ESCALA POWER5

Hardware Information

Managing adapters and devices

REFERENCE
86 A1 44EW 00

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July 2006

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

REFERENCE
86 A1 44EW 00

Printed in France

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Table of Contents

Managing adapters and devices

The following information describes the specifications and maintenance of adapters and devices.

- **Managing PCI adapters**
  This section provides information using and managing Peripheral Component Interconnect (PCI) adapters and specifications for specific adapters.
- **Managing host channel adapters**
  Learn about how to install and manage host channel adapters.
- **Managing media devices**
  Review the following information to learn about the prerequisites and device operations related to specified media devices.

Managing PCI adapters

This section provides information using and managing Peripheral Component Interconnect (PCI) adapters and specifications for specific adapters.

For related information about PCI adapters, see the following:

- For instructions on how to install, remove, or replace an adapter in a system unit or expansion unit, see PCI adapters.
- For adapter placement information, see PCI placement in the system unit or expansion unit.

- **PCI adapter use and operations**
  The following information relates to Peripheral Component Interconnect (PCI) adapter use.
- **PCI adapter information by feature type**
  Use the following information to aid in identifying adapters and service data for the adapters installed within a system unit.

Parent topic: Managing adapters and devices

Related links
For instructions on how to install, remove, or replace an adapter in a system unit or expansion unit, see:

PCI Adapters

PCI adapter use and operations

The following information relates to Peripheral Component Interconnect (PCI) adapter use.

Note:

- See the PCI adapters topic in Removing and Replacing parts for information about placement, installation and removal of PCI adapters.
- In some systems, you can install PCI adapters with the power on. These adapters are referred to as *hot-pluggable* PCI adapters.

  See the PCI adapters topic in Removing and Replacing parts to determine if your system unit supports the hot-plugging of adapters.
- Do not hot-plug any PCI adapter supporting the system's boot device or system console, with the following exception: in you can use Concurrent Maintenance (hot-plug) on the LS adapter (boot device adapter).

Select the appropriate information from this list:

- PCI slots
- Secondary PCI bus
- Multiple primary PCI buses
- Hot-pluggable PCI slots
- Integrated adapters
- 32-bit versus 64-bit PCI slots
- 33 MHz versus 50/66 MHz 64-Bit PCI slots
- Connectivity versus performance
- Slot restrictions
- Adapter labels

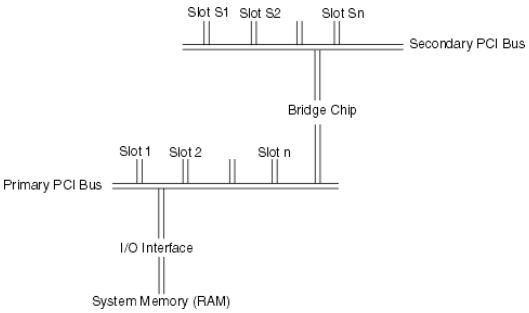
PCI slots

Each PCI bus has a limit on the number of adapters it can support. Typically, this limit can range from two adapters to six adapters for each bus. To overcome this limit, the system design can implement multiple PCI buses. You can use either of the following methods to add PCI buses to your system:

- Adding secondary PCI buses from the primary PCI bus
- Implementing multiple primary buses

Secondary PCI bus

To increase the number of PCI slots when designing a system, add a secondary PCI bus. A PCI-to-PCI bridge chip can connect a secondary bus to a primary bus. The following illustration shows how to use a primary PCI bus to increase the total number of PCI slots.



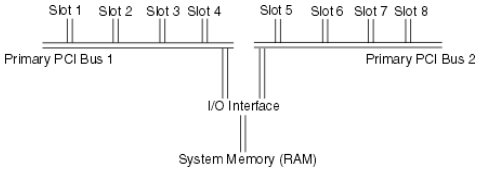
Because the slots on the secondary PCI bus must pass through the bridge chip, certain adapters on a secondary PCI bus might experience lower performance.

Some systems implement a secondary PCI bus. On these systems, place higher-speed adapters on the primary bus to optimize performance.

Multiple primary PCI buses

Another way to add more PCI slots, design the system with two or more primary PCI buses. This design requires a more complex I/O interface with the system memory. The following illustration shows another

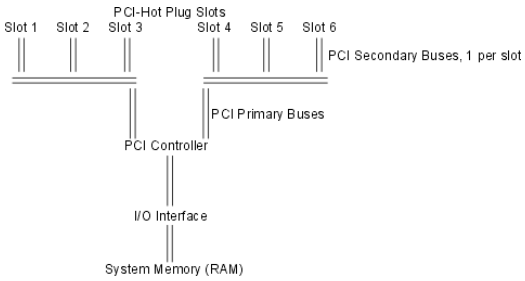
method of increasing the number of PCI slots.



This design can improve I/O performance over the secondary bus method because the I/O interface has created multiple parallel paths into the system memory.

Hot-pluggable PCI slots

If your system contains hot-plug enabled PCI slots. These systems dedicate a PCI bus to each PCI slot, which allows the adapter to be removed or added without affecting other adapters. This architecture uses one or more PCI primary buses that are bridged to multiple PCI secondary buses. Each PCI secondary bus has a single PCI slot.



Integrated adapters

The main processor board integrates a number of devices, but they physically connect to one of the PCI buses. For this reason, some of the buses might have only two or three slots available to install adapters. Integrated PCI adapters include SCSI adapters and Ethernet adapters.

32-bit versus 64-bit PCI slots

Choosing between 32-bit and 64-bit slots influences slot placement and affects performance. Higher-speed adapters use 64-bit slots because they can transfer 64 bits of data for each data-transfer phase.

The 32-bit adapters can typically function in 64-bit PCI slots. However, 32-bit adapters still operate in 32-bit mode and offer no performance advantage in a 64-bit slot. Likewise, most 64-bit adapters can operate in 32-bit PCI slots, but the 64-bit adapter operates in 32-bit mode and reduces performance potential.

33 MHz versus 50/66 MHz 64-Bit PCI slots

Connectivity versus performance

You must consider some performance implications when configuring your system. Installing the maximum number of adapters might affect system performance.

Connectivity limits define how many specified adapters can be physically plugged into a system. This limit defines how many adapters the software and hardware can support. Connectivity limits define the maximum number of adapters for connecting to networks or disks. In many cases, a disk or network has a low duty cycle and the system needs additional adapters to retain the physical connection to all resources. In these cases, follow the connectivity limits.

This information also provides suggested performance limits, established to determine how many concurrently running adapters can provide good performance. As you add adapters (with each adapter performing at close to its rated speed), additional adapters continue to provide an incremental performance increase. After the system reaches its performance limit, adding more adapters does not provide an increase in I/O throughput.

Bus speed, memory speed, adapter design, or processor speed can influence performance. The system processor's speed can often limit how many adapters of a given type the system can support while maintaining maximum performance. After a system uses 90 percent of its system processor, adding more adapters only provides a minor throughput increase.

Because of the wide variety of workloads, this information provides performance-limit guidelines only. The guidelines are based on I/O streaming of large reads or writes to a disk or network. They are not based on small I/Os, which are more transaction-rate limited. Small I/O workloads probably use more system processor capacity and result in fewer supported adapters for maximum performance.

These guidelines are based on the maximum number of processors supported for multiprocessor systems. If your system runs fewer than the maximum number of processors supported, then typically you must reduce the maximum number of adapters by the same ratio. For example, if a system with a maximum of 12 processors can support 12 ATM adapters for maximum performance, the same system with eight processors can support only eight ATM adapters for maximum performance.

If your system uses disk and communication adapters concurrently, use a more conservative estimate of the number of supported adapters.

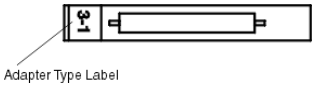
If your configured system runs close to its performance limits, ensure that your system type or configuration provides the desired performance. In these cases, you might need to contact your marketing support personnel for more detailed information.

Slot restrictions

You must install some adapters in specific PCI slots in various systems. Physical size limits, I/O address considerations, thermal limitations, and other factors influence these specifications.

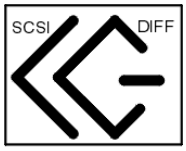
Adapter labels

The following illustrations show how an adapter is labeled.

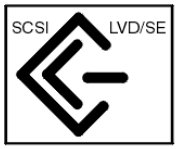


SCSI-1 or SCSI-2 single-ended, low-voltage differential, or differential adapters might carry one of the following ANSI icons:

Single-Ended



Differential



Low Voltage Differential/ Single-Ended

Parent topic: Managing PCI adapters

PCI adapter information by feature type

Use the following information to aid in identifying adapters and service data for the adapters installed within a system unit.

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

Adapters can be identified by there feature code (FC) or their custom card identification number (CCIN). The CCIN number is normally labeled on the adapter.

- **10 Gb Ethernet-SR PCI-X 2.0 DDR adapter (FC 5721)(CCIN 573A)**
  Learn about the 10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter.
- **10 Gb Ethernet-LR PCI-X 2.0 DDR adapter (FC 5722)(CCIN 576A)**
  Learn about the 10 Gb Ethernet-LR PCI-X 2.0 DDR adapter.
- **Dual port gigabit Ethernet-SX PCI-X adapter (FC 5707)(CCIN 5707)**
  Learn about the dual port gigabit Ethernet-SX PCI-X adapter.
- **Gigabit Ethernet-SX PCI-X adapter (FC 6800, 5700)(CCIN 5700)**
  Learn about the Gigabit Ethernet-SX PCI-X adapter.
- **4-Port 10/100 Base-TX Ethernet PCI adapter (FC 4961)**
  Learn about the 4-Port 10/100 Base-TX Ethernet PCI adapter..
- **4-Port 10/100/1000 Base-TX PCI-X adapter (FC 5740, FC 1954)**
  Learn about the 4-Port 10/100/1000 Base-TX PCI-X adapter.
- **10/100/1000 Base-TX Ethernet PCI-X adapter (FC 1979, 5701, 6801)(CCIN 5701)**
  Learn about the 10/100/1000 Base-TX Ethernet PCI-X adapter.
- **10/100 Mbps Ethernet PCI adapter II (FC 4962)(CCIN 4962)**
  Learn about the 10/100 Mbps Ethernet PCI adapter II.
- **4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter (FC 1905, 5758, 5761) (CCIN 1910, 280D)**
  Learn about the 4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter.
- **4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter (FC 1910, 5759) (CCIN 1910, 5759)**
  Learn about the 4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter.

- **PCI-X DDR dual-channel Ultra320 SCSI adapter (FC 0647, 1912, 5736, 5775) (CCIN 571A)**
  Learn about the PCI-X DDR dual-channel Ultra320 SCSI adapter.
- **PCI-X DDR dual-channel Ultra320 SCSI RAID adapter (FC 0648, 1913, 5737, 5776)(CCIN 571B)**
  Learn about the PCI-X DDR dual-channel Ultra320 SCSI RAID adapter.
- **Auxiliary-write cache IOA (FC 5580, 5581)(CCIN 5708)**
  Learn about the auxiliary-write cache IOA adapter and the PCI-X Ultra4 RAID disk-controller adapters used with it.
- **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.
- **POWER GXT135P graphics PCI adapter (FC 2848)**
  Learn about the POWER GXT135P graphics PCI adapter.
- **POWER GXT135P graphics PCI adapter (FC 2849)**
  Learn about the POWER GXT135P graphics PCI adapter.
- **PCI audio adapter (FC 8244)**
  Learn about the PCI audio adapter.
- **2 port USB PCI adapter (FC 2738)(CCIN 28EF)**
  Learn about the 2 Port USB PCI adapter.
- **8-Port asynchronous EIA-232E/RS-422A PCI adapter (FC 2943)**
  Learn about the 8-Port asynchronous EIA-232E/RS-422A PCI adapter.
- **64-bit/66MHz PCI ATM 155 UTP adapter (FC 4953)**
  Learn about the 64-bit/66MHz PCI ATM 155 UTP adapter.
- **PCI-X Cryptographic Coprocessor (FC 4764)(CCIN 4764)**
  Learn about the 4764 PCI-X Cryptographic Coprocessor.
- **Cryptographic accelerator (FC 4960, CCIN 2058)**
  Learn about the cryptographic accelerator.
- **PCI cryptographic coprocessor (FC 4963)**
  Learn about the PCI cryptographic coprocessor.

Parent topic: Managing PCI adapters

10 Gb Ethernet-SR PCI-X 2.0 DDR adapter (FC 5721)(CCIN 573A)

Learn about the 10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter.

Overview

The 10 Gigabit 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 Gigabit 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 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
- Message Signaled Interrupts (MSI)
- 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 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 1. 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.

Gathering tools and documentation

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

- The 10 Gigabit 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. 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. Otherwise, install the device driver.

To install device driver software, do the following:

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:
    - 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.

Verify AIX software installation

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

1. If necessary, log in as root user.
2. 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 5Lversion 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

Refer to the PCI Adapters topic for instructions on placement and installation of 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:

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 machine 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 card at one time.

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

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.

Understanding the 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 2. 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

Parent topic: PCI adapter information by feature type

10 Gb Ethernet-LR PCI-X 2.0 DDR adapter (FC 5722)(CCIN 576A)

Learn about the 10 Gb Ethernet-LR PCI-X 2.0 DDR adapter.

Overview

The 10 Gigabit 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 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
- Message Signaled Interrupts (MSI)
- 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 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-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 multimode fiber network attachment

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

Table 1. 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:

- The 10 Gigabit 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 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. 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. Otherwise, install the device driver.

To install device driver software, do the following:

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:
    - 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.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.

Verify AIX software installation

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

1. If necessary, log in as root user.
2. 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 5Lversion 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

Refer to the PCI Adapters topic for instructions on placement and installation of 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:

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 machine 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 card at one time.

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

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.

Understanding the 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 2. 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

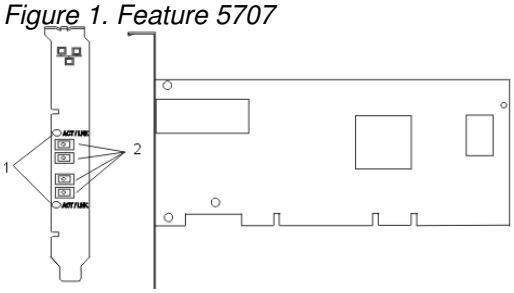
Parent topic: PCI adapter information by feature type

Dual port gigabit Ethernet-SX PCI-X adapter (FC 5707)(CCIN 5707)

Learn about 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 1. 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

Gigabit Ethernet-SX PCI-X Adapter Specifications

Item
Description

FRU number
00P4290

I/O bus architecture
PCI 2.2 and PCI-X V1.0a compliant

Busmaster
Yes

Maximum number
For system-specific adapter placement information, see PCI placement in the system unit or expansion unit

Adapter size
PCI short form

Connector information
LC fiber optic

Wrap plug
LC fiber optic, part number 11P3847

Cables
Customer supplied. Optional LC-SC 62.5 micron converter cable, part number 11P1374, FC 2459, is available. For 50 micron LC-SC connections, use converter cable part number 11P1373, FC 2456.

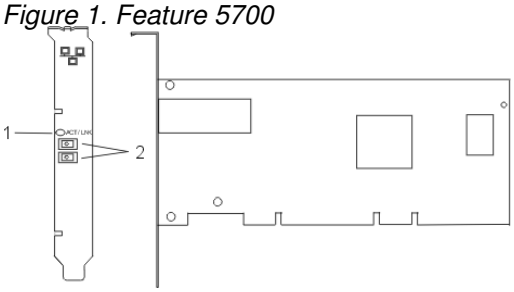
Parent topic: PCI adapter information by feature type

Gigabit Ethernet-SX PCI-X adapter (FC 6800, 5700)(CCIN 5700)

Learn about 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 ESCALA PL 450T/R 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 1. 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
FRU number
00P3055
I/O bus architecture
PCI 2.2 and PCI-X V1.0a compliant
Busmaster
Yes
Maximum number
For system-specific adapter placement, see PCI placement in the system unit or expansion unit.
Adapter size
PCI short form
Connector information
LC fiber optic
Wrap plug
LC fiber optic, part number 11P3847
Cables
Customer supplied. Optional LC-SC 62.5 micron converter cable, part number 11P1374, FC 2459, is available. For 50 micron LC-SC connections, use converter cable part number 11P1373, FC 2456.

Parent topic: PCI adapter information by feature type

4-Port 10/100 Base-TX Ethernet PCI adapter (FC 4961)

Learn about 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.

