
- Cat 5 or Cat 3 UTP cables for 100 Mbps or 10 Mbps network attachment

**Restriction:** The cables can be no longer than 100 meters (including patch cables) from the adapter to the local switch.

## Verifying the software requirements

You can use the adapter on operating systems shown in “Operating system or partition requirements.”

## Gathering tools and documentation

To install the adapter, make sure you have access to the following items:

- The adapter
- The operating system documentation
- The system unit documentation for removing and replacing features
- The PCI adapter placement or PCI adapter placement
- A flat-blade screwdriver
- The AIX base operating system CD, which includes the device driver, or the AIX device driver CD

## Installing the device driver software

This section explains how to install device driver software. The device driver is provided for the AIX 5L operating system on the AIX base operating system CD, which includes the device driver, or the AIX device driver CD.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example, the CD) into the media device.  
If your system does not have a CD-ROM drive, refer to your system documentation for performing a Network Installation Management (NIM) installation.
3. Type the following System Management Interface Tool (SMIT) fast path command: `smit devinst`
4. Press Enter. The Install Additional Device Software window highlights the **INPUT device / directory for software** option.
5. Type the name of the input device that you are using, or press F4 to select the input device from a list.
6. Press Enter. The Install Additional Device Software window highlights the SOFTWARE to install option.
7. Press F4 to select List.
8. Type / to display the Find window.
9. Type the device package name `devices.pciex.14106803`.
10. Press Enter. The system finds and highlights this device driver software.
11. Press F7 to select the highlighted device driver software.
12. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE window displays. The entry fields are automatically updated.
13. Press Enter to accept the information. The ARE YOU SURE window displays.
14. Press Enter to accept the information. The COMMAND STATUS window displays.
  - The message RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the installation summary.
  - After a successful installation, SUCCESS displays in the Result column of the installation summary at the bottom of the page.
15. Remove the installation media from the drive.
16. Press F10 to exit SMIT.

## Verifying the AIX software installation

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

1. If necessary, log in as root user.
2. Type `lslpp -l devices.pciex.14106803.rte` and press Enter.

If the device driver is installed, the following table is an example of the data that appears.

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pciex.14106803.rte	5.x.0.0	COMMITTED	4-Port 10/100/1000 Base-TX PCI Express Software

3. Confirm that the `devices.pciex.14106803.rte` filesets are installed. If no data displays in the window, reinstall the driver.



## Installing the adapter

This section explains how to install the adapter. If you are installing the operating system at this time, install the adapter before you install the operating system. If the operating system is already installed and you need to install the device driver for this adapter, install the device driver software before you install the adapter.

**Attention:** Before installing an adapter, review the precautions in “Safety information” on page 2 and “Handling static-sensitive devices” on page 3. Do not remove the adapter from its anti-static package until you are ready to place it in the system unit.

To install the adapter, follow these steps:

1. Determine the PCIe slot in which to place the adapter.  
The adapter has an x4 PCIe connector and can be placed in a x4, x8 or x16 slot. See the PCI adapter placement or PCI adapter placement for information about the PCIe slots on your system unit.
2. Install the adapter using the instructions in the system unit service guide.

## Verifying the adapter installation

To verify that the system unit recognizes the adapter, type `lsdev -Cs pci` at the command line and press Enter.

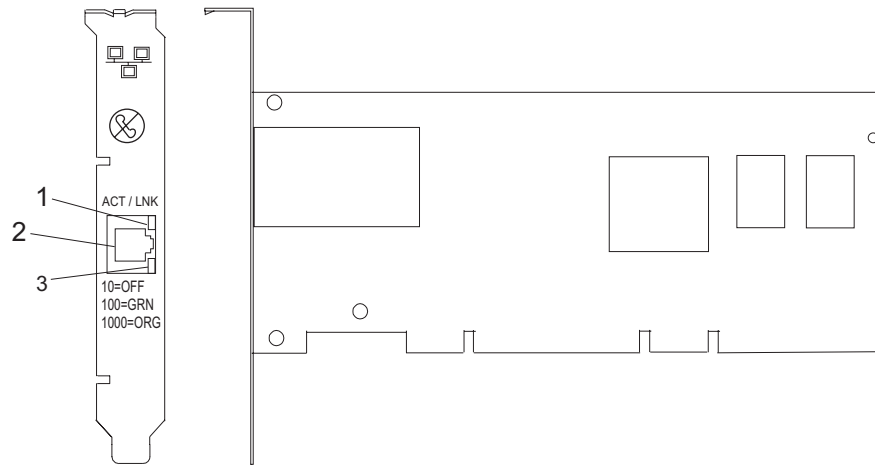
A list of PCI devices displays. If the adapter is installed correctly, an available status for each port indicates that the adapter is installed and ready to use. If a message indicates that any of the ports are DEFINED instead of AVAILABLE, shut down the server and verify that the adapter was installed correctly.



## Chapter 14. 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 1959, 1979, 5701, 6801; CCIN 5701)

Learn about the specifications and LEDs for 10/100/1000 Base-TX Ethernet PCI-X Adapter.

The 10/100/1000 Base-TX Ethernet PCI-X Adapter is a high-performance, highly integrated, universal Ethernet LAN adapter for PCI-X and PCI systems. The adapter provides 10/100/1000 Mbps connectivity using standard unshielded twisted pair (UTP) cable for distances of up to 100 meters. It conforms to IEEE 802.3ab 1000 Base-T standard. The adapter is designed to run in standard PCI-X V1.0a compliant systems with 32 or 64-bit PCI-X Bus Master slots at 66 or 133 MHz, and in PCI 2.2 compliant systems with 32 or 64-bit PCI bus master slots at 33 or 66 MHz. The adapter runs on 5.0 V and 3.3 V aux.



- 1 ACT/LNK LED
- 2 RJ-45 Connector
- 3 Link Speed LED

The LEDs on the 10/100/1000 Base-TX Ethernet PCI-X Adapter provide information about the adapter's operation status. The LEDs are visible through the adapter's mounting bracket and, when lit, indicate the following conditions:

LED	Light	Description
Link Speed	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps
Link	Green	Good link
	Off	No link: could indicate a bad cable, bad connector, configuration mismatch, or not selected
	Blinking	Indicates data activity

### 10/100/1000 Base-TX Ethernet PCI-X adapter specifications

Item Description

**FRU number**

5701 is 03N6524\* or 00P6130\*\*

1979 is 03N6525\* or 80P6445\*\*

1959 is 03N6526\* or 03N4700\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

**I/O bus architecture**

PCI 2.2 and PCI-X V1.0a compliant

**Busmaster**

Yes

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement. .

**Adapter size**

PCI short form

**Connector information**

RJ-45

**Wrap plug**

RJ-45, part number 03N6070\* or 00G2380\*\*

**Cables**

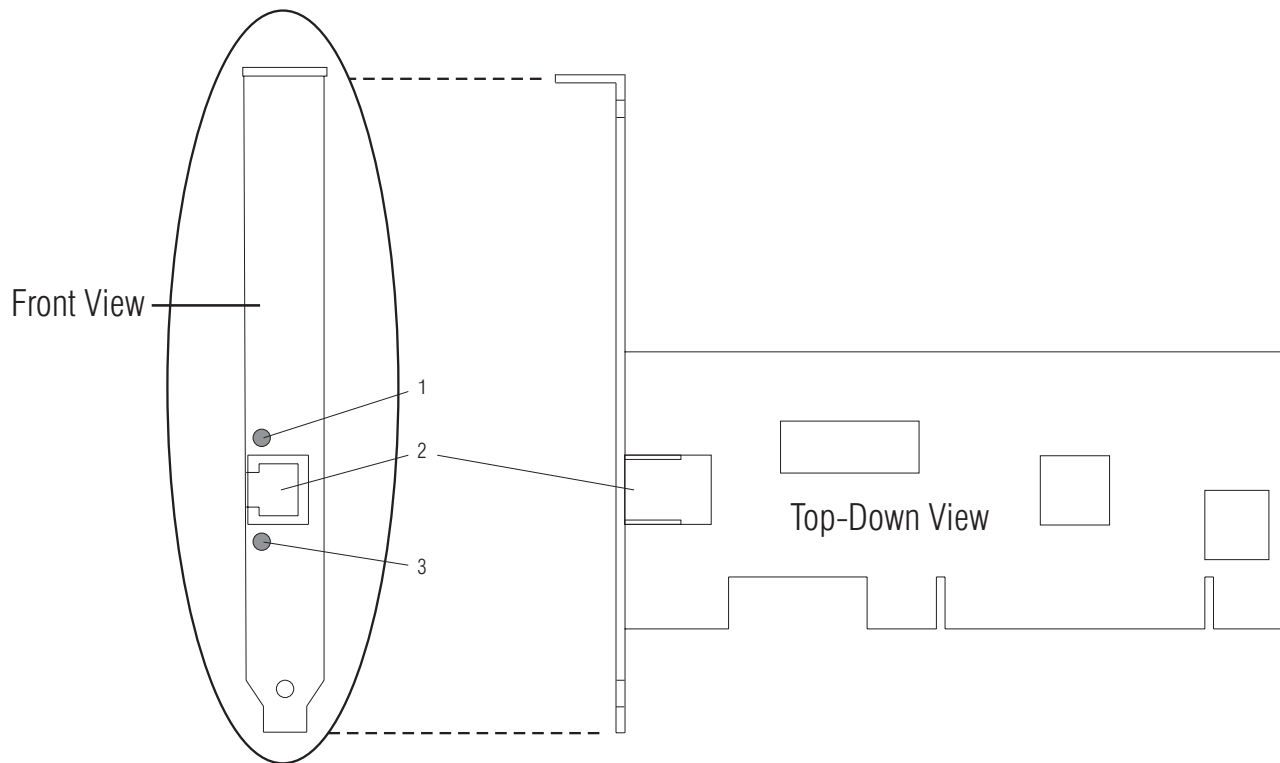
For best performance, use cables that meet Cat 5e cabling standards, or later.

---

## Chapter 15. 10/100 Mbps Ethernet PCI Adapter II (FC 4962; CCIN 4962)

Learn about the specifications and LEDs for the 10/100 Mbps Ethernet PCI Adapter II.

The 10/100 Mbps Ethernet PCI Adapter II is a 32-bit, 33 MHz high performance expansion adapter for systems adhering to the Peripheral Component Interconnect (PCI) and IEEE 802.3 standards. The adapter connects the system to an Ethernet LAN at either 10 Mbps or 100 Mbps data rate.



- 1 ACT/LINK LED
- 2 RJ-45 connector
- 3 100 TX LED

### 10/100 Mbps Ethernet PCI adapter II specifications

**Item** Description

**FRU number**

09P5023 (Not designed to comply with RoHS requirement.)

**I/O bus architecture**

PCI 2.2 compliant

**Busmaster**

Yes

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

**Connector**

RJ-45

**Wrap plug**

RJ-45, part number 00G2380

**Cables**

For best performance, use cables that meet Cat 5e cabling standards, or later.

---

## Chapter 16. PCI-X DDR Dual –x4 Port SAS RAID Adapter (FC 5902; CCIN 572B)

Learn about the specifications and operating system requirements for the 5902 adapter.

### Overview

The PCI-X DDR Dual –x4 Port SAS RAID Adapter is a long-form factor adapter for high-performance, serial attached SCSI (SAS) applications. FC 5902 is always to be in used in a high availability, multi-initiator configuration using two adapters in dual-controller mode. Two 5902 adapters provide for mirrored-write cache data and mirrored-RAID parity footprints between the two adapters. With correct cabling, multiple wide ports are used to provide redundant paths to each dual port SAS disk. The adapter manages SAS path redundancy and path switching should a SAS failure occur. RAID levels 0, 5, 6, and 10 are supported. The adapter pairs are used primarily with EXP 12S SAS disk expansion drawers, FC 5886.

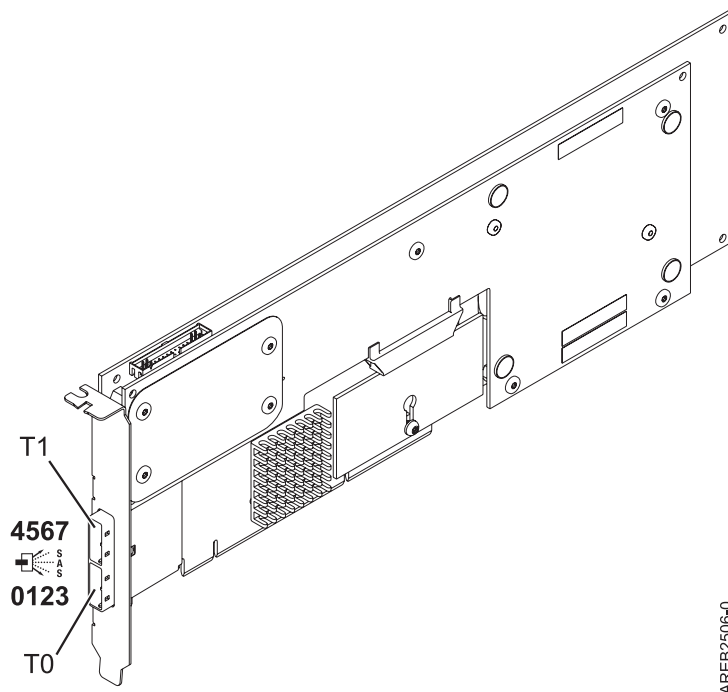


Figure 14. PCI-X DDR Dual –x4 Port SAS RAID Adapter

### Specifications

Item	Description
Adapter FRU number	44V5194 (Designed to comply with RoHS requirement.)
Battery FRU number	39J5555 (Designed to comply with RoHS requirement.)
I/O bus architecture	PCI-X DDR

**Slot requirement**

One long, 64-bit, 3.3 V, PCI-X slot for each adapter.

Adapters are installed in pairs.

Adapter pairs do not need to be in the same enclosure. For higher availability, place adapters in separate enclosures. See the PCI adapter placement for supported placement rules.

**Cables**

SAS device attachment requires specific cables that are provided with the subsystem or device features being attached. Refer to the Site and hardware planning . See the section about serial-attached SCSI cable planning in the chapter about planning for cables.

**Voltage**

3.3V

**Form factor**

Long

**Maximum number**

Refer to the PCI adapter placement.

**Attributes provided**

- Eight physical links by way of two external x4 SAS ports provides attachment of SAS disk enclosures only
- Supports up to 48 SAS disks when configured with four FC 5886 EXP 12S disk expansion drawers
- Removable media devices are not supported
- SAS Serial SCSI Protocol (SSP), and Serial Management Protocol (SMP)
- 175 MB of nonvolatile fast write cache
- RAID 0, 5, 6, 10
- Concurrent firmware update
- 440-500 Mhz PPC

**Operating system or partition requirements**

This adapter is supported for the following operating systems:

- AIX Version 6.1 with the 6100-01 Technology Level, or later
- AIX 5L Version 5.3 with the 5300-08 Technology Level, or later
- Red Hat Enterprise Linux version 4, with update 7, or later
- Red Hat Enterprise Linux version 5, with update 2, or later
- SUSE Linux Enterprise Server 10, with service pack 2, or later

This adapter requires the following drivers:

- AIX: devices.pci.1410bd02 device driver package
- Linux:
  - iprutils version 2.2.8 and ipr driver version 2.0.11.6 (or newer) for RHEL4 kernels
  - iprutils version 2.2.8 and ipr driver version 2.2.0.2 (or newer) for RHEL5 kernels
  - iprutils version 2.2.8 and ipr driver version 2.2.0.2 (or newer) for SLES10 kernels

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.



---

## Chapter 17. PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and Cable Card (FC 5909; CCIN 57B9)

Learn about the specifications and operating system requirements for feature 5909.

### Overview

The PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and Cable Card is a x8 PCI Express (PCIe) SAS adapter combined with a cable card in a single cassette assembly. This feature provides an optimized 3/3 split DASD backplane solution within a single PCIe slot for the model 17M/MA system unit. With this feature, three of the six internal serial-attached SCSI (SAS) disk slots (4, 5, and 6) in the system unit enclosure are controlled by the SAS adapter contained in this feature.

The single cassette assembly goes in slot P1-C3 in the model 17M/MA system unit. The feature is not supported in any other models.

There are three connectors on the tailstock of this single cassette assembly. The top connector ( **C** in Figure 15 on page 62.) is the cable card link to the three internal SAS disk slots in the system unit. The middle connector is covered with a label and is not used. The bottom connector ( **D** in Figure 15 on page 62.) is the SAS adapter.

An external AI-cable ( **B** in Figure 16 on page 63) connects the top connector with the bottom connector, thereby connecting the three internal SAS disk slots to the SAS adapter. Both the top and bottom connectors are mini-SAS 4x ports.

The SAS adapter contained in this feature is a 64-bit, bootable SAS adapter providing RAID 0, 5, 6, and 10 capability, but with no write cache.

Figure 15 on page 62 shows the PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and Cable Card in a cassette with the cassette cover removed to show an internal view of the feature.

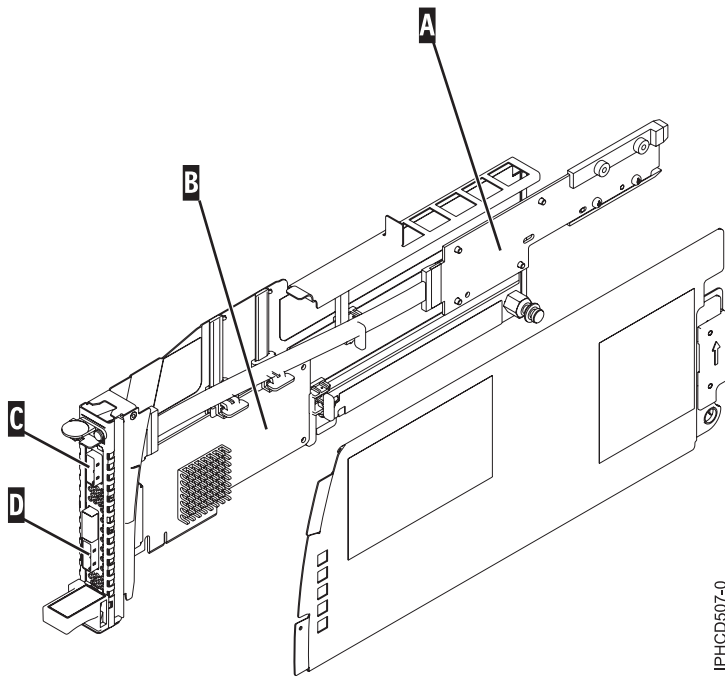


Figure 15. PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and Cable Card in a cassette

- A** Cable card
- B** SAS adapter
- C** 4x SAS port provides connection to the internal SAS disk slots
- D** 4x SAS port for the SAS adapter

Figure 16 on page 63 shows a back view of model 17M/MA with feature 5909 installed and cabled.

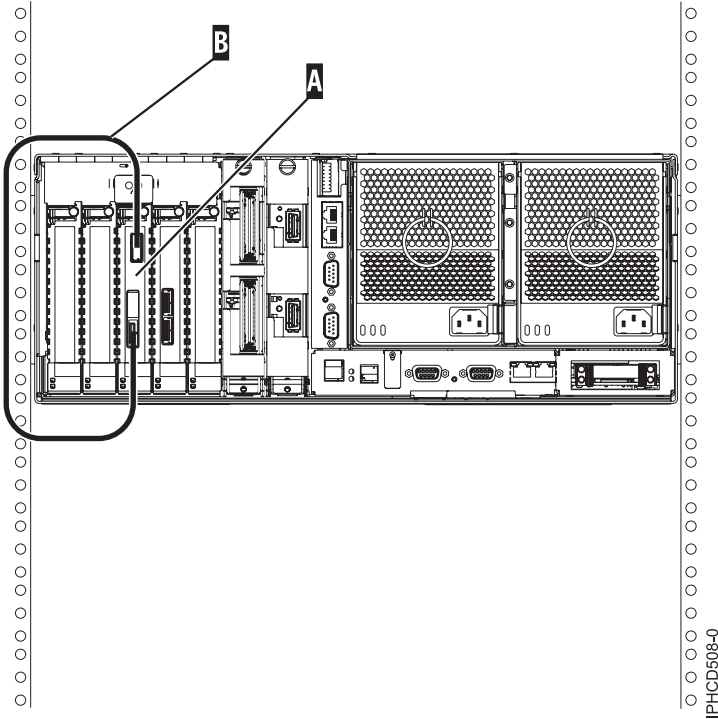


Figure 16. Back view of system unit with feature 5909 installed and cabled

- A** Cassette containing feature 5909
- B** SAS 4x AI-cable.

## Specifications

### Item Description

#### Adapter FRU number

44V4813 (Designed to comply with RoHS requirement.)

#### I/O bus architecture

PCIe x8

#### Slot requirement

PCIe slot P1-C3 in a model 17M/MA system unit

#### Cables

SAS 4x AI-cable:

- FC 3679
- FRU number 44V4041

SAS device attachment requires specific cables that are provided with the subsystem or device features being attached. Refer to the Site and hardware planning . See the section about serial-attached SCSI cable planning in the chapter about planning for cables.

#### Maximum number

One per system unit enclosure.

This feature is only supported in the P1-C3 slot in the model 17M/MA system unit.

#### Attributes provided

- One external 4x SAS port on the PCIe SAS adapter provides attachment to the internal SAS disk slots using an external AI-cable attached to the combined cable card.
- SAS Serial SCSI Protocol (SSP), Serial ATA Tunneling Protocol (STP) and Serial Management Protocol (SMP)
- RAID 0, 5, 6, 10
- Concurrent Firmware Update

- 440-500 Mhz PPC
- Optimized for SAS disk configurations that use dual paths through dual expanders for redundancy and reliability.

## Operating system or partition requirements

This adapter is supported for the following operating systems:

- AIX Version 6.1 with the 6100-01 Technology Level, or later
- AIX 5L Version 5.3 with the 5300-08 Technology Level
- Red Hat Enterprise Linux version 4, with update 7, or later
- Red Hat Enterprise Linux version 5, with update 2, or later
- SUSE Linux Enterprise Server 10, with service pack 2, or later

This adapter requires the following drivers:

- AIX: devices.pciex.14103903 device driver package
- Linux:
  - iprutils version 2.2.8 and ipr driver version 2.0.11.6 (or newer) for RHEL4 kernels
  - iprutils version 2.2.8 and ipr driver version 2.2.0.2 (or newer) for RHEL5 kernels
  - iprutils version 2.2.8 and ipr driver version 2.2.0.2 (or newer) for SLES10 kernels

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.

---

## Chapter 18. PCI-X DDR External Dual – x4 Port SAS Adapter (FC 5900 and 5912; CCIN 572A)

Learn about the specifications and operating system requirements for the 5900 and 5912 adapter.

### Overview

The PCI-X DDR External Dual – x4 Port SAS Adapter is a low-profile adapter for high-performance and high-density, Serial Attached SCSI (SAS) applications. The adapter provides two mini SAS 4x connectors, which allow the eight physical links to be used in various narrow and wide-port configurations. The adapter is a 64-bit, 3.3 V, bootable SAS adapter that provides RAID 0, 5, 6, and 10 capability. It does not have write cache. The adapter can address up to 48 SAS disk drives, although the actual number of drives in a system is subject to the physical placement limitations of the system. Externally attached devices are designed to run at a data rate of 1.5 Gb/s for serial ATA (SATA) devices, and 3 Gb/s for SAS devices. This card supports RAID and non-RAID DASD, tape, and optical devices. Feature 5912 supports the multi-initiator and high availability configurations.

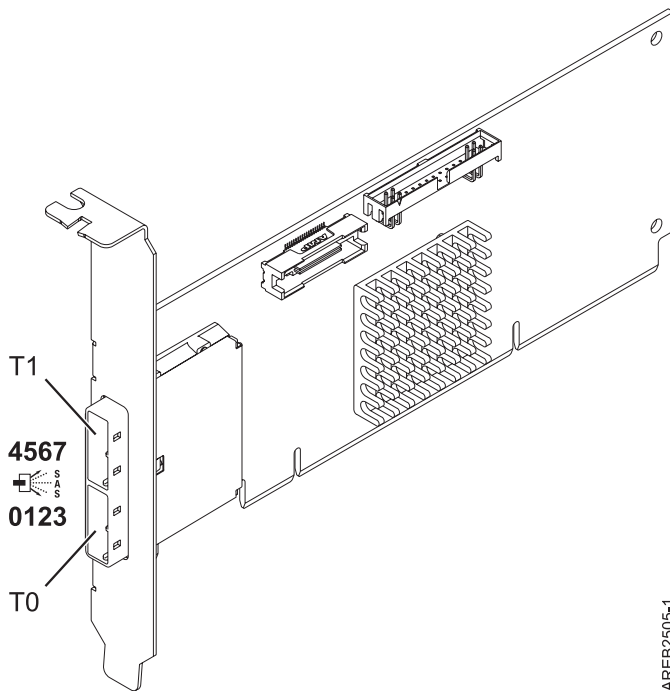


Figure 17. PCI-X DDR External Dual – x4 Port SAS Adapter

### Specifications

Item	Description
Adapter FRU number	
	5900: 44V3296*
	5912: 44V4413*

\* Designed to comply with RoHS requirement.

**I/O bus architecture**

PCI-X DDR

**Slot requirement**

One available PCI-X slot

If the adapter is used with the feature 3650 or 3651 cable card, the cable card occupies slot P1-C3 in the 17M/MA system unit. Features 3650 and 3651 are only supported in the model 17M/MA.