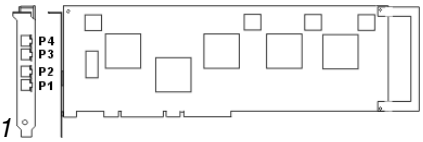


Figure 1. Feature 4961

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

Item	Description
FRU number	09P1421
I/O bus architecture	PCI
Busmaster	Yes
Connector information	8-position RJ-45
Cables:	Customer supplied (use Y type connection)
For 10 Mbps	Use category 3, 4, or 5 unshielded twisted pair
For 100 Mbps	Use category 5 only unshielded twisted pair
Wrap plug	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

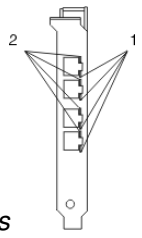


Figure 2. Adapter LEDs

Parent topic: PCI adapter information by feature type

4-Port 10/100/1000 Base-TX PCI-X adapter (FC 5740, FC 1954)

Learn about the 4-Port 10/100/1000 Base-TX PCI-X adapter.

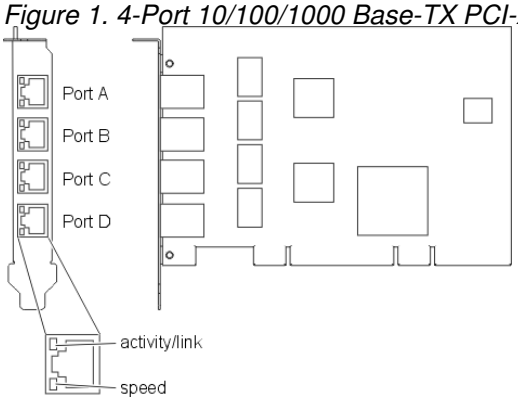
Overview

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 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-Tcompliant
- 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
    - ♦ CAT-5 cabling for 1000 Mbps
    - ♦ CAT-3 or CAT-5 cabling for 100 Mbps or 10 Mbps
- Two LED adapter status indicators per port for link activity and speed
- Boot ROM on two ports
- Advanced cable diagnostics
- European Union Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment compliant

Figure 1. 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 and U3

SUSE Linux Enterprise Server 9 SP3

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 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 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
- CAT-5 unshielded twisted pair (UTP) cables for 1000 Mbps network attachment
- CAT-5 or CAT-3 unshielded twisted pair (UTP) cables for 100 Mbps or 10 Mbps network attachment

Note: The above cable can be no longer than 100 meters. Including patch cables, this is the maximum allowable cable length 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.

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:

- 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(s)
- 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 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. 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 for instructions. Otherwise, install the device driver.

To install device driver software, do the following:

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:
    - 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 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:

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

Refer to the PCI Adapters topic for instructions on placement and installation of 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:

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 machine 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:

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.

Understanding the adapter LEDs

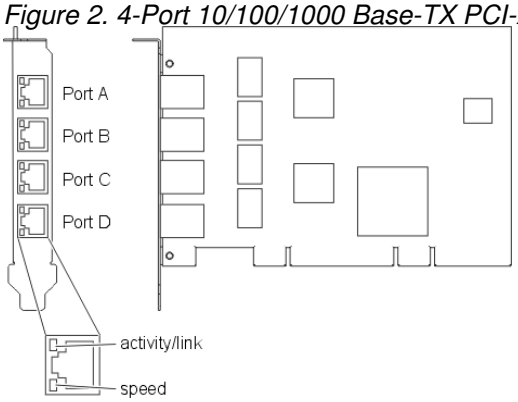
The LEDs on the 4-Port 10/100/1000 Base-TX PCI-X adapter provide information about the card's operation status. The LEDs are visible through the card's mounting bracket and, when lit, indicate the following conditions:

Table 1.

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 2. 4-Port 10/100/1000 Base-TX PCI-X adapter

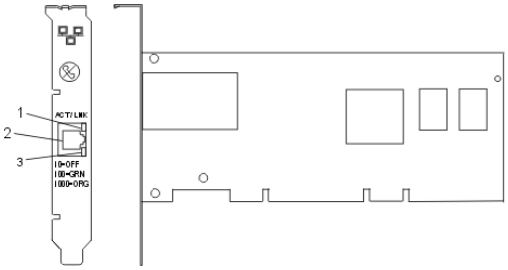


Parent topic: PCI adapter information by feature type

10/100/1000 Base-TX Ethernet PCI-X adapter (FC 1979, 5701, 6801)(CCIN 5701)

Learn about the 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 over four pairs of standard CAT-5 cable 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

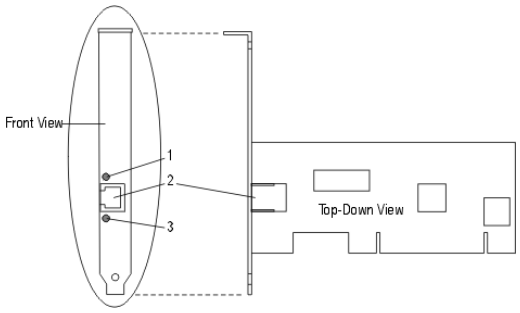
Item
Description
FRU number
00P3056
I/O bus architecture
PCI 2.2 and PCI-X V1.0a compliant
Busmaster
Yes
Maximum number
For system-specific adapter placement, see PCI placement in the system unit or expansion unit.
Adapter size
PCI short form
Connector information
RJ-45
Wrap plug
RJ-45, part number 00G2380
Cables
Customer supplied. Use CAT-5 twisted pair bulk cables (TIA or EIA 568A is recommended).

Parent topic: PCI adapter information by feature type

10/100 Mbps Ethernet PCI adapter II (FC 4962)(CCIN 4962)

Learn about 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 card 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
I/O bus architecture	PCI 2.2 compliant
Busmaster	Yes
Maximum number	For system-specific adapter placement information, see PCI placement in the system unit or expansion unit
Connector	RJ-45
Wrap plug	RJ-45, part number 00G2380
Cables	Customer supplied. Use CAT-5 twisted pair bulk cables (TIA/EIA 568A is recommended).

Parent topic: PCI adapter information by feature type

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

Learn about 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 IBM 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 connector(s), 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	03N5005 (FC 1905) 03N5014 (FC 5758, 5761)
Wrap plug FRU number	11P3847 (FC 1905, 5758. 5761)
I/O bus architecture	PCI-X 2.0a, PCI 3.0, PCI-X Mode 2 - 266MHz, 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 PCI placement in the system unit or expansion unit
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 base.

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 PTF prerequisites. To do this, use the IBM Prerequisite Web site at http://www-912.ibm.com/e_dir/eServerPrereq.nsf

Parent topic: PCI adapter information by feature type

Related information

PCI adapter placement in the system unit or expansion unit

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4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter (FC 1910, 5759) (CCIN 1910, 5759)

Learn about the 4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter.

The 4 Gigabit 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 IBM 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 connector(s), 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	03N5020 (FC 1910) 03N5029 (FC 5759)
Wrap plug FRU number	11P3847 (FC 1910, 5759)
I/O bus architecture	PCI-X 2.0a, PCI 3.0, PCI-X Mode 2 - 266MHz, 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 PCI placement in the system unit or expansion unit

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

Parent topic: PCI adapter information by feature type

Related information

PCI adapter placement in the system unit or expansion unit

PCI-X DDR dual-channel Ultra320 SCSI adapter (FC 0647, 1912, 5736, 5775) (CCIN 571A)

Learn about 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.

PCI-X DDR dual-channel Ultra320 SCSI adapter specifications

Item

Description

FRU number

39J3536 (FC 0647, 5736, 5775)
39J2421 (FC 1912)

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 PCI placement in the system unit or expansion unit

Operating system or partition requirements
: AIX 5L for Power version 5.2 with 5200-07 required maintenance package or higher
AIX 5L for Power version 5.3 with 5300-03 required maintenance package or higher
Red Hat Enterprise Linux 4 Update 2 or newer
SuSE Linux Enterprise Server 9 Service Pack 2 or newer

Required software or drivers
: 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)

Tools
: None

Cables
: Attachment cables are shipped with the attaching subsystem or device.

Parent topic: PCI adapter information by feature type

PCI-X DDR dual-channel Ultra320 SCSI RAID adapter (FC 0648, 1913, 5737, 5776)(CCIN 571B)

Learn about 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 0,10,5,6 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.

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

Item
: **Description**

FRU number
: 39J3534 (FC 5737)
39J2418 (FC 1913)

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 PCI placement in the system unit or expansion unit

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.

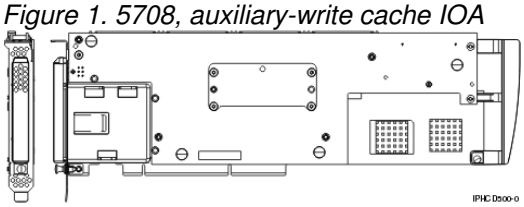
Parent topic: PCI adapter information by feature type

Auxiliary-write cache IOA (FC 5580, 5581)(CCIN 5708)

Learn about 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 1. 5708, auxiliary-write cache IOA



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 restore.

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	• Long, 64 bit, 133 MHz, 3.3 V edge connector, single-slot • PCI-X 2.0 compliant • Compatible down to 32 bit, 33 MHz PCI adapter slots
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, see PCI placement in the system unit or expansion unit.
Partition information	• If you are placing the feature in the primary partition or any non-partitioned system, the auxiliary cache IOA for the load source (LS) adapter must be in the same enclosure as the LS IOA. • If you are placing the feature in the secondary partition on any system, the auxiliary cache IOA for the LS adapter must be under the LS IOP.
Related information	• This feature must be placed in attached expansion units. The 5708 adapter cannot be placed in the model ESCALA PL 250T/R, ESCALA PL 450T/R, or ESCALA PL 850R/PL 1650R/R+ system units. • The disk controller adapter and the auxiliary-write cache adapter each require one PCI slot. • Both adapters must be installed in the same enclosure. • The adapters are connected by a SCSI cable (provided).

	• The operating system identifies the 5708 adapter as a storage controller with no devices attached. • The 5708 adapter is not supported in an environment without an IOP. • Types 2780 and 2757 will not appear on ordering, shipping, or inventory documentation when received as part of these features.

Installing the adapters

To install the adapters, see PCI adapters, then return here for instruction on installing the SCSI cable.

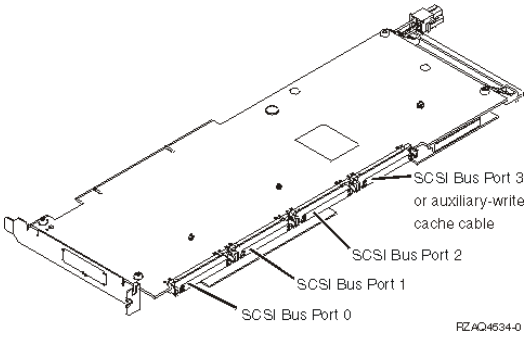
Installing the SCSI cable

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:

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



2. Attach the cable to the SCSI port on the auxiliary-write cache adapter.

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.

Parent topic: PCI adapter information by feature type

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.

Parent topic: PCI adapter information by feature type

Description and technical overview

The 1 Gigabit iSCSI TOE PCI-X Adapter is an adapter that 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

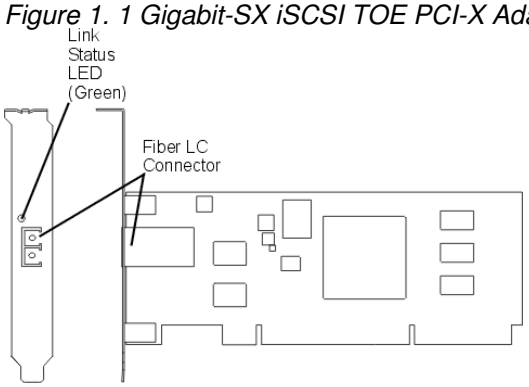
1 Gigabit-SX iSCSI TOE PCI-X Adapter (optical connector), FC 5714 and FC 1987 (CCIN 573C)

- 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.

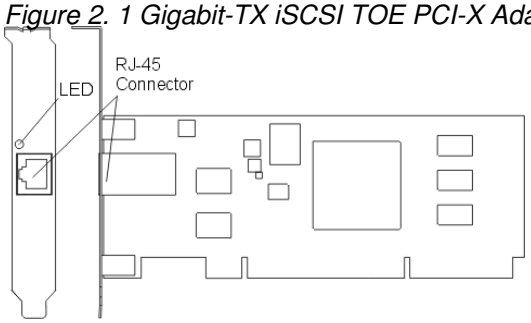
Figure 1. 1 Gigabit-SX iSCSI TOE PCI-X Adapter



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

- 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 for category-5 copper cabling

Figure 2. 1 Gigabit-TX iSCSI TOE PCI-X Adapter



Parent topic: 1 Gigabit iSCSI TOE PCI-X adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

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

Parent topic: 1 Gigabit iSCSI TOE PCI-X adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

Verifying your hardware requirements

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

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

- Category 5 unshielded twisted pair (UTP) cables for network attachment

  Note: The cable can be no longer than 100 meters, including patch cables. This is the maximum allowable cable length 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 (850nm) 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 1. 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 µ.m MMF	160	2	220
62.5 µ.m MMF	200	2	275
50 µ.m MMF	400	2	500
50 µ.m MMF	500	2	500

Parent topic: Preparing to install the adapter

Verifying your software requirements

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.

Parent topic: Preparing to install the adapter

Checking prerequisites

To install the 1 Gigabit-SX iSCSI TOE PCI-X Adapter or 1 Gigabit-TX iSCSI TOE PCI-X Adapter, you will need the following:

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

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.

Parent topic: Preparing to install the adapter

Gathering tools and documentation

To install the adapter, you need the following items:

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

Parent topic: Preparing to install the adapter

Installing the device driver software for the adapter

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

Parent topic: 1 Gigabit iSCSI TOE PCI-X adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

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

This section explains 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. 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 for instructions.

To install the device driver software, do the following:

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:

   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
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, to see the adapter installation procedure.

Parent topic: Installing the device driver software for the adapter

Verify AIX software installation

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

1. If necessary, log in as root user.
2. 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.
   - 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. If you continue to experience problems, it may be necessary to call your system support organization. Refer to your operating system documentation for instructions.

Parent topic: Installing the device driver software for the adapter

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

This section explains how to install 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 toInstalling the 1 Gigabit iSCSI TOE PCI-X adapter. 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 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:

   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.
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.

Parent topic: Installing the device driver software for the adapter

Verify AIX software installation

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

1. If necessary, log in as root user.
2. 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 device driver software. If you continue to experience problems, it may be necessary to call your system support organization. Refer to your operating system documentation for instructions.

Parent topic: Installing the device driver software for the adapter

Installing the 1 Gigabit iSCSI TOE PCI-X adapter

This section takes you through installing the adapter, verifying the adapter installation, and running adapter diagnostics.

- **Installing the adapter**
- **Verifying the adapter installation**
- **Running adapter diagnostics**

Parent topic: 1 Gigabit iSCSI TOE PCI-X adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

Installing 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.

To install your adapter hardware first, refer to the PCI Adapter topic for instructions on placement and installation of PCI adapters.

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 first, and then return to this section.

Parent topic: Installing the 1 Gigabit iSCSI TOE PCI-X adapter

Verifying the adapter installation

For general instructions on verifying an installed part, refer to the Verify the installed part topic

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 machine. Verify that the adapter was installed correctly.

Parent topic: Installing the 1 Gigabit iSCSI TOE PCI-X adapter

Running adapter diagnostics

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

Parent topic: Installing the 1 Gigabit iSCSI TOE PCI-X adapter

Configuring the 1 Gigabit iSCSI TOE PCI-X adapter

The following information describes how 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.

Parent topic: 1 Gigabit iSCSI TOE PCI-X adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

Overview of 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.
4. Configure the storage device. See Configuring the storage device.

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.

Parent topic: Configuring the 1 Gigabit iSCSI TOE PCI-X adapter

Installing the device-specific storage support files

In order for the system to function properly 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.

Parent topic: Configuring the 1 Gigabit iSCSI TOE PCI-X adapter

Configuring the adapter in AIX

Using the smit command, do the following:

1. From the command prompt, type smit iscsi, 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:

```
                                                 Entry Fields
 iSCSI Adapter                                   ics0
 Description                                     iSCSI Adapter
 Status                                          Available
 Location                                        1f-09
         iSCSI Initiator Name
 Maximum number of Commands to Queue to Adapter  200                  +#
 Maximum Transfer Size                           0x100000             +
 Discovery Filename                              /etc/iscsi/targetshw0 *
 Discovery Policy                                file               +
 Automatic Discovery Secrets Filename            /etc/iscsi/autosecret>
 Adapter IP Address                              10.100.100.14
 Adapter Subnet Mask                             255.255.255.0
 Adapter Gateway Address
 Apply change to DATABASE only                   no                    +


sc+1=Help          Esc+2=Refresh       Esc+3=Cancel        Esc+4=List
sc+5=Reset         Esc+6=Command       Esc+7=Edit          Esc+8=Image
sc+9=Shell         Esc+0=Exit          Enter=Do
```

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 **targetshw*x*** 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 -vl 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.