**Cables**

SAS device attachment requires specific cables that are provided with the subsystem or device features being attached. Special cabling is required for multi-initiator and high availability configurations. Refer to the Site and hardware planning . See the section about serial attached SCSI cable planning in the chapter about planning for cables.

**Voltage**

3.3V

**Form factor**

Short, low-profile

**Maximum number**

Refer to the PCI adapter placement.

**Attributes provided**

- Two external mini SAS 4x connectors provide attachment of SAS and SATA device enclosures
- SAS Serial SCSI Protocol (SSP) , Serial ATA Tunneling Protocol (STP), and Serial Management Protocol (SMP)
- RAID 0, 5, 6, 10
- Concurrent firmware update
- Removable media device supported
- 440-500 Mhz PPC
- Support for multi-initiator and high availability configurations (5912)

**Operating system or partition requirements**

This adapter is supported for the following operating systems:

- AIX 5L Version 5.3 with the Technology Level 6 and Service Pack 4 (5300-06-04), or later
- AIX 5L Version 5.3 with the 5300-07 Technology Level, or later
- AIX 6.1
- Red Hat Enterprise Linux version 5, with update 1, or later
- SUSE Linux Enterprise Server 10, with service pack 1, or later

The following versions are required for multi-initiator and high availability support:

- AIX Version 6.1 with the 6100-01 Technology Level, or later
- AIX 5L Version 5.3 with the 5300-08 Technology Level, or later
- Red Hat Enterprise Linux version 4, with update 7, or later
- Red Hat Enterprise Linux version 5, with update 2, or later
- SUSE Linux Enterprise Server 10, with service pack 2, or later

This adapter requires the following drivers:

- AIX: devices.pci.1410bd02 device driver package
- Linux:
  - Version 2.0.11.5, or later, for RHEL 4 kernels
  - Version 2.2.0.1, or later, for RHEL 5 kernels
  - Version 2.2.0.1, or later, for SLES 10 kernels
  - Version 2.3.0, or later, for kernel.org kernels (kernel version 2.6.20, or later)

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.





---

## Chapter 19. 8 Gigabit PCI Express Dual Port Fibre Channel Adapter (FC 5735; CCIN 577D)

Learn about the specifications and operating system requirements for the 5735 adapter.

### Overview

The 8 Gigabit PCI Express Dual Port Fibre Channel Adapter is a high-performance adapter based on the Emulex LPe12002 PCIe Host Bus Adapter (HBA). Each port provides single initiator capability over a fibre link. The ports have LC type connectors and utilize shortwave laser optics. The adapter connects to fibre channel switches and operates at link speeds of 2, 4, and 8 Gbps. The adapter automatically negotiates with the switch to the highest speed of which the switch is capable. LEDs on each port provide information on the status and link speed of the port.

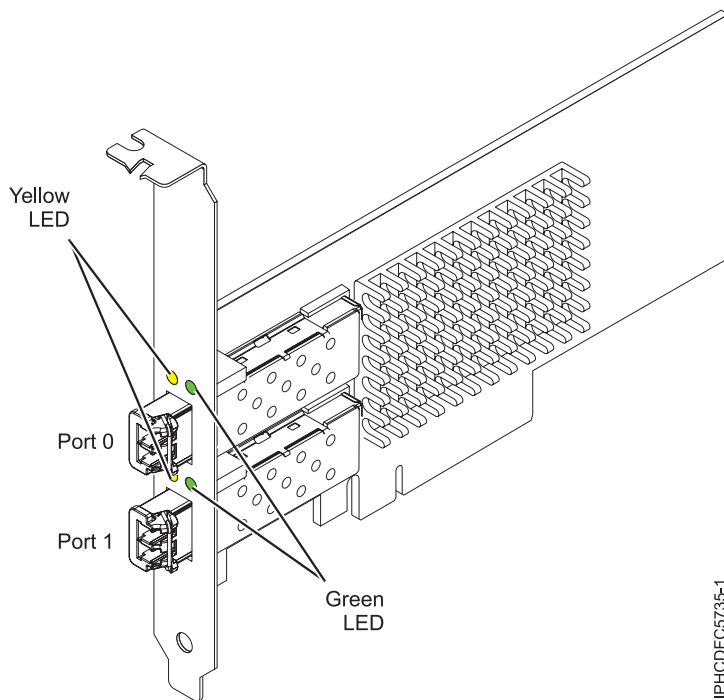


Figure 18. 5735 adapter

### Adapter specifications

#### Item Description

##### FRU number

10N9824 (Designed to comply with RoHS requirement)

##### Wrap plug FRU number

12R9314 (Designed to comply with RoHS requirement)

11P3847 (Not designed to comply with RoHS requirement)

##### I/O bus architecture

PCI Express (PCIe) Base and CEM 2.0

x8 PCIe bus interface

##### Slot requirement

One available PCIe x8 or x16 slot

## Voltage

3.3V

## Form factor

Short, low-profile with standard size bracket

## FC compatibility

2, 4, 8 gigabit

## Cables

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following specifications:

- OM3: Multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2: Multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1: Multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cables should not be connected to OM3 cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the entire length of the cables.

The following table shows the supported distances for the three different cable types at the three different link speeds.

Table 14. Supported cable distances by link speed

Cable type	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	0.5 m - 500 m	0.5 m - 380 m	0.5 m - 150 m
OM2	0.5 m - 300 m	0.5 m - 150 m	0.5 m - 50 m
OM1	0.5 m - 150 m	0.5 m - 70 m	0.5 m - 21 m

## Maximum number

For system-specific adapter placement information, see the PCI adapter placement.

## Operating system or partition requirements

The adapter is supported under the following operating systems:

- AIX 5L Version 5.3 with the 5300-09 Technology Level, or later
- AIX Version 6.1 with the 6100-02 Technology Level, or later
- V6R1 with resave PTFs
- V6R1M1
- Red Hat Enterprise Linux version 4 U7
- Red Hat Enterprise Linux version 5 U2
- SUSE Linux Enterprise Server 10, SP2

**Note:** If you are installing a new feature, ensure that you have the software required to support the new feature and that you determine if there are any existing prerequisites.

## Adapter LED

Green and yellow LEDs can be seen through openings in the adapter's mounting bracket. Green indicates firmware operation and yellow signifies port activity. Table 15 summarizes the link rate conditions. There is a 1-second pause when the LED is off between each group of fast blinks (2, 3, or 4). Observe the LED sequence for several seconds to be sure that you have correctly identified the state.

Table 15. Normal LED states

Green LED	Yellow LED	State
Slow blink	Off	Normal, link inactive or not started

Table 15. Normal LED states (continued)

Green LED	Yellow LED	State
On	2 fast blinks	2 Gbps link rate - normal, link active
On	3 fast blinks	4 Gbps link rate - normal, link active
On	4 fast blinks	8 Gbps link rate - normal, link active

Power-on self test (POST) conditions and results are summarized in Table 16. These states can be used to identify abnormal states or problems. Follow the action to be taken for each condition.

Table 16. POST conditions and results

Green LED	Yellow LED	State	Action to be taken
Off	Off	Wake-up failure (dead board)	Perform AIX or operating system diagnostics.
Off	On	POST failure (dead board)	Perform AIX or operating system diagnostics.
Off	Slow blink	Wake-up failure monitor	Perform AIX or operating system diagnostics.
Off	Fast blink	POST failure	Perform AIX or operating system diagnostics.
Off	Flashing	POST processing in progress	None
On	Off	Failure while functioning	Perform AIX or operating system diagnostics.
On	On	Failure while functioning	Perform AIX or operating system diagnostics.
Slow blink	Slow blink	Offline for download	None
Slow blink	Fast blink	Restricted offline mode, waiting for restart	None
Slow blink	Flashing	Restricted offline mode, test active	None

## Replacing fibre channel adapters using hot swap

When hot swapping fibre channel adapters, be aware that device-related software for the storage devices might have additional devices (for example, the dar device associated with the FAStT or DS4800) that need to be removed. Refer to specific storage device documentation for information about how to remove these additional devices.

The new adapter has a unique worldwide port name (WWPN). Check the zoning and LUN assignments to ensure that the new adapter will function as expected.



---

## Chapter 20. 4 Gigabit PCI Express Single Port Fibre Channel Adapter (FC 5773; CCIN 5773)

Learn about the specifications and operating system requirements for the 5773 adapter.

### Overview

The 4 Gigabit PCI Express Single Port Fibre Channel Adapter is a 64-bit, short form factor x4, PCIe adapter with an LC-type external fiber connector that provides single initiator capability over an optical fiber link or loop. The adapter automatically negotiates the highest data rate between the adapter and an attaching device at 1 Gbps, 2 Gbps, or 4 Gbps of which the device or switch is capable. Distances between the adapter and an attaching device or switch can reach up to 500 meters running at 1 Gbps data rate, up to 300 meters running at 2 Gbps data rate, and up to 150 meters running at 4 Gbps data rate. When used with Fibre Channel storage switches supporting long-wave optics, the adapter can reach distances of up to 10 kilometers running at either 1 Gbps, 2 Gbps, or 4 Gbps data rates.

The adapter can be used to attach devices either directly, or by means of Fibre Channel switches. If you are attaching a device or switch with a SC type fiber connector, you must use an LC-SC 50 micron fiber converter cable (#2456) or a LC-SC 62.5 micron fiber converter cable (#2459).

The adapter has the following features:

- Compliant with the PCIe Base and CEM 1.0a specifications:
  - x1 and x4 lane link interface at 2.5 Gbit/s (auto-negotiated with system)
  - Supports VC0 (1 Virtual Channel) and TC0 (1 Traffic Class)
  - Configuration and IO Memory read/write, completion, message
  - Support for 64 bit addressing
  - ECC error protection
  - Link CRC on all PCIe packets and message information
  - Large payload size: 2048 bytes for read and write
  - Large read request size: 4096 bytes
- Compatible with 1, 2, and 4 Gb Fibre Channel interface:
  - Auto-negotiate between 1 Gb, 2 Gb or 4 Gb link attachments
  - Support for all Fibre Channel topologies: point-to-point, arbitrated loop, and fabric
  - Support for Fibre Channel class 2 and 3
  - Maximum Fibre Channel throughput achieved using full duplex hardware support
- End-to-end data path parity and CRC protection, including internal data path RAMs
- Architectural support for multiple upper layer protocols
- Internal high-speed SRAM memory
- ECC protection of local memory, includes single-bit correction and double-bit protection
- Embedded short-wave optical (LC) connection with diagnostics capability
- Onboard Context Management by firmware (per port):
  - Up to 510 FC Port Logins
  - Up to 2047 concurrent Exchanges
  - I/O multiplexing down to the FC Frame level
- Data buffers capable of supporting 64+ buffer-to-buffer (BB) credits per port for short-wave applications

- Link management and recovery handled by firmware
- Onboard diagnostic capability accessible by optional connection
- Parts and construction compliant with the European Union Directive of Restriction of Hazardous Substances (RoHS)
- Performance up to 4.25 Gbps full duplex

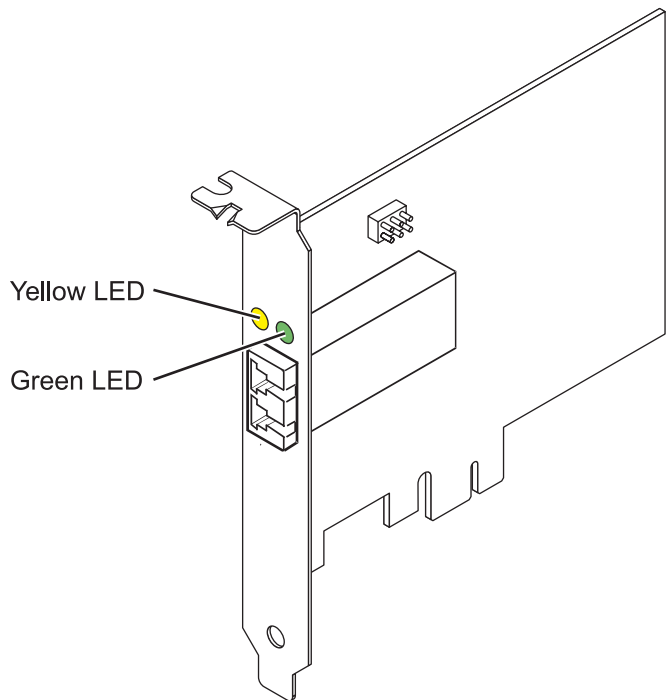


Figure 19. 5773 adapter

## Adapter specifications

### Item Description

**FRU number**  
10N7249\*

\*Designed to comply with RoHS requirement.

**Wrap plug FRU number**  
11P3847

### I/O bus architecture

PCI Express (PCIe) Base and CEM 1.0a  
x4 PCIe bus interface

### Slot requirement

One available PCIe x4, x8, or x16 slot

### Voltage

3.3V

### Form factor

Short, low-profile

### FC compatibility

1, 2, 4 gigabit

### Cables

- 50/125 micron fiber
- 1.0625 Gb/sec 2m-500m
- 2.125 Gb/sec 2m – 300m

- 4.25 Gb/sec 2m – 150m
- 6.25/125 micron fiber
- 1.0625 Gb/sec 2m – 300m
- 2.125 Gb/sec 2m – 150m
- 4.25 Gb/sec 2m – 70m

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or PCI adapter placement.

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.

**Operating system or partition requirements**

The adapter is supported under the following operating systems:

- AIX 5L Version 5.2 with the 5200-10 Technology Level, or later
- AIX 5L Version 5.3 with the 5300-06 Technology Level, or later
- Red Hat Enterprise Linux version 4 U5
- Red Hat Enterprise Linux version 5
- SUSE Linux Enterprise Server 9 SP4
- SUSE Linux Enterprise Server 10, SP1

**Note:** If you are installing a new feature, ensure that you have the software required to support the new feature and that you determine if there are any existing prerequisites.

**Adapter LED states**

Green and yellow LEDs can be seen through openings in the adapter’s mounting bracket. Green indicates firmware operation and yellow signifies port activity. Table 17 summarizes normal LED states. There is a 1 Hz pause when the LED is off between each group of fast blinks (1, 2 or 3). Observe the LED sequence for several seconds to ensure that you correctly identify the state.

*Table 17. Normal LED states*

Green LED	Yellow LED	State
On	1 fast blink	1 Gbps link rate - normal, link active
On	2 fast blinks	2 Gbps link rate - normal, link active
On	3 fast blinks	4 Gbps link rate - normal, link active

Power-On Self Test (POST) conditions and results are summarized in Table 18. These states can be used to identify abnormal states or problems.

*Table 18. POST conditions and results*

Green LED	Yellow LED	State
Off	Off	Wake-up failure (dead board)
Off	On	POST failure (dead board)
Off	Slow blink	Wake-up failure monitor
Off	Fast blink	Failure in post
Off	Flashing	Post processing in progress
On	Off	Failure while functioning

Table 18. POST conditions and results (continued)

Green LED	Yellow LED	State
On	On	Failure while functioning
Slow blink	Off	Normal, link down
Slow blink	On	Not defined
Slow blink	Slow blink	Offline for download
Slow blink	Fast blink	Restricted offline mode, waiting for restart
Slow blink	Flashing	Restricted offline mode, test active
Fast blink	Off	Debug monitor in restricted mode
Fast blink	On	Not defined
Fast blink	Slow blink	Debug monitor in test fixture mode
Fast blink	Fast blink	Debug monitor in remote debug mode
Fast blink	Flashing	Not defined

## Device ID jumper

The default setting for the device ID jumper labeled P0\_JX is to set the jumper on pins 1 and 2 as shown in Figure 20. Do not change the jumper settings for a standard installation.

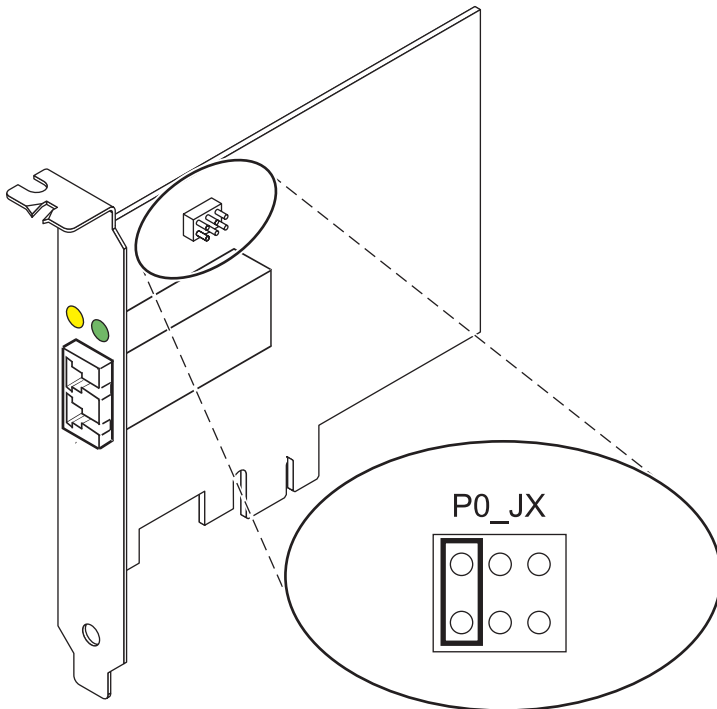


Figure 20. Device ID jumper

## Replacing hot swap HBAs

Fibre Channel host bus adapters (HBAs) connected to a FAS*t*T or DS4000™ storage subsystem have a child device called a disk array router (dar). You must unconfigure the disk array router before you can hot swap an HBA that is connected to a FAS*t*T or DS4000 storage subsystem. For instructions, refer to



*Replacing hot swap HBAs in the System Storage™ DS4000 Storage Manager Version 9, Installation and Support Guide for AIX, HP-UX, Solaris, and Linux on POWER, order number GC26-7848.*



---

## Chapter 21. 4 Gigabit PCI Express Dual Port Fibre Channel Adapter (FC 5774; CCIN 5774)

Learn about the specifications and operating system requirements for the 5774 adapter.

### Overview

The 4 Gigabit PCI Express Dual Port Fibre Channel Adapter is a 64-bit, short form factor x4, PCIe adapter with an LC-type external fiber connector that provides single initiator capability over an optical fiber link or loop. The adapter automatically negotiates the highest data rate between the adapter and an attaching device at 1 Gbps, 2 Gbps, or 4 Gbps of which the device or switch is capable. Distances between the adapter and an attaching device or switch can reach up to 500 meters running at 1 Gbps data rate, up to 300 meters running at 2 Gbps data rate, and up to 150 meters running at 4 Gbps data rate. When used with Fibre Channel storage switches supporting long-wave optics, the adapter can reach distances of up to 10 kilometers running at either 1 Gbps, 2 Gbps, or 4 Gbps data rates.

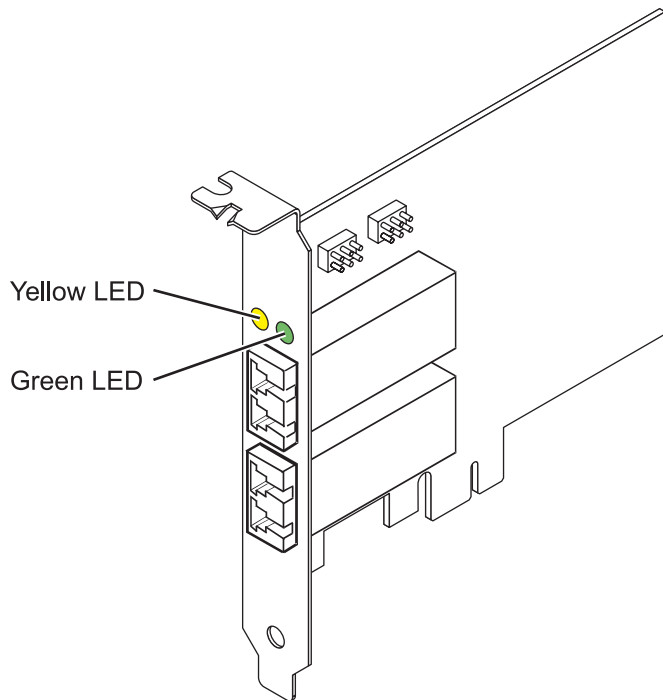
The adapter can be used to attach devices either directly, or by means of Fibre Channel switches. If you are attaching a device or switch with a SC type fiber connector, you must use an LC-SC 50 micron fiber converter cable (#2456) or a LC-SC 62.5 micron fiber converter cable (#2459).

The adapter has the following features:

- Compliant with the PCIe Base and CEM 1.0a specifications:
  - x1 and x4 lane link interface at 2.5 Gbit/s (auto-negotiated with system)
  - Supports VC0 (1 Virtual Channel) and TC0 (1 Traffic Class)
  - Configuration and IO Memory read/write, completion, message
  - Support for 64 bit addressing
  - ECC error protection
  - Link CRC on all PCIe packets and message information
  - Large payload size: 2048 bytes for read and write
  - Large read request size: 4096 bytes
- Compatible with 1, 2, and 4 Gb Fibre Channel interface:
  - Auto-negotiate between 1 Gb, 2 Gb or 4 Gb link attachments
  - Support for all Fibre Channel topologies: point-to-point, arbitrated loop, and fabric
  - Support for Fibre Channel class 2 and 3
  - Maximum Fibre Channel throughput achieved using full duplex hardware support
- End-to-end data path parity and CRC protection, including internal data path RAMs
- Architectural support for multiple upper layer protocols
- Internal high-speed SRAM memory
- ECC protection of local memory, includes single-bit correction and double-bit protection
- Embedded short-wave optical (LC) connection with diagnostics capability
- Onboard Context Management by firmware (per port):
  - Up to 510 FC Port Logins
  - Up to 2047 concurrent Exchanges
  - I/O multiplexing down to the FC Frame level
- Data buffers capable of supporting 64+ buffer-to-buffer (BB) credits per port for short-wave applications

- Link management and recovery handled by firmware
- Onboard diagnostic capability accessible by optional connection
- Parts and construction compliant with the European Union Directive of Restriction of Hazardous Substances (RoHS)
- Performance up to 4.25 Gbps full duplex

Figure 21. 5774 adapter



## Specifications

### Item Description

#### Adapter FRU number

10N7255\*

\* Designed to comply with RoHS requirement

#### Wrap plug FRU number

11P3847

#### I/O bus architecture

PCIe Base and CEM 1.0a  
x4 PCIe bus interface

#### Slot requirement

One available PCIe x4, x8, or x16 slot

#### Voltage

3.3V

#### Form factor

Short, low-profile

#### FC compatibility

1, 2, 4 gigabit

#### Cables

- 50/125 micron fiber
- 1.0625 Gb/sec 2m-500m
- 2.125 Gb/sec 2m – 300m

- 4.25 Gb/sec 2m – 150m
- 6.25/125 micron fiber
- 1.0625 Gb/sec 2m – 300m
- 2.125 Gb/sec 2m – 150m
- 4.25 Gb/sec 2m – 70m

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or PCI adapter placement.

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.

**Operating system or partition requirements**

The adapter is supported under the following operating systems:

- AIX 5L Version 5.2 with the 5200-10 Technology Level, or later
- AIX 5L Version 5.3 with the 5300-06 Technology Level, or later
- Red Hat Enterprise Linux version 4 U5
- Red Hat Enterprise Linux version 5
- SUSE Linux Enterprise Server 9 SP4
- SUSE Linux Enterprise Server 10, SP1

**Note:** If you are installing a new feature, ensure that you have the software required to support the new feature and that you determine if there are any existing prerequisites.

**Adapter LED states**

Green and yellow LEDs can be seen through openings in the adapter’s mounting bracket. Green indicates firmware operation and yellow signifies port activity. Table 19 summarizes normal LED states. There is a 1 Hz pause when the LED is off between each group of fast blinks (1, 2 or 3). Observe the LED sequence for several seconds to ensure that you correctly identify the state.

*Table 19. Normal LED states*

Green LED	Yellow LED	State
On	1 fast blink	1 Gbps link rate - normal, link active
On	2 fast blinks	2 Gbps link rate - normal, link active
On	3 fast blinks	4 Gbps link rate - normal, link active

Power-On Self Test (POST) conditions and results are summarized in Table 20. These states can be used to identify abnormal states or problems.

*Table 20. POST conditions and results*

Green LED	Yellow LED	State
Off	Off	Wake-up failure (dead board)
Off	On	POST failure (dead board)
Off	Slow blink	Wake-up failure monitor
Off	Fast blink	Failure in post
Off	Flashing	Post processing in progress
On	Off	Failure while functioning

Table 20. POST conditions and results (continued)

Green LED	Yellow LED	State
On	On	Failure while functioning
Slow blink	Off	Normal, link down
Slow blink	On	Not defined
Slow blink	Slow blink	Offline for download
Slow blink	Fast blink	Restricted offline mode, waiting for restart
Slow blink	Flashing	Restricted offline mode, test active
Fast blink	Off	Debug monitor in restricted mode
Fast blink	On	Not defined
Fast blink	Slow blink	Debug monitor in test fixture mode
Fast blink	Fast blink	Debug monitor in remote debug mode
Fast blink	Flashing	Not defined

## Device ID jumper

The default setting for the two device ID jumpers labeled P0\_JX and P1\_JX is to set the jumpers on pins 1 and 2 as shown in Figure 22. Do not change the jumper settings for a standard installation.