Parent topic: Configuring the 1 Gigabit iSCSI TOE PCI-X adapter

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. For an explanation of this file format see

http://publib16.boulder.ibm.com/doc_link/en_US/a_doc_lib/files/aixfiles/targets.htm.

Parent topic: Configuring the 1 Gigabit iSCSI TOE PCI-X adapter

Configuring the storage device

Storage devices need to be correctly configured in order to be visible to the adapter. Often the storage device must be told of the adapter iSCSI name, and the adapter must be told 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.

Parent topic: Configuring the 1 Gigabit iSCSI TOE PCI-X adapter

Connecting the adapter to an Ethernet network

For information about connecting the IBM 1 Gigabit iSCSI TOE PCI-X Adapter to your Ethernet network, refer to the following procedures:

- **Connecting the 1 Gigabit-SX iSCSI TOE PCI-X adapter (optical connector) to an Ethernet network**
- **Understanding the adapter LED**
- **Connecting the network cables and adapter**
- **Connecting the 1 Gigabit-TX iSCSI TOE PCI-X adapter (copper connector) to an Ethernet network**
- **Connecting the network cables and adapter**
- **Understanding the adapter LED**

Parent topic: 1 Gigabit iSCSI TOE PCI-X adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

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

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.

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

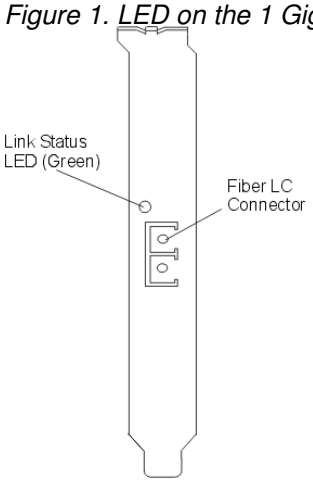
Parent topic: Connecting the adapter to an Ethernet network

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



Parent topic: Connecting the adapter to an Ethernet network

Connecting the network cables and adapter

Before you begin connecting the adapter, make sure you have the hardware listed in Verifying your hardware requirements.

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.

Parent topic: Connecting the adapter to an Ethernet network

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

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

Parent topic: Connecting the adapter to an Ethernet network

Connecting the network cables and adapter

Before you begin connecting the adapter, make sure you have the hardware listed in Verifying your hardware requirements.

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

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.

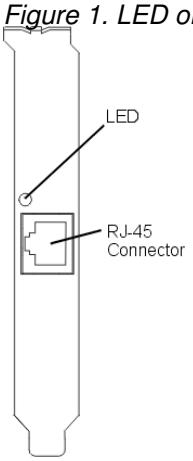
Parent topic: Connecting the adapter to an Ethernet network

Understanding the adapter LED

The LED on the 1 Gigabit-TX iSCSI TOE PCI-X Adapter provide information about the card's link status. The LED is visible through the card's mounting bracket and indicate 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 1. LED on the 1 Gigabit-TX iSCSI TOE PCI-X Adapter



Parent topic: Connecting the adapter to an Ethernet network

Technical Appendixes

This information may be useful for resolving configuration errors.

- **Config logging information**
- **iSCSI TOE adapter error log information (ICS_ERR template)**
- **iSCSI TOE protocol driver error log detail (ISCSI_ERR template)**

Parent topic: 1 Gigabit iSCSI TOE PCI-X adapter (FC 5714, 1987, 5713, 1986)(CCIN 573B, 573C)

Config logging information

It may be helpful to use the config log facility when trying to debug the iSCSI environment. This information may be useful for resolving configuration errors. The most common error scenario is when **cfgmgr -vl ics0** completes successfully, but does not create any hdisks, or creates fewer hdisks than expected. There are several common configuration errors that can lead to this scenario. The cfglog may 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 methodology is to perform the following:

```
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 what went wrong. 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 SCIOLSTART ioctl fails, it will prevent the discovery of the hdisks. A failure of SCIOLSTART will be recorded in the config log as follows:

```
SCIOLSTART 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 SCIOLSTART 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 SCIOLSTART 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, there are two 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 does not have any LUNs assigned to the device, no error will appear, but there will be a message indicating `0 luns found`.

Parent topic: Technical Appendixes

iSCSI TOE adapter error log information (ICS_ERR template)

This section describes the error log entries made by the iSCSI TOE adapter.

- Table 1 shows the detail sense data layout.
- Table 2 shows the detail sense data descriptions.
- Special detail sense data and Table 3 show a special format that is used for logging bulk data such as a crash record or an IOCB request or completion queue.
- Table 4 shows the error number values.

The detail sense data log in the ICS_ERR template for PCI iSCSI TOE adapters uses the structure error_log_def defined in **src/rspc/kernext/pci/qlisc/qliscdd.h**.

Table 1. Detail Sense Data

`AAAA AAAA` is the general error field.

```
XXXX VVVV AAAA AAAA BBBB BBBB CCHH RRRR YYYY YYYY RRRR RRRR RRRR RRRR RRRR RRRR
IIII IIII IIII IIII IIII IIII IIII IIII PPPP PPPP PPPP PPPP SSSS SSSS UUUU UUUU
LLLL LLLL LLLL LLLL EEEE EEEE EEEE EEEE DDDD DDDD DDDD DDDD MMMM MMMM MMMM MMMM
FFFF FFFF FFFF FFFF GGGG GGGG GGGG GGGG JJJJ JJJJ JJJJ JJJJ KKKK KKKK KKKK KKKK
OOOO OOOO OOOO OOOO QQQQ QQQQ QQQQ QQQQ RRRR RRRR RRRR RRRR RRRR RRRR RRRR RRRR
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
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TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT TTTT
WWWW RRRR ZZZZ ZZZZ 2222 2222 2222 2222 3333 3333 3333 3333 4444 4444 4444 4444
5555 5555 5555 5555 6666 6666 6666 6666 7777 7777 7777 7777 8888 8888 8888 8888
9999 9999 9999 9999 #### #### #### #### $$$$ $$$$ $$$$ $$$$ %%%% %%%% %%%% %%%%
&&&& &&&& &&&& &&&& **** **** **** **** @@@@ @@@@ @@@@ @@@@ ???? ???? ???? ????
```

Table 2. Detail sense data descriptions

Data	Description
X	Device type ID. X value of 0 indicates Qlogic iSCSI adapter driver.
V	Valid length of detail.
A	Determined by the adapter driver based on the error.
B	Return code from an operation.
C	Discovery policy. Possible values: • 0 - Unknown how the adapter is connected • 1 - This adapter is using flat file discovery • 2 - This adapter is using SLP
H	Type of data in the error log. Possible values: • 0 - None • 1 - Mailbox • 2 - IOCB • 3 - Register data • 4 - Driver data • 5 - qlisc_cmd data • 6 - Raw data • 7 - Return code data
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
*	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 3. 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 4. 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
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	Can't issue Login because of invalid mode. Mode, origin, and ddb_dev_index provided
0x91	ICS_ERR6	Can't issue Logout because of invalid mode. Mode, origin, and ddb_dev_index provided
0x92	ICS_ERR6	Can't get DDB because of invalid mode. Mode, origin, and ddb_dev_index provided
0x93	ICS_ERR6	Can't set DDB because of invalid mode. Mode, origin, and ddb_dev_index provided
0x94	ICS_ERR6	Can't do a Get Management data mailbox. Mode, origin, and ddb_dev_index provided
0x95	ICS_ERR6	Can't do a Read Flash ROM mailbox because of of invalid mode. Mode and origin provided
0x96	ICS_ERR6	Can't do a Write Flash ROM mailbox because of invalid mode. Mode, origin provided
0x97	ICS_ERR6	Can't do a ping because of invalid mode. Mode, address provided
0x98	ICS_ERR6	Can't get crash record data because of invalid mode, Mode, data size and origin provided.
0x99	ICS_ERR6	Can't free DDB because of invalid mode. Mode, origin, and ddb_dev_index provided
0x9A	ICS_ERR6	Can't get About Firmware data because of invalid mode. Mode, origin provided.
0x9B	ICS_ERR6	Can't get init firmware control block data because of invalid mode. Mode, origin provided.
0x9A	ICS_ERR6	Can't 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 iSCS nodes known by adapter has decreased.
0xA9	ICS_ERR6	Failed to build Get Firmware State after Initialize Firmware, Return code included.
0xAA	ICS_ERR6	We 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, heart beat, 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.
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.

Parent topic: Technical Appendixes

iSCSI TOE protocol driver error log detail (ISCSI_ERR template)

This section describes the error log entries made by the iSCSI protocol driver.

- Table 1 shows the detail sense data layout.
- Table 2 shows the detail sense data descriptions.
- Table 3 shows the error number values.