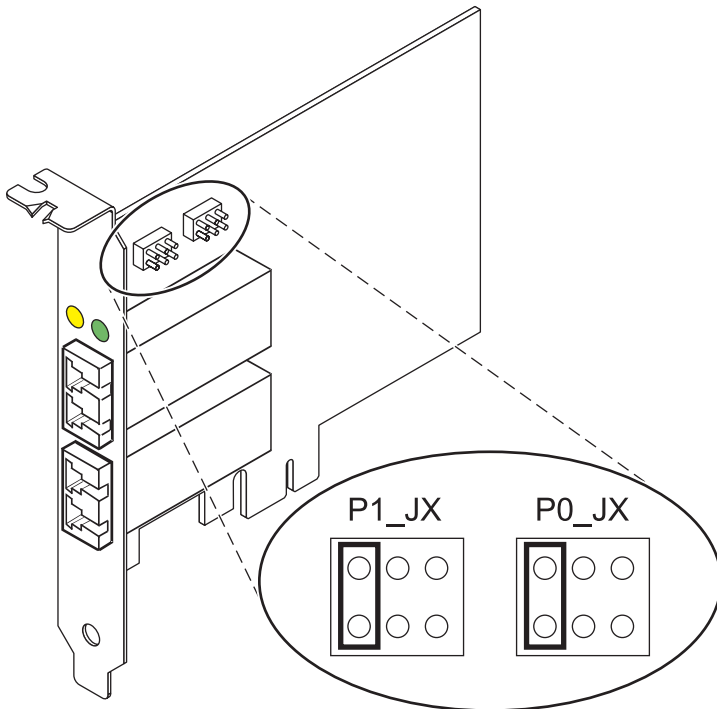


Figure 22. Device ID jumper

## Replacing hot swap HBAs

Fibre Channel host bus adapters (HBAs) connected to a FAStT or DS4000 storage subsystem have a child device called a disk array router (dar). You must unconfigure the disk array router before you can hot swap an HBA that is connected to a FAStT or DS4000 storage subsystem. For instructions, refer to

*Replacing hot swap HBAs in the System Storage DS4000 Storage Manager Version 9, Installation and Support Guide for AIX, HP-UX, Solaris, and Linux on POWER, order number GC26-7848.*





## Chapter 22. 2 Gigabit Fibre Channel PCI-X Adapter (FC 1957, 1977, 5716; CCIN 574C)

Learn about the specifications and operating system requirements for the 2 Gigabit Fibre Channel PCI-X Adapter.

The 2 Gigabit Fibre Channel PCI-X Adapter is a 64-bit address/data, short form factor PCI-X adapter with an LC type external fiber connector that provides single or dual initiator capability over an optical fiber link or loop. With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage. The 2 Gigabit Fibre Channel PCI-X Adapter will auto-negotiate for the highest data rate (either 1 Gbps or 2 Gbps) of which the device or switch is capable. Distances of up to 500 meters running at 1 Gbps data rate and up to 300 meters running at 2 Gbps data rate are supported between the adapter and an attaching device or switch. When used with Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable of running at either 1 Gps or 2 Gps data rates.

The 2 Gigabit Fibre Channel PCI-X Adapter can be used to attach devices either directly, or by means of fibre channel switches. If attaching a device or switch with a SC type fiber connector, use of an LC-SC 50 micron fiber converter cable (#2456) or a LC-SC 62.5 micron fiber converter cable (#2459) is required.

### Adapter specifications

Table 21. Feature codes (FC), custom card identification numbers (CCIN) and field replaceable unit (FRU) part numbers

FC	CCIN	FRU
1957	1957	03N7068* or 03N6440**
1977	197E	03N7067* or 0H14096**
5716	280B	03N7069* or 03N6441**
* Designed to comply with RoHS requirement.		
** Not designed to comply with the RoHS requirement.		

#### Item Description

##### Wrap plug FRU number

12R9314

##### I/O bus architecture

PCI 32 and 64-bit data and 33/66 MHz clock frequency

PCI-X 64-bit data and 66/100/133 MHz clock frequency

##### Slot requirement

One available 3.3 volt PCI or PCI-X slot (5 volt tolerant)

##### FC compatibility

1, 2, 4 gigabit

##### Cables

Multimode 50/125 micron fiber with LC connectors:

1.0625Gb/sec: 2m – 500m

2.125Gb/sec: 2m – 300m

Multimode 62.5/125 micron fiber with LC connectors:

1.0625Gb/sec: 2m – 300m

2.125Gb/sec: 2m – 150m

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

**Operating system or partition requirements**

AIX 5L Version 5.2 with the 5200-04 Technology Level

AIX 5L Version 5.3 with the 5300-03 Technology Level

Red Hat Enterprise Linux version 3 U3

SUSE Linux Enterprise Server 9

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.

---

## Chapter 23. 2 Gigabit Fibre Channel PCI and PCI-X Adapters (FC 6228, 6239)

Learn about the specifications and operating system requirements for the 2 Gigabit Fibre Channel PCI and PCI-X adapters.

The 2 Gigabit Fibre Channel PCI and PCI-X Adapters are 64-bit address/data, short form factor PCI and PCI-X adapters with an LC type external fiber connector that provides single or dual initiator capability over an optical fiber link or loop. With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high speed local and remote located storage. The 2 Gigabit Fibre Channel PCI and PCI-X Adapters will auto-negotiate for the highest data rate (either 1 Gbps or 2 Gbps) of which the device or switch is capable. Distances of up to 500 meters running at 1 Gbps data rate and up to 300 meters running at 2 Gbps data rate are supported between the adapter and an attaching device or switch. When used with Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable of running at either 1 Gps or 2 Gps data rates.

### PCI adapter (FC 6228)

The 2 Gigabit Fibre Channel Adapter for 64-bit PCI Bus can be used to attach devices either directly, or by means of fibre channel switches. If attaching a device or switch with a SC type fiber connector, use of an LC-SC fibre channel conversion cable (#2456) is required.

### PCI-X adapter (FC 6239)

The 2 Gigabit Fibre Channel PCI-X Adapter can be used to attach devices either directly, or by means of Fibre Channel Switches. If attaching a device or switch with a SC type fiber connector, use of an LC-SC 50 micron fiber converter cable (#2456) or a LC-SC 62.5 micron fiber converter cable (#2459) is required.

## Adapter specifications

Table 22. Feature codes (FC), custom card identification numbers (CCIN) and field replaceable unit (FRU) part numbers

FC	CCIN	FRU
6228	4-W	80P4384*
6239	5704	80P6415*

\*Not designed to comply with RoHS requirement.

### Item Description

#### Wrap plug FRU number

11P3847

#### I/O bus architecture

PCI 32 and 64-bit data and 33/66 MHz clock frequency

PCI-X 64-bit data and 66/100/133 MHz clock frequency

#### Slot requirement

One available 3.3 volt PCI or PCI-X slot

#### FC compatibility

1, 2, 4 Gigabit

#### Cables

Multimode 50/125 micron fiber with LC connectors:

1.0625Gb/sec: 2m – 500m

2.125Gb/sec: 2m – 300m

Multimode 62.5/125 micron fiber with LC connectors:

1.0625Gb/sec: 2m – 300m

2.125Gb/sec: 2m – 150m

**Maximum number**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

**Operating system or partition requirements**

AIX 5L Version 5.2 with the 5200-04 Technology Level

AIX 5L Version 5.3 with the 5300-03 Technology Level

Red Hat Enterprise Linux version 3 U3

SUSE Linux Enterprise Server 9

---

## Chapter 24. 4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter (FC 1905, 5758, 5761; CCIN 1910, 280D)

Learn about the specifications and operating system requirements for the 4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter.

The 4 Gigabit Single-Port Fibre Channel PCI-X 2.0 DDR Adapter is a 64-bit address/data, short form factor PCI-X adapter with an LC type external fiber connector that provides single initiator capability over an optical fiber link or loop. With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high-speed local and remote located storage. The 4 Gigabit Single-Port Fibre Channel PCI-X Adapter will auto-negotiate for the highest data rate between adapter and an attaching device at 1 Gbps, 2 Gbps or 4 Gbps of which the device or switch is capable. Distances of up to 500 meters running at 1 Gbps data rate, up to 300 meters running at 2 Gbps data rate, and 4 Gbps data rate up to 150 meters are supported between the adapter and an attaching device or switch. When used with Fibre Channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1 Gbps, 2 Gbps, or 4 Gbps data rates.

The 4 Gigabit Single-Port Fibre Channel PCI-X Adapter can be used to attach devices either directly, or by means of fibre channel switches. If attaching a device or switch with a SC type fiber connectors, use of an LC-SC 50 micron fiber converter cable (#2456) or a LC-SC 62.5 micron fiber converter cable (#2459) is required.

### Adapter specifications

#### Item Description

#### Adapter FRU number

03N5014\* or 03N5005\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

#### Wrap plug FRU number

11P3847 (FC 1905, 5758, 5761)

#### I/O bus architecture

PCI-X 2.0a, PCI 3.0, PCI-X Mode 2 - 266 MHz, PCI-X Mode 1 - 133 MHz, PCI - 66 MHz

#### Slot requirement

One available 3.3 volt PCI or PCI-X slot

#### FC compatibility

1, 2, 4 Gigabit

#### Cables

50/125 micron Fibre

1.0625Gb/sec 2m-500m

2.125Gb/sec 2m – 300m

4.25Gb/sec 2m – 150m

6.25/125 micron fibre

1.0625 Gb/sec 2m – 300m

2.125 Gb/sec 2m – 150m

4.25 Gb/sec 2m – 70m

#### Maximum number

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

**Operating system or partition requirements**

AIX 5L Version 5.2 with the 5200-08 Technology Level

AIX 5L Version 5.3 with the 5300-04 Technology Level

Red Hat Enterprise Linux version 4 U2

SUSE Linux Enterprise Server 9 SP3

V5R3M0 with PTFs, V5R3M5 with PTFs

V5R4M0

**Note:** If you are installing a new feature, ensure that you have the software required to support the new feature and that you determine if there are any existing prerequisites.

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.

---

## Chapter 25. 4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter (FC 1910, 5759; CCIN 1910, 5759)

Learn about the specifications and operating system requirements for the 4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter.

The 4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter is a 64-bit address/data, short form factor PCI-X adapter with an LC type external fiber connector that provides single or dual initiator capability over an optical fiber link or loop. With the use of appropriate optical fiber cabling, this adapter provides the capability for a network of high-speed local and remote located storage. The adapter will auto-negotiate for the highest data rate between adapter and an attaching device at 1 Gbps, 2 Gbps or 4 Gbps of which the device or switch is capable. Between the adapter and an attaching device or switch, the distances supported are up to: 500 meters running at 1 Gbps data rate, 300 meters running at 2 Gbps data rate, and 150 meters running at 4 Gbps data rate. When used with fibre channel storage switches supporting long-wave optics, distances of up to 10 kilometers are capable running at either 1 Gbps, 2 Gbps, or 4 Gbps data rates.

The 4 Gb Dual-Port Fibre Channel PCI-X Adapter can be used to attach devices either directly, or by means of fibre channel switches. If attaching a device or switch with a SC type fiber connectors, use a LC-SC 50 micron fiber converter cable (#2456) or a LC-SC 62.5 micron fiber converter cable (#2459).

### Adapter specifications

Item	Description
------	-------------

<b>Adapter FRU number</b>	
---------------------------	--

	03N5029* or 03N5020**
--	-----------------------

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

<b>Wrap plug FRU number</b>	
-----------------------------	--

	11P3847 (FC 1910, 5759)
--	-------------------------

<b>I/O bus architecture</b>	
-----------------------------	--

	PCI-X 2.0a, PCI 3.0, PCI-X Mode 2 - 266 MHz, PCI-X Mode 1 - 133 MHz, PCI - 66 MHz
--	---

<b>Slot requirement</b>	
-------------------------	--

	One available 3.3 volt PCI or PCI-X slot
--	--

<b>FC compatibility</b>	
-------------------------	--

	1, 2, 4 gigabit
--	-----------------

<b>Cables</b>	
---------------	--

	50/125 micron Fibre
--	---------------------

	1.0625Gb/sec 2m-500m
--	----------------------

	2.125Gb/sec 2m – 300m
--	-----------------------

	4.25Gb/sec 2m – 150m
--	----------------------

	62.5/125 micron fibre
--	-----------------------

	1.0625 Gb/sec 2m – 300m
--	-------------------------

	2.125 Gb/sec 2m – 150m
--	------------------------

	4.25 Gb/sec 2m – 70m
--	----------------------

<b>Maximum number</b>	
-----------------------	--

	For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.
--	--

**Operating system or partition requirements**

AIX 5L Version 5.2 with the 5200-08 Technology Level

AIX 5L Version 5.3 with the 5300-04 Technology Level

Red Hat Enterprise Linux version 4 U2

SUSE Linux Enterprise Server 9 SP3

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.



---

## Chapter 26. PCI-X Ultra RAID Disk Controller (FC 2757; CCIN 2757)

Learn about the specifications for the PCI-X Ultra RAID Disk Controller.

This adapter is a PCI-X SCSI controller with a maximum compressed write cache of 757 MB. The 2757 provides RAID-5 protection for internal disks and also supports internal tape units, internal CD/DVD-ROM and internal DVD-RAM units. The 2757 has four LVD SCSI buses. Hardware data compression is not supported.

A 5708 or 574F Auxiliary Cache IOA is required for RAID. The Auxiliary Cache IOA is to be connected to the fourth SCSI bus of the 2757.

### Specifications

Item	Description
------	-------------

FRU number	039J5057 **
------------	-------------

\*\*Not designed to comply with RoHS requirement.

I/O bus architecture	PCI 2.2 compliant
----------------------	-------------------

Slot requirement	One available 3.3 volt PCI or PCI-X slot
------------------	--

Maximum number	For system-specific adapter placement information, see the PCI adapter placement
----------------	--

Tools	None
-------	------

Cables	Attachment cables are included with the attaching subsystem or device.
--------	--

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.



---

## Chapter 27. PCI-X Ultra4 RAID Disk Controller (FC 0627, 0641, 2780; CCIN 2780)

Learn about the specifications for the PCI-X Ultra RAID Disk Controller.

This adapter is an Ultra4 (Ultra320) SCSI controller with a maximum compressed write cache of 757 MB and a maximum compressed read cache size of 1 GB that provides RAID-5 protection for internal disks and also supports internal tape units, CD-ROM and DVD units. The 2780 has four Ultra4 (Ultra320) SCSI buses. In addition to providing RAID-5 protection for disks, it is also designed to work as a high performance controller for disks protected by system mirroring or disks with no protection. This controller also uses a Cache Battery Pack, which can be replaced concurrently with system operation.

A 5708 or 574F Auxiliary Cache IOA is required for RAID. The Auxiliary Cache IOA is to be connected to the 4th SCSI bus of the 2780.

The 0627 is a direct attach 2780 for use with Linux or AIX.

The 0641 is a direct attach 2780 with a CCIN 574F auxiliary-write cache IOA.

### Specifications

Item	Description
------	-------------

<b>FRU number</b>	
-------------------	--

	042R7704 *
--	------------

\*Designed to comply with RoHS requirement.

<b>I/O bus architecture</b>	
-----------------------------	--

	PCI 2.2 compliant
--	-------------------

<b>Slot requirement</b>	
-------------------------	--

	One available 3.3 volt PCI or PCI-X slot
--	--

<b>Maximum number</b>	
-----------------------	--

	For system-specific adapter placement information, see the PCI adapter placement.
--	---

<b>Tools</b>	None
--------------	------

<b>Cables</b>	
---------------	--

	Attachment cables are included with the attaching subsystem or device.
--	--



---

## Chapter 28. PCI-X DDR Dual-Channel Ultra320 SCSI Adapter (FC 0647, 1912, 5736, 5775; CCIN 571A)

Learn about the specifications for the PCI-X DDR Dual-Channel Ultra320 SCSI Adapter.

The PCI-X DDR Dual-Channel Ultra320 SCSI Adapter is a high-performance SCSI adapter for PCI-X and PCI systems. The adapter provides two SCSI channels (buses), each capable of running 320 MBps (maximum). Each SCSI bus can either be internal (on systems that support internal SCSI devices or backplane attachments) or external, but not both. Internally attached Ultra320 devices run at a data rate of up to 320 MBps on systems that have internal backplanes that are capable of supporting Ultra320 speeds.

The adapter uses and supports low voltage differential (LVD) drivers and receivers only.

### PCI-X DDR dual-channel Ultra320 SCSI adapter specifications

Item	Description
------	-------------

<b>FRU number</b>	
-------------------	--

	FC 0647, 5736, or 5775 is 42R4860* or 39J4996**
--	---

	FC 1912 is 42R4862* or 39J4998**
--	----------------------------------

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

<b>I/O bus architecture</b>	
-----------------------------	--

	PCI 2.2 compliant
--	-------------------

<b>Slot requirement</b>	
-------------------------	--

	One available 3.3 volt PCI or PCI-X slot
--	--

<b>Maximum number</b>	
-----------------------	--

	For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.
--	--

<b>Operating system or partition requirements</b>	
---	--

	AIX 5L Version 5.2 with the 5200-08 Technology Level, or later
--	--

	AIX 5L Version 5.3 with the 5300-03 Technology Level, or later
--	--

	Red Hat Enterprise Linux 4 Update 2, or later
--	---

	SUSE Linux Enterprise Server 9 Service Pack 2, or later
--	---

<b>Required software or drivers</b>	
-------------------------------------	--

	AIX - devices.pci.1410c002 device driver package
--	--

	Linux - ipr driver Version 2.0.10.3 (or later) for SLES 9 kernels, Version 2.0.11.1 (or later) for RHEL4 kernels, or Version 2.0.13 (or later) for kernel.org kernels (kernel version 2.6.12 or later)
--	--

<b>Tools</b>	None
--------------	------

<b>Cables</b>	
---------------	--

	Attachment cables are included with the attaching subsystem or device.
--	--

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.



---

## Chapter 29. PCI-X DDR Dual-Channel Ultra320 SCSI RAID Adapter (FC 5737, 5776; CCIN 571B)

Learn about the specifications for the PCI-X DDR Dual-Channel Ultra320 SCSI RAID Adapter.

The PCI-X DDR Dual-Channel Ultra320 SCSI RAID Adapter is a high-performance SCSI adapter for PCI-X and PCI systems. The adapter provides RAID 0, 5, 6, or 10 capability, 90 MB of write cache, and can address up to 30 16-bit SCSI physical disk drives on two independent SCSI buses. The adapter uses and supports low voltage differential (LVD) drivers and receivers only. Each SCSI bus can either be internal (on systems that support internal SCSI devices or backplane attachments) or external, but not both. Internally attached Ultra320 devices run at a data rate of up to 320 MBps on systems that have internal backplanes that are capable of supporting Ultra320 speeds.

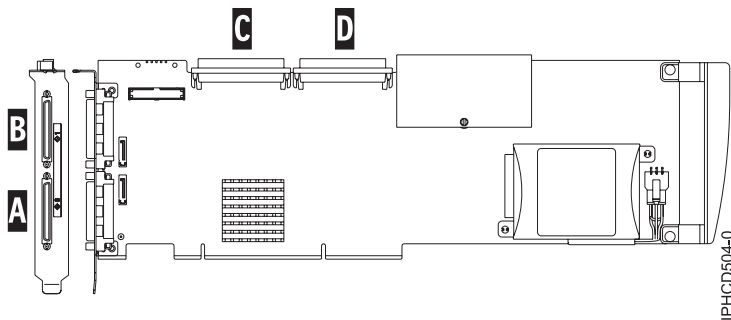


Figure 23. PCI-X DDR Dual-Channel Ultra320 SCSI RAID Adapter

- A** SCSI port 0
- B** SCSI port 1
- C** SCSI port 0
- E** SCSI port 1

**Note:** Each SCSI bus (0 or 1) can either be internal (on systems that support internal SCSI devices or backplane attachments) or external, but not both.

### PCI-X DDR dual-channel Ultra320 SCSI RAID Adapter specifications

#### Item Description

##### FRU number

FC 5737 or 5776 is 42R4855\* or 39J5024\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

##### I/O bus architecture

PCI 2.2 compliant

##### Slot requirement

One available 3.3 volt PCI or PCI-X slot

##### Maximum number

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

##### Operating system or partition requirements

AIX 5L Version 5.2 with the 5200-07 Technology Level, or later

AIX 5L Version 5.3 with the 5300-03 Technology Level, or later

Red Hat Enterprise Linux version 4, Update 2 or newer

SUSE Linux Enterprise Server 9 Service Pack 2 or newer

V5R3 or later

**Required software or drivers**

AIX - devices.pci.1410be02 device driver package

Linux - ipr driver Version 2.0.10.3 (or later) for SLES 9 kernels, Version 2.0.11.1 (or later) for RHEL4 kernels, or Version 2.0.13 (or later) for kernel.org kernels (kernel version 2.6.12 or later)

**Tools** None

**Cables**

Attachment cables are shipped with the attaching subsystem or device.

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.



---

## Chapter 30. Auxiliary-write cache IOA (FC 5580, 5581; CCIN 5708)

Learn about the specifications and installation notes for the auxiliary-write cache IOA adapter and the PCI-X Ultra4 RAID disk-controller adapters used with it.

Feature 5580 includes a 2780 PCI-X Ultra4 RAID disk-controller adapter, a CCIN 5708 auxiliary-write cache IOA adapter, and the required connection cable. Feature 5581 includes a 2757 PCI-X Ultra RAID disk-controller adapter, a CCIN 5708 auxiliary-write cache IOA adapter, and the required connection cable.

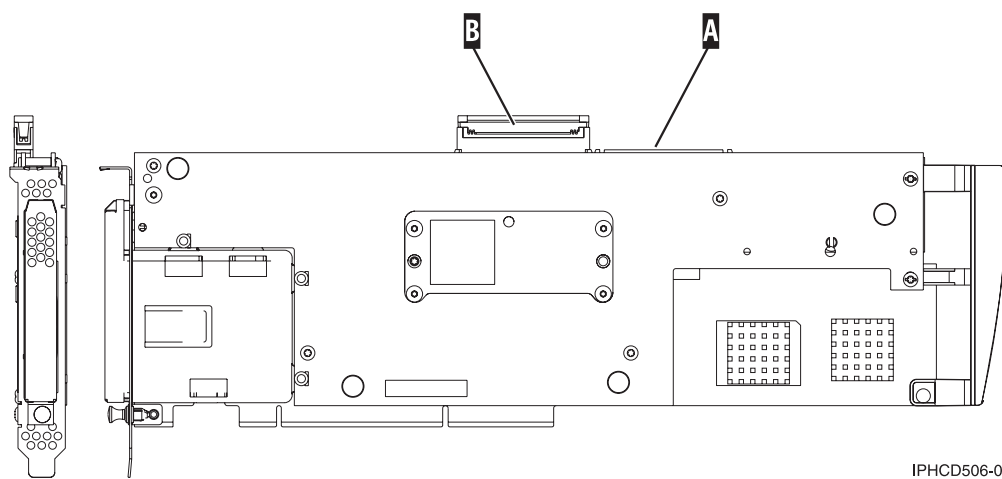


Figure 24. 5708, auxiliary-write cache IOA

- A** SCSI port used to attach the auxiliary-write cache IOA to a supported disk-controller. See “Installing the SCSI cable” on page 103.
- B** Unused SCSI port shown here with a cover over it.

**Note:** Backplane daughter cards and RAID enablement cards that are not in the PCI form factor are not covered in this topic. To find part numbers and location codes for these types of cards, see the Parts Information topic. A link to that topic can be found in this topic under Related references.

A physical cable connection is required between the 5708 adapter and SCSI port 4 of a 2780 or 2757 adapter. Both the 5708 adapter and the disk-controller adapter it is connected to must be installed in the same physical system unit or expansion unit, and must be installed in the same partition.

The 5708 adapter has 757 MB of auxiliary maximum compressed write cache. The adapter mirrors the write cache of the disk-controller adapter that it is connected to. Protection of data is enhanced by having two copies of the write cache stored on separate adapters. If a failure occurs to the write cache of the disk-controller, the 5708 adapter provides a backup copy during the recovery of the failed IOA.

### Considerations for installing or converting to feature 5580 or 5581

**Attention:** Converting your adapters to feature 5580 or 5581 will require extensive planning. If the planning is not done correctly, the result could be an extended server outage, loss of data, or both. You might need to do a full system restoration.

Read the following questions in relation to your system:

- Are you converting from feature 2780 to feature 5580?
- Are you converting from feature 2757 to feature 5581?
- Are you replacing any other existing storage adapters with features 5580 and 5581?
- Is your server partitioned (LPAR)?

If the answer to any of these questions is yes, or you are unsure of the answers, contact your authorized service provider for planning and deployment services.

## 5708 adapter specifications

Item	Description
Adapter FRU number	39J0686
Battery FRU number	97P4846
Cable FRU number	39J1702
Cables	Specific Storage Adapter to Auxiliary Storage Adapter SCSI cable is necessary and is provided with each feature or conversion.
I/O bus architecture	PCI 2.2 power/bus compliant
Unit description	<ul style="list-style-type: none"> <li>• Long, 64 bit, 133 MHz, 3.3 V edge connector, single-slot</li> <li>• PCI-X 2.0 compliant</li> <li>• Compatible down to 32 bit, 33 MHz PCI adapter slots</li> </ul>
Operating system or partition requirements	Supported in the operating systems or partitions only, versions V5R2, V5R3, and later.
Maximum number	For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement. .
Partition information	<ul style="list-style-type: none"> <li>• If you are placing the feature in the primary partition or any non-partitioned system, the auxiliary cache IOA for the load source adapter must be in the same enclosure as the load source IOA.</li> <li>• If you are placing the feature in the secondary partition on any system, the auxiliary cache IOA for the load source adapter must be under the load source IOP.</li> </ul>
Related information	<ul style="list-style-type: none"> <li>• The disk controller adapter and the auxiliary-write cache adapter each require one PCI slot.</li> <li>• Both adapters must be installed in the same enclosure.</li> <li>• The adapters are connected by a SCSI cable (provided).</li> <li>• The operating system identifies the 5708 adapter as a storage controller with no devices attached.</li> <li>• The 5708 adapter is not supported in an environment without an IOP.</li> <li>• Types 2780 and 2757 will not appear on ordering, shipping, or inventory documentation when received as part of these features.</li> </ul>

## Installing the adapters

For instructions on how to install PCI adapters, refer to the PCI adapters topic.