Table 1. 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 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 WWSS 1111 1111
2222 2222 2222 2222 3333 3333 3333 3333
```

Table 2. 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: • 0 - Unknown how the adapter is connected • 1 - This adapter is using flat file discovery • 2 - This adapter is using SLP
H	Type of data in the error log. Possible values: • 0 - IOCB • 1 - CMD Element • 2 - Raw/General
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
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 non data requests since opened
#	Number of times a request was not sent because no command elements
%	lbolt when last opened
*	lbolt of current request

Table 3. Error number values

Error Number	Error Template	Description of Error
0x1	ISCSI_ERR4	Command Time-out in SCIOLINQU. dev_info information is included.
0x2	ISCSI_ERR4	Command Time-out in SCIOLSTUNIT. 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	

		SCIOLSTART 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.
0x10	ISCSI_ERR13	Only logged when debug is turned on . An LUN reset (SCIOLRESET) 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 (SCIOLRESET) 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 occured.
0x30	ISCSI_ERR2	Async status received from adapter indicates a complete adapter failure
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.
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	We timed out waiting for either link to come up or DHCP server to restablish our lease. The rc fields indicates which of these two is the case.
0x71	ISCSI_ERR2	We 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
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 succesfully, 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

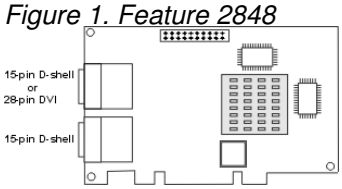
Parent topic: Technical Appendixes

POWER GXT135P graphics PCI adapter (FC 2848)

Learn about 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 1. Feature 2848



Adapter specifications

Item
Description

FRU number
00P5758

Bus architecture
PCI

Bus width
32-bit

Memory
16 MB SDRAM

Number of colors supported
8-bit or 24-bit

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

Display power management
Supports VESA and DPMS

Connector
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

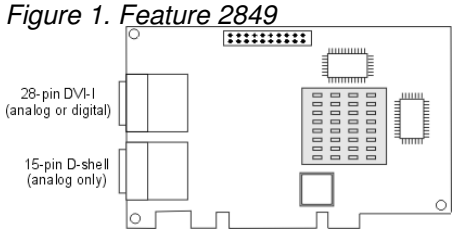
Parent topic: PCI adapter information by feature type

POWER GXT135P graphics PCI adapter (FC 2849)

Learn about 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 1. Feature 2849



Adapter specifications

Item
Description
FRU number
09P5758
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

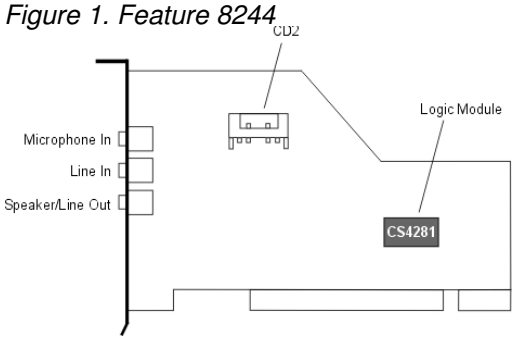
Parent topic: PCI adapter information by feature type

PCI audio adapter (FC 8244)

Learn about 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 1. Feature 8244



PCI audio adapter specifications

Item
Description
FRU number
00P4648
Bus architecture
PCI
Bus width
32-bit

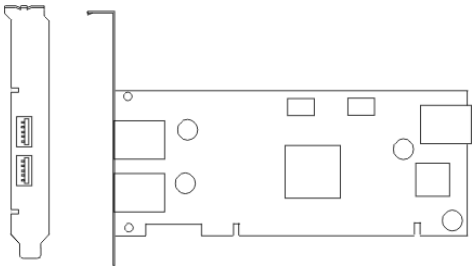
Parent topic: PCI adapter information by feature type

2 port USB PCI adapter (FC 2738)(CCIN 28EF)

Learn about 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
- Supports up to 127 devices for each port
- Supports peripheral hot-swap and wake-up



2 Port USB PCI adapter specifications

Item
Description

FRU number
80P2994 , 80P6227 (o/p)

Bus architecture
PCI 2.2 compliant

Busmaster
Yes

Card type
Half size

Maximum number and adapter slots
For system-specific adapter placement, see PCI placement in the system unit or expansion unit.

Connector
Standard USB single pin-type series "A" receptacle

Wrap plug
None

Cables
None

Parent topic: PCI adapter information by feature type

8-Port asynchronous EIA-232E/RS-422A PCI adapter (FC 2943)

Learn about 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.

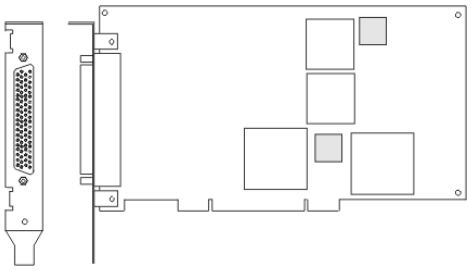


Figure 1. Feature 2943

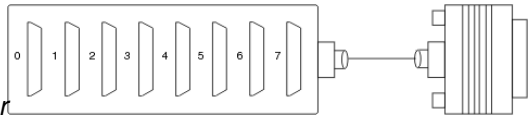


Figure 2. Feature 2943 connector

8-Port asynchronous EIA-232E/RS-422A PCI adapter specifications

Item
: **Description**

FRU number
: 93H6541

I/O bus
: PCI

Bit rate
: 50 - 230,000 (set by the program)

Bits for each character
: 5, 6, 7, 8 (set by the program)

Busmaster
: 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.

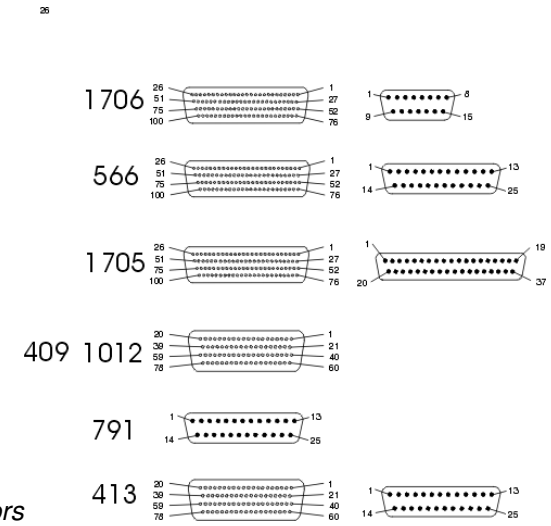


Figure 3. 25 pin D-shell standard connectors

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/TxDb	O	30	50	11	10	40	02	63	64	02
RxD/RxDb	I	55	17	37	56	28	08	46	27	03
RTS/TxDa	O	51	31	12	14	21	41	62	60	04
CTS/RxDa	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:

1. * = RTS is wrapped internally to CTS and RI for each port in RS-422

2. ** = Pins 65 through 78 are ground

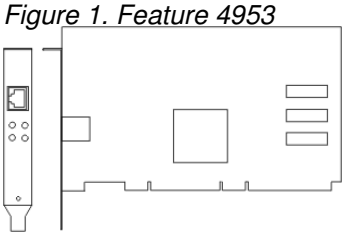
Parent topic: PCI adapter information by feature type

64-bit/66MHz PCI ATM 155 UTP adapter (FC 4953)

Learn about 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 1. Feature 4953



64-bit/66MHz PCI ATM 155 UTP adapter specifications

Item
: **Description**

FRU number
: 21P4112

Bus architecture
: PCI 2.2

Card type
: Half

Adapter slots
: For system-specific adapter placement information, see PCI placement in the system unit or expansion unit

Wrap plug
: 21P8009 (Supplied with adapter) or 42H0540

Connector information
: RJ-45

Cables
: The cat5 cable can be unshielded twisted pair (UTP) or shielded twisted pair (STP), up to 100 meters in length.

Parent topic: PCI adapter information by feature type

PCI-X Cryptographic Coprocessor (FC 4764)(CCIN 4764)

Learn about 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 a rich set of basic services for financial PIN, EMV, and SET applications. The coprocessor also can serve as an accelerator to speed up the establishment on 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

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 PCI placement in the system unit or expansion unit

Environmental requirements

Note: 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 ESCALA PL 450T/R mbar, maximum 1039 mbar
- ◊ Humidity when shipping: 5% to 100% RH

Storage

The adapter should be stored 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: max 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.

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.

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 higher
- ◊ AIX 5L Version 5.3 with the 5300-05 Technology Level, or higher

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.

CCA support program installation

The Common Cryptographic Architecture (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 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:

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

   OR
   a. In the entry field, type the name of the input device that you are using and press Enter.
   b. 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:

1. If necessary, log in as root user.
2. At the command line, enter: **`lslpp -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 higher.

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.

Refer to the PCI Adapters topic for instructions on placement and installation of PCI adapters. 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:

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 need to run diagnostics, see Working with AIX diagnostics.

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. Instructions are in the Replacing the battery on a type 4764 card topic.

Connectors

Table 1. 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 1. Front side

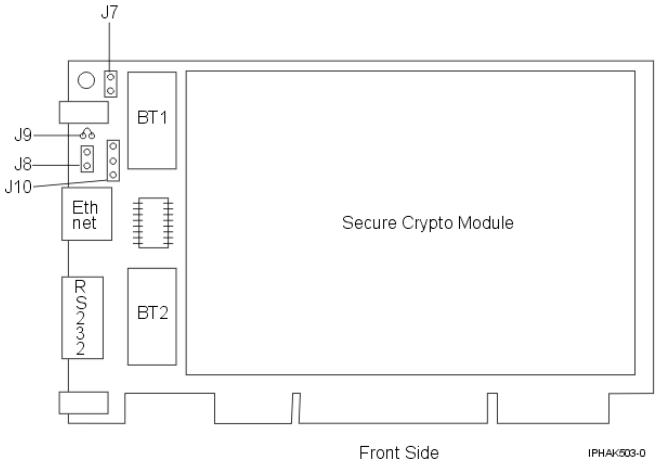
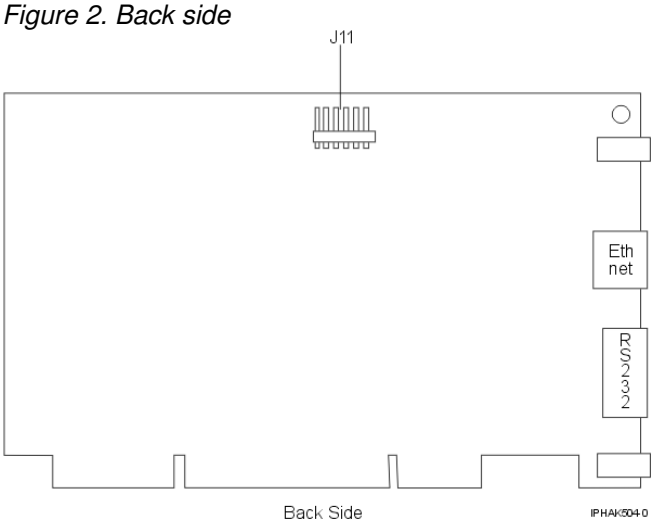


Figure 2. Back side



Parent topic: PCI adapter information by feature type

Related information

Removing and replacing PCI adapters

PCI adapter placement in the system unit or expansion unit Replacing the battery on a type 4764 card Disabling the cryptographic coprocessor on a type 4764 card CryptoCards Web site ESCALA PL Series Prerequisite Web page Working with AIX diagnostics

Cryptographic accelerator (FC 4960, CCIN 2058)

Learn about 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/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.

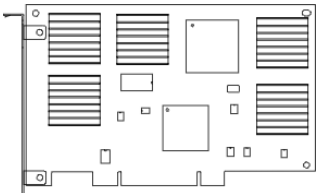


Figure 1. Feature 4960

Cryptographic accelerator specifications

The following items are requirements and specifications for this adapter.

Power consumption
: Typical, 20 watts

Voltage
: +5.0 Vdc ±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 PCI placement in the system unit or expansion unit

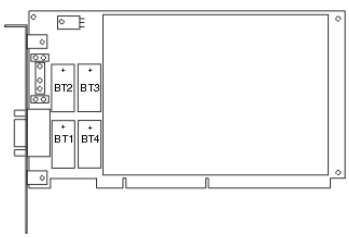
Parent topic: PCI adapter information by feature type

PCI cryptographic coprocessor (FC 4963)

Learn about 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.

Note:

1. 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.
2. 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
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 PCI placement in the system unit or expansion unit
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.

Parent topic: PCI adapter information by feature type

Managing host channel adapters

Learn about how to install and manage host channel adapters.

For information about installing and managing a host channel adapter in an InfiniBand cluster network, see Clustering systems using InfiniBand (IB) hardware.

Parent topic: Managing adapters and devices

Managing media devices

Review the following information to learn about the prerequisites and device operations related to specified media devices.

- **Tape devices**
  Review this information to learn about the different types of tape drives and how to use them.
- **Slimline media devices**
  Review this information to learn about installing, replacing, and the different types of slimline media devices.
- **Floppy devices**
  Use this information to learn about floppy device features.

Parent topic: Managing adapters and devices

Tape devices

Review this information to learn about the different types of tape drives and how to use them.

- **Overview**
  The following information provides an overview for tape drives.
- **Using tape drive media**
  Review the following information to learn about general guidelines for tape drive media usage.
- **Preparing the tape drive for installation**
  Use this information to learn how you can be prepared before you install, remove, or replace any tape drives.
- **Type of tape device**
  Review this information to learn about the different models of tape devices.

Parent topic: Managing media devices

Overview

The following information provides an overview for tape drives.

Select the appropriate information from this list:

- Tape drive overview
- Tape drive environment and use
- Tape handling and storage
- Environmental issues
- Tape drive cleaning
- SCSI hardware issues
- Microcode updates

Tape drive overview

Your tape drive must be installed in the cleanest possible environment. Additionally, tape drives require high quality, data grade tapes and cleaning on a regular basis. Media must also be stored and handled properly. Improper use, storage or handling of tape drives or media may void your warranty or service agreement. If a tape drive stops functioning due to a component failure during the tape drive warranty or maintenance time, the tape drive supplier will replace the tape drive unit. The tape drive supplier will replace any defective tape drive under the terms and conditions of the warranty or service agreement.

The tape drive is used primarily for:

- Saving and restoring system data files
- Archiving important records
- Distributing operating system software upgrades

Note: The following information describes hardware features and functions. While the hardware supports them, the availability of these features and functions depends upon support from the operating system. For information about support for features and functions, see the documentation for your operating system.

Tape drive environment and use

Tape drives require specific maintenance and environmental conditions to operate well over time. Using high-quality, data-grade media, handling and storing this media correctly, operating the tape drive in a clean environment, and keeping the tape drive correctly cleaned can help you to avoid problems with your tape drive.

If a tape drive stops functioning due to a component failure during the tape drive warranty or maintenance time, the service provider will replace the tape drive unit. The service provider will replace any defective tape drive under the terms and conditions of its warranty or service agreement. It is the service provider's objective to work with you to identify the cause of any tape-drive problem and provide a solution.

Tape handling and storage

Most tape is supplied in a sealed cartridge. It is provided this way so that the tape will remain in a clean environment. Opening the cartridge allows dirt and airborne particles to enter and then become a source of contamination. The cartridge should only be opened by the tape drive and not an operator. The tape also is held under proper tension inside the cartridge. If the cartridge is dropped, this tension will be relaxed.

Attention: Inserting a dropped cartridge into a tape drive can cause incorrect loading and result in a jam. This action will ruin the tape and can cause physical damage if the cartridge is not removed correctly.

When the tapes are stored, they must be replaced in their protective containers and stored on their end. The storage area must be clean, dry, at normal room temperature, and away from any magnetic fields. Improper use, storage, or handling of tape drives or media might void your warranty or service agreement.

Environmental issues

Tape drives are designed to operate in a clean environment. Problems can be caused by dirt, dust, fibers, and airborne particles. Airborne particles are the most difficult to address. When a tape is installed into the tape drive, the clearance between the heads and the tape is measured in microns. Particles can damage the tape or the head if they come in contact with either. Customers are responsible to provide a clean operating environment for the tape drive and system.

Tape drive cleaning

No matter how clean the environment, debris can build up on the heads of any tape drive. Every time tape motion occurs, some of the media surface comes off on the heads. Over time, this surface builds up and causes errors in reading and writing. Customers are responsible to clean the tape drive in accordance with the cleaning information that was provided with the tape drive.

Cleaning cartridges can be used a limited number of times. After a cleaning cartridge has been used to its maximum number of times, the cartridge is considered expired. When cartridges expire, they must be replaced. Never reuse an expired cleaning cartridge. Doing so allows previously removed dirt to be reintroduced to the tape drive. Place a mark on the cleaning cartridge after each use, to best determine when your cleaning cartridge has expired.

SCSI hardware issues

Note: If you are installing the auto-docking version of this device on your system, this section does not apply to your system. For information about the auto-docking feature, see your system documentation.

SCSI bus cables and terminators can affect tape drive performance. Use cables and terminators that are designed specifically to keep the SCSI bus as free of noise as possible. Generic cables or terminators can adversely affect the SCSI bus performance. If your service provider's analysis indicates a problem with inferior cables, it might be necessary for the customer to replace them.

Microcode updates

To make certain that the tape drives work their very best, your system supplier might release changed microcode for the tape drives. When a microcode change is developed, your system supplier makes the change available to you through its service organization or by electronic delivery. You might be responsible for installing new microcode as it becomes available. However, microcode can be installed by your service provider or your system administrator. For more information, contact your authorized service provider.

Parent topic: Tape devices

Using tape drive media

Review the following information to learn about general guidelines for tape drive media usage.

For specific information related to the media that can be used with the tape drive you have, see Type of tape device.

Attention: Your system supplier might support only the media that it sells. If the supplier's analysis indicates that the problem is caused by using inferior media, it is the customer's responsibility to replace the inferior media.

Select the appropriate information from this list:

- Types of cartridges
- Recommendations for data cartridge usage
- Prolonging head life
- Storage and shipping environments
- Tape cartridge storage
- Operating in harsh environments
- Ordering tape cartridges

Types of cartridges

Most tape devices are shipped with the following media cartridges.

Data Cartridge
: Use the data cartridge to save or restore programs or data.

Test Cartridge
: Use the specially labeled test cartridge to run the AIX system diagnostics (for information about running diagnostics, refer to your AIX documentation). Do not use the test cartridge to save or restore customer programs or data.

Cleaning Cartridge
: Use the specially labeled cleaning cartridge to clean the device.

  Attention: Use of other than the IBM specified cleaning cartridge can damage your device and might void your warranty.

To order additional cartridges, refer to Ordering tape cartridges.

Recommendations for data cartridge usage

The following list describes recommended guidelines that will help to protect your data and prolong the life of your tape cartridges and the device:

- Use only the tape cartridge specified for your Type of tape device
- Remove the tape cartridge from the drive when the drive is not in use.
- Back up and then discard any tape cartridge that repeatedly produces error messages (the error information is in the System Error Log).
- On the data cartridge, do not open the door that covers the tape. The door protects the tape from dirt, dust, and damage.
- Do not touch the tape. Any substance transferred to the tape by touching could cause loss of data.
- To avoid problems with loading and unloading, use only one label on a cartridge. Multiple or poorly placed labels can clog the drive load mechanism.
- Do not use poor-quality tape cartridges. They can cause excessive read or write errors, and they might damage the tape drive.
- Discard any tape cartridges that are dropped, because the impact might damage the tape's internal mechanism.
- Make sure the environment is kept clean and constant. Do not operate in a dusty environment and always maintain a constant environment. A consistent storage and operating environment reduces media exposure to climatic stress.
- Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and might void the warranty.
- Printers and copiers can produce paper dust and toner dust. Locate the tape unit away from these items. High traffic areas near hallways and doors can also produce excess dust and dirt.
- Record all important information on the tape label. Information, such as the model and number of the system or tape drive, the date, the density, any error statistics, and include a log number. Also note the operating environment and compression mode.

Prolonging head life

This new technology found in the tape device is read and write compatible with newer tape cartridges. Due to media characteristics, extended use of older tape cartridges might increase head wear on the drive. An indication of this head wear is an increase in soft (recoverable) errors. Using newer tape cartridges may have enhanced characteristics that can reduce drive head wear and maximize the overall advantages of the tape device.

Storage and shipping environments

Before using a tape cartridge, let it acclimatize to the operating environment by placing the cartridge in the operating environment for as long as it has been away from the environment or for 24 hours, whichever is less. Acclimatization is necessary for any data cartridge exposed to an environmental change in humidity or to temperature changes of 11°C (20°F) or more. To determine the appropriate operating environment, see Tape drive environment and use.

Retrieval of archived data can be performed on a tape unit that is clean and fully operational. Try to make the recovery environment the same as the operating environment. Allow tapes at least 24 hours to acclimatize to the environment of the tape unit.

The recommended environment for storage and shipment of cartridges is shown in Table 1.

Table 1. Recommended Environment for Data Cartridges

Environmental Factor	Storage	Shipping
Temperature	5°C to 32°C (41° to 90°F)	-40 to 52°C (-40 to 125°F)
Relative Humidity (noncondensing)	20 to 60%	5 to 80%
Maximum Wet Bulb	26°C (79°F)	26°C (79°F)

Tape cartridge storage

Tape drives record data using densities similar to hard disk drives. Because most computer systems are not located in a dust-free, climate-controlled environment, you must exercise special care when dealing with tape cartridges and tape drives. They must be treated as a valuable asset used to protect your business data.

Use the following guidelines for storing your tape cartridges:

- Keep temperature and humidity constant at the levels listed in Table 1.
- Always store tape cartridges in their protective cases. The storage case helps prevent damage from dust and physical misuse. When the tape cartridges are not in use or being stored, keep them in their storage cases and stand on edge in a designated storage location. Do not stack cartridges on the flat side or stack other items on top of the tape cartridges. Handle your tape cartridges with care to reduce archival problems.
- Keep protective cases for tape cartridges closed except when inserting or removing a cartridge. Contamination can build up and be transferred to the tape cartridge if the protective case is left open.
- Exercise stored tapes at least once every 12 months. Run the tape from Beginning of Data (BOD) to End of Data (EOD) and back to BOD at normal operating speeds. Exercise tapes stored in a warmer environment more frequently.
- Sunlight can damage the tape and the cartridge shell. Store tape cartridges out of the direct sunlight.

Attention: Operation outside of the recommended environment can result in possible loss of data or failure of the drive.

Operating in harsh environments

The device is suited to streaming operations, as opposed to multiple stop-and-start, random-search tape operations. When the tape is used for frequent stop-and-start operations, it is beneficial to still have as much streaming movement as possible. This can be accomplished by ensuring that any save or restore operation is the only active operation being performed.

Do not use any tape for archival purposes if it has been used outside of the ranges specified in Table 1 for an extended period of time. The magnetic and physical strength of the tape will have deteriorated as a result of its exposure to the environment. Do not store important data on such a tape; transfer the data to a newer tape for reliable archiving.

Ordering tape cartridges

All tape cartridges are not alike. The tape composition and length, and the construction of the cartridge itself can all affect the quality and capacity of the recording and the performance of your tape drive. A poor quality tape cartridge might appear to work adequately in your system, yet it can leave contamination in the tape path or impede the speed of the recording.

The length and composition of the tape, and the size, shape, and construction of the cartridge shell must all be considered when selecting the tape cartridge to be used with your system. Your service provider might support using only data and cleaning cartridges supplied by it. Data grade tape media is the only type of tape media that should be used for backup and data processing.

To order cartridges, contact your authorized service provider.

The following tables list all available data cartridges for a specific type of cartridge:

Table 2. Recommended 4-mm Data Cartridges

IBM Part Number	Type of Cartridge	Native (uncompressed) Capacity
59H3465	Data Cartridge DDS3	12GB
59H4458	Data Cartridge DDS4	20GB
18P7912	DAT 72 Data Cartridge	36 GB
59H4457	4-mm Test Cartridge	--

21F8763	4-mm Cleaning Cartridge	--

Table 3. Recommended 8-mm Data Cartridges

Part Number	Type of Cartridge	Length
35L1044	20 GB AME with SmartClean Data Cartridge	75 m (246 ft)
09L5323	40 GB AME with SmartClean Data Cartridge	150 m (492 ft)
18P6484	60 GB AME with SmartClean Data Cartridge	225 m (738 ft)
35L1409	Cleaning Cartridge	

Table 4. Recommended VXA X Type Data Cartridges

Part Number	Type of Cartridge	Length
24R2137	80/160 GB X23 VXA Data Cartridge	230 m (754 ft)
24R2136	40/80 GB X10* VXA Data Cartridge	124m (406 ft)
24R2134	20/40 GB X6* VXA Data Cartridge	62 m (203 ft)
24R2135	VXA X6* Test Cartridge	62 m (203 ft)
24R2138	VXA 20 X Cleaning Cartridge	

Note: *X type media requires a minimum microcode level of 2105.

Table 5. Recommended VXA V Type Data Cartridges

Part Number	Type of Cartridge	Length
19P4876	80/160 GB V23 VXA Data Cartridge	230 m (754 ft)
24R2136	40/80 GB V10 VXA Data Cartridge	124m (406 ft)
19P4878	20/40 GB V6 VXA Data Cartridge	62 m (203 ft)
19P4879	VXA V6 Test Cartridge	62 m (203 ft)
19P4880	VXA 20 V Cleaning Cartridge	

Note: V cartridges are the original VXA cartridge

Table 6. LTO Ultrium Data Cartridges

Part Number	Type of Cartridge	Length
08L9120	100/200GB LTO Ultrium 1 Data Cartridges	610 m (2000 ft)
08L9870	200/400GB LTO Ultrium 2 Data Cartridges	610 m (2000 ft)
24R0395	LTO Gen-2 Test Tape	610 m (2000 ft)

35L2086	Universal Cleaning Tape	

Parent topic: Tape devices

Preparing the tape drive for installation

Use this information to learn how you can be prepared before you install, remove, or replace any tape drives.

Select the appropriate information from this list:

- Handling recommendations
- Planning your SCSI device layout
- Determining your SCSI address
- Setting the SCSI address
- Configuring the tape drive
- Updating microcode levels

Handling recommendations

Attention: Be sure to read these instructions before you remove the device from its anti-static bag or any time you handle it.

For optimum performance, always follow these recommendations:

- Handle the drive carefully and by its external metal chassis. Keep your hands away from the printed circuit boards, components, and printed circuit (flex) cables.
- If possible, work on a cushioned surface, and do not drop the device onto the work surface.
- If you move the device to an environment that is colder or warmer than its previous environment, keep the drive in its package and allow the package to reach the current room temperature. This action prevents potential data loss or damage to the device. Allow one hour of acclimatization for each 10 degrees C (18 degrees F) difference between the ship or storage temperature and the room temperature.

Note: If you are installing the auto-docking version of this device on your system, the remainder of this information does not apply to your system. For information about the auto-docking feature, see your system documentation.

Planning your SCSI device layout

SCSI devices are attached in a daisy-chain configuration to a SCSI adapter inside your system unit. SCSI devices can be installed inside your system unit or connected externally. When you connect more than one SCSI device, it is important that you plan the layout of your SCSI chain. Each device in the chain has a unique SCSI address (also called a *SCSI ID*). A terminator is required at each end of the SCSI chain.

Determining your SCSI address

Before you install the drive, you must set the SCSI address on the drive. First, determine which SCSI addresses are available to use. Then choose an address and install jumpers on the drive to set the selected address. The drive supports addresses 6 through 0 and 8 through 15. You can use any available SCSI address as long as no two SCSI devices on the same chain use the same address. Usually, no device can use address 7, which is reserved for the SCSI adapter.

Note: Drives are usually shipped with an SCSI address of 0.

SCSI addresses are in sequential order from highest to lowest priority. All SCSI devices can use SCSI addresses 6 through 0. If your system unit and adapter support the wide (16-data bit, 68-conductor cable) SCSI interface, you might see addresses in the range of 0 through 15.

Setting the SCSI address

The drive is provided with jumpers packaged in a small plastic bag. After you choose an available SCSI address, you can install the jumpers on the drive to match the selected address.

Attention: Each tape drive has different jumper settings and pin locations.

To set the SCSI address complete the following steps:

1. Remove the drive from its anti-static bag.
2. Find the pin positions located on the jumper block on the back of the drive. These positions are always used to set the SCSI address on the drive.
3. Refer to the drawing labeled SCSI ID Setting on the tape drive to determine in which pin positions you insert the jumpers to correctly set the SCSI address.
    a. To set a position to On, insert a jumper onto both the top and bottom pins.
    b. To set a position to Off, either insert a jumper onto the top pin only or remove the jumper from the jumper block.

Configuring the tape drive

To configure the drive after installation, boot your system unit. Device drivers are provided in the operating systems that support the drive. Your operating system recognizes the drive and automatically updates your system unit configuration.

Updating microcode levels

Media devices contain microcode that you can update. Contact your authorized service provider for instructions on how to obtain and install the latest microcode levels for your device.

Parent topic: Tape devices

Type of tape device

Review this information to learn about the different models of tape devices.

- **200/400 GB Half High Ultrium 2 tape drive (FC 5755)**
  Review this information to learn more about the LTO half high tape drive.
- **160/320 GB internal tape drive VXA-320 (FC 6279)**
  Review this information to learn about the 160/320 GB internal tape drive.
- **80/160 GB internal tape drive VXA-2 (FC 6120)**
  Review this information to learn about the 80/160 GB internal tape drive.
- **60/150 GB 16-bit 8-mm internal tape drive (FC 6134)**
  Review this information to learn about the 60/150 GB 16-bit 8-mm internal tape drive.
- **36/72GB Data72 4mm internal tape drive (FC 6258)**
  Review this information to learn about the 36/72GB Data72 4mm internal tape drive.

Parent topic: Tape devices

200/400 GB Half High Ultrium 2 tape drive (FC 5755)

Review this information to learn more about the LTO half high tape drive.

The IBM LTO half high tape drive is a SCSI device that can be used for backing up, restoring and archiving data. These files can include multimedia, imaging, transaction processing, large databases, and other storage-intensive applications. Each tape cartridge can store up to 200 GB of data (uncompressed), or up to 400 GB of data (compressed), assuming a 2 to 1 compression ratio.

Note: The actual capacity varies depending on the application, the type of data, and the tape cartridge. 200 GB is typical and 400 GB is possible when the Data Compression setting is activated. The default setting of Data Compression is controlled by the host system. The user and the application software can control the activation or deactivation of the data compression setting. The drive can optimally achieve a 2:1 compression ratio.

The LTO half high tape drive features:

- A sustained native data transfer rate of up to 24 MB per second, 48 MB per second at 2:1 compression
- Downward read and write compatibility with earlier LTO-type data cartridges.
- Uses the self-configuring SCSI device driver native to the host operating system.
- Can be used as an bootable device, depending on the host system configuration.

- **Cleaning the tape drive**
- **Reset tape drive (FC 5755)**
- **Setting the write-protect switch (FC 5755)**
- **Status lights (FC 5755)**
- **Tape Cartridges (FC 5755)**

Parent topic: Type of tape device

Cleaning the tape drive

Clean the device whenever the Fault status light comes on or a system I/O error related to the device occurs.

Attention: Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and might void the warranty.

To clean the tape drive, complete the following steps:

1. Make sure that the power is on to the tape drive.
2. If a tape cartridge is in the tape drive, eject and remove the cartridge.

   Note: Some cleaning cartridges have white dots on the window side that are designed to be used to log the use of the cartridge. Each time the cartridge is used, mark one of the dots on the cartridge with a pen or marker. When all of the dots have been marked, discard the cleaning cartridge.

3. Grasp the cleaning cartridge by the outer edges, with the window-side up and the write-protect switch facing you.
4. Slide the cartridge into the opening on the front of the drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.
5. After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The tape drive does the following:
   - Loads the cleaning cartridge into the tape drive.
   - Cleans the drive by moving the cleaning tape forward for approximately 30 seconds.
   - Unloads the cleaning cartridge when the cleaning operation is complete.
   - Indicates a successful cleaning operation by turning off the Cleaning status light (if the Cleaning light was on prior to the cleaning process. Otherwise, the Cleaning light remains solid to indicate that the cleaning cartridge is no longer usable. Obtain a new cleaning cartridge and repeat the process.)

     Note: If the cleaning operation completes but the Cleaning light remains on, repeat the cleaning procedure with a new cleaning cartridge. If the light still remain on, contact your authorized service representative.

To determine how many times a cleaning cartridge may be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the drive automatically detects the error and ejects the cartridge. If the Cleaning status light was on prior to the cleaning process, it stays on; if the Cleaning light was off, the depleted cartridge causes the light to come on.

If a system error occurs, clean the drive and retry the operation. If the operation fails, replace the data cartridge, clean the drive again, then retry the operation.

Parent topic: 200/400 GB Half High Ultrium 2 tape drive (FC 5755)

Reset tape drive (FC 5755)

Use this information to reset your half-high LTO-2 tape drive, without impacting server operation. Please allow up to 2 minutes for the entire tape drive process to complete.

Attention: Resetting a tape drive before the current backup operation has completed may cause loss of customer data.

To use reset the tape drive, follow these steps:

1. Press and hold the eject button for 7 seconds, until the green Ready LED starts flashing rapidly, then release the button. The Ready LED will continue flashing, indicating that the drive is waiting for a cartridge to be inserted.
2. Press and release the eject button. The green Activity LED will begin flashing rapidly.
3. Quickly press the eject button twice (double click the button). The Activity LED will continue flashing slowly while the reset function is in progress. When the reset function is complete, the tape cartridge will remain in the drive and the Ready LED will be lit. Allow up to 2 minutes for the reset function to complete.

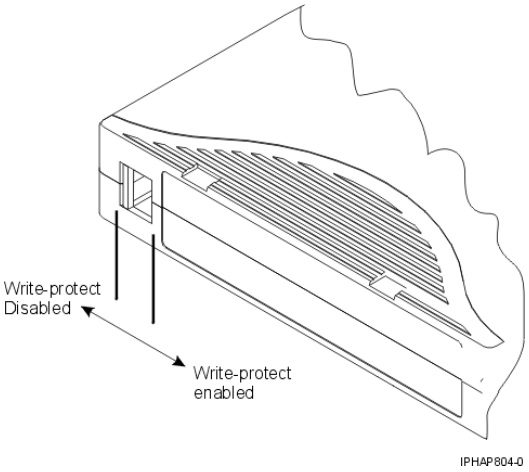
   Note: A solid amber Cleaning LED light indicates that the reset is complete, but the tape unit requires cleaning. Clean the tape unit by inserting an IBM Universal LTO Cleaning Cartridge (P/N 35L2086).

After the reset function completes, the tape unit is restored to normal operating mode. To remove the cartridge, press the eject button.

Parent topic: 200/400 GB Half High Ultrium 2 tape drive (FC 5755)

Setting the write-protect switch (FC 5755)

The position of the write-protect switch on the tape cartridge determines when you can write to the tape. Before loading cartridges into magazines, you should set the write-protect switch of each cartridge to enable or disable data recording.



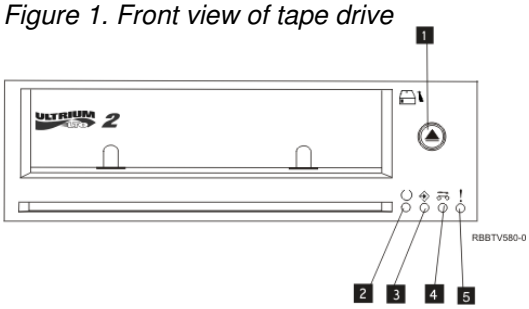
1 When the switch is set to the left, data can be written to the tape.
2 When the switch is set to the right, data can not be written to the tape.

Parent topic: 200/400 GB Half High Ultrium 2 tape drive (FC 5755)

Status lights (FC 5755)

The following is a front view of the tape drive:

Figure 1. Front view of tape drive



1 Eject button
2 Ready (green)
3 Active (green)
4 Cleaning (amber)
5 Fault (orange)

The status lights and their ISO symbols are on the device as follows:

Ready (green)

Activity (green)

Cleaning (amber)

Fault ! (orange)

The combinations of the lights and their definitions are shown in the following table.

Table 1. Definition of Status Light Combinations

Operation	Ready	Activity	Cleaning	Fault
Power-On LED Test[1]	On for 2.0 seconds	On for 2.0 seconds	On for 2.0 seconds	On for 2.0 seconds
Power-On Self-Test (POST) is in progress[2]	Flashing	Off	Off	Off
A cartridge is not loaded	Off	Off	On[3]/Off	Off
Cartridge loaded, no activity	On	Off	On[3]/Off	Off
Data cartridge loaded, activity	On	Flashing	On[3]/Off	Off
Cleaning cartridge loaded, activity	On	Flashing	On	Off
Cleaning cartridge loaded, cleaning failed	Off	Off	On[3 4]	Off
Cartridge is loading or unloading	Off	Flashing	On[3]/Off	Off
Unrecoverable drive failure	On/Off	Off	On[3]/Off	Flashing[5]
Firmware download is in progress	Flashing	Off	On[3]/Off	Off
Firmware update is in progress	Flashing	Flashing	On[3]/Off	Off
Firmware download failure[6]	Off	Off	On[3]/Off	Flashing[5]
Maximum operating temperature exceeded[7]	Off	Off	On[3]/Off	On
Diagnostics test is in-progress	Flashing	Off or Flashing	On[3] / Off	Off
Media failure[8]	Off	Off	Flashing	Off
Incorrect media inserted in drive[8]	Off	Both LEDs Flashing Together		Off

Note:

1. All 4 LEDs will be on solid for 2 seconds. A timing tolerance of 10 percent is acceptable.
2. If the drive completes Power-On Self-Test (POST) within 2 seconds, no POST in progress indication is required.
3. A solid amber Clean LED indicates that the drive needs cleaning. In most cases the drive will continue to function, but it must be cleaned as soon as possible.
4. If the cleaning function completes and the solid amber Clean LED remains lit, the cleaning function was not successful. The cleaning cartridge may be depleted. Obtain a new LTO cleaning cartridge and use it to perform the cleaning function again.
5. The Fault LED will flash to indicate an unrecoverable error. An unrecoverable error is an error condition that results in the drive not being able to function unless initiator, operator, or service intervention is applied. An unrecoverable drive failure is usually the result of a hardware error condition. One of the following actions will be needed to clear the flashing Fault LED:
   - Hard SCSI Reset
   - Cartridge Eject
   - Power Cycle
   - Retry Microcode Download

   An unrecoverable cartridge (media) failure is usually the result of a defective cartridge, media, or cartridge state and will require the drive to eject the cartridge (if possible) to clear the flashing LED.
6. The firmware download failed and the drive is not functional. The drive boot code is in control and the firmware download must be retried.

7. When the Fault LED is solid, it indicates an over temperature condition. The drive has exceeded its preset temperature limit, and if a tape is present in the drive it will be ejected. The Fault LED will remain solid until the drive temperature drops below a secondary temperature limit, and a data or cleaning cartridge is inserted.
8. While running drive diagnostics (using either SEND DIAG or the Self-Test Procedure), a media-related problem (hard media error or excessive soft error rate) will be reported as a media failure (with flashing Clean LED), and a write-protected, damaged, or incompatible cartridge will be reported as incorrect media (with Activity and Clean LEDs flashing simultaneously).

Parent topic: 200/400 GB Half High Ultrium 2 tape drive (FC 5755)

Tape Cartridges (FC 5755)

Available Tape Cartridges

Table 1. LTO Ultrium Data Cartridges

Part Number	Type of Cartridge	Length
08L9120	100/200GB LTO Ultrium 1 Data Cartridges	610 m (2000 ft)
08L9870	200/400GB LTO Ultrium 2 Data Cartridges	610 m (2000 ft)
24R0395	LTO Gen-2 Test Tape	610 m (2000 ft)
35L2086	Universal Cleaning Tape	

Data Cartridge Erasure

Do not attempt to bulk erase an LTO data cartridge for reuse. Bulk eraser devices cannot properly erase an LTO data cartridge and will permanently damage the cartridge.

Parent topic: 200/400 GB Half High Ultrium 2 tape drive (FC 5755)

160/320 GB internal tape drive VXA-320 (FC 6279)

Review this information to learn about the 160/320 GB internal tape drive.