Return here for instruction on installing the SCSI cable.

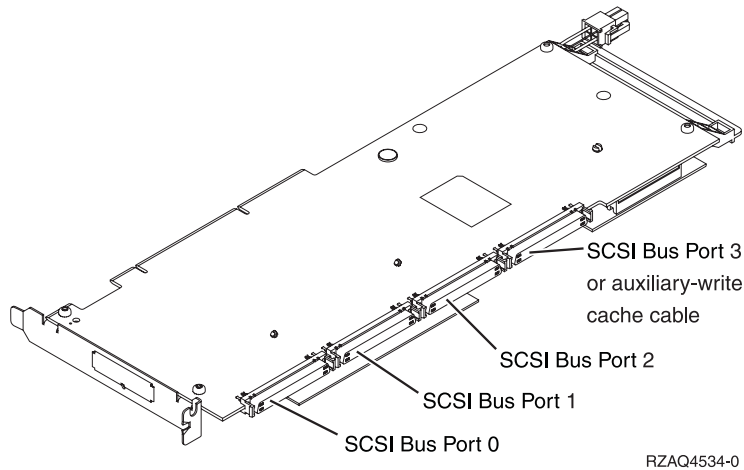
## Installing the SCSI cable

The disk controller adapter and the auxiliary-write cache adapter are connected by a SCSI cable.

**Attention:** Do not install or remove the adapter cable if the adapters have the power on. Use the service procedures to turn off the power to the adapter slots or shut down the system or partition in which the adapters are placed.

To install the SCSI cable, do the following steps:

1. Attach the SCSI cable to SCSI bus port 3 (fourth physical port) of the disk controller adapter.



2. Attach the cable to SCSI port **A** on the auxiliary-write cache adapter. See Figure 24 on page 101.

### Note:

1. Attaching the cable to the disk controller reduces the number of SCSI buses that support disk drives from four to three.
2. Reducing the number of SCSI buses might also reduce the number of disk drives supported by the disk controller, depending on the system unit or expansion drawer in which the disk controller is installed.
3. No disk drives are driven by the auxiliary-write cache adapter. This adapter protects against extended outage caused by loss of write cache, but does not protect against a disk controller failure.



---

## Chapter 31. 1 Gigabit iSCSI TOE PCI-X Adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

Learn about the 1 Gigabit iSCSI TOE PCI-X Adapter.

---

### Description and technical overview

The 1 Gigabit iSCSI TOE PCI-X Adapter encapsulates SCSI commands and data into TCP packets and transports them over a 1-gigabit-Ethernet network through IP. The adapter is dual function, operating as an iSCSI TOE (TCP/IP offload engine) adapter or as a general purpose Ethernet adapter where the TCP/IP protocol is offloaded onto the adapter. However, the network function is not supported by AIX.

The adapter is available in the following versions:

- 1 Gigabit-SX iSCSI TOE PCI-X Adapter (optical connector), FC 5714 and FC 1987
- 1 Gigabit-TX iSCSI TOE PCI-X Adapter (copper connector), FC 5713 and FC 1986

#### 1 Gigabit-SX iSCSI TOE PCI-X Adapter (optical connector), FC 5714 and FC 1987 (CCIN 573C)

- FRU part number 03N6058\* or 30R5519\*\*  
(\* Designed to comply with RoHS requirement.  
\*\* Not designed to comply with the RoHS requirement.)
- 133 MHz PCI-X version 1.0a support and version 2.0 mode 1
- PCI 2.3 compliant
- Low profile
- 3.3 V
- Hardware implementation of entire TCP/IP stack
- 200 MB/s, full duplex gigabit Ethernet
- iSCSI initiator support
- IEEE 802.3z compliant
- iSCSI RFC 3720 Compliant
- Multimode fiber cabling support
- Fiber LC connector for multimode fiber cabling
- Dual-address cycle support for access to 64-bit addresses
- 64-bit addressing support for systems with physical memory greater than 4 gigabytes
- PCI-X split transactions support
- LED indicator for link activity

**Note:** The fiber adapters are designed with specifications that the cable be a dual-cable connector, with transmit and receive cable ends clamped together. If you use separate transmit and receive fiber cables, clamp the cables together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and is designed to improve overall performance.

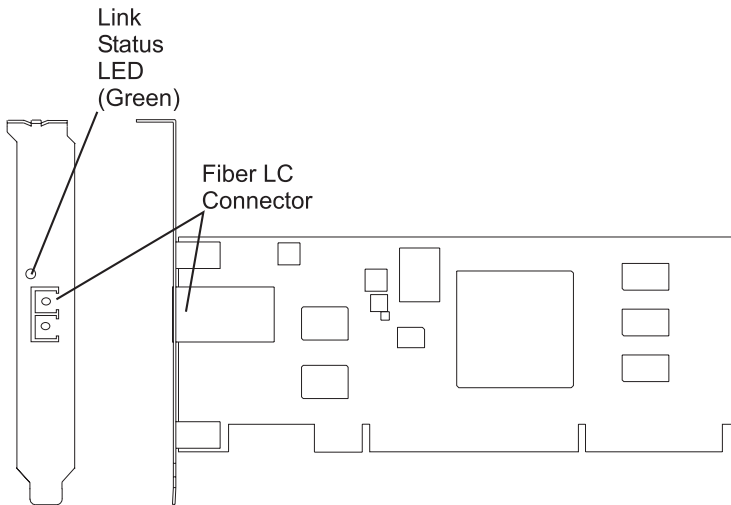


Figure 25. 1 Gigabit-SX iSCSI TOE PCI-X Adapter

**1 Gigabit-TX iSCSI TOE PCI-X Adapter (copper connector), FC 5713 and FC 1986 (CCIN 573B)**

- FRU part number 03N6056\* or 30R5219\*\*  
 (\* Designed to comply with RoHS requirement.  
 \*\* Not designed to comply with the RoHS requirement.)
- 133 MHz PCI-X version 1.0a support and version 2.0 mode 1
- PCI 2.3 compliant
- Low profile
- 3.3 v
- Hardware implementation of entire TCP/IP protocol stack
- Full Duplex Gigabit Ethernet
- iSCSI initiator support
- IEEE 802.3ab 1000 Base-T compliant
- iSCSI RFC 3720 Compliant
- PCI-X split transactions support
- LED indicator for link activity
- RJ-45 unshielded twisted pair (UTP) connector

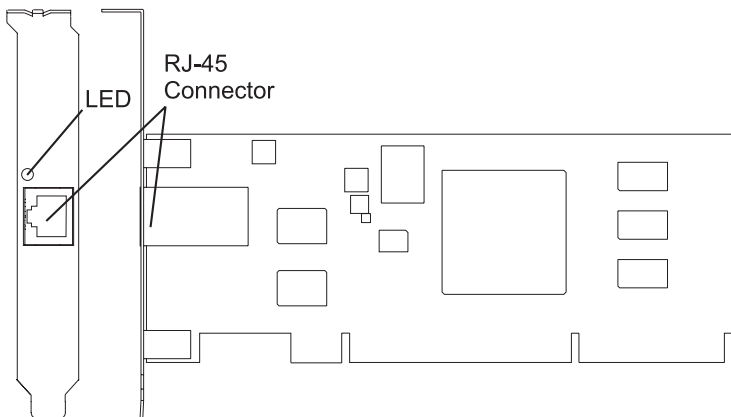


Figure 26. 1 Gigabit-TX iSCSI TOE PCI-X Adapter

---

## Preparing to install the adapter

Preparing to install the adapter involves the following tasks.

- Verifying your hardware requirements
- Verifying your software requirements
- Checking prerequisites
- Gathering tools and documentation

**Note:** If you are installing your operating system at this time, install the adapter before you install the operating system. If you are installing only the device driver for this adapter, install the device driver before you install the adapter.

## Verifying your hardware requirements

Before you install your adapter, verify that you have the required hardware.

### 1 Gigabit-TX iSCSI TOE PCI-X Adapter (copper connector)

The 1 Gigabit-TX iSCSI TOE PCI-X Adapter requires the following hardware:

- Cat 5, Cat 5e, or Cat 6 unshielded twisted pair (UTP) cables for network attachment.

**Restriction:** The cable can be no longer than 100 meters (including patch cables) from the adapter to the local switch.

- RJ-45 wrap plug. (Part number 00P1689, included in FC 5713 and FC 1986)

### 1 Gigabit-SX iSCSI TOE PCI-X Adapter (optical connector)

The 1 Gigabit-SX iSCSI TOE PCI-X Adapter requires the following hardware:

- A wrap plug for the multimode fiber connector (Part number 113847, included in FC 5714 and FC 1987)
- Shortwave (850 nm) 50/62.5 micron multimode fiber network attachment

The following table shows the minimum and maximum allowable fiber cable lengths from the SX adapter to the gigabit Ethernet switch, including patch cables:

*Table 23. Fiber cable lengths for the 1 Gigabit-SX iSCSI TOE PCI-X Adapter (optical connector).*

Fiber type	Modal bandwidth (MHz-km)	Minimum range (meters)	Maximum range (meters)
62.5 $\mu$ .m MMF	160	2	220
62.5 $\mu$ .m MMF	200	2	275
50 $\mu$ .m MMF	400	2	500
50 $\mu$ .m MMF	500	2	500

## Verifying your software requirements

Before you install your adapter, verify that you have the required operating system software.

The 1 Gigabit iSCSI TOE PCI-X Adapter is supported on AIX 5L version 5.2 and 5.3, and on SUSE Linux Enterprise Server 9 SP3.

## Checking prerequisites

To install the adapter, you will need the following items.

- The adapter

- AIX Base Operating System CD, which includes the device driver, or the AIX device driver CD

If an item is missing or damaged, contact your vendor.

**Note:** Be sure to retain your proof of purchase as it might be required to receive warranty service.

## Gathering tools and documentation

To install the adapter, you need the following tools and documentation.

- A flat-blade screwdriver
- Instructions on how to install a PCI adapter in your specific, system unit.  
For instructions on how to install PCI adapters, refer to the PCI adapters topic.
- Your operating system documentation. .

---

## Installing the device driver software for the adapter

Use the information in this section to install the device driver software. The device driver is provided for the AIX operating system.

### Installing the device driver software for the 1 Gigabit-SX iSCSI TOE PCI-X Adapter

Learn how to install the device driver software. The device driver is provided for the AIX operating system.

**Note:** If you are installing your operating system at this time, install the adapter before you install the operating system. If you are installing only the device driver for this adapter, install the device driver before you install the adapter.

1. If you should install your device driver software first, go to step 1 and continue with this section.
2. If you should install your adapter hardware first, go to “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter” on page 111. When you install AIX, your adapter device driver is automatically installed.

**Note:** You only need to install the device driver for the first instance of the 1 Gigabit-SX iSCSI TOE PCI-X Adapter. Any subsequent installation of the 1 Gigabit-SX iSCSI TOE PCI-X Adapter will not require that you install the device driver again. Go to “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter” on page 111 for instructions.

To install the device driver software, do the following steps:

1. Turn on the system unit power.
  2. Log in as root user.
  3. Insert the media containing the device driver software (for example, a CD-ROM) into the appropriate media device. If your system does not have a CD-ROM drive, refer to your system documentation for performing a NIM (Network Installation Management) installation.
  4. At the command line, type the following System Management Interface Tool (SMIT) fastpath:  

```
smit devinst
```
  5. Press Enter. The Install Additional Device Software screen highlights the INPUT device/directory for software option.
  6. Select or type your input device by doing one of the following actions:
    - Press F4 to display the input device list and select the name of the device (for 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. The Install Additional Device Software window highlights the SOFTWARE to install option.



7. Press F4 to display the SOFTWARE to install window.
8. Type a forward slash (/) to display the Find window.
9. For the 1 Gigabit-SX iSCSI TOE PCI-X Adapter, type the following device package name:  
devices.pci.1410cf02
10. Press Enter. The system finds and highlights this device driver software.
11. Press Enter.  
The INSTALL ADDITIONAL DEVICE SOFTWARE screen displays. The entry fields are automatically updated.
12. Press Enter to accept the information.  
The ARE YOU SURE window displays.
13. Press Enter to accept the information.  
The COMMAND STATUS screen displays. The term RUNNING is highlighted, to indicate that the installation and configuration command is in progress.
14. When RUNNING changes to OK, scroll to the bottom of the page and locate the Installation Summary.  
After a successful installation, SUCCESS displays in the Result column of the Installation Summary.
15. Remove the installation media from the drive.
16. Press F10 to exit SMIT.
17. Go to “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter” on page 111, to see the adapter installation procedure.

## Verifying AIX software installation

Use this procedure to verify that the device driver for the adapter is installed.

1. If necessary, log in as root user.
2. At the command line, type: `lslpp -l devices.pci.1410cf02.rte`
3. Press Enter. Possible results are as follows:
  - If the 1 Gigabit-SX iSCSI TOE PCI-X Adapter device driver is installed, the following is an example of the data that displays on your screen:

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pci.1410cf02.rte	5.3.0.0	COMMITTED	1000 Base-SX PCI-X iSCSI TOE Adapter Device Software

Verify that the **devices.pci.1410cf02.rte** filesets are installed at the AIX 5.2.0 or later level. If this information displays but you continue to have problems, go to “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter” on page 111.

- If no data displays on your screen, the 1 Gigabit-SX iSCSI TOE PCI-X Adapter device driver did not install correctly. Return to “Installing the device driver software for the 1 Gigabit-SX iSCSI TOE PCI-X Adapter” on page 108. If you continue to experience problems, it may be necessary to call your system support organization. Refer to your operating system documentation for instructions.

## Installing the device driver software for the 1 Gigabit-TX iSCSI TOE PCI-X Adapter

Learn how to install the device driver software. The device driver is provided for the AIX operating system.

**Note:** If you are installing your operating system at this time, install the adapter before you install the operating system. If you are installing only the device driver for this adapter, install the device driver before you install the adapter.

- If you should install your device driver software first, go to step 1 and continue with this section.

- If you should install your adapter hardware first, go to “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter” on page 111. When you install AIX, your adapter device driver automatically installs.

**Note:** You only need to install device driver for the first instance of the 1 Gigabit-TX iSCSI TOE PCI-X Adapter. Any subsequent installation of the 1 Gigabit-TX iSCSI TOE PCI-X Adapter will not require device driver installation again. Go to “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter” on page 111 for instructions.

To install device driver software:

1. Turn on the system unit power.
2. Log in as root user.
3. Insert the media containing the device driver software (for example: CD-ROM) into the appropriate media device. If your system does not have a CD-ROM drive, refer to your AIX operating system documentation for performing a NIM (Network Installation Management) installation.
4. Type the following System Management Interface Tool (SMIT) fastpath:  
smit devinst
5. Press Enter. The Install Additional Device Software screen highlights the INPUT device/directory for software option.
6. Select or type your input device by doing one of the following actions:
  - Press F4 to display the input device list and select the name of the device (for 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. The Install Additional Device Software window highlights the SOFTWARE to install option.
7. Press F4 to display the SOFTWARE to install window.
8. Type the following to display the Find window:  
/
9. For the 1 Gigabit-TX iSCSI TOE PCI-X Adapter, type the following device package name:  
devices.pci.1410d002
10. Press Enter. The system finds and highlights this device driver software.
11. Press F7 to select the highlighted device driver software.
12. Press Enter.  
The INSTALL ADDITIONAL DEVICE SOFTWARE screen displays. The entry fields are automatically updated.
13. Press Enter to accept the information.  
The ARE YOU SURE window displays.
14. Press Enter to accept the information.  
The COMMAND STATUS screen displays. The term RUNNING is highlighted to indicate that the installation and configuration command is in progress.
15. When RUNNING changes to OK, scroll to the bottom of the page and locate the Installation Summary.  
After a successful installation, SUCCESS displays in the Result column of the Installation 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, “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter” on page 111.

## Verifying AIX software installation

Use this procedure to verify that the device driver for the adapter is installed.

1. If necessary, log in as root user.
2. At the command line, type: `lslpp -l devices.pci.1410d002.rte`
3. Press Enter. Possible results are as follows:
  - If the 1 Gigabit-TX iSCSI TOE PCI-X Adapter device driver is installed, the following is an example of the data that displays on your screen:

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pci.1410d002.rte	5.3.0.0	COMMITTED	1000 Base-TX PCI-X iSCSI TOE Adapter Device Software

Verify that the `devices.pci.1410d002.rte` filesets are installed at the AIX 5.2.0 or later level. If this information displays but you continue to have problems, go to “Installing the 1 Gigabit iSCSI TOE PCI-X Adapter.”

- If no data displays on your screen, the 1 Gigabit-TX iSCSI TOE PCI-X Adapter device driver did not install correctly. Return to “Installing the device driver software for the 1 Gigabit-TX iSCSI TOE PCI-X Adapter” on page 109. If you continue to experience problems, it may be necessary to call your system support organization. Refer to your operating system documentation for instructions.

---

## Installing the 1 Gigabit iSCSI TOE PCI-X Adapter

Use the procedures in this section to install the adapter, verify the adapter installation, and run adapter diagnostics.

### Installing the adapter

Learn how to install the adapter.

**Note:** If you are installing your operating system at this time, install the adapter before you install the operating system. If you are installing only the device driver for this adapter, install the device driver before you install the adapter.

For instructions on how to install PCI adapters, refer to the PCI adapters topic.

After you have installed the adapter, continue on to “Verifying the adapter installation.”

To install your device driver software first, go to “Installing the device driver software for the adapter” on page 108 first, and then return to this section.

### Verifying the adapter installation

Learn how to verify the adapter installation.

At the system prompt:

1. Type `cfgmgr` and then press Enter.
2. Type `lsdev -Cs pci` and then press Enter.

A list of PCI devices displays. If the 1 Gigabit-XX iSCSI TOE PCI-X Adapter installed correctly, an Available status indicates that the adapter is installed and ready to use.

If the message on your screen indicates that your adapter is Defined instead of Available, shut down your server. Verify that the adapter was installed correctly.

## Running adapter diagnostics

Diagnostics are provided with the device driver software. To run diagnostics, refer to your system unit documentation for instructions.

---

## Configuring the 1 Gigabit iSCSI TOE PCI-X adapter

Use the following information to configure the 1 Gigabit iSCSI TOE PCI-X adapter in AIX.

**Note:** You must complete this configuration in order for the adapter to function correctly.

### Overview of configuration process

These are the steps in the configuration process.

1. Install any device-specific storage device support files. See “Installing the device-specific storage support files.”
2. Use the **smit** command to configure the adapter in AIX. See “Configuring the adapter in AIX.”
3. Update the iSCSI targets flat file. See “Updating the iSCSI targets flat file” on page 113.
4. Configure the storage device. See “Configuring the storage device” on page 113.

**Note:**

1. The adapter does not support autonegotiation. Connected devices should be set to 1 gigabit-per-second only.
2. Some Ethernet switch configurations exhibit degraded reliability when configured in a high fan-in topology. Observe conservative LAN resource allocation practices when planning Ethernet storage networks.

### Installing the device-specific storage support files

For the system to function correctly with AIX, storage devices often require support-files. These files might include special utilities or device specific object data manager (ODM) entries.

Refer to the support documentation provided by the manufacturer of the storage device being used.

### Configuring the adapter in AIX

Learn how to configure the adapter using AIX commands.

Using the **smit** command, do the following steps:

1. From the command prompt, type **smit icsi**, then press Enter.
2. In the **smit** menu, move the cursor over the **iSCSI Adapter** entry, then press Enter.
3. In the menu that displays, from the **Change/Show** option, select the number of the adapter you are configuring (Examples: **ics0**, **ics1**). The following is an example of the settings displayed when you select an adapter number:

iSCSI Adapter	[Entry Fields]
Description	ics0
Status	iSCSI Adapter
Location	Available
iSCSI Initiator Name	1f-09
Maximum number of Commands to Queue to Adapter	[ ]
Maximum Transfer Size	[200]                    +#
Discovery Filename	[0x100000]               +
Discovery Policy	[/etc/icsi/targetshw0] *
Automatic Discovery Secrets Filename	file                     +
Adapter IP Address	[/etc/icsi/autosecret>
Adapter Subnet Mask	[10.100.100.14]
Adapter Gateway Address	[255.255.255.0]
	[ ]

Apply change to DATABASE only

no

+

sc+1=Help  
sc+5=Reset  
sc+9=Shell

Esc+2=Refresh  
Esc+6=Command  
Esc+0=Exit

Esc+3=Cancel  
Esc+7=Edit  
Enter=Do

Esc+4=List  
Esc+8=Image

#### Note:

- Set the value for the Maximum number of Commands to Queue to Adapter to be greater than the queue depth times the number of LUNs. For example, for 20 LUNs with a queue depth of 20, the value should be greater than 400.
- To use flat file discovery, the Discovery Policy must be set to "file."
- Change the default file name `/etc/iscsi/targetshw` from `targetshw` to `targetshwx` where `x` is the adapter instance number (Examples: `ics0`, `ics1` ).
- The user may specify the iSCSI node name. If it is not specified, the adapter will use the default iSCSI node name provided by the adapter. To display the iSCSI node name used by a particular adapter, use the `lscfg` command to display the adapter VPD. For example, to display the iSCSI node name for `ics0`, use `lscfg -v1 ics0`. The iSCSI node name is in the **Z1** field of the displayed VPD. The initiator's iSCSI node name may be required to configure some iSCSI targets.
- If the `rmdev` command with the `-d` option is issued, then you must reenter the data in the specified fields.

## Updating the iSCSI targets flat file

When autodiscovery is not used, the 1 Gigabit iSCSI TOE PCI-X adapter obtains the iSCSI target descriptions from a flat file. The default file name is `/etc/iscsi/targetshw`. The information in this file must accurately describe the target devices for this adapter.

## Configuring the storage device

To be visible to the adapter, storage devices must be correctly configured. Often the storage device must be informed of the adapter iSCSI name, and the adapter must be informed of the storage device iSCSI name. Additionally, either or both may need specific permissions to access the other side of the iSCSI connection.

For instruction on configuring the storage device, refer to the support documentation provided by the manufacturer of the storage device.

---

## Connecting the adapter to an Ethernet network

Use this information to learn about connecting the 1 Gigabit iSCSI TOE PCI-X Adapter to your Ethernet network.

### Connecting the 1 Gigabit-SX iSCSI TOE PCI-X adapter (optical connector) to an Ethernet network

The fiber adapters are designed with specifications that the cable be a dual-cable connector, with transmit and receive cable ends clamped together. If you use separate transmit and receive fiber cables, clamp the cables together to enhance the retention strength on the fiber transceiver connector. Clamping the cables together also improves the alignment of the fibers with the connector and is designed to improve overall performance.

**Note:** Only one type of network can be attached to the adapter at a time.

## Understanding the adapter LED

The LED on the 1 Gigabit-SX iSCSI TOE PCI-X Adapter provides information about the card's link status. The LED is visible through the card's mounting bracket and indicates the following conditions.

Light	State	Description
Green	On	Good Link
Green	Off	No link: could be the result of a bad cable, bad connector, or configuration mismatch

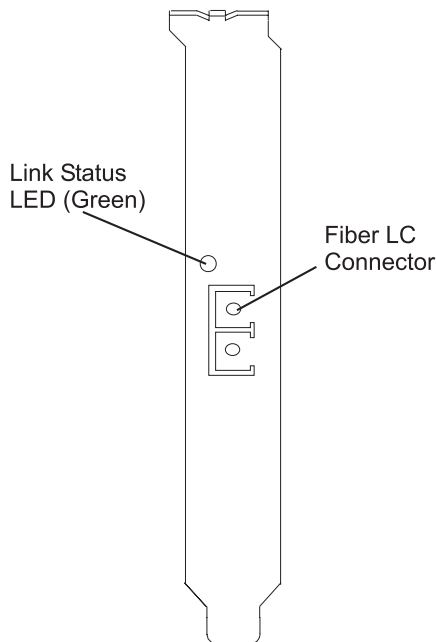


Figure 27. LED on the 1 Gigabit-SX iSCSI TOE PCI-X Adapter

## Connecting the network cables and adapter

Use these instructions to connect the adapter to your network.

Before you begin connecting the adapter, make sure you have the hardware listed in “Verifying your hardware requirements” on page 107.

To connect the adapter to the multimode fiber network:

- Insert the male LC Fiber Optic Connector into the adapter LC connector.
- Insert the male LC Fiber Optic connector of the other end of the cable into the network switch.

## Connecting the 1 Gigabit-TX iSCSI TOE PCI-X adapter (copper connector) to an Ethernet network

Only one type of network can be attached to the adapter at a time.

## Connecting the network cables and adapter

Use these instructions to connect the adapter to your network.

Before you begin connecting the adapter, make sure you have the hardware listed in “Verifying your hardware requirements” on page 107.