Description	The 160/320 GB Internal Tape Drive with VXA Technology is a 5.25-inch, half-high, Ultra2 LVD 16-bit tape drive, which provides a high capacity for save/restore and achieve functions. This tape drive uses VXA tape data cartridges and is compression capable, providing a capacity of up to 320 GB - a significant increase in capacity over the previous internal tape drives. Characteristics: • Capacity: 160 GB native mode, 320 GB (typical) compression mode • Form Factor: 5.25-inch half high

	• Media: uses VXA tape data cartridges • Technology: Helical scan, rotating head • Operation: Streaming • Data Transfer Rate: 12 MBps native mode, 24 MBps (typical) compression • Interface: SCSI-2 (LVD/SE) asynchronous/synchronous • Compatability: 160 GB mode (Read/Write), 320 GB compression (Read/Write) • Attributes provided: One 160/320 GB internal tape drive • Attributes required: One 1.6-inch (41 mm) half-high media bay and one SCSI-2 internal 16-bit address
Tools	The following tools and documentation are needed to complete the installation: • A flat-blade screwdriver (if this device is not an auto-docking feature on your system) • Your system unit documentation, including any service documentation • Your operating system documentation If an item is missing or damaged, contact the place of purchase. **Note:** If you are installing the auto-docking version of this device on your system, the remainder of this information does not apply to your system. See your system documentation for information about the auto-docking feature.
Related information	Check that your package contains the following items: • The device • Media kit containing: ♦ 1 cleaning cartridge ♦ 1 test tape ♦ Jumpers (located in a plastic bag) • Specific hardware for attaching the device to your specific system, as detailed on the parts listing provided with your device

- **Cleaning the tape drive**
- **Loading and Unloading cartridges**
- **Setting the write-protect switch (FC 6279)**
- **Status lights (FC 6279)**
- **Tape Cartridges (FC 6279)**

Parent topic: Type of tape device

Cleaning the tape drive

Clean the device whenever the Fault status light comes on or a system I/O error related to the device occurs.

Attention: Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and might void the warranty.

To clean the tape drive, complete the following steps:

1. Make sure that the power is on to the tape drive.
2. If a tape cartridge is in the tape drive, eject and remove the cartridge.

Note: Some cleaning cartridges have white dots on the window side that are designed to be used to log the use of the cartridge. Each time the cartridge is used, mark one of the dots on the cartridge with a pen or marker. When all of the dots have been marked, discard the cleaning cartridge.

3. Grasp the cleaning cartridge by the outer edges, with the window-side up and the write-protect switch facing you.
4. Slide the cartridge into the opening on the front of the drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.
5. After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The tape drive does the following:
    - Loads the cleaning cartridge into the tape drive.
    - Cleans the drive by moving the cleaning tape forward for approximately 30 seconds.
    - Unloads the cleaning cartridge when the cleaning operation is complete.
    - Indicates a successful cleaning operation by turning off the Cleaning status light (if the Cleaning light was on prior to the cleaning process. Otherwise, the Cleaning light remains solid to indicate that the cleaning cartridge is no longer usable. Obtain a new cleaning cartridge and repeat the process.)

    Note: If the cleaning operation completes but the Cleaning light remains on, repeat the cleaning procedure with a new cleaning cartridge. If the light still remain on, contact your authorized service representative.

To determine how many times a cleaning cartridge may be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the drive automatically detects the error and ejects the cartridge. If the Cleaning status light was on prior to the cleaning process, it stays on; if the Cleaning light was off, the depleted cartridge causes the light to come on.

If a system error occurs, clean the drive and retry the operation. If the operation fails, replace the data cartridge, clean the drive again, then retry the operation.

Parent topic: 160/320 GB internal tape drive VXA-320 (FC 6279)

Loading and Unloading cartridges

To avoid problems with loading and unloading, use only one label on a cartridge. Having too many or poorly placed labels can clog the drive-load mechanism.

Parent topic: 160/320 GB internal tape drive VXA-320 (FC 6279)

Loading a cartridge

To load a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Grasp the cartridge by the outer edges, with the window-side up and the write-protect switch facing you.

Note: Make sure that the write-protect switch is correctly set.

3. Slide the cartridge into the opening on the front of the device until the loading mechanism pulls the cartridge into the drive and the drive door closes.

To indicate that the load operation was successful the Ready status light comes on.

Unloading a cartridge

To unload a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Press the Unload button. The device rewinds, unloads, and ejects the tape cartridge.

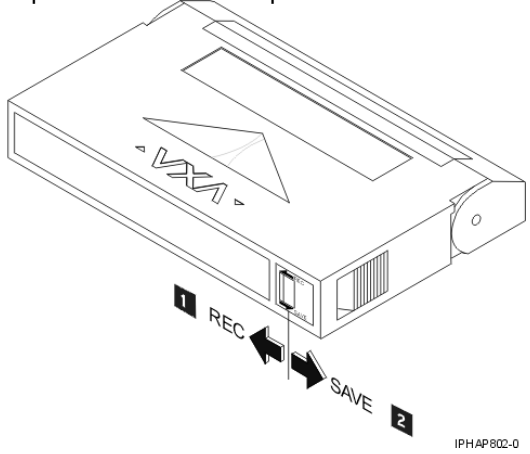
   The process might take from 15 seconds to several minutes, depending on the position of the tape and the amount of data written. During this task, the status lights do the following:

   - The Ready status light turns off.
   - The Activity status light flashes during the unload operation.
   - The Activity status light turns off when the cartridge is ejected from the tape drive.

Attention: There is an emergency eject and reset feature that releases the tape cartridge and resets the drive. Use the emergency eject feature if the cartridge does not move correctly or if the unload process fails. The emergency eject and reset feature procedure might result in loss of data. To perform an emergency eject of the tape cartridge or a reset of the drive, press and hold the Unload button for at least 10 seconds. If a cartridge is in the drive, the cartridge automatically ejects without rewinding the tape.

Setting the write-protect switch (FC 6279)

The position of the write-protect switch on the tape cartridge determines when you can write to the tape.



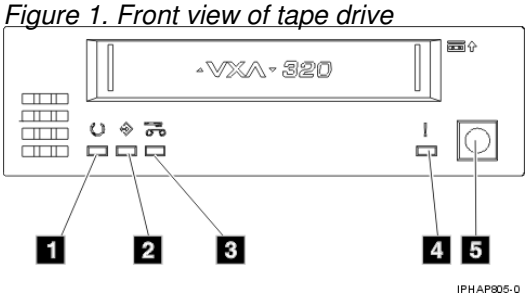
1 When the switch is set to the left, data can be written to and read from the tape.
2 When the switch is set to the right, data can only be read.

Parent topic: 160/320 GB internal tape drive VXA-320 (FC 6279)

Status lights (FC 6279)

The following is a front view of the tape drive:

Figure 1. Front view of tape drive



1 Ready (green)
2 Active (green)
3 Cleaning (amber)
4 Fault (orange)
5 Eject button

The status lights and their ISO symbols are on the device as follows:

Ready (green)

Activity (green)

Cleaning (amber)

Fault (orange)

The combinations of the lights and their definitions are shown in the following table.

Table 1. Definition of Status Light Combinations

Operation	Ready	Activity	Cleaning	Fault
Power-on self-test[1]	Flashing	Off	Off	Off
Power On LED Test	On for 2.0 seconds	On for 2.0 seconds	On for 2.0 seconds	On for 2.0 seconds

No tape loaded	Off	Off	On[2]/Off	Off
Cartridge loaded, no activity	On	Off	On[2]/Off	Off
Data or Cleaning Cartridge loaded, activity	On	Flashing	On[2]/Off	Off
Cleaning Cartridge loaded, cleaning failed[2]	Off	Off	On[2]	Off
Cartridge loading or unloading[2]	Off	Flashing	On[2]/Off	Off
Unrecoverable drive failure[3]	On/Off	Off	On[2]/Off	Flashing[3]
Firmware Download	Flashing	Off	On[2]/Off	Off
Firmware Update	Flashing	Flashing	On[2]/Off	Off
Microcode Download failure[4]	Off	Off	On[2]/Off	Flashing[3]
Over Temperature[5]	Off	Off	On[2]/Off	On

Note:

1. If the drive completes the Power On Self Test (POST) within the 2.0 second Power On LED Test time, the POST indicator sequence is eliminated
2. A solid amber LED indicates the drive needs cleaning. The drive will continue to function, but, needs cleaning as soon as possible. A power cycle does not turn off this indicator.
3. The Fault LED will flash to indicate an unrecoverable error. An unrecoverable error is an error condition that results in the drive not being able to function unless initiator, operator, or service intervention is applied. An unrecoverable drive failure is usually the result of a hardware error condition. One of the following actions will be needed to clear the flashing Fault LED:
   - Hard SCSI Reset
   - Cartridge Eject
   - Power Cycle
   - Retry Microcode Download

   An unrecoverable cartridge (media) failure is usually the result of a defective cartridge, media, or cartridge state and will require the drive to eject the cartridge (if possible) to clear the flashing LED.
4. The firmware download failed and the drive is not functional. The drive boot code is in control and the microcode download should be retried. The drive can be identified using the Inquiry command and is bootable while in this state.
5. The Fault LED will be on solid to indicate an over temperature condition.

Parent topic: 160/320 GB internal tape drive VXA-320 (FC 6279)

Tape Cartridges (FC 6279)

Compatible Tape Cartridges

Two types of tape cartridges are supported by this tape drive:

- X cartridges are the newest version of the VXA cartridge
- V cartridges are the original VXA cartridge

The V and X cartridges have similar shells and come in a variety of tape lengths. Both cartridges utilize AME media and offer the similar read/write speeds and capacities.

Available Tape Cartridges

Table 1. X tape cartridges

Part Number	Description	Type	Other information
24R2137	230m 80/160GB	X23 Data Cartridge	Teal Accent
24R2136	124m 40/80GB	X10 Data Cartridge	Teal Accent
24R2134	20/40GB	X6 Data Cartridge	Teal Accent
24R2135	62m 20/40GB	X6 Test Cartridge	Teal Accent
24R2138	X Cleaning Cartridge	VXA 20 usage	Teal Accent

Table 2. V tape cartridges

Part Number	Description	Type	Other information
19P4876	230m 80/160GB	V23 Data Cartridge	Purple accent

Data cartridge erasure

Most bulk eraser devices do not have the capability to erase the data cartridge. To properly erase a VXA data cartridge with a bulk eraser device, the erasure field strength must be a minimum of 4000 Gauss.

Parent topic: 160/320 GB internal tape drive VXA-320 (FC 6279)

80/160 GB internal tape drive VXA-2 (FC 6120)

Review this information to learn about the 80/160 GB internal tape drive.

Description	The 80/160 GB Internal Tape Drive with VXA Technology is a 5.25-inch, half-high, Ultra2 LVD 16-bit tape drive, which provides a high capacity for save/restore and achieve functions. This tape drive uses VXA tape data cartridges and is compression capable, providing a capacity of up to 160 GB - a significant increase in capacity over the previous internal tape drives. Characteristics: • Capacity: 80 GB native mode, 160 GB (typical) compression mode • Form Factor: 5.25-inch half high • Media: uses VXA tape data cartridges • Technology: Helical scan, rotating head • Operation: Streaming • Data Transfer Rate: 6 MBps native mode, 12 MBps (typical) compression • Interface: SCSI-2 (LVD/SE) asynchronous/synchronous • Compatability: 80 GB mode (Read/Write), 160 GB compression (Read/Write) • Attributes provided: One 80/160 GB internal tape drive • Attributes required: One 1.6-inch (41 mm) half-high media bay and one SCSI-2 internal 16-bit address
Tools	The following tools and documentation are needed to complete the installation: • A flat-blade screwdriver (if this device is not an auto-docking feature on your system) • Your system unit documentation, including any service documentation

	• Your operating system documentation If an item is missing or damaged, contact the place of purchase. **Note:** If you are installing the auto-docking version of this device on your system, the remainder of this information does not apply to your system. See your system documentation for information about the auto-docking feature.
Related information	Check that your package contains the following items: • The device • Media kit containing: ♦ 1 data cartridge ♦ 1 cleaning cartridge ♦ 1 test tape ♦ Jumpers (located in a plastic bag) • Specific hardware for attaching the device to your specific system, as detailed on the parts listing provided with your device

- **Cleaning the tape drive**
- **Loading and Unloading cartridges**
- **Setting the write-protect switch (FC 6120)**
- **Status lights (FC 6120)**
- **Tape Cartridges (FC 6120)**

Parent topic: Type of tape device

Cleaning the tape drive

Clean the device whenever the Fault status light comes on or a system I/O error related to the device occurs.

Attention: Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and might void the warranty.

To clean the tape drive, complete the following steps:

1. Make sure that the power is on to the tape drive.
2. If a tape cartridge is in the tape drive, eject and remove the cartridge.

   Note: Some cleaning cartridges have white dots on the window side that are designed to be used to log the use of the cartridge. Each time the cartridge is used, mark one of the dots on the cartridge with a pen or marker. When all of the dots have been marked, discard the cleaning cartridge.

3. Grasp the cleaning cartridge by the outer edges, with the window-side up and the write-protect switch facing you.
4. Slide the cartridge into the opening on the front of the drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.

5. After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The tape drive does the following:
   - Loads the cleaning cartridge into the tape drive.
   - Cleans the drive by moving the cleaning tape forward for approximately 30 seconds.
   - Unloads the cleaning cartridge when the cleaning operation is complete.
   - Indicates a successful cleaning operation by turning off the Cleaning status light (if the Cleaning light was on prior to the cleaning process. Otherwise, the Cleaning light remains solid to indicate that the cleaning cartridge is no longer usable. Obtain a new cleaning cartridge and repeat the process.)

   Note: If the cleaning operation completes but the Cleaning light remains on, repeat the cleaning procedure with a new cleaning cartridge. If the light still remain on, contact your authorized service representative.

To determine how many times a cleaning cartridge may be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the drive automatically detects the error and ejects the cartridge. If the Cleaning status light was on prior to the cleaning process, it stays on; if the Cleaning light was off, the depleted cartridge causes the light to come on.

If a system error occurs, clean the drive and retry the operation. If the operation fails, replace the data cartridge, clean the drive again, then retry the operation.

Parent topic: 80/160 GB internal tape drive VXA-2 (FC 6120)

Loading and Unloading cartridges

To avoid problems with loading and unloading, use only one label on a cartridge. Having too many or poorly placed labels can clog the drive-load mechanism.

Parent topic: 80/160 GB internal tape drive VXA-2 (FC 6120)

Loading a cartridge

To load a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Grasp the cartridge by the outer edges, with the window-side up and the write-protect switch facing you.

   Note: Make sure that the write-protect switch is correctly set.

3. Slide the cartridge into the opening on the front of the device until the loading mechanism pulls the cartridge into the drive and the drive door closes.

To indicate that the load operation was successful the Ready status light comes on.

Unloading a cartridge

To unload a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Press the Unload button. The device rewinds, unloads, and ejects the tape cartridge.

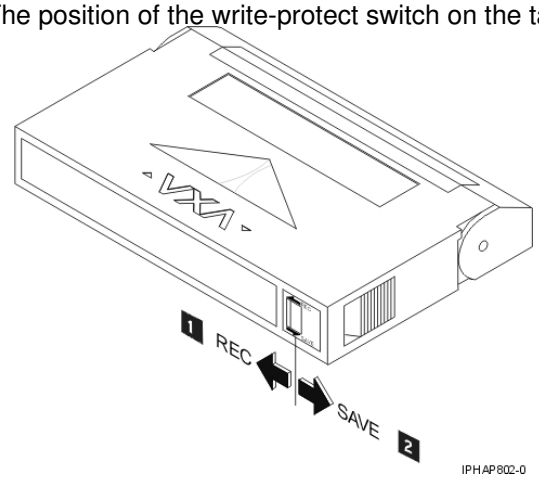
   The process might take from 15 seconds to several minutes, depending on the position of the tape and the amount of data written. During this task, the status lights do the following:

   - The Ready status light turns off.
   - The Activity status light flashes during the unload operation.
   - The Activity status light turns off when the cartridge is ejected from the tape drive.

Attention: There is an emergency eject and reset feature that releases the tape cartridge and resets the drive. Use the emergency eject feature if the cartridge does not move correctly or if the unload process fails. The emergency eject and reset feature procedure might result in loss of data. To perform an emergency eject of the tape cartridge or a reset of the drive, press and hold the Unload button for at least 10 seconds. If a cartridge is in the drive, the cartridge automatically ejects without rewinding the tape.

Setting the write-protect switch (FC 6120)

The position of the write-protect switch on the tape cartridge determines when you can write to the tape.



1 When the switch is set to the left, data can be written to and read from the tape.

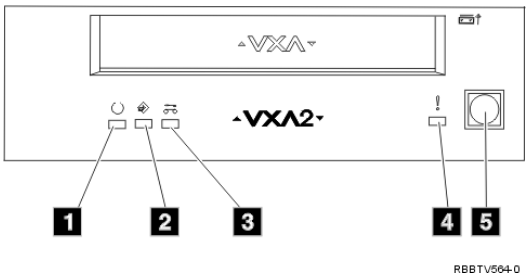
2 When the switch is set to the right, data can only be read.

Parent topic: 80/160 GB internal tape drive VXA-2 (FC 6120)

Status lights (FC 6120)

The following is a front view of the tape drive:

Figure 1. Front view of tape drive



1 Ready (green)
2 Active (green)
3 Cleaning (amber)
4 Fault (orange)
5 Eject button

The status lights and their ISO symbols are on the device as follows:

Ready ◯ (green)

Activity ◈ (green)

Cleaning ⚙ (amber)

Fault ! (orange)

The combinations of the lights and their definitions are shown in the following table.

Table 1. Definition of Status Light Combinations

Operation	**Ready** ◯	**Activity** ◈	**Cleaning** ⚙	**Fault** !
Power-on self-test[1]	Flashing	Off	Off	Off
Power On LED Test	On for 2.0 seconds	On for 2.0 seconds	On for 2.0 seconds	On for 2.0 seconds
No tape loaded	Off	Off	On[2]/Off	Off
Cartridge loaded, no activity	On	Off	On[2]/Off	Off
Data or Cleaning Cartridge loaded, activity	On	Flashing	On[2]/Off	Off
Cleaning Cartridge loaded, cleaning failed[2]	Off	Off	On[2]	Off

Cartridge loading or unloading[2]	Off	Flashing	On[2]/Off	Off
Unrecoverable drive failure[3]	On/Off	Off	On[2]/Off	Flashing[3]
Firmware Download	Flashing	Off	On[2]/Off	Off
Firmware Update	Flashing	Flashing	On[2]/Off	Off
Microcode Download failure[4]	Off	Off	On[2]/Off	Flashing[3]
Over Temperature[5]	Off	Off	On[2]/Off	On

Note:

1. If the drive completes the Power On Self Test (POST) within the 2.0 second Power On LED Test time, the POST indicator sequence is eliminated
2. A solid amber LED indicates the drive needs cleaning. The drive will continue to function, but, needs cleaning as soon as possible. A power cycle does not turn off this indicator.
3. The Fault LED will flash to indicate an unrecoverable error. An unrecoverable error is an error condition that results in the drive not being able to function unless initiator, operator, or service intervention is applied. An unrecoverable drive failure is usually the result of a hardware error condition. One of the following actions will be needed to clear the flashing Fault LED:
   - Hard SCSI Reset
   - Cartridge Eject
   - Power Cycle
   - Retry Microcode Download

   An unrecoverable cartridge (media) failure is usually the result of a defective cartridge, media, or cartridge state and will require the drive to eject the cartridge (if possible) to clear the flashing LED.
4. The firmware download failed and the drive is not functional. The drive boot code is in control and the microcode download should be retried. The drive can be identified using the Inquiry command and is bootable while in this state.
5. The Fault LED will be on solid to indicate an over temperature condition.

Parent topic: 80/160 GB internal tape drive VXA-2 (FC 6120)

Tape Cartridges (FC 6120)

Compatible Tape Cartridges

Two types of tape cartridges are supported by this tape drive:

- X cartridges are the newest version of the VXA cartridge
- V cartridges are the original VXA cartridge

The V and X cartridges have similar shells and come in a variety of tape lengths. Both cartridges utilize AME media and offer the similar read/write speeds and capacities.

Note:

1. To use X cartridges, the tape drive must have a minimum microcode level of 2105. To display the microcode level of the tape drive in AIX, do the following:
   a. Open an AIX command prompt.
   b. Type the lscfg -vl rmtx command, where x is the tape drive number, then press Enter.

   The output will contain the following line:

```
Device Specific.(Z1).....2105
```

In the previous example, 2105 represents the microcode level. If the command output contains a value of 2105 or higher, the tape drive supports the use of X cartridges. If the command output contains a value of 2104 or lower, update your microcode to 2105 or higher to use X cartridges in this tape drive.
2. X cartridges are only supported in VXA-2 tape drives. A user can write an X cartridge in VXA-1 format on a VXA-2 tape drive, but it will only be readable on a VXA-2 drive.
3. The VXA-2 drive supports use of V10 media., but this cartridge is not offered.

Available Tape Cartridges

Table 1. X tape cartridges

Part Number	Description	Type	Other information
24R2137	230m 80/160GB	X23 Data Cartridge	Green accent
24R2136	124m 40/80GB	X17 Data Cartridge	Green accent
24R2134	20/40GB	X6 Data Cartridge	Green accent
24R2135	62m 20/40GB	X6 Test Cartridge	Green accent
24R2138	X Cleaning Cartridge	VXA 20 usage	Green accent

Table 2. V tape cartridges

Part Number	Description	Type	Other information
19P4876	230m 80/160GB	V23 Data Cartridge	Purple accent
19P4877	124m 40/80GB	V17 Data Cartridge	Red accent
19P4878	20/40GB	V6 Data Cartridge	Blue accent
19P4879	62m 20/40GB	V6 Test Cartridge	Blue accent
19P4880	X Cleaning Cartridge	VXA 20 usage	Gray accent

Parent topic: 80/160 GB internal tape drive VXA-2 (FC 6120)

60/150 GB 16-bit 8-mm internal tape drive (FC 6134)

Review this information to learn about the 60/150 GB 16-bit 8-mm internal tape drive.

Description	The 60/150GB 16-bit 8-mm Internal Tape Drive consists of a 5.25-inch half-high, 16-bit tape drive. This drive provides a high capacity tape drive for save/restore and archiving functions. This tape drive uses IBM 8-mm data cartridges and is compression capable, providing a capacity of up to 150 GB. The 60/150 GB 16-bit 8-mm Internal Tape Drive, is limited to a maximum system ambient operating temperatureof 31C (87.8F) at a maximum operating altitude of 2134m (7000 ft). Lower altitudes have higher maximum ambient operating temperatures. Characteristics: • Capacity: 60 GB Native Mode, 150 GB (typical) Compression Mode • Form Factor: 5.25-inch Half-high

	• Media: IBM 8-mm Data Cartridge with Smart Clean Technology • Operation: Streaming • Data Transfer Rate: 12 MB/Sec. Native Mode, 30 MB/Sec. (typical) Compression M • Interface: SCSI-2 16-bit Low Voltage Differential(LVD) / Single-ended (SE) Asynchronous/Synchronous • Compatibility: Contact your authorized service provider • Attributes provided: 60/150GB 16-bit 8-mm Internal Tape Drive • Attributes required: One 1.6-inch(41mm) half-high media bay and one SCSI-2 internal 16-bit address
Tools	The following tools and documentation are needed to complete the installation: • A flat-blade screwdriver (if this device is not an auto-docking feature on your system) • Your system unit documentation, including any service documentation • Your operating system documentation If an item is missing or damaged, contact the place of purchase. **Note:** If you are installing the auto-docking version of this device on your system, the remainder of this information does not apply to your system. See your system documentation for information about the auto-docking feature.
Related information	Check that your package contains the following items: • The device • Media kit containing: ♦ 1 data cartridge ♦ 1 cleaning cartridge ♦ 1 test tape ♦ Jumpers (located in a plastic bag) • Specific hardware for attaching the device to your specific system, as detailed on the parts listing provided with your device

- **Cleaning the tape drive**
- **Loading and Unloading cartridges**
- **Setting the write-protect switch (FC 6134)**
- **Status lights (FC 6134)**
- **Tape Cartridges (FC 6134)**

Parent topic: Type of tape device

Cleaning the tape drive

Clean the device whenever the Fault status light comes on or a system I/O error related to the device occurs.

Attention: Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and might void the warranty.

To clean the tape drive, complete the following steps:

1. Make sure that the power is on to the tape drive.
2. If a tape cartridge is in the tape drive, eject and remove the cartridge.

Note: Some cleaning cartridges have white dots on the window side that are designed to be used to log the use of the cartridge. Each time the cartridge is used, mark one of the dots on the cartridge with a pen or marker. When all of the dots have been marked, discard the cleaning cartridge.

3. Grasp the cleaning cartridge by the outer edges, with the window-side up and the write-protect switch facing you.
4. Slide the cartridge into the opening on the front of the drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.
5. After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The tape drive does the following:
    - Loads the cleaning cartridge into the tape drive.
    - Cleans the drive by moving the cleaning tape forward for approximately 30 seconds.
    - Unloads the cleaning cartridge when the cleaning operation is complete.
    - Indicates a successful cleaning operation by turning off the Fault status light (if the Fault light was on prior to the cleaning process.

Note: If the cleaning operation completes but the Fault light remains on, repeat the cleaning procedure with a new cleaning cartridge. If the light still remains on, contact your authorized service provider.

To determine how many times a cleaning cartridge can be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the tape drive automatically detects the error and ejects the cartridge. If the Fault status light was on prior to the cleaning process, it stays on; if the Fault light was off, the depleted cartridge causes the light to come on.

If a system error occurs, clean the drive and retry the operation. If the operation fails, replace the data cartridge, clean the drive again, then retry the operation.

Parent topic: 60/150 GB 16-bit 8-mm internal tape drive (FC 6134)

Loading and Unloading cartridges

To avoid problems with loading and unloading, use only one label on a cartridge. Having too many or poorly placed labels can clog the drive-load mechanism.

Parent topic: 60/150 GB 16-bit 8-mm internal tape drive (FC 6134)

Loading a cartridge

To load a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Grasp the cartridge by the outer edges, with the window-side up and the write-protect switch facing you.

Note: Make sure that the write-protect switch is correctly set.

3. Slide the cartridge into the opening on the front of the device until the loading mechanism pulls the cartridge into the drive and the drive door closes.

To indicate that the load operation was successful the Ready status light comes on.

Unloading a cartridge

To unload a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Press the Unload button. The device rewinds, unloads, and ejects the tape cartridge.

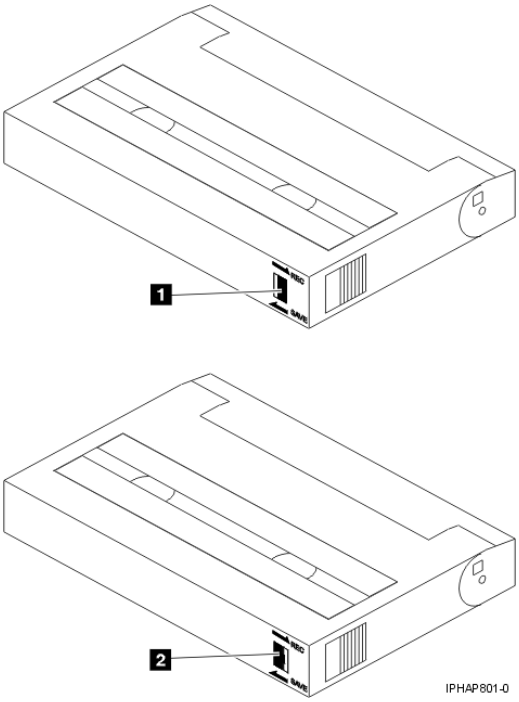
   The process might take from 15 seconds to several minutes, depending on the position of the tape and the amount of data written. During this task, the status lights do the following:

   - The Ready status light turns off.
   - The Activity status light flashes during the unload operation.
   - The Activity status light turns off when the cartridge is ejected from the tape drive.

Attention: There is an emergency eject and reset feature that releases the tape cartridge and resets the drive. Use the emergency eject feature if the cartridge does not move correctly or if the unload process fails. The emergency eject and reset feature procedure might result in loss of data. To perform an emergency eject of the tape cartridge or a reset of the drive, press and hold the Unload button for at least 10 seconds. If a cartridge is in the drive, the cartridge automatically ejects without rewinding the tape.

Setting the write-protect switch (FC 6134)

The position of the write-protect switch on the tape cartridge determines when you can write to the tape.



1 When the switch is set to the left in the SAVE position, data cannot be written to or read from the tape (data is saved).

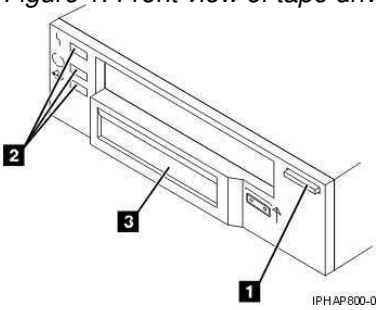
2 When the switch is set to the right in the REC (Record) position, data can be written to and read from the tape.

Parent topic: 60/150 GB 16-bit 8-mm internal tape drive (FC 6134)

Status lights (FC 6134)

The following is a front view of the tape drive:

Figure 1. Front view of tape drive



1 Unload button

2 Status lights

3 Liquid crystal display (LCD)

The status lights and their ISO symbols are on the device as follows:

Ready (green)

Activity (green)

Fault (amber)

The combinations of the lights and their definitions are shown in the following table.

Table 1. Definition of Status Light Combinations

Operation	Ready	Activity	Fault
POST or Reset	On	On	On
Error or Failed POST	Off	Off	Flash
Ready (No Cartridge Loaded)	Off	Off	N/A
Ready (Cartridge Loaded)	On	Off	N/A
Normal Cartridge Motion	On	Flashing	N/A
High Speed Motion	On	Fast Flashing	N/A
Time to Clean Cartridge	N/A	N/A	On
Cleaning in Progress	On	Flashing	On

Parent topic: 60/150 GB 16-bit 8-mm internal tape drive (FC 6134)

Tape Cartridges (FC 6134)

Available Tape Cartridges

Table 1. 8-mm Data Cartridges

Part Number	Type of Cartridge	Length
35L1044	20 GB AME with SmartClean Data Cartridge	75 m (246 ft)
09L5323	40 GB AME with SmartClean Data Cartridge	150 m (492 ft)
18P6484	60 GB AME with SmartClean Data Cartridge	225 m (738 ft)
35L1409	Cleaning Cartridge	

Parent topic: 60/150 GB 16-bit 8-mm internal tape drive (FC 6134)

36/72GB Data72 4mm internal tape drive (FC 6258)

Review this information to learn about the 36/72GB Data72 4mm internal tape drive.

Description	The 36/70 GB Data72 4-mm Internal Tape Drive is a 5.25-inch, half-high, single-ended 16-bit tape drive, which provides a high capacity for save/restore and achieve functions. This tape drive uses IBM 4-mm data cartridges and is compression capable, providing a capacity of up to 70 GB - a significant increase in capacity over the previous 20/40 4-mm internal tape drives (when using DDS-4 media). Characteristics: • Capacity: 36 GB native mode, 72 GB (typical) compression mode • Form Factor: 5.25-inch half high • Media: IBM 4-mm supports new DAT72 media • Technology: Helical scan, rotating head • Operation: Streaming • Data Transfer Rate: 3 MBps native mode, 6 MBps (typical) compression • Interface: Low voltage differential • Compatability: 12 GB mode(Read/Write), 24 GB compression (Read/Write), 36 GB mode (Read/Write), 72 GB compression (Read/Write). • Attributes provided: 4mm tape capability • Attributes required: One 1.6-inch (41mm) half-high media bay and one SCSI-2 internal SE 16-bit address
Tools	The following tools and documentation are needed to complete the installation: • A flat-blade screwdriver (if this device is not an auto-docking feature on your system) • Your system unit documentation, including any service documentation • Your operating system documentation Contact the place of purchase if an item is missing or damaged. **Note:** If you are installing the auto-docking version of this device on your system, the remainder of this chapter does not apply to your system. See your system documentation for information about the auto-docking feature.
Media	This tape drive uses 4mm data cartridges for saving and restoring system data. It is designed to use only DDS (Digital Data Storage) data cartridges. The cartridges are identified by one of the following DDS symbols:  The tape drive only reads and writes data to tape cartridges that are DDS-3, DDS-4, or DAT 72 format. **Note:** This tape drive only supports DDS-3, DDS-4, and DAT 72 tape cartridges. If any other cartridge is inserted in the drive, it will be ejected. This tape drive has been designed to operate with DDS media that meet the following standards of the European Computer Manufacturers Association (ECMA):

	• ECMA-236 DDS-3 format • ECMA-288 DDS-4 format
Related information	When you check that your package contains the following items: • The tape drive • Media kit containing: ♦ 1 cleaning cartridge ♦ 1 test tape ♦ Jumpers (located in a plastic bag) • Specific hardware for attaching the drive to your specific system, as detailed on the parts listing provided with your drive.

- **Cleaning the tape drive**
- **Loading and Unloading cartridges**
- **Setting the write-protect switch (FC 6258)**
- **Status lights (FC 6258)**
- **Tape Cartridges (FC 6258)**

Parent topic: Type of tape device

Cleaning the tape drive

Clean the device whenever the Fault status light comes on or a system I/O error related to the device occurs.

Attention: Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and might void the warranty.

To clean the tape drive, complete the following steps:

1. Make sure that the power is on to the tape drive.
2. If a tape cartridge is in the tape drive, eject and remove the cartridge.

   Note: Some cleaning cartridges have white dots on the window side that are designed to be used to log the use of the cartridge. Each time the cartridge is used, mark one of the dots on the cartridge with a pen or marker. When all of the dots have been marked, discard the cleaning cartridge.

3. Grasp the cleaning cartridge by the outer edges, with the window-side up and the write-protect switch facing you.
4. Slide the cartridge into the opening on the front of the drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.
5. After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The tape drive does the following:
   ♦ Loads the cleaning cartridge into the tape drive.
   ♦ Cleans the drive by moving the cleaning tape forward for approximately 30 seconds.
   ♦ Unloads the cleaning cartridge when the cleaning operation is complete.