To connect the adapter to an unshielded twisted pair (UTP) network, do the following steps:

1. Insert the RJ-45 jack of the UTP cable into the RJ-45 connector on the adapter.
2. Insert the RJ-45 jack of the other end of the UTP cable into the network switch.

## Understanding the adapter LED

The LED on the 1 Gigabit-TX iSCSI TOE PCI-X Adapter provides information about the card's link status. The LED is visible through the card's mounting bracket and indicates the following conditions.

Light	State	Description
Green	On	Good Link
Green	Off	No link: could be the result of a bad cable, bad connector, or configuration mismatch

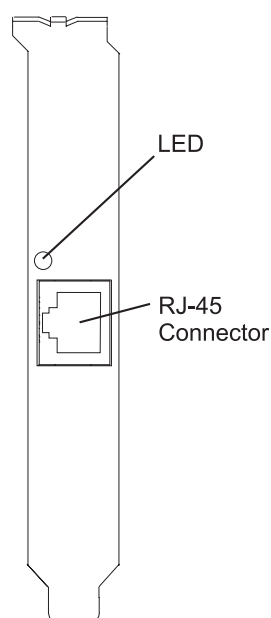


Figure 28. LED on the 1 Gigabit-TX iSCSI TOE PCI-X Adapter

---

## Resolving configuration errors

Learn about config logging information, iSCSI TOE adapter error log information (ICS\_ERR template), and iSCSI TOE protocol driver error log detail (ISCSI\_ERR template).

This information might be useful for resolving configuration errors.

### Config logging information

It might be helpful to use the config log facility when trying to debug the iSCSI environment.

The most common error scenario is when `cfgmgr -vl ics0` completes successfully, but does not create any hdisks, or creates fewer hdisks than expected. Several common configuration errors can lead to this scenario. The `cfglog` can be used to determine which of several common errors may have occurred.

You can run the following command to display any captured config log data:

```
alog -o -t cfg
```

To display information about the log file configuration, such as the location of the log file, run:



```
alog -L -t cfg
```

If config logging is not enabled, it can be enabled as follows:

```
export CFGLOG=""  
echo "Create cfglog" | alog -t cfg
```

A useful debug method is to perform the following steps:

```
rmdev -Rl ics<x>  
rm /usr/adm/ras/cfglog  
echo "Create cfglog" | alog -t cfg  
cfgmgr -l ics<x>  
alog -o -t cfg
```

Some common errors will cause the open of the iSCSI protocol device driver to fail. In this case, the `cfglog` will contain a message such as the following, where `XX` is an error number from `errno.h`

```
open of /dev/iscsi0 returned XX" where XX is an error number from errno.h.
```

The value returned by the open can indicate the problem. Two common values that can be caused by a configuration error are 69 (ENETDOWN) and 70 (ENETUNREACH).

The return code 69 indicates that the link attached to the iSCSI adapter is physically down. Check to see if the cable is correctly plugged in.

The return code 70 indicates that the link is up, but that the adapter was unable to obtain a client address from DHCP. If the adapter's `host_addr` attribute is not set to a valid IP address, the adapter will attempt to acquire an IP address from a DHCP server. If no DHCP server provides an IP address, the open will fail with a return code 70.

After a successful open, the configuration method will attempt to start the device. If the `SCIOSTART` ioctl fails, it will prevent the discovery of the hdisks. A failure of `SCIOSTART` will be recorded in the config log as follows:

```
SCIOSTART failed, errno = E, status_class = C, status_detail = D
```

If the values of `C` or `D` for the Status Class and Status Detail are nonzero, it indicates that the iSCSI login failed. The Status Class and Status Detail are values returned in the iSCSI login response. The meaning of the Status Class and Status Detail values are documented in the iSCSI RFC 3270.

The `SCIOSTART` ioctl may also fail before it attempts the iSCSI login. If the Status Class and Status Detail are both zero but `Errno` is nonzero, then the ioctl failed before the login occurred.

Two common `errno` values returned by the `SCIOSTART` ioctl are 73 (ECONNRESET) and 81 (EHOSTUNREACH).

The `errno` 73 indicates that the target IP address refused the TCP connection that the iSCSI adapter attempted. One possible cause is that the wrong TCP port number is specified in the `/etc/iscsi/targetshw<x>` configuration file.

The `errno` 81 indicates that the iSCSI adapter did not get any response from the target's IP address. In other words, the iSCSI adapter cannot ping the target's IP address.

If the iSCSI adapter does not discover any new hdisks, and the `cfglog` does not reveal any of those errors, the following are other possibilities.

- If the syntax of the `/etc/iscsi/targetshw<x>` file is incorrect, the configuration method will not attempt to open or start the device, so the preceding errors will not appear.
- If the target device is accessible but no LUNs are assigned to the device, no error will appear, but there will be a message indicating 0 luns found.





Table 25. Detail sense data descriptions (continued)

Data	Description
H	Type of data in the error log. Possible values: <ul style="list-style-type: none"> <li>• 0 - None</li> <li>• 1 - Mailbox</li> <li>• 2 - IOCB</li> <li>• 3 - Register data</li> <li>• 4 - Driver data</li> <li>• 5 - qlisc_cmd data</li> <li>• 6 - Raw data</li> <li>• 7 - Return code data</li> </ul>
Y	Link Speed
R	These values are reserved for future use.
I	IP address of adapter
P	Port Number of target.
S	Adapter State
U	Number of iSCSI nodes known
L	Poll Lbolt value
E	Lbolt of last adapter reset
D	No DMA resource count
M	No adapter IOCBs available
F	Number of Input requests
G	Number of Outbound requests
J	Number of control requests
K	Total number of Input bytes
F	Total number of Output bytes
Q	Current lbolt value
N	iSCSI name of target
T	If command was for IOCB, then this contains IOCB that failed
W	I/O Handle of next IOCB
Z	How often Link stat timer is running (in seconds)
2	Number of IOCBs issued
3	Number of mailboxes issued
4	Number of link down events
5	MAC bytes received
6	MAC CRC error count
7	MAC encoding error count
8	Number of IP packets transmitted
9	Number of IP bytes transmitted
#	Number of IP packets received
\$	Number of IP bytes received
%	IP fragment received overlap count
&	Transmitted iSCSI PDU count

Table 25. Detail sense data descriptions (continued)

Data	Description
*	Transmitted iSCSI data bytes
@	Received iSCSI PDU count
?	Received iSCSI data bytes

**Special detail sense data**(AAAA AAAA is the general error field.)

This format is used for logging bulk data such as a crash record or an IOCB request or completion queue. The first line of the detail data has a special format and all remaining lines of the detail data contain the bulk data being logged. Note that the bulk data may take up more than one of these records. The first line of the entry contains information to piece the data together. The first line is:

XXXX XXXX AAAA AAAA BBBB BBBB CCCC CCCC DDDD DDDD EEEE EEEE FFFF FFFF 0000 0000

The following table shows how to interpret the special detail sense data:

Table 26. Special detail sense data descriptions

Data	Description
X	Not used
A	Number determined by the adapter driver based on the error. At present it will always be "0xFF" for the special format.
B	Return code from an operation
C	Segment number of the data in this record
D	Offset of the beginning of this record in the total data
E	Length of valid data in this record
F	Total length of data to be logged

For example, when logging a crash record the total length is usually 0x1000 bytes. Each of these records can contain 0x300 bytes and there will be six of these error report entries. The first five segments will be numbered 1, 2, 3, 4, 5 with length of 0x300 and offsets of x0, x300, x600, x900, xC00. The sixth entry will be segment 6 with length of x100 and offset 0xf00.

Table 27. Error Number Values

Error Number	Error Template	Description of Error
0x23	ICS_ERR6	DHCP lease expired. Link is no longer usable.
0x25	ICS_ERR6	Adapter Reset Timer expired
0x26	ICS_ERR6	Mailbox time-out, mailbox provided
0x27	ICS_ERR2	IOCB time-out
0x28	ICS_ERR2	Time-out on invalid type timer
0x29	ICS_ERR6	D_MAP_LIST failed return code provided. May need to increase the max_xfer_size attribute for the adapter icsX
0x2A	ICS_ERR6	Time-out on invalid type timer
0x2B	ICS_ERR6	Received completion for adapter originated IOCB, but could not find the original IOCB.
0x2C	ICS_ERR6	Size of mailbox IOCB is not equal to mb info size
0x2E	ICS_ERR2	Abort time out

Table 27. Error Number Values (continued)

Error Number	Error Template	Description of Error
0x2F	ICS_ERR6	Received unsolicited IOCB and protocol driver does not handle unsolicited IOCBs
0x30	ICS_ERR2	Adapter reported fatal error
0x31	ICS_ERR6	Invalid command entry type, command provided.
0x32	ICS_ERR6	Invalid command opcode, command provided.
0x33	ICS_ERR6	Invalid command entry type, command provided.
0x34	ICS_ERR6	Invalid command opcode, command provided.
0x36	ICS_ERR6	Stub routine called.
0x4B	ICS_ERR6	D_MAP_INIT in config INIT failed, size of DMA resources provided in return code field
0x4C	ICS_ERR6	D_MAP_INIT at open time failed, size of DMA resources provided in return code field
0x4D	ICS_ERR6	Could not allocate delay timer at open time.
0x4E	ICS_ERR6	Could not allocate poll timer at open time
0x50	ICS_ERR10	Debug Only Trace. Target is reporting busy. IOCB, and cmd included.
0x51	ICS_ERR6	Invalid type or parameter error, IOCB, and cmd included.
0x52	ICS_ERR6	DMA error occurred, IOCB and cmd included.
0x53	ICS_ERR6	Entry State Flag error, IOCB and cmd included.
0x55	ICS_ERR6	Unknown Async IOCB received. IOCB included.
0x65	ICS_ERR6	Should never occur
0x71	ICS_ERR6	Exceeded delay waiting for I/O to complete before download operation.
0x7A	ICS_ERR2	Failed to get NVRAM semaphore for extracting VPD.
0x83	ICS_ERR6	EEH callback function with unsupported parameter..EEH_DD_DEBUG.
0x90	ICS_ERR6	Cannot issue Login because of invalid mode. Mode, origin, and ddb_dev_index provided
0x91	ICS_ERR6	Cannot issue Logout because of invalid mode. Mode, origin, and ddb_dev_index provided
0x92	ICS_ERR6	Cannot get DDB because of invalid mode. Mode, origin, and ddb_dev_index provided
0x93	ICS_ERR6	Cannot set DDB because of invalid mode. Mode, origin, and ddb_dev_index provided
0x94	ICS_ERR6	Cannot do a Get Management data mailbox. Mode, origin, and ddb_dev_index provided
0x95	ICS_ERR6	Cannot do a Read Flash ROM mailbox because of of invalid mode. Mode and origin provided
0x96	ICS_ERR6	Cannot do a Write Flash ROM mailbox because of invalid mode. Mode, origin provided
0x97	ICS_ERR6	Cannot do a ping because of invalid mode. Mode, address provided
0x98	ICS_ERR6	Cannot get crash record data because of invalid mode, Mode, data size and origin provided.
0x99	ICS_ERR6	Cannot free DDB because of invalid mode. Mode, origin, and ddb_dev_index provided
0x9A	ICS_ERR6	Cannot get About Firmware data because of invalid mode. Mode, origin provided.

Table 27. Error Number Values (continued)

Error Number	Error Template	Description of Error
0x9B	ICS_ERR6	Cannot get init firmware control block data because of invalid mode. Mode, origin provided.
0x9A	ICS_ERR6	Cannot get firmware state because of invalid mode. Mode, origin provided.
0xA0	ICS_ERR6	Received Mailbox completion, but do not have any mailboxes active. Mailbox completion and last know mailbox IOCB sent included
0xA2	ICS_ERR6	Get Initialize Firmware mailbox failed, completion mailbox and original mailbox provided.
0xA3	ICS_ERR6	Initialize Firmware mailbox failed, completion mailbox and original mailbox provided.
0xA4	ICS_ERR6	Failed to build Get Firmware State after Initialize Firmware, Return code included.
0xA5	ICS_ERR6	Failed to build Get Crash Record mailbox.
0xA6	ICS_ERR6	Failed to build Get DDB mailbox.
0xA7	ICS_ERR6	Get DDB mailbox failed, mailbox, rc, and original mailbox included
0xA8	ICS_ERR6	Number of iSCSI nodes known by adapter has decreased.
0xA9	ICS_ERR6	Failed to build Get Firmware State after Initialize Firmware, Return code included.
0xAA	ICS_ERR6	Issued Get DDB mailboxes, but have no previously known nodes.
0xAB	ICS_ERR6	Get Crash Record mailbox failed.
0xAC	ICS_ERR6	Get Crash Record succeeded. Crash record data follows in "0xFF" error report entries.
0xAD	ICS_ERR6	Unknown mailbox completed. mailbox included.
0xAE	ICS_ERR6	Unrecoverable error reported by Get Firmware State
0xB0	ICS_ERR2	Mailbox completed with busy status, completion mailbox and original included.
0xB1	ICS_ERR2	Mailbox failed with invalid parameter or invalid command. Mailbox included
0xB2	ICS_ERR2	Mailbox failed. Mailbox included.
0xB3	ICS_ERR2	Mailbox failed with unknown status. Mailbox included.
0xC0	ICS_ERR2	Adapter reported system error.
0xC1	ICS_ERR10	Debug only log, Link up
0xC2	ICS_ERR10	Debug only log. Link Down
0xC3	ICS_ERR10	Debug only log. Adapter reported DDB change
0xC4	ICS_ERR10	Debug only log. Adapter's IP addresss or MAC address changed
0xC5	ICS_ERR10	Debug only log. iSNS message received.
0xC6	ICS_ERR1	Adapter reporting self test failure.
0xC7	ICS_ERR2	NVRAM invalid async mailbox received
0xC8	ICS_ERR2	Async message reporting login, heartbeat, DNS, failures.
0xC9	ICS_ERR2	Unknown Async mailbox received.
0xCA	ICS_ERR10	SCSI Command PDU rejected
0xCB	ICS_ERR6	Build get DDB entry mailbox failed
0xCC	ICS_ERR10	Link dead flag set (link down longer than link timeout period
0xD0	ICS_ERR2	Reset Adapter failed. Reset step provided.

Table 27. Error Number Values (continued)

Error Number	Error Template	Description of Error
0xD1	ICS_ERR2	Reset Adapter failed. Adapter reported Fatal Error
0xD2	ICS_ERR2	Reset Adapter failed. Adapter self test did not complete
0xDEAD	ICS_ERR1	All retries of adapter reset failed.
0xE0	ICS_ERR6	Failed to allocate iSCSI entry list.
0xE1	ICS_ERR6	Failed to create new node entry for CHAP entry
0xE2	ICS_ERR7	Failed to initialize EEH
0xF0	ICS_ERR6	D_MAP_INIT for microcode download failed
0xF1	ICS_ERR6	D_MAP_PAGE for microcode download failed.
0xF2	ICS_ERR6	Failed to build write FLASH mailbox
0xF3	ICS_ERR6	Get DDB entry mailbox failed.
0xF4	ICS_ERR6	Set DDB entry mailbox failed.
0xF5	ICS_ERR6	Could not find empty slot for CHAP secret
0xF6	ICS_ERR6	Could not get CHAP secret entry from FLASH
0xF7	ICS_ERR6	Secrets memory area pointer unexpectedly NULL
0xF8	ICS_ERR6	Build get DDB entry mailbox failed
0xF9	ICS_ERR6	Could not write to FLASH to erase CHAP secret
0xFA	ICS_ERR2	SCSI IOCB Command queue data follows. RC is current queue head. (debug driver only)
0xFB	ICS_ERR2	SCSI IOCB completion queue data follows. RC is current queue head. (debug driver only)
0xFF	ICS_ERR6	Crash record or queue data. Special format for detailed sense data.

## iSCSI TOE protocol driver error log detail (ICS\_ERR template)

Learn about the error log entries made by the iSCSI protocol driver.

- Table 28 on page 123 shows the detail sense data layout.
- Table 29 on page 123 shows the detail sense data descriptions.
- Table 30 on page 124 shows the error number values.

Table 28. Detail Sense Data

AAAA AAAA is the general error field.

```

XXXX VVVV AAAA AAAA BBBB BBBB CCHH RRRR YYYY YYYY TTTT TTTT LLLL LLLL LLLL LLLL
IIII IIII IIII IIII IIII IIII IIII IIII EEEE EEEE EEEE EEEE EEEE EEEE EEEE EEEE
QQQQ QQQQ QQQQ QQQQ QQQQ QQQQ QQQQ QQQQ ZZZZ ZZZZ ZZZZ ZZZZ ZZZZ ZZZZ ZZZZ ZZZZ
NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN
NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN
NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN
NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN
NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN
NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN
NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN NNNN
JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ
JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ JJJJ
TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT
TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT
DDDD DDDD DDDD DDDD DDDD DDDD DDDD DDDD DDDD DDDD DDDD DDDD GGGG GGGG GGGG GGGG
GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG
GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG GGGG
MMMM MMMM MMMM MMMM PPPP PPPP PPPP PPPP KKKK KKKK KKKK KKKK UUUU WSS 1111 1111
2222 2222 2222 2222 3333 3333 3333 3333

```

Table 29. Detail sense data descriptions

Data	Description
X	Device type ID. X value of 0 indicates Qlogic iSCSI protocol driver.
V	Valid length of detail.
A	Determined by the adapter driver based on the error.
B	Return code from either the adapter driver output routine or control function.
C	Discovery policy. Possible values: <ul style="list-style-type: none"> <li>• 0 - Unknown how the adapter is connected</li> <li>• 1 - This adapter is using flat file discovery</li> <li>• 2 - This adapter is using SLP</li> </ul>
H	Type of data in the error log. Possible values: <ul style="list-style-type: none"> <li>• 0 - IOCB</li> <li>• 1 - CMD Element</li> <li>• 2 - Raw/General</li> </ul>
Y	Status value of the control element returned by the adapter driver.
T	Time-out value of command.
L	Lun id to which this request was issued
I	This value is the 128-bit IP address of this adapter.
E	This value is the 128-bit IP address of the device to which this command was sent.
Q	The iSCSI CDB that failed.
Z	Additional CDB
R	These values are reserved for future use.
N	Target name
J	If the type of data is IOCB, then is the failed command IOCB
T	If the type of data is IOCB, this is the reply IOCB
D	DSD array for this command
G	This is used for the first 72 bytes of autosense

Table 29. Detail sense data descriptions (continued)

Data	Description
M	Bus real address of SCSI CDB
P	Bus real address of Auto sense buffer
K	Bus real address of DSD list
U	scsi_buf version
W	q_tag_msg
S	cmd_type
1	Variable CDB len
2	Port Number
3	num_start_LUNs for this target
F	This is used for the address of the failing scsi_info structure.
P	Port Number
G	Time out value
U	Number of remaining active commands for this device if it is LUN specific
S	Qstate if command is to a specific LUN
N	First 242 bytes of the the iSCSI name of the target.
M	Target State if applicable
P	Open count since device configured
2	Preempt count for fairness
3	Flags from target
4	Adapter specific stats from ndd_specstats: CRC
5	transmit data in megabytes since opened
6	received data in megabytes since opened
7	Number of writes since opened
8	Number of reads since opened
9	Number of nondata requests since opened
#	Number of times a request was not sent because no command elements
%	lbolt when last opened
*	lbolt of current request

Table 30. Error number values

Error Number	Error Template	Description of Error
0x1	ISCSI_ERR4	Command Time-out in SCIOINQU. dev_info information is included.
0x2	ISCSI_ERR4	Command Time-out in SCIOSTUNIT. dev_info information is included.
0x3	ISCSI_ERR4	Command Time-out in Test Unit Ready IOCTL. dev_info information is included.
0x4	ISCSI_ERR4	Command Time-out in Read Block Ioctl. dev_info information is included.
0x5	ISCSI_ERR6	SCIOLNMSRV control request to the adapter driver failed
0x6	ISCSI_ERR6	SCIOSTART failed since target IP address or iSCSI name is the same as this adapter.
0x7	ISCSI_ERR6	Trace table failed to allocate
0x8	ISCSI_ERR6	size of SCIOLNMSRV is not multiple of word.



Table 30. Error number values (continued)

Error Number	Error Template	Description of Error
0x10	ISCSI_ERR13	Only logged when debug is turned on . An LUN reset (SCIORESET) ioctl call failed with EINVAL, most likely because LUN reset is not supported for this device, so a target reset was issued instead.
0x11	ISCSI_ERR6	Invalid kernext handle passed to strategy.
0x12	ISCSI_ERR6	Version 0 scsi_buf or no kernext handle passed to strategy
0x13	ISCSI_ERR6	SC_DEV_RESTART received but has a scsi command in it.
0x14	ISCSI_ERR6	Only logged when debug is turned on. An unexpected SC_Q_CLR was received
0x15	ISCSI_ERR6	Only logged when debug is turned on. A SC_DEV_RESTART command was received.
0x16	ISCSI_ERR6	Only logged when debug is turned on . A SC_TARGET_RESET command was received
0x17	ISCSI_ERR6	Only logged when debug is turned on . A SC_LUN_RESET command was received
0x18	ISCSI_ERR6	An invalid scsi_buf was received in the strategy routine.
0x19	ISCSI_ERR6	A SCSI Command with no command length is about to be issued.
0x1A	ISCSI_ERR6	Invalid control element received from adapter driver.
0x1B	ISCSI_ERR6	Invalid IOCB entry type for control element completion.
0x1C	ISCSI_ERR6	Unknown unsolicited IOCB received.
0x1D	ISCSI_ERR6	Control element received from adapter driver, but is not active. cmd included.
0x1E	ISCSI_ERR6	Unknown mailbox command completion received.
0x1F	ISCSI_ERR6	Processing completion of marker command but invalid IOCB or target.
0x20	ISCSI_ERR6	Timeout for an unknown device.
0x21	ISCSI_ERR6	Timeout for an unknown device. ID/Lun is not valid. target_info information is included.
0x22	ISCSI_ERR6	A command completed before it was to be timed out (i.e. the command completed within milliseconds of timing-out).
0x23	ISCSI_ERR6	Timeout for command that is not active. dev_info information is included.
0x26	ISCSI_ERR4	A device cancel timed-out. There are still commands active at the adapter, which were not flushed back. dev_info information is included.
0x27	ISCSI_ERR6	A device cancel timed-out and the retry of the cancel failed. dev_info information is included.
0x28	ISCSI_ERR4	A target cancel timed-out. target_info information is included.
0x29	ISCSI_ERR4	A login issued to the adapter driver's cmd entry point timed out. target_info information is included.
0x2A	ISCSI_ERR4	A Pass thru IOCB timed out.
0x2B	ISCSI_ERR4	Proc level task management function (SCIORESET) timed-out. command is included
0x2C	ISCSI_ERR4	Interrupt level task management function (Target Reset) timed-out. command is included
0x2D	ISCSI_ERR6	Wait for DDB time-out occurred.
0x2E	ISCSI_ERR4	Data underrun detected by adapter, the command is included.
0x2F	ISCSI_ERR4	An unknown time-out occurred.
0x30	ISCSI_ERR2	Async status received from adapter indicates a complete adapter failure

Table 30. Error number values (continued)

Error Number	Error Template	Description of Error
0x31	ISCSI_ERR2	Only logged when debug is turned on . Async status received from adapter driver indicating link is dead
0x32	ISCSI_ERR4	Only logged when debug is turned on. Async status received from adapter driver indicating link is down.
0x33	ISCSI_ERR4	Only logged when debug is turned on. Async status received from adapter driver indicating link is up.
0x34	ISCSI_ERR4	Only logged when debug is turned on. Async status received from adapter driver indicating a LOGO was received for a device. target_info information is included
0x35	ISCSI_ERR4	Only logged when debug is turned on . Async status received from adapter driver indicating a State Change Notification was received. target_info information is included.
0x36	ISCSI_ERR2	Only logged when debug is turned on . The adapter has been halted.
0x37	ISCSI_ERR2	Only logged when debug is turned on . The adapter has been resumed after being halted.
0x38	ISCSI_ERR13	Only logged when debug is turned on. Async status received from adapter driver indicating PDU was rejected.
0x39	ISCSI_ERR6	Only logged when debug is turned on. Async status received from adapter driver indicating DDB change
0x3A	ISCSI_ERR2	Only logged when debug is turned on. Unknown async NDD status received from adapter driver
0x3B	ISCSI_ERR6	Unknown async status received from adapter driver
0x3C	ISCSI_ERR13	Async status for DDB change received indicating device is different.
0x3D	ISCSI_ERR4	Only logged when debug is turned on. Async status received from adapter indicating DHCP lease expired.
0x40	ISCSI_ERR2	Adapter dd detected error that indicates HOST IO BUS ERROR. cmd element included
0x41	ISCSI_ERR2	Adapter dd detected error that indicates adapter hardware failure. cmd element included.
0x42	ISCSI_ERR4	Adapter dd detected error that indicates adapter software failure. cmd element included.
0x43	ISCSI_ERR4	Adapter dd detected an unknown error status from the adapter driver.cmd element included.
0x44	ISCSI_ERR13	Device returning busy status.
0x45	ISCSI_ERR4	Adapter reporting an invalid IOCB. cmd element included
0x46	ISCSI_ERR2	Adapter reporting DMA error on IOCB. cmd element included
0x47	ISCSI_ERR4	Adapter reporting an entry state flag error. cmd element included
0x48	ISCSI_ERR6	IOCB failed with invalid parameter. Cmd included
0x49	ISCSI_ERR2	IOCB failed with DMA error. Cmd included.
0x4A	ISCSI_ERR10	IOCB failed with transport error. Cmd included.
0x4B	ISCSI_ERR10	OCB failed because data direction specified from device is different from IOCB. Cmd included.
0x4C	ISCSI_ERR6	IOCB failed because Queue full. Cmd included.
0x4D	ISCSI_ERR13	IOCB failed because device at DDB dev index changed. Cmd included.

Table 30. Error number values (continued)

Error Number	Error Template	Description of Error
0x4E	ISCSI_ERR10	IOCB failed because device indicated the device has a duplicate tag. Cmd included.
0x4F	ISCSI_ERR6	IOCB failed with unknown error status, cmd included.
0x51	ISCSI_ERR6	Could not issue Cancel for above failing a command which has not received an interrupt. dev_info information is included.
0x60	ISCSI_ERR4 or ISCSI_ERR6	Call to adapter driver's output entry point failed to accept a control element for SCSI command. The return code is included. cmd element included
0x61	ISCSI_ERR4 or ISCSI_ERR6	Call to adapter driver's output entry point failed to accept a cancel control element. The return code is included. cmd element included
0x62	ISCSI_ERR4 or ISCSI_ERR6	Output routine failed to accept target reset or a device. The return code is included. target_info information included.
0x63	ISCSI_ERR4 or ISCSI_ERR6	Output routine failed to accept LUN reset for a device. The return code is included. dev_info information included.
0x64	ISCSI_ERR4 or ISCSI_ERR6	Output routine failed to accept Abort Task Set for a device. The return code is included. dev_info information included.
0x65	ISCSI_ERR4 or ISCSI_ERR6	Output routine failed to accept Clear ACA for a device. The return code is included. dev_info information included.
0x66	ISCSI_ERR4 or ISCSI_ERR6	Output routine failed to accept Marker for a device. The return code is included dev_info information included.
0x67	ISCSI_ERR4 or ISCSI_ERR6	Output routine failed to accept normal Passthru IOCB for a device. The return code is included. command is included
0x70	ISCSI_ERR2	Timed out waiting for either link to come up or DHCP server to reestablish our lease. The rc fields indicates which of these two is the case.
0x71	ISCSI_ERR2	Timed out waiting for the adapter to resume.
0x80	ISCSI_ERR6	Ioctl issue task management command failed from adapter driver returned error. cmd included.
0x81	ISCSI_ERR6	Ioctl issue task management command failed. cmd included.
0x82	ISCSI_ERR6	non-Ioctl issued task management command failed from adapter driver returned error. cmd included.
0x83	ISCSI_ERR6	non-Ioctl issued task management command failed. cmd included.
0x84	ISCSI_ERR6	Unknown task management command failed. cmd included.
0x85	ISCSI_ERR6	Unknown task management command completed. cmd included.
0x86	ISCSI_ERR6	Unable to cancel task management command.
0x87	ISCSI_ERR6	Unknown task management command timed-out.
0x90	ISCSI_ERR6	Unknown Passthru IOCB completion status returned.
0x91	ISCSI_ERR6	Only displayed with debug driver . Passthru IOCB issued from ioctl failed.
0x92	ISCSI_ERR6	Passthru IOCB not-issued from ioctl failed.
0x93	ISCSI_ERR2	Cancel (Internal Lun Reset) failed.
0x94	ISCSI_ERR6	Cancel completed but has no device associated
0x95	ISCSI_ERR10	Adapter detected underrun/overrun
0x96	ISCSI_ERR13	Async PDU with autosense data received.
0x97	ISCSI_ERR13	Target is requesting logout. Target included.
0x98	ISCSI_ERR13	Target will drop this connection or all connections. Target included
0x99	ISCSI_ERR13	Target requesting renegotiation of iSCSI parameters. Target included

Table 30. Error number values (continued)

Error Number	Error Template	Description of Error
0x9A	ISCSI_ERR13	Unknown Async IOCB received. Control element included.
0x9B	ISCSI_ERR10	Only displayed with debug driver. Check condition with autosense data length returned from a SCSI command, but the key fields of the autosense data are all 0.
0xA0	ISCSI_ERR13 or ISCSI_ERR6	A command entry point command was returned from the adapter with an error. This command was for a Login. target_info is included
0xA1	ISCSI_ERR13	A command entry point relogin command returned successfully, but the device at this N_Port ID is different (i.e a different iSCSI name) target_info is included
0xA2	ISCSI_ERR13 or ISCSI_ERR6	A command entry point command was returned from the adapter with an error. This command was for a Logout. target_info is included
0xA4	ISCSI_ERR6	Unknown cmd was sent from the adapter driver to protocol driver
0xB1	ISCSI_ERR4 or ISCSI_ERR6	Adapter driver's cmd entry point rejected a login/logout operation. target_info is included
0xC0	ISCSI_ERR6	Multiple matches for target_info found with same iSCSI name.
0xC1	ISCSI_ERR6	Failed to issue cancel prior to Clear ACA.
0xE0	ISCSI_ERR6	IP address not IPV4 nor IPV6 for ioctl iSCSI login
0xE1	ISCSI_ERR6	IP address not IPV4 nor IPV6 for non-ioctl iSCSI login

---

## Chapter 32. POWER GXT145 PCI Express Graphics Accelerator (FC 5748)

Learn about the features, requirements, installation notes, and troubleshooting tips for the POWER™ GXT145 PCI Express Graphics Accelerator.

### Overview

The POWER GXT145 graphics adapter is a PCI Express (PCIe) adapter that accelerates and enhances the system unit video. The adapter has no hardware switches to set. Mode selection is made through the software. Figure 29 shows the adapter and its connectors.

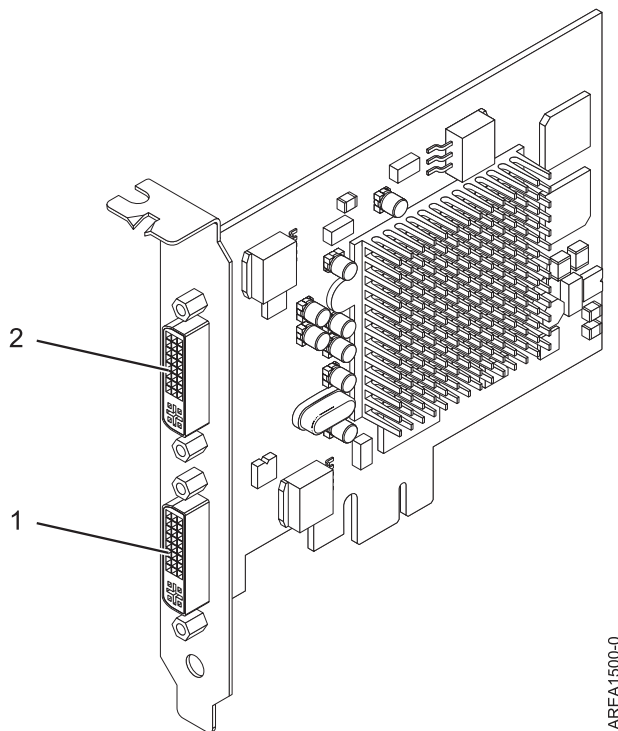


Figure 29. POWER GXT145 PCI Express Graphics Accelerator

- 1 Primary DVI connector, 28 pin, analog or digital
- 2 Secondary DVI connector, 28 pin, analog or digital

Connect the primary monitor to connector 1. If you are using an optional, secondary monitor, connect the secondary monitor to connector 2. For AIX, the video that is displayed on the secondary monitor is the same as the video displayed the primary monitor, and at the same resolution and refresh rate.

The following table shows the feature code, custom card identification number and field-replaceable unit part number for the adapter.

feature code (FC)	custom card identification number (CCIN)	field-replaceable unit (FRU) part number
5748	5748	10N7756*

feature code (FC)	custom card identification number (CCIN)	field-replaceable unit (FRU) part number
Designed to comply with RoHS requirement		

This adapter provides the following features:

- 8-bit indexed or 24-bit true color.
- 32 MB SDRAM frame buffer.
- x1 PCIe bus interface.
- Two DVI-I analog or digital connectors.
- One monitor connected, analog, up to 2048 x 1536 resolution.
- One monitor connected, digital, up to 1280 x 1024 resolution.
- A second monitor supported on secondary connector at up to 1600 x 1200 analog or 1280 x 1024 digital.
  - For Linux, a second monitor is supported on the secondary connector at resolutions up to 1600 x 1200 analog or 1280 x 1024 digital.
  - For AIX, when running with two monitors, both monitors must have an analog connection with the same resolution, up to 1600 x 1200. The image on the primary monitor will also be displayed on the secondary monitor.
- Display power management: Video Electronics Standards Association (VESA), Display Power Management Signaling (DPMS)

## Operating system or partition requirements

The adapter is supported under the following operating systems:

- AIX 5L Version 5.3 with the 5300-06 Technology Level or later
- AIX 5L Version 5.2 with the 5200-10 Technology Level or later
- Red Hat Enterprise Linux version 4.5
- SUSE Linux Enterprise Server 10 SP1

If you require support on another AIX release, ensure that the adapter is supported on that release before you install the adapter. Contact service and support for assistance.

## Preparing for installation

If you are installing the operating system at this time, install the adapter before you install the operating system. See “Installing the adapter” on page 131 for instructions. If you are installing only the device driver for this adapter, install the device driver software before you install the adapter. See “Installing the device driver software” on page 131 for instructions.

## Gathering tools and documentation

To install the adapter, make sure you have access to the following items:

- The adapter
- The operating system documentation
- The system service guide for removing and replacing features
- The PCI adapter placement or PCI adapter placement
- A flat-blade screwdriver
- The media containing the device driver software

## Installing the device driver software

This section explains how to install device driver software for the adapter. The device driver is provided for the AIX 5L operating system.

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example, the CD) into the media device.  
If your system does not have a CD-ROM drive, refer to your system documentation for performing a Network Installation Management (NIM) installation.
3. Type the following System Management Interface Tool (SMIT) fast path command: `smit devinst`
4. Press Enter. The Install Additional Device Software window highlights the **INPUT device / directory for software** option.
5. Type the name of the input device that you are using, or press F4 to select the input device from a list.
6. Press Enter. The Install Additional Device Software window highlights the SOFTWARE to install option.
7. Press F4 to select List.
8. Type / to display the Find window.
9. Type the device package name `devices.pci.2b102725`.
10. Press Enter. The system finds and highlights this device driver software.
11. Press F7 to select the highlighted device driver software.
12. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE window displays. The entry fields are automatically updated.
13. Press Enter to accept the information. The ARE YOU SURE window displays.
14. Press Enter to accept the information. The COMMAND STATUS window displays.
  - The message RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the installation summary.
  - After a successful installation, SUCCESS displays in the Result column of the installation summary at the bottom of the page.
15. Remove the installation media from the drive.
16. Press F10 to exit SMIT.

## Installing the adapter

This section explains how to install the adapter. If you are installing your operating system at this time, install your adapter before you install the operating system. If the operating system is already installed and you need to install the device driver for this adapter, install the device driver software before you install the adapter. See “Installing the device driver software” for instructions.

**Attention:** Before installing an adapter, review the precautions in “Safety information” on page 2 and “Handling static-sensitive devices” on page 3. Do not remove the adapter from its anti-static package until you are ready to place it in the system unit.

To install the adapter, follow these steps:

1. Determine the PCIe slot in which to place the adapter.



The POWER GXT145 graphics adapter has an x1 PCIe connector and can be placed in a PCIe x1, x4, x8 or x16 slot. See the PCI adapter placement or PCI adapter placement for information about the PCIe slots on your system unit.

2. Shut down the system unit and install the adapter using the instructions in the system unit documentation.
3. Connect the monitor cable to the adapter.  
If necessary, you can use a DVI-A dongle (feature code 4276) for connecting a VGA 15-pin connector on a monitor cable to the DVI connector on the adapter. For example, a DVI-A dongle is needed to connect to a TF3 console or a KVM switch.
4. Start the system unit and the monitor.
5. When prompted, configure the adapter by following the online configuration instructions.
6. When **Select Display** (console) appears, press the number key on your keyboard for the monitor that is to be the default.

## Troubleshooting

If you have video problems after the initial installation, follow these procedures to troubleshoot the problem:

- Check the cables.
- Check the device driver software installation.
- Check the console.
- Check the adapter installation.

### Checking the cables

1. Ensure the monitor cables are connected to the correct adapter.
2. If you have more than one video adapter, be sure that each adapter is connected to a monitor.
3. Verify that the connections are secure.
4. If no log-in prompt appears, restart the system unit.

### Checking the device driver software installation

Verify that the device driver for the POWER GXT145 is installed by typing the following command and then pressing Enter:

```
lslpp -l all | grep GXT145
```

If the GXT145 device driver is installed, the following table is an example of the data that appears if you are running AIX Version 5.2:

```
devices.pci.2b102725.X11 5.2.0.105 COMMITTED AIXwindows GXT145 Graphics  
devices.pci.2b102725.diag 5.2.0.105 COMMITTED GXT145 Graphics Adapter  
devices.pci.2b102725.rte 5.2.0.105 COMMITTED GXT145 Graphics Adapter
```

If the POWER GXT145 device driver did not fully install, reinstall the driver.

See “Installing the device driver software” on page 131.

### Checking the console

1. If you continue to experience problems, you can redirect the monitor to the new adapter using the `chdisp` command.
2. If you continue to experience problems after you have checked your cables and tried the `chdisp` command, run diagnostics.



## Checking the adapter installation

Verify that the system unit recognizes the POWER GXT145 adapter. At the AIX command line type `lsdev -Cs pci`.

If the POWER GXT145 adapter is correctly installed, the following is an example of the data that appears:

```
cor0 Available 0K-00 GXT145 Graphics Adapter
```

If the message indicates the adapter is DEFINED instead of AVAILABLE, shut down the system unit and check the GXT145 adapter to ensure it is installed correctly.

If you continue to experience problems after following the steps in this section, contact service and support for assistance.



---

## Chapter 33. POWER GXT135P graphics PCI Adapter (FC 2848)

Learn about specifications for the POWER GXT135P graphics PCI Adapter.

The POWER GXT135P graphics PCI Adapter is a high-performance PCI graphics adapter that accelerates and enhances your system unit video. This adapter has no hardware switches to set. Mode selection is made through the software. Connection to the video monitor is made through a high density 15-pin D-shell connector or, on some versions of the adapter, a 28-pin DVI connector.

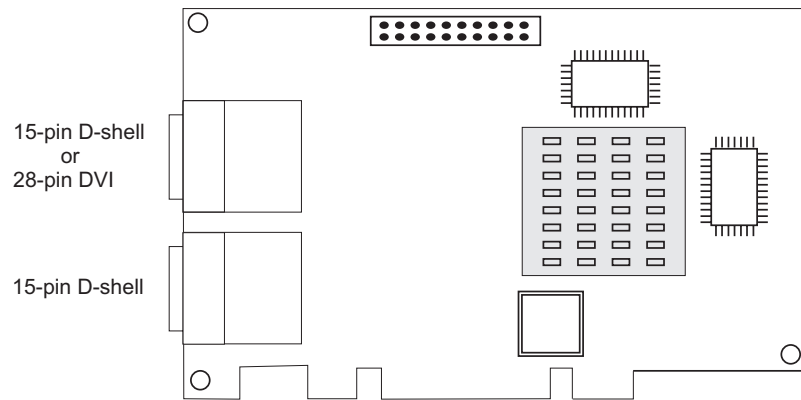


Figure 30. Feature 2848

### Adapter specifications

Item	Description
------	-------------

<b>FRU number</b>	
-------------------	--

	03N5853* or 00P5758**
--	-----------------------

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

<b>Bus architecture</b>	
-------------------------	--

	PCI
--	-----

<b>Bus width</b>	
------------------	--

	32-bit
--	--------

<b>Memory</b>	
---------------	--

	16 MB SDRAM
--	-------------

<b>Number of colors supported</b>	
-----------------------------------	--

	8-bit or 24-bit
--	-----------------

<b>Screen resolutions</b>	
---------------------------	--

	640x480 at 60 Hz vertical refresh
--	-----------------------------------

	1024x768 at 60 - 85 Hz vertical refresh
--	---

	1280x1024 at 60 - 85 Hz vertical refresh
--	--

	1600x1200 at 75 - 85 Hz vertical refresh
--	--

	2048x1536 at 60 - 75 Hz vertical refresh
--	--

<b>Display power management</b>	
---------------------------------	--

	Supports VESA and DPMS
--	------------------------

<b>Connector</b>	
------------------	--

	Two 15-pin D-shell connectors
--	-------------------------------

or

One 15-pin D-shell connector and one 28-pin DVI connector

Optional 28-pin DVI to 15-pin D-shell convertor

---

## Chapter 34. POWER GXT135P graphics PCI Adapter (FC 2849; CCIN 2849)

Learn about specifications for the POWER GXT135P graphics PCI Adapter.

The POWER GXT135P graphics PCI Adapter is a high-performance PCI graphics adapter that accelerates and enhances your system unit video. This adapter has no hardware switches to set. Mode selection is made through the software. Connection to the video monitor is made through a high-density 15-pin D-shell connector or a 28-pin DVI connector.

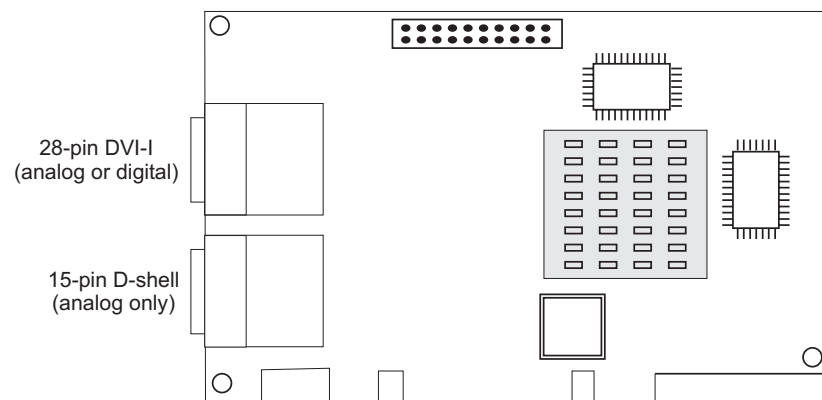


Figure 31. Feature 2849

### Adapter specifications

#### Item Description

##### FRU number

03N5853\* or 00P5758\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

##### Bus architecture

PCI

##### Bus width

32-bit

##### Memory

16 MB SDRAM

##### Number of colors supported

8-bit or 24-bit

##### Analog screen resolutions

640x480 at 60 Hz vertical refresh

1024x768 at 60 - 85 Hz vertical refresh

1280x1024 at 60 - 85 Hz vertical refresh

1600x1200 at 75 - 85 Hz vertical refresh

2048x1536 at 60 - 75 Hz vertical refresh

##### Digital screen resolutions

640x480 at 60 Hz vertical refresh

1024x768 at 60 Hz vertical refresh

1280x1024 at 60 Hz vertical refresh

1600x1200 at 30 Hz vertical refresh

**Display power management**

Supports VESA and DPMS

**Connectors**

15-pin D-shell connector

28-pin DVI-I connector

---

## Chapter 35. PCI IOP (FC 2843, CCIN 2834)

Learn about the features of the PCI IOP.

The 2843 is a PCI I/O processor with 64MB of memory which drives PCI IOA adapters. 2843 can drive a maximum of four IOAs.

**FRU number**

039J3247\*\*

\*\* Not designed to comply with the RoHS requirement.





---

## Chapter 36. PCI IOP (FC 2844, CCIN 2844)

Learn about the features of the PCI IOP.

2844 is a PCI I/O processor that drives PCI IOA adapters in the system unit and in HSL attached PCI or PCI-X I/O expansion units. A 2844 can drive a maximum of four IOAs, subject to configuration restrictions.

**Fru number**

39J1719 \*

39J3242\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.



---

## Chapter 37. PCI IOP for SAN Load Source (FC 2847, CCIN 2847)

Learn about the features of the PCI IOP for SAN Load Source.

This adapter provides the specialized function required to attach a operating system load source by way of a Fibre Channel adapter and boot from that load source. Feature 2847 does not support multipath for the load source disk unit, but does support multipath for all other logical units numbers (LUNs) attached to this IOP. A minimum of two IOPs are required for enabling redundancy.

### **Fru number**

42R6471\*

39J4035\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.



---

## Chapter 38. PCI Audio Adapter (FC 8244)

Learn about specifications for the PCI Audio Adapter.

The PCI Audio Adapter provides audio playback and recording capability for your system. External jacks allow you to connect speakers, microphone, or other audio devices to your system. An internal connector and cable are provided for connection to your system's CD-ROM or DVD-ROM drive.

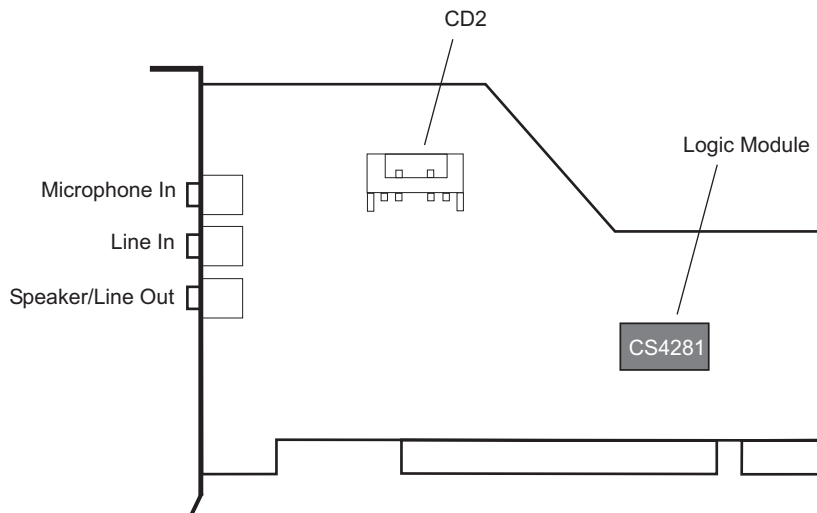


Figure 32. Feature 8244

### PCI Audio Adapter specifications

Item	Description
------	-------------

<b>FRU number</b>	
-------------------	--

10N7732\* or 80P2598\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

<b>Bus architecture</b>	
-------------------------	--

PCI

<b>Bus width</b>	
------------------	--

32-bit



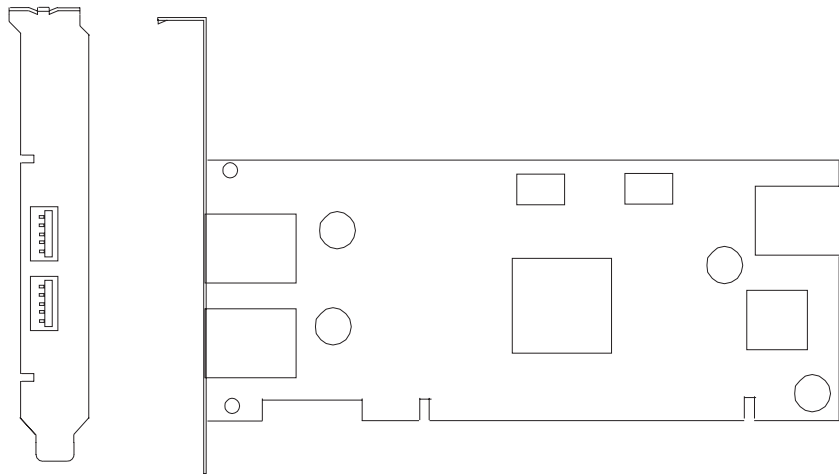
---

## Chapter 39. 2-port USB PCI Adapter (FC 2738; CCIN 28EF)

Learn about the specifications for the 2-port USB PCI Adapter.

The 2-port USB PCI Adapter is a 32-bit, 33 MHz high-performance expansion adapter that provides the following features:

- 32-bit, 33MHz PCI Local Bus Specification Revision 2.2
- Single-slot, half-size PCI card
- +5V or +3.3V signaling
- FCC Class B
- Two downstream USB ports
- Full 12 MHz bandwidth on each port
- Full compliance with Universal Serial Bus Specifications, Revision 1.1 and 2.0
- Compatible with OpenHCI Open Host Controller Interface Specifications for USB, Release 1.10a
- EHCI compatible
- Integrated Dual-Speed USB Transceivers
- Up to 127 devices for each port
- Peripheral hot-swap and wake-up



### 2 Port USB PCI adapter specifications

Item	Description
------	-------------

FRU number	
------------	--

	80P2994 **
--	------------

\*\* Not designed to comply with RoHS requirement.

Bus architecture	
------------------	--

	PCI 2.2 compliant
--	-------------------

Busmaster	
-----------	--

	Yes
--	-----

Card type	
-----------	--

	Half size
--	-----------

**Maximum number and adapter slots**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement. .

**Connector**

Standard USB single pin-type series "A" receptacle

**Wrap plug**

None

**Cables**

None



---

## Chapter 40. 4-Port USB PCI Express Adapter (FC 2728; CCIN 57D1)

Learn about the specifications for the 4-Port USB PCI Express (PCIe) Adapter.

The 4-Port USB PCIe Adapter is a 32-bit, 33 MHz high-performance expansion adapter that provides the following features and support:

- 32-bit, 33MHz PCI Local Bus Specification Revision 2.2
- Single-slot, full-size PCIe card
- +5V or +3.3V signaling
- FCC Class B
- Four downstream USB ports
- Full 12 MHz bandwidth on each port
- Full compliance with Universal Serial Bus Specifications, Revision 1.1 and 2.0
- EHCI compatible
- Integrated Dual-Speed USB Transceivers
- Up to 127 devices for each port

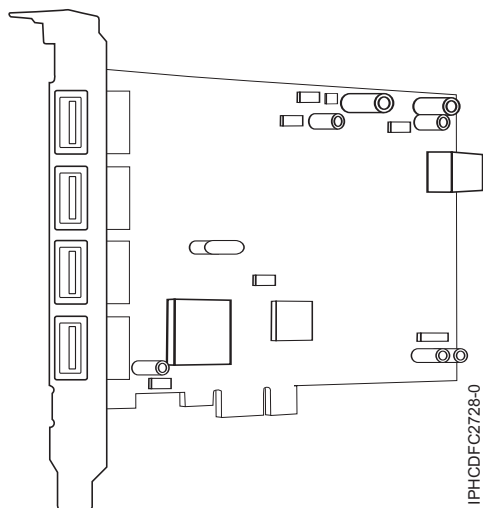


Figure 33. 4-Port USB PCIe Adapter

### Specifications

Item	Description
FRU number	46K6692 (Designed to comply with RoHS requirement.)
Bus architecture	PCI 2.2 compliant
Busmaster	Yes
Card type	Full size

**Maximum number and adapter slots**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement. .

**Connector**

Standard USB single pin-type series "A" receptacle

**Wrap plug**

None

**Cables**

None

---

## Chapter 41. ARTIC960Hx 4-Port Selectable PCI Adapter (FC 2947)

Learn about the specifications for the ARTIC960Hx 4-Port Selectable PCI Adapter.

### Overview

The ARTIC960Hx 4-Port Selectable PCI Adapter consists of an ARTIC960Hx Base PCI Adapter, an ARTIC960 4-Port Selectable PCI Mezzanine Card (PMC), and an 8MB DRAM Memory card.

The Base PCI Adapter provides high-function control of I/O operations and serves to off-load input/output tasks from the system microprocessor. It has a memory connector that supports 8 MB of extended-data output (EDO) dynamic random-access memory (DRAM).

The 4-Port Selectable PMC connects to the Base PCI adapter by two 64-pin connectors. The PMC card provides a high-function, application-specific interface that expands the capability of the base adapter.

The Base PCI Adapter and the attached 4-Port Selectable PMC occupy a single 32-bit expansion slot.

In addition to this topic, you can learn more about the adapter in the *ARTIC960Hx 4-Port Selectable PCI Adapter, ARTIC960Hx 4-Port T1/E1 PCI Adapter, ARTIC960Hx DSP Resource PCI Adapter Installation and User's Guide SA23-2577*

Figure 34 shows a side view of the ARTIC960Hx Base PCI Adapter.

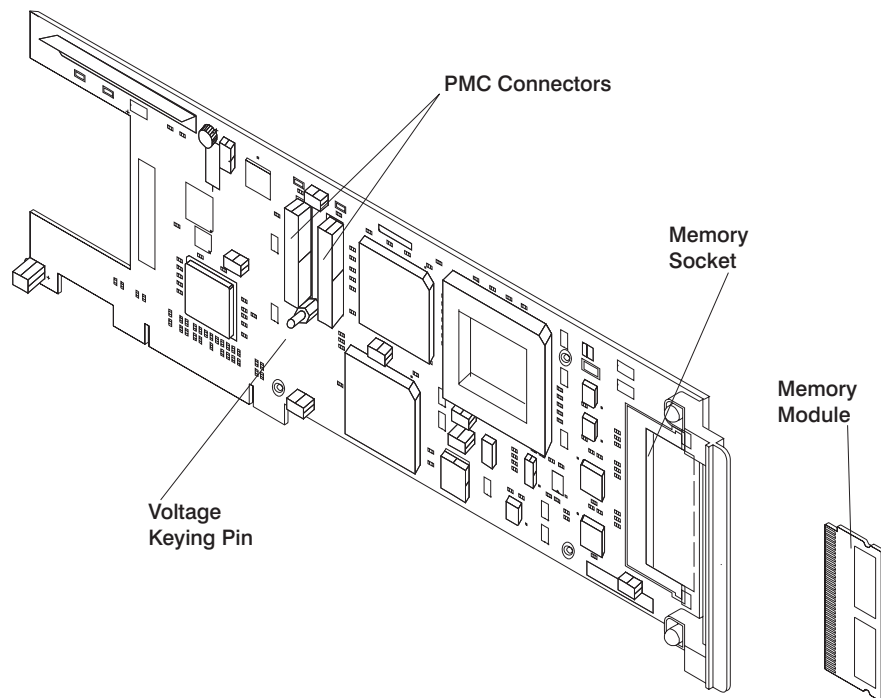


Figure 34. ARTIC960Hx Base PCI Adapter

Figure 35 on page 152 shows a side view of the 4-Port Selectable PMC.

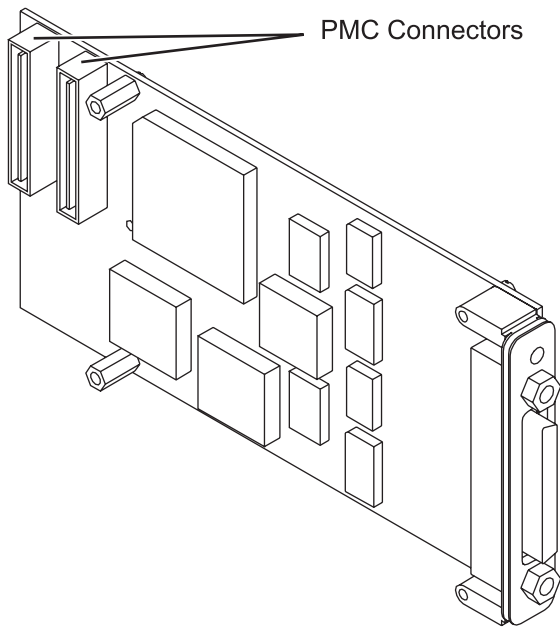


Figure 35. 4-Port Selectable PMC

## Adapter specifications

### Item Description

#### FRU numbers

Base adapter, 87H3427

8 MB memory module, 87H3621

4-Port selectable mezzanine card, 87H3413

#### I/O bus architecture

PCI, 32-bit, 33-MHz

The 2947 can be installed in supported 32-bit or 64-bit, 33-MHz, 66-MHz, 133-MHz, and 266-MHz PCI and PCI-X bus slots.

#### Busmaster

Yes

#### Bus size

32-bit

#### Wrap plugs

See "Wrap plugs" on page 153

#### Cables

EIA-232 (ISO 2110) cable

EIA-530 (ISO 2110) cable

V.35 DTE (ISO 2593) cable

RS 449 (ISO 4902) cable

X.21 (ISO 4903) cable

## Wrap plugs

FRU number	Description of wrap plug
87H3311	120-pin connector
87H3439	25-pin wrap plug (EIA-232 (ISO 2110) or EIA-530 (ISO 2110))
87H3442	34-pin wrap plug (V.35 DTE (ISO 2593) 34-pin male block)
87H3440	37-pin wrap plug (RS-449 (ISO 4902))
53G0638	15-pin wrap plug (X.21 (ISO 4903))

## Port speeds

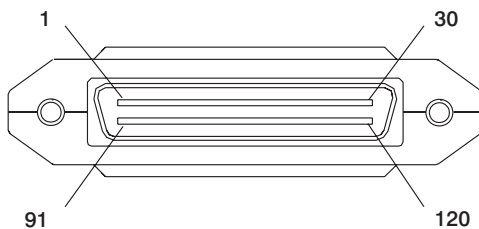
When clocks are supplied by an external device (all interfaces except EIA-232), the 4-Port Selectable PMC supports four ports running simultaneously at a maximum data rate of 2.048 Mbps, duplex, and synchronous. The following table shows the maximum speed supported for each electrical interface.

Electrical interface	Maximum speed per port
EIA-232 (ISO 2110)	38.4 Kbps (U.S. only) 19.2 Kbps (EMEA only)
EIA-530 (ISO 2110)	2.048 Mbps
V.35 DTE (ISO 2593)	2.048 Kbps (US only) 64 Kbps (EMEA only)
RS 449 (ISO 4902)	2.048 Mbps
X.21 (ISO 4903)	2.048 Mbps

Clocks supplied by a Dual Universal Serial Communications Controller (DUSCC) on the 4-Port Selectable PMC provide synchronous data rates up to 230.4 Kbps, duplex. In addition, an on-card clock generator can provide data rates of either 1.544 Mbps or 2.048 Mbps for each port. Selection of the clock frequency is programmable.

## 4-Port Selectable PMC 120-pin connector

The individual signals for all ports connect to the 4-Port Selectable PMC through the 120-pin connector at the rear of the card. Each cable has a single 120-pin, male, D-shell connector that branches into four individual cables, each of which provides access to one of four independent ports. The 120-pin D-shell connector is shown in the following illustration.





---

## Chapter 42. 2-Port Asynchronous EIA-232 PCI Adapter (FC 5723)

Learn about the specifications for the 2-Port Asynchronous EIA-232 PCI Adapter.

This adapter provides connection for two (2) asynchronous EIA-232 devices. Ports are programmable to support asynchronous protocols over an EIA-232 interface at line speeds up to 128 Kbps.

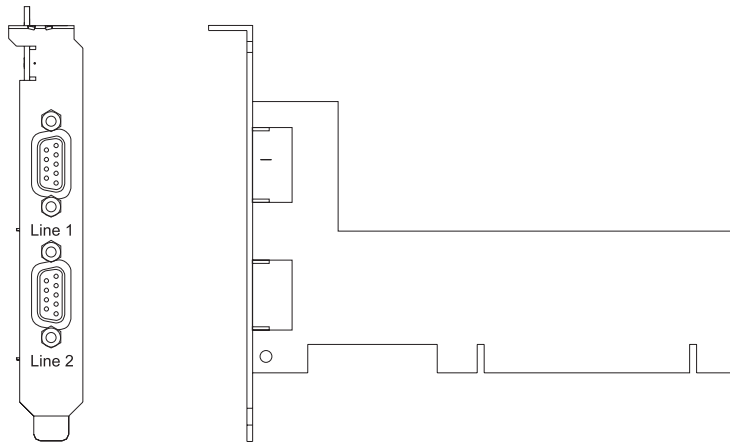


Figure 36. 2-Port Asynchronous EIA-232 PCI Adapter

### Features and specifications

- FRU number 80P4353 (Not designed to comply with RoHS requirement.)
- 2 external DB09 connectors
- Exar Dual Async Controller, XR17D152
- EIA-232 compatible
- Supports Xon/Xoff offload
- Supports RTS/CTS or DTR/DSR off-load
- PCI Local Bus Specification Revision 2.2 compliant
- Bus width: 32 bit data and address
- Bus speed: 33 MHz
- Single slot, less than half-size PCI card
- Universal signaling (5V or 3.3V)
- FCC Class-B
- Power consumption: 1.3 watts (nominal), 2.465 watts (maximum)
- Hardware or software flow control
- Custom baud rates
- 16C850 UART equivalent

### Operating system or partition requirements

AIX 5L Version 5.2 with the 5200-04 Technology Level, and later

AIX 5L Version 5.3, and later

Red Hat Enterprise Linux version 4

SUSE Linux Enterprise Server 9 SP1

**Note:** If you are installing a new feature, ensure that you have the software required to support the new feature and that you determine if there are any existing prerequisites.



---

## Chapter 43. 8-Port asynchronous EIA-232E/RS-422A PCI Adapter (FC 2943)

Learn about the specifications for the 8-Port asynchronous EIA-232E/RS-422A PCI Adapter.

The 8-Port asynchronous EIA-232E/RS-422A PCI adapter is a multi-channel intelligent serial communications feature that supports speeds of up to 230 Kbps for each asynchronous port and is run by a 32-bit, 20 MHz, IDT 3041 processor.

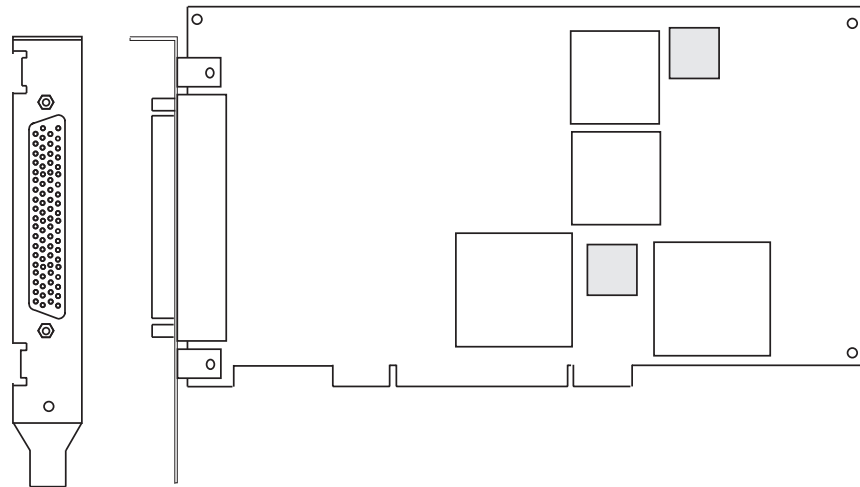


Figure 37. Feature 2943

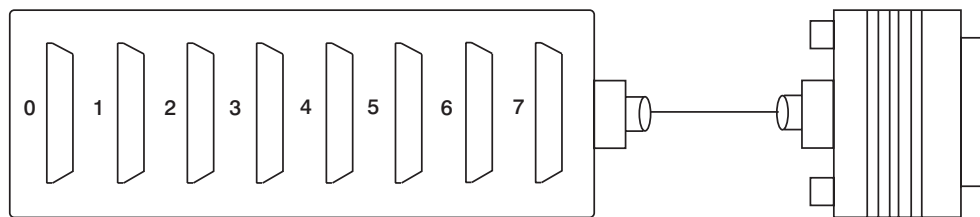


Figure 38. Feature 2943 connector

### 8-Port asynchronous EIA-232E/RS-422A PCI Adapter specifications

Item	Description
<b>FRU number</b>	93H6541 (Not designed to comply with RoHS requirement.)
<b>I/O bus</b>	PCI
<b>Bit rate</b>	50 - 230,000 (set by the program)
<b>Bits for each character</b>	5, 6, 7, 8 (set by the program)
<b>Busmaster</b>	No

**Maximum number**

8

**Connector**

78-pin D-shell female

**Wrap plug**

EIA-232 25-pin, part number 6298964. This wrap plug tests all of the adapter functions for both EIA-232 and RS-422.

**Cable** 8-Port DB-25 connector box, part number 11H5967 included with adapter

**Modem cable**

EIA-232 modem cable, part number 6323741, feature code 2936, length 3 meters or 10 feet

RS-422 modem cable, customer supplied (must meet RS-422 requirements)

**Terminal/printer cable**

EIA-232 terminal/printer cable, part number 12H1204, feature code 2934, length 3 meters or 10 feet

RS-422 terminal/printer cable, part number 30F8966, feature code 2945, length 20 meters or 66 feet

### 8-Port EIA-232E/RS-422A Adapter 78-position and 25-position connectors

The 8-Port asynchronous EIA-232E/RS-422A PCI adapter is shipped with a connector box that provides eight 25 pin D-shell standard connectors.

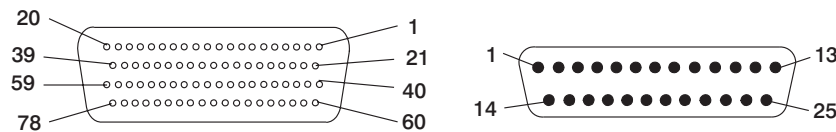


Figure 39. 25 pin D-shell standard connectors

Mnemonic EIA-232E/ RS-422A	I/O	Port 0	Port 1	Port 2	Port 3	Port 4	Port 5	Port 6	Port 7	25-Position Connector
TxD/TxD <sub>b</sub>	O	30	50	11	10	40	02	63	64	02
RxD/RxD <sub>b</sub>	I	55	17	37	56	28	08	46	27	03
RTS/TxD <sub>a</sub>	O	51	31	12	14	21	41	62	60	04
CTS/RxD <sub>a</sub>	I	16	53	59	57	25	04	09	45	05
DCD/DCD	I	35	33	39	18	43	23	48	06	08
DTR/DTR	O	49	32	13	52	22	03	61	01	20
DSR/DSR	I	54	34	58	38	05	42	29	26	06
RI/NA*	I	36	15	20	19	44	24	47	07	22
SGND**	--	--	--	--	--	--	--	--	--	07
FGND										01, Cable Shield

- Notes:**
- \* = RTS is wrapped internally to CTS and RI for each port in RS-422
  - \*\* = Pins 65 through 78 are ground

---

## Chapter 44. 64-bit/66MHz PCI ATM 155 UTP Adapter (FC 4953)

Learn about the specifications for the 64-bit/66MHz PCI ATM 155 UTP Adapter.

The 64-bit/66MHz PCI ATM 155 UTP Adapter provides the interface between the ATM 155 Mb/sec unshielded twisted pair network and the 64-bit/66 MHz PCI bus in your system.

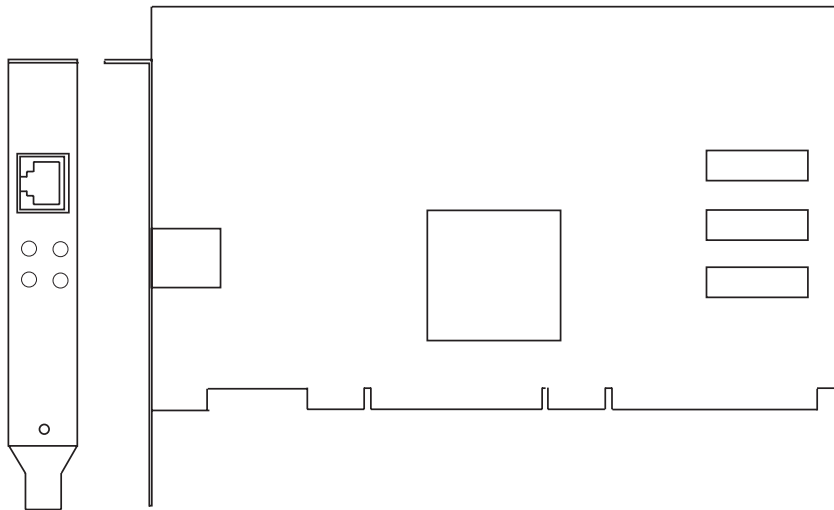


Figure 40. Feature 4953

### 64-bit/66MHz PCI ATM 155 UTP Adapter specifications

Item	Description
------	-------------

<b>FRU number</b>	
-------------------	--

	21P4112 (Not designed to comply with RoHS requirement.)
--	---

<b>Bus architecture</b>	
-------------------------	--

	PCI 2.2
--	---------

<b>Card type</b>	
------------------	--

	Half
--	------

<b>Adapter slots</b>	
----------------------	--

	For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement. .
--	--

<b>Wrap plug</b>	
------------------	--

	21P8009 (Supplied with adapter) or 42H0540
--	--

<b>Connector information</b>	
------------------------------	--

	RJ-45
--	-------

<b>Cables</b>	
---------------	--

	The cat5 cable can be unshielded twisted pair (UTP) or shielded twisted pair (STP), up to 100 meters in length.
--	---



---

## Chapter 45. PCI-X Cryptographic Coprocessor (FC 4764; CCIN 4764)

Learn about the specifications, requirements, and installation notes for the 4764 PCI-X Cryptographic Coprocessor.

The adapter for the PCI-X Cryptographic Coprocessor provides applications with cryptographic processing capability and a means to securely store cryptographic keys. Cryptographic functions available include encryption for keeping data confidential, message digests and message authentication codes for ensuring that data has not been changed, and digital signature generation and verification for authentication. In addition, the coprocessor provides basic services for financial PIN, EMV, and SET applications. The coprocessor also can serve as an accelerator to accelerate the establishment of new SSL sessions.

The adapter is designed to meet FIPS PUB 140-2 Security Level 4 requirements.

### Specifications and requirements

#### Item Description

##### FRU number

41U0442\* or 12R6540\*\*

\* Designed to comply with RoHS requirement.

\*\* Not designed to comply with the RoHS requirement.

##### Battery kit

41V1061, kit contains two batteries and a battery tray.

##### Adapter type

Short, 64-bit, 3.3 v, PCI version 2.2, PCI-X version 1.0

##### Placement information

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

##### Environmental requirements

**Attention:** The PCI-X Cryptographic Coprocessor must be shipped, stored, and used within the following environmental specifications. If these specifications are not met, the 4764 tamper sensors can be activated and render the 4764 permanently inoperable.

##### Shipping

Ship the adapter in the original packaging (moisture barrier bag with desiccant and thermally insulated box with gel packs).

Temperature when shipping: +5 degrees F (-15 degrees C) to +140 degrees F (+60 degrees C)

Pressure when shipping: minimum 550 mbar, maximum 1039 mbar

Humidity when shipping: 5% to 100% RH

##### Storage

Store the adapter in sealed moisture barrier bag with desiccant.

Temperature in storage: +38.8 degrees F (+1 degrees C) to +140 degrees F (+60 degrees C)

Pressure in storage: minimum 700 mbar, maximum 1039 mbar

Humidity in storage: 5% to 80% RH

##### Operation (ambient in system)

Temperature while operating: +50 degrees F (+10 degrees C) to +104 degrees F (+40 degrees C)

Humidity while operating: 8% to 80% RH

Altitude while operating: maximum 7000 feet, equivalent to 768 mbar

### Handling requirements

Each PCI-X Cryptographic Coprocessor is shipped from the factory with a certified device key. This electronic key, which is stored in the adapter's battery-powered and protected memory, digitally signs status messages to confirm that the PCI Cryptographic Coprocessor is genuine and that no tampering has occurred.

If any of the secure module's tamper sensors are triggered by tampering or by accident, the PCI-X Cryptographic Coprocessor erases all data in the protected memory, including the certified device key. Incorrect removal of the batteries triggers the tamper sensors and destroys the certified device keys. The PCI Cryptographic Coprocessor cannot operate without the certified device keys. To protect the keys, follow the guidelines given in the documentation provided with the coprocessor.

**Attention:** The batteries keep the coprocessor powered on even when it is not installed in a system. When handling, installing, or removing the adapter, do not let the adapter circuits come in contact with any conductive surface or tools. Doing so can render the adapter permanently inoperable.

Do not remove the adapter's batteries. Data in the protected memory is lost when battery power is removed. For information about replacing the batteries, see "Replacing the batteries" on page 165.

**Attention:** While installing the coprocessor, observe the following precautions:

- The coprocessor is always powered by the batteries, even when it is not installed in the system.
- The battery power is necessary to keep the coprocessor operational.
- The loss of battery power or a voltage drop triggers a Tamper Event and permanently renders the coprocessor inoperable.
- Any short on the battery power distribution circuits causes a voltage drop and a Tamper Event.
- Do not lay the coprocessor on or cause the coprocessor to come in contact with any conductive surface.
- Do not touch the coprocessor circuits with metal or conductive tools.
- Use static-protective measures at all times when handling the coprocessor.

### Operating system or partition requirements

AIX 5L Version 5.2 with the 5200-09 Technology Level, or later

AIX 5L Version 5.3 with the 5300-05 Technology Level, or later

### Required software or drivers

**AIX**

devices.pci.1410e501 device driver package

**Linux**

No Linux support

### Required firmware

CD form number LCD8-0477-00 contains functional firmware and must be purchased with the adapter.

### **PKCS11 support program installation**

The *4764 PCI-X Cryptographic Coprocessor PKCS#11 Support Program Installation Manual* is included on the CD that is shipped with the adapter. The manual is contained in the `csufx.xcrypto.man` file set.

### **CCA support program installation**

The *4764 PCI-X Cryptographic Coprocessor CCA Support Program Installation Manual* is included on the CD that is shipped with the adapter. The manual is contained in the `csufx.xcrypto.man` file set.

## **Preparing for installation**

If you are installing your operating system at this time, install your adapter before you install the operating system. See "Installing the adapter" on page 164 for instructions.

If you are installing only the device driver for this adapter, install your device driver software before you install the adapter. See "Installing the device driver software" for instructions.

## **Installing the device driver software**

This section explains how to install device driver software. The device driver is provided for the following AIX 5L technology levels:

AIX 5L Version 5.2 with the 5200-09 Technology Level

AIX 5L Version 5.3 with the 5300-05 Technology Level

To install device driver software, do the following steps:

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example; CD) into the appropriate media device.
3. Type the following System Management Interface Tool (SMIT) fast path: `smitty devinst`
4. Press Enter. The Install Additional Device Software menu highlights the INPUT device or directory for software option.
5. Select or type your input device by doing one of the following actions:
  - Press F4 to display the input device list and select the name of the device (for 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. The Install Additional Device Software window highlights the SOFTWARE to install option.
6. Press F4 to display the SOFTWARE to install window.
7. Enter / to display the Find window.
8. For the adapter, type the following device package name: `devices.pci.1410e501`
9. Press Enter. The system finds and highlights this device driver software.
10. Press F7 to select the highlighted device driver software.
11. Press Enter. The INSTALL ADDITIONAL DEVICE SOFTWARE menu displays. The entry fields are automatically updated.
12. Press Enter to accept the information. The ARE YOU SURE menu displays.
13. Press Enter to accept the information. The COMMAND STATUS menu displays.
  - The term RUNNING is highlighted to indicate that the installation and configuration command is in progress.
  - When RUNNING changes to OK, scroll to the bottom of the page and locate the Installation Summary.

- After a successful installation, SUCCESS displays in the Result column of the Installation Summary at the bottom of the display.
14. Remove the installation media from the drive.
  15. Press F10 to exit SMIT.
  16. Verify the device driver. See “Verifying the device driver”
  17. Install the adapter. See “Installing the adapter.”

## Verifying the device driver

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

1. If necessary, log in as root user.
2. At the command line, enter: `lspp -l devices.pci.1410e501.rte`
3. Press Enter.

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

Fileset	Level	State	Description
Path: /usr/lib/objrepos devices.pci.1410e501.rte	5.2.0.95	COMMITTED	Cryptographic Coprocessor

Verify that the filesets `devices.pci.1410e501.rte` are at level 5.2.0.95 or later.

If no data displays on your display, the adapter device driver did not install correctly. Reinstall the driver.

## Installing the adapter

**Attention:** While installing the coprocessor, observe the following precautions:

- The coprocessor is always powered by the batteries, even when it is not installed in the system.
- The battery power is necessary to keep the coprocessor operational.
- The loss of battery power or a voltage drop triggers a Tamper Event and permanently renders the coprocessor inoperable.
- Any short on the battery power distribution circuits causes a voltage drop and a Tamper Event.
- Do not lay the coprocessor on or cause the coprocessor to come in contact with any conductive surface.
- Do not touch the coprocessor circuits with metal or conductive tools.
- Use static-protective measures at all times when handling the coprocessor.

For instructions on how to install PCI adapters, refer to the PCI adapters topic.

After you have installed the adapter, verify the adapter installation.

## Verifying the adapter installation

To verify that your system unit recognizes the PCI adapter, do the following steps:

1. If necessary, log in as root user.
2. At the command line, type: `lsdev -Cs pci`
3. Press Enter.

A list of PCI devices displays. If the adapter is installed correctly, an Available status for each port indicates that the adapter is installed and ready to use. If the message on your display indicates that any of the ports are DEFINED instead of AVAILABLE, shut down the system and verify that the adapter was



installed correctly. The adapters appear as Crypt0, Crypt1, and so on.

## Running coprocessor diagnostics

Diagnostics are provided with the device driver software.

If you remove a cryptographic adapter and do not replace it, and you run diagnostics on the remaining cryptographic adapters, the results might not be correct. As a result, always run the `cfgmgr -v` command after removing a cryptographic adapter.

## Replacing the batteries

Two lithium batteries that are mounted on the adapter supply power to the adapter's components, including protected memory. Support software or application software can query the coprocessor to determine whether the batteries need to be replaced. When the batteries need replacing, have the procedure done by trained service providers using the 41V1061 Battery kit for the 4764.

### CAUTION:

**Only trained service personnel may replace this battery. The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.**

*Do Not:*

- \_\_\_ **Throw or immerse into water**
- \_\_\_ **Heat to more than 100 degrees C (212 degrees F)**
- \_\_\_ **Repair or disassemble**

**Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C002a)**

The Battery Replacement Kit includes:

- Two replacement batteries
- A battery tray with connecting wires
- Two sets of spare battery attention labels

To replace the batteries, follow these steps:

1. Turn off the computer and all attached devices.
2. Disconnect all cables, including the power cable.

### CAUTION:

**The battery is a nickel-cadmium battery. To avoid possible explosion, do not burn. Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C005a)**

3. Remove the cover from the expansion slots according to the directions provided with your computer.
4. Open the Battery Replacement Kit.

**Attention:** Electrostatic discharge (ESD) can damage the card and its components. Wear an ESD wrist strip while handling and installing the card, or take the following precautions:

- Limit your movements, this helps prevent static electricity building up around you.
- Prevent others from touching the card or other components.
- Handle the card by its edges only. Do not touch exposed circuitry and components.

5. Remove the card from the bus slot in the host computer.
6. Insert one of the new batteries into the battery tray provided with the kit. Align the + on the battery with the + on the battery tray (the end with the red wire). Connect the tray wires to the J10 connector located near the RS-232 serial port, as shown in Figure 41 on page 167. The connector is polarized to ensure a proper connection.

**Attention:** Any loss of power erases data stored in the card's protected memory. To prevent loss, ensure that the battery tray contains a fresh battery and is attached to the J10 connector.

7. Remove the battery attention labels from the battery holders on the card. These labels can be torn off and discarded. They are to be replaced by the spare labels included in the kit.
8. Remove the battery from the BT1 position. To eject the battery, turn the coprocessor over and insert a small object, such as a screwdriver, through the hole to eject the battery.
9. Replace the battery in the BT1 position with a new battery.
10. Replace the battery in the BT2 position with the battery in the battery tray. The new battery already installed in the BT1 position provides power to the adapter while you perform this step.
11. Remove the battery holder from the J10 connector.
12. Reapply the spare battery attention labels onto the holders on the card covering the batteries.
13. Reinstall the coprocessor into the PCI-X bus slot, and be sure the card is fully seated.
14. Replace the host computer's cover.
15. Reconnect the power cable and any other cables you disconnected.
16. Power on the computer. The card runs its power on self-test (POST).
17. Reinstall the adapter.

## Connectors

*Table 31. Connectors and jumpers on the PCI-X Cryptographic Coprocessor*

Connectors	Name of jumper	Default position
J7	PCI-X EEPROM write	Jumper installed
J8	External intrusion latch disable	Jumper not installed
J9	Battery disconnect wire	Jumper (wire loop) installed
J10	Temporary-battery connector	Jumper not installed
J11	External intrusion latch	Jumper not installed

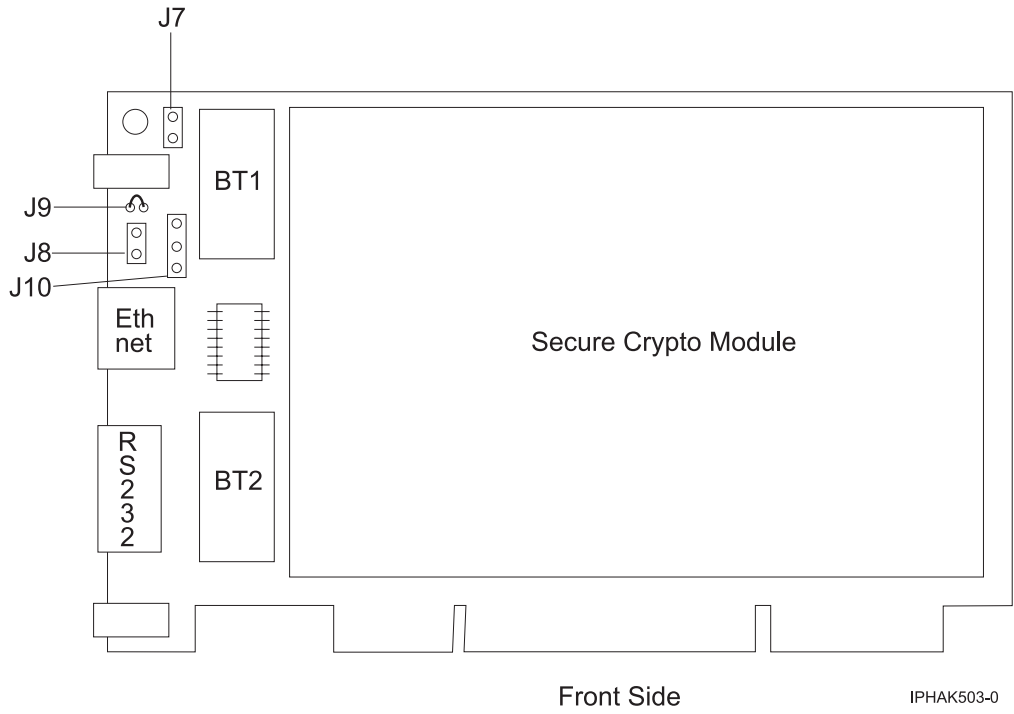


Figure 41. Front side of the adapter

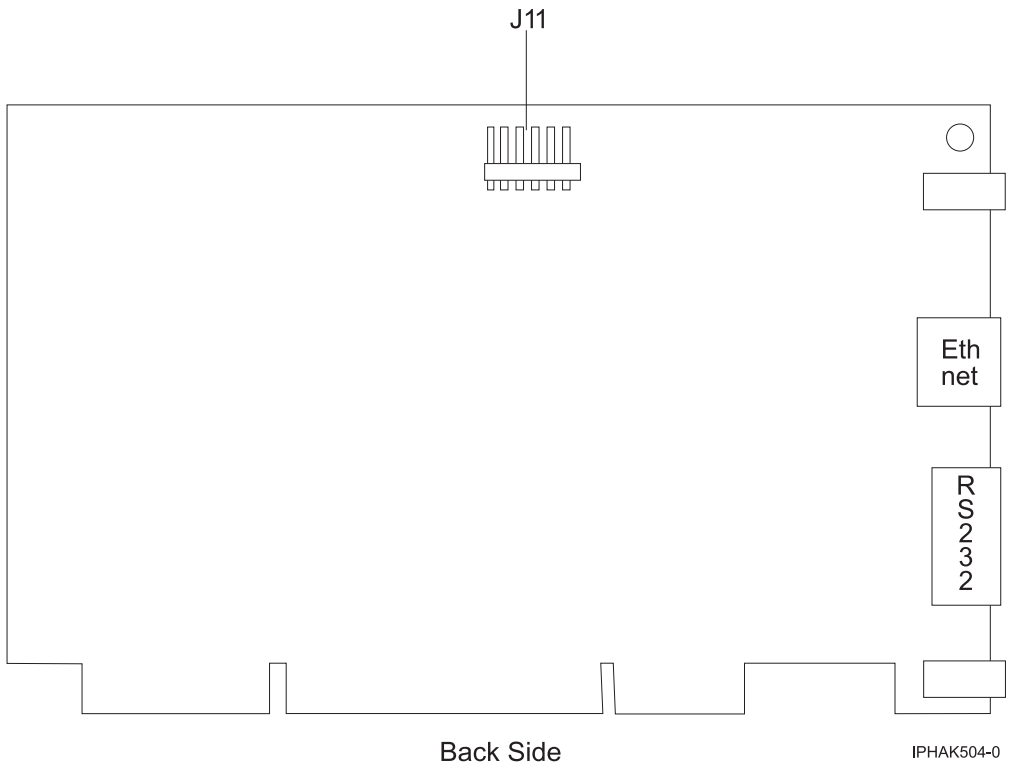


Figure 42. Back side of the adapter



---

## Chapter 46. Cryptographic Accelerator (FC 4960; CCIN 2058)

Learn about the specifications for the cryptographic Accelerator.

The cryptographic accelerator provides high cryptographic performance through hardware acceleration by offloading computationally intensive public-key processing from a host processor. The overall operation control, including command decoding, is implemented in hardware.

As a result, e-business applications requiring Public Key Cryptography might experience an increase in performance. At the same time, the cryptographic accelerator releases the host processor to respond to other Internet transactions, database transactions, customer requests, and so on.

The adapter supports the following encryption and decryption functions:

- DES
- T-DES
- DES MAC
- T-DES MAC
- SHA-1
- Parallel processing of the same input data using DES and SHA
- DES to SHA
- Modular Exponentiation (with and without CRT)
- Modular Multiplication.

You install the cryptographic accelerator in a PCI card slot.

**Note:** This adapter does not incorporate a microprocessor subsystem (CPU, DRAM, Flash), a secure programming environment, nor tamper detection and response functions.

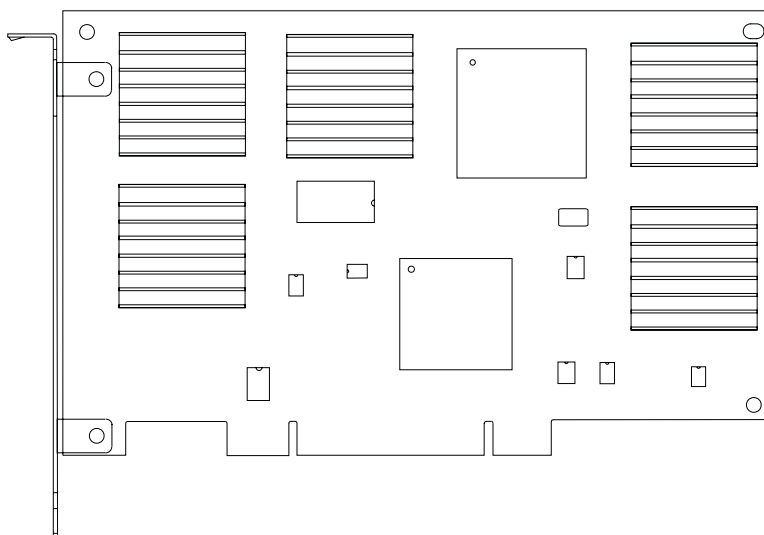


Figure 43. Feature 4960

## Cryptographic accelerator specifications

The following items are requirements and specifications for this adapter.

### FRU part number

11P3106 (Not designed to comply with RoHS requirement.)

### Power consumption

Typical, 20 watts

### Voltage

+5.0 Vdc  $\pm$ 10 percent

### Temperature

Operating, +10 to +40 degrees C (50 to 104 degrees F)

Storage, +1 to +40 degrees C (5 to 104 degrees F)

### Relative humidity

8 to 80 percent

### Physical dimensions

174.63 mm by 106.68 mm

### Maximum number

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

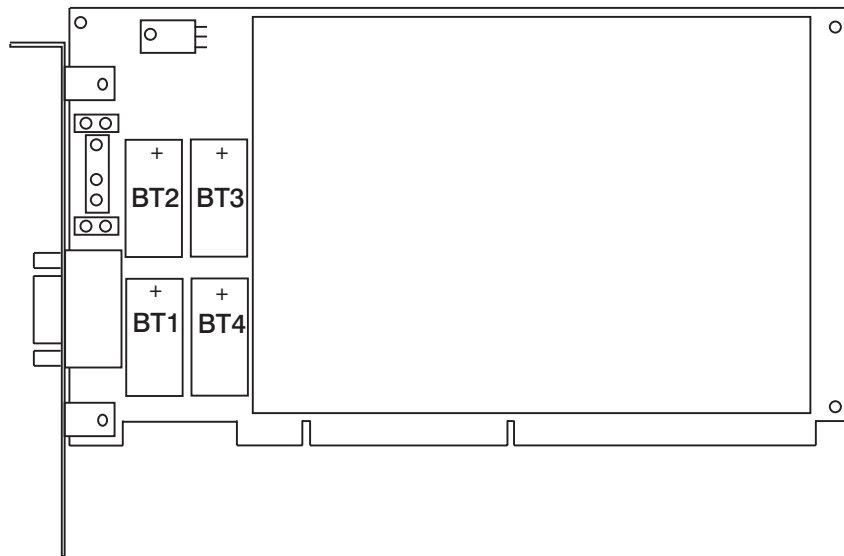
---

## Chapter 47. PCI Cryptographic Coprocessor (FC 4963)

Learn about the specifications for the PCI Cryptographic Coprocessor.

The PCI Cryptographic Coprocessor is designed to provide data security functions for PCI bus systems. The PCI cryptographic coprocessor provides high-performance secure hardware engines, including methods of transmitting data, verifying electronic signatures, bulk data encryption, and decryption.

The adapter is designed to FIPS PUB 140-1 Security Level 4 Standards.



Each PCI Cryptographic Coprocessor is shipped from the factory with a certified device key. This electronic key, which is stored in the adapter's battery-powered and protected memory, digitally signs status messages to confirm that the PCI Cryptographic Coprocessor is genuine and that no tampering has occurred.

### Attention:

- If any of the secure module's tamper sensors are triggered by tampering or by accident, the PCI Cryptographic Coprocessor erases all data in the protected memory, including the certified device key. Incorrect removal of the batteries triggers the tamper sensors and destroys the certified device keys. The PCI Cryptographic Coprocessor cannot operate without the certified device keys. To protect the keys, follow the guidelines given in the documentation provided with the coprocessor.
- The batteries keep the coprocessor powered on even when it is not installed in a system. When handling, installing, or removing the coprocessor, do not let the coprocessor circuits come in contact with any conductive surface or tools. Doing so can render the adapter permanently inoperable.

### PCI cryptographic coprocessor specifications

Item	Description
------	-------------

FRU number	
------------	--

	10J0357 (Not designed to comply with RoHS requirement.)
--	---

**Battery kit**

09J8199, Kit contains two batteries and a battery tray. Two kits are required for battery replacement.

**Bus architecture**

PCI version 2.1

**Adapter slots**

For system-specific adapter placement information, see the PCI adapter placement or the PCI adapter placement.

**Temperature range, stored**

+33.8 degrees F (+1 degree C) to +140 degrees F (+60 degrees C)

**Temperature range, operating**

+50 degrees F (+10 degrees C) to +104 degrees F (+40 degrees C)

**Connector**

For manufacturing test use only. Not for use by customer.



---

## Chapter 48. Replacing RAID disk-controller cache battery packs

You might need to remove or replace the cache battery from its controller. This section includes procedures so that you can perform these tasks.

Replacing this feature is a customer task. You can perform this task yourself, or contact an authorized service provider to perform the task for you. You might be charged a fee by the authorized service provider for this service.

To complete the procedures for the adapters, you will also need to use removal and replacement procedures for PCI adapters.

---

### Replacing the cache battery pack on the 571B adapter

You might need to replace the cache battery pack on the controller. Use the procedure in this section to perform this task.

#### About this task

The following procedure describes how to replace a cache battery pack on the PCI-X DDR Dual Channel Ultra320 SCSI RAID adapter, CCIN 571B. The following feature codes apply to the 571B adapter.

Feature	CCIN	Description
0658 1913 5737 5776	571B	PCI-X DDR Dual Channel Ultra320 SCSI RAID adapter

Replacing this feature is a customer task. You can perform this task yourself, or contact an authorized service provider to perform the task for you. You might be charged a fee by the authorized service provider for this service.

**Important:** Removing the cache battery with the system or partition already in a powered-off state might result in the loss of customer data. If the system has been powered off *prior* to the battery service action, you *must* IPL to DST and continue this procedure *before* replacing the battery.

For information about replacing the cache battery pack on an AIX system or partition, see the *PCI-X SCSI RAID Controller Reference Guide for AIX*.

For information about replacing the cache battery pack on a Linux system or partition, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

---

### Replacing the cache battery pack on the 2757 controller

You might need to replace the cache battery pack. Use the procedure in this section to perform this task.

#### About this task

This procedure describes how to replace the cache battery pack on the PCI-X Ultra RAID controller, CCIN 2757. The following feature codes apply to the 2757 controller.

Feature	CCIN	Description
2757	2757	PCI-X Ultra RAID controller
5581 5591	2757	2757 Controller with Auxiliary Write Cache

Replacing this feature is a customer task. You can perform this task yourself, or contact an authorized service provider to perform the task for you. You might be charged a fee by the authorized service provider for this service.

**Important:** Removing the cache battery with the system or partition already in a powered-off state might result in the loss of customer data. If the system has been powered off *prior* to the battery service action, you *must* IPL to DST and continue this procedure *before* replacing the battery.

---

## Replacing the cache battery pack on the 571F and 575B adapters

You might need to replace the cache battery pack. Use the procedure in this section to perform this task.

### About this task

This procedure describes how to replace the cache battery pack on the PCI-X DDR double wide quad channel Ultra 320 SCSI RAID adapter with auxiliary write cache, CCIN 571F (controller) and 575B (cache). The following feature codes apply to this double-wide adapter

Feature	CCIN	Description
0650 0651 5739 5746 5778 5781 5782	571F 575B	PCI-X DDR double wide quad channel Ultra 320 SCSI RAID adapter with auxiliary write cache

**Note:** The cache battery for both the 571F adapter and the 575B adapter is contained in the single battery FRU that is physically located on the 575B auxiliary write cache adapter. The functions of forcing the battery pack into an error state and starting IOA cache on either adapter in the card set will result in the same functions automatically being performed on the other adapter in the card set.

Replacing this feature is a customer task. You can perform this task yourself, or contact an authorized service provider to perform the task for you. You might be charged a fee by the authorized service provider for this service.

**Important:** Removing the cache battery with the system or partition already in a powered-off state might result in the loss of customer data. If the system has been powered off *prior* to the battery service action, you *must* IPL to DST and continue this procedure *before* replacing the battery.

For information about replacing the cache battery pack on an AIX system or partition, see the *PCI-X SCSI RAID Controller Reference Guide for AIX*.

For information about replacing the cache battery pack on a Linux system or partition, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

**Note:** To complete these procedures, *do not* power off the adapter or power off the system or partition. The cache battery on these adapters is designed to be replaced concurrently.

---

## Replacing the cache battery pack on the 571E, 574F, 2780, or 5708 adapters

You might need to replace the cache battery pack. Use the procedure in this section to perform this task.

### About this task

This procedure describes how to replace the cache battery pack on the adapters listed in the following table

Feature	CCIN	Description
5582 5583	571E 574F	PCI-X DDR Quad Channel Ultra 320 SCSI RAID adapter with an auxiliary-write cache IOA
0627 2780	2780	PCI-X Ultra4 RAID disk-controller
0641 5590	2780 574F	PCI-X Ultra4 RAID disk-controller with an auxiliary-write cache IOA
5580	2780 5708	PCI-X Ultra4 RAID disk-controller auxiliary-write cache IOA
0649 5738 5777	571E	PCI-X DDR Quad Channel Ultra 320 SCSI RAID adapter

Replacing this feature is a customer task. You can perform this task yourself, or contact an authorized service provider to perform the task for you. You might be charged a fee by the authorized service provider for this service.

**Important:** Removing the cache battery with the system or partition already in a powered-off state might result in the loss of customer data. If the system has been powered off *prior* to the battery service action, you *must* IPL to DST and continue this procedure *before* replacing the battery.

For information about replacing the cache battery pack on an AIX system or partition, see the *PCI-X SCSI RAID Controller Reference Guide for AIX*.

For information about replacing the cache battery pack on a Linux system or partition, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

**Note:** To complete these procedures, *do not* power off the adapter or power off the system or partition. The cache battery on these adapters is designed to be replaced concurrently.



---

## **Appendix. Accessibility features**



---

## Notices

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

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

The manufacturer may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to the manufacturer.

**The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:** THIS INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. The manufacturer may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to Web sites not owned by the manufacturer are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this product and use of those Web sites is at your own risk.

The manufacturer may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning products not produced by this manufacturer was obtained from the suppliers of those products, their published announcements or other publicly available sources. This manufacturer has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to products not produced by this manufacturer. Questions on the capabilities of products not produced by this manufacturer should be addressed to the suppliers of those products.

All statements regarding the manufacturer's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

The manufacturer's prices shown are the manufacturer's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

If you are viewing this information in softcopy, the photographs and color illustrations may not appear.

The drawings and specifications contained herein shall not be reproduced in whole or in part without the written permission of the manufacturer.

The manufacturer has prepared this information for use with the specific machines indicated. The manufacturer makes no representations that it is suitable for any other purpose.

The manufacturer's computer systems contain mechanisms designed to reduce the possibility of undetected data corruption or loss. This risk, however, cannot be eliminated. Users who experience unplanned outages, system failures, power fluctuations or outages, or component failures must verify the accuracy of operations performed and data saved or transmitted by the system at or near the time of the outage or failure. In addition, users must establish procedures to ensure that there is independent data verification before relying on such data in sensitive or critical operations. Users should periodically check the manufacturer's support websites for updated information and fixes applicable to the system and related software.

---

## Trademarks

IBM, the IBM logo, and [ibm.com](http://ibm.com) are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml).

Intel, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks of Intel Corporation in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Red Hat, the Red Hat "Shadow Man" logo, and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc., in the United States and other countries.

Other company, product or service names may be trademarks or service marks of others.

---

## Electronic emission notices

### Class A Notices

The following Class A statements apply to the servers.



## **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. IBM® is not 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.

## **Industry Canada Compliance Statement**

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

## **Avis de conformité à la réglementation d'Industrie Canada**

Cet appareil numérique de la classe A respecte est conforme à la norme NMB-003 du Canada.

## **European Community Compliance Statement**

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to 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.

European Community contact:  
IBM Technical Regulations  
Pascalstr. 100, Stuttgart, Germany 70569  
Tele: 0049 (0)711 785 1176  
Fax: 0049 (0)711 785 1283  
E-mail: tjahn@de.ibm.com

**Warning:** 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.

## VCCI Statement - Japan

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 product is a Class A Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

## Electromagnetic Interference (EMI) Statement - People's Republic of China

### 声 明

此为A级产品,在生活环境中,该产品可能会造成无线电干扰。在这种情况下,可能需要用户对其干扰采取切实可行的措施。

Declaration: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may need to perform practical action.

## 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.

## Electromagnetic Interference (EMI) Statement - Korea

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

### Germany Compliance Statement

#### Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

"Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

#### Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

#### Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung nach des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

## Electromagnetic Interference (EMI) Statement - Russia

**ВНИМАНИЕ!** Настоящее изделие относится к классу А.  
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

---

### Terms and conditions

Permissions for the use of these publications is granted subject to the following terms and conditions.

**Personal Use:** You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative works of these publications, or any portion thereof, without the express consent of the manufacturer.

**Commercial Use:** You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of the manufacturer.

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any data, software or other intellectual property contained therein.

The manufacturer reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by the manufacturer, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

THE MANUFACTURER MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THESE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.



BULL CEDOC  
357 AVENUE PATTON  
B.P.20845  
49008 ANGERS CEDEX 01  
FRANCE

REFERENCE  
86 A1 58EV 04