   ♦ Indicates a successful cleaning operation by turning off the Fault status light (if the Fault light was on prior to the cleaning process.

Note: If the cleaning operation completes but the Fault light remains on, repeat the cleaning procedure with a new cleaning cartridge. If the light still remains on, contact your authorized service provider.

To determine how many times a cleaning cartridge can be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the tape drive automatically detects the error and ejects the cartridge. If the Fault status light was on prior to the cleaning process, it stays on; if the Fault light was off, the depleted cartridge causes the light to come on.

If a system error occurs, clean the drive and retry the operation. If the operation fails, replace the data cartridge, clean the drive again, then retry the operation.

Parent topic: 36/72GB Data72 4mm internal tape drive (FC 6258)

Loading and Unloading cartridges

To avoid problems with loading and unloading, use only one label on a cartridge. Having too many or poorly placed labels can clog the drive-load mechanism.

Parent topic: 36/72GB Data72 4mm internal tape drive (FC 6258)

Loading a cartridge

To load a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Grasp the cartridge by the outer edges, with the window-side up and the write-protect switch facing you.

   Note: Make sure that the write-protect switch is correctly set.

3. Slide the cartridge into the opening on the front of the device until the loading mechanism pulls the cartridge into the drive and the drive door closes.

To indicate that the load operation was successful the Ready status light comes on.

Unloading a cartridge

To unload a cartridge, complete the following steps:

1. Make sure that the tape device power is on.
2. Press the Unload button. The device rewinds, unloads, and ejects the tape cartridge.

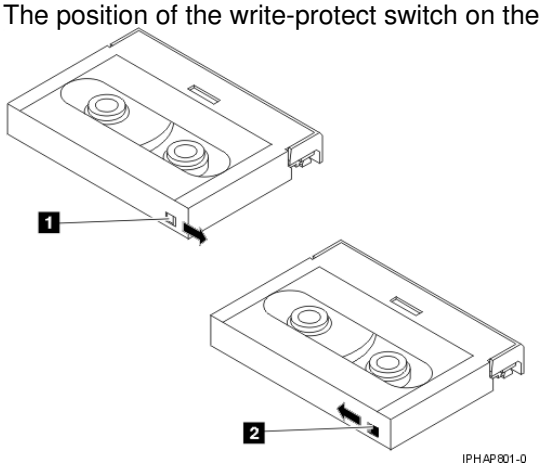
The process might take from 15 seconds to several minutes, depending on the position of the tape and the amount of data written. During this task, the status lights do the following:

- The Ready status light turns off.
- The Activity status light flashes during the unload operation.
- The Activity status light turns off when the cartridge is ejected from the tape drive.

Attention: There is an emergency eject and reset feature that releases the tape cartridge and resets the drive. Use the emergency eject feature if the cartridge does not move correctly or if the unload process fails. The emergency eject and reset feature procedure might result in loss of data. To perform an emergency eject of the tape cartridge or a reset of the drive, press and hold the Unload button for at least 10 seconds. If a cartridge is in the drive, the cartridge automatically ejects without rewinding the tape.

Setting the write-protect switch (FC 6258)

The position of the write-protect switch on the tape cartridge determines when you can write to the tape.



1 When the switch is set to the right, data can be written to and read from the tape

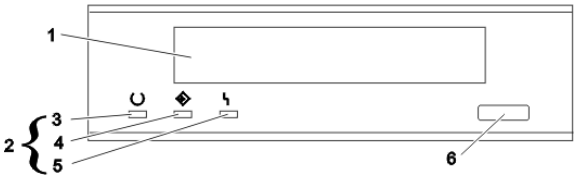
2 When the switch is set to the left, data can only be read.

Parent topic: 36/72GB Data72 4mm internal tape drive (FC 6258)

Status lights (FC 6258)

The following is a front view of the tape drive:

Figure 1. Front view of tape drive



1	Tape drive door
2	Status lights
3	Ready (green)
4	Active (green)
5	Fault (amber)
6	Unload/Reset button

The status lights and their ISO symbols are on the device as follows:

Ready

Ready (green)

Activity

Activity (green)

Fault

Fault (amber)

The combinations of the lights and their definitions are shown in the following table.

Table 1. Definition of Status Light Combinations

Ready **Ready** (green)	**Activity** **Activity** (green)	**Fault** **Fault** (amber)	**Definition**
Flashing	Off	Off	The Power-On Self Test (POST) is running or the test cartridge is running.
Off or On	Off or Flashing	On	The tape drive requires cleaning. See Cleaning the tape drive. • If the Ready light is on, a tape cartridge is in the drive. If the light is off, a cartridge is not in the drive. • If the Activity light flashes, a tape cartridge is in the drive and tape movement is occurring. If the light is off, no tape movement is occurring.
Off	Off	Off or On	One of the following conditions exists:

			• The power is off (Fault light is off). • The POST completed successfully, but no tape cartridge has been inserted. • If the Fault light is on, cleaning is required. See Cleaning the tape drive.
On	Off or Flashing	Off or On	A data cartridge has been inserted. • The device is ready to receive commands from the system (whether the Fault light is on or off). • If the Fault light is on, cleaning is required. See Cleaning the tape drive. • If the Activity light flashes, a tape cartridge is in the drive and tape movement is occurring. If the light is off, no tape movement is occurring.
On	Flashing	Off or On	The tape is in motion, and the device is running an operation or is cleaning.
Off	Off	Flashing	The device detected an internal fault that requires corrective action. 1. Reset the error by turning the power off to the device, then turning it back on, or by holding down the Unload/Reset button for 8 seconds. 2. If the Fault light still flashes after the reset, contact your service provider.

Note:

1. The device needs cleaning when the tape drive turns on the Fault status light (solid amber). The light turns on when the device exceeds a preset operating limit.
2. The recommended preventive-maintenance cleaning frequency is approximately 50 tape motion hours. Tape motion hours are defined as the time that the tape drive is moving tape.
3. When the Fault light turns on (solid amber), the device causes AIX to log an information error (TAPE_ERR6) in the AIX log, indicating that the tape drive needs to be cleaned.
4. Use only quality media and cleaning cartridges.
5. The device is designed to operate in normal office environments. Dirty environments or other poor environments might damage the tape drive. It is the customer's responsibility to provide the proper operating environment.
6. When the tape drive indicates that the drive needs to be cleaned, it is the customer's responsibility to clean the tape drive with the recommended cleaning cartridge.
7. If a tape cartridge that is not DDS-3, DDS-4, or DAT72 format is used, that cartridge will be immediately ejected as an incorrect cartridge type.

Parent topic: 36/72GB Data72 4mm internal tape drive (FC 6258)

Tape Cartridges (FC 6258)

Available Tape Cartridges

Table 1. 4-mm Data Cartridges

IBM Part Number	Type of Cartridge	Native (uncompressed) Capacity
18P7912	DAT 72 Data Cartridge	36 GB
59H4457	4-mm Test Cartridge	--
21F8763	4-mm Cleaning Cartridge	--
59H3465	Data Cartridge DDS3	12GB
59H4458	Data Cartridge DDS4	20GB

Data cartridge erasure

Most bulk eraser devices do not have the capability to erase the 4mm data cartridge. To correctly erase a 4mm data cartridge with a bulk eraser device, the erasure coercivity rating must be a minimum of 3900 Oersted.

Parent topic: 36/72GB Data72 4mm internal tape drive (FC 6258)

Slimline media devices

Review this information to learn about installing, replacing, and the different types of slimline media devices.

- **16X/48X IDE DVD-ROM Drive (FC 2634)**
  Review this information to learn about the features of the IDE DVD-ROM Drive.
- **16X/48X SCSI DVD-ROM Drive (FC 2635)**
  Review this information to learn about the features of the SCSI DVD-ROM Drive

Parent topic: Managing media devices

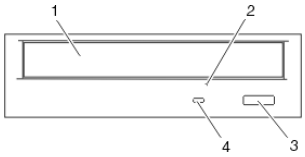
16X/48X IDE DVD-ROM Drive (FC 2634)

Features

This section describes the features of the 16X/48X IDE DVD-ROM Drive. The 16X/48X IDE DVD-ROM Drive is a half-high, 5.25-inch, single-ended, tray-loading drive. Its features include the following:

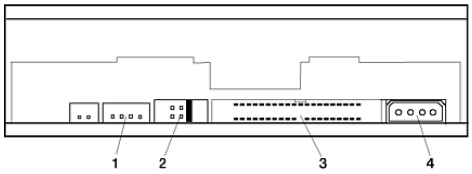
- CD media high-speed data transfer rate of 3300 KB per second (22X) at the inner diameter, 0 KB per second (48X) at the outer diameter.
- DVD media high-speed transfer rate is 8.91 MB per second (6.6x) at the inner diameter and 21.6 MB (16X) at the outer diameter.
- High-speed burst rate of 16.6 MB per second in PIO mode 4 and 33.3 MB per second in UDMA mode 2.
- Average random access time of 90 ms for CD media and 105 ms for DVD media.
- Can be installed in either a vertical or horizontal orientation.
- Loading tray accommodates both 8 cm discs (in the horizontal orientation only) and 12 cm discs.
- Reads multisession discs.
- Reads CD-recordable discs.
- Reads CD-RW discs.
- Supports all major CD-ROM formats: Mode 1, Mode 2, XA, CDDA, and audio.
- Reads DVD-RAM discs as defined by the *DVD Specification for Rewritable Discs, Version 2.1*.

Front view



1 Compact Disc Tray
2 Emergency Eject Hole
3 Load/Unload Button
4 Status Light

Rear view



Note: Audio is currently not enabled on server systems.

1 Audio Line-Out Connector
2 Jumper Block and Pins
3 40-pin IDE Interface Connector
4 Power Connector

Opening the Tray Manually

The tray automatically opens when you press the Load/Unload button. If it does not automatically open, follow these steps to manually open the tray:

1. Follow your operating system instructions for shutting down your system, then turn off the power to your system unit. Unplug the power cord from the wall outlet.
2. Insert the straightened end of a paper clip into the emergency eject hole until you feel some resistance.
3. Continue to push in the paper clip while you pull out the tray with your fingernail.

4. Pull the tray completely open and remove the disc. It is normal for the tray to make a clicking sound while you are pulling it open.

DVD-RAM Type II Disc

The DVD-RAM Type II disc can be removed from its cartridge and played in a DVD-ROM drive that is compatible with DVD-RAM.

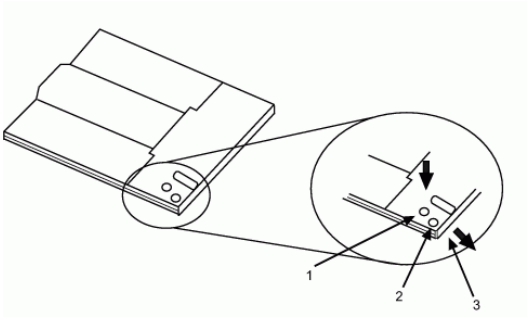
Attention: Be careful when handling removed discs. Debris, dust particles, fingerprints, smears, or scratches can affect recording and playback of discs. To clean dust or other debris, use a DVD-RAM/CD-ROM cleaning kit. Do not use solvents to clean disc surfaces. When labeling a disc, write only on the printed label side, using a soft felt-tip marker. Do not use a hard-tip pen to write on disc surface. Keep out of direct sunlight, high temperatures, and humidity. Do not attach labels to either side of the disc.

Removing a Disc from the Cartridge

To remove a disc from the cartridge, do the following:

1. Use the tip of a ballpoint pen to push the locking pin up and out of the disc cartridge.
2. Use the tip of a ballpoint pen to push down on the lock button while pulling the cartridge lid open.
3. With the cartridge lid open, slide the disc out of the cartridge.

Note: Handle the disc only by its edges.



1 Locking Pin
2 Lock Button
3 Cartridge Lid

Returning a Disc to the Cartridge

To return a disc to the cartridge, do the following:

Note: Both the disc label and the cartridge label should be facing up.

1. Slide the disc into the cartridge.
2. Close the cartridge lid. Make sure the lock button snaps into position.
3. Install the locking pin.

Attention: Handle the disc only by its edges.

Parent topic: Slimline media devices

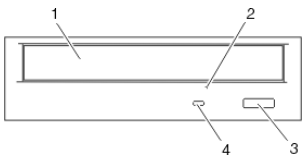
16X/48X SCSI DVD-ROM Drive (FC 2635)

Features

This section describes the features of the 16X/48X SCSI DVD-ROM Drive. The 16X/48X IDE DVD-ROM Drive is a half-high, 5.25-inch, tray-loading drive with a Low-Voltage-Differential (LVD) SCSI interface. Its features include the following:

- CD media high-speed data transfer rate of 3300 KB per second (22X) at the inner diameter, 0 KB per second (48X) at the outer diameter.
- DVD media high-speed transfer rate is 8.91 MB per second (6.6x) at the inner diameter and 21.6 MB (16X) at the outer diameter.
- Average random access time of 90 ms for CD media and 105 ms for DVD media.
- Can be installed in either a vertical or horizontal orientation.
- Loading tray accommodates both 8 cm discs (in the horizontal orientation only) and 12 cm discs.
- Reads multisession discs.
- Reads CD-recordable discs.
- Reads CD-RW discs.
- Supports all major CD-ROM formats: Mode 1, Mode 2, XA, CDDA, and audio.
- Reads DVD-RAM discs as defined by the *DVD Specification for Rewritable Discs, Version 2.1*.

Front View

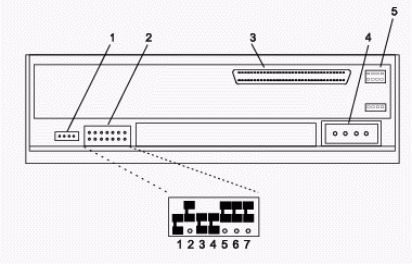


1 Compact Disc Tray
2 Emergency Eject Hole
3 Load/Unload Button

4 Status Light

Rear View and Jumper Pin Positions

The following figure shows the jumper pins as they are set at the factory.



1 Audio line-out connector
2 Jumper block and jumper pins
3 68-pin SCSI interface connector
4 Power connector
5 SCSI mode/term power (Not Used)

SCSI ID	Jumper 1	Jumper 2	Jumper 3	Jumper 4
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1
10	0	1	0	1
11	1	1	0	1
12	0	0	1	1
13	1	0	1	1
14	0	1	1	1
15	1	1	1	1

DVD-RAM Type II Disc

The DVD-RAM Type II disc can be removed from its cartridge and played in a DVD-ROM drive that is compatible with DVD-RAM.

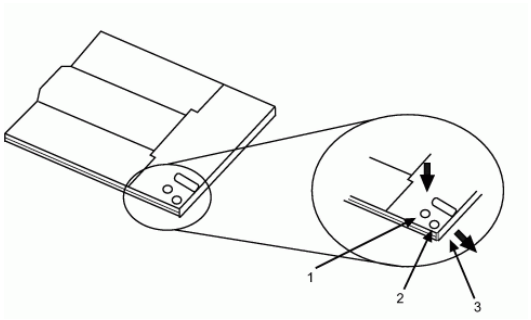
Attention: Be careful when handling removed discs. Debris, dust particles, fingerprints, smears, or scratches can affect recording and playback of discs. To clean dust or other debris, use a DVD-RAM/CD-ROM cleaning kit. Do not use solvents to clean disc surfaces. When labeling a disc, write only on the printed label side, using a soft felt-tip marker. Do not use a hard-tip pen to write on disc surface. Keep out of direct sunlight, high temperatures, and humidity. Do not attach labels to either side of the disc.

Removing a Disc from the Cartridge

To remove a disc from the cartridge, do the following:

1. Use the tip of a ballpoint pen to push the locking pin up and out of the disc cartridge.
2. Use the tip of a ballpoint pen to push down on the lock button while pulling the cartridge lid open.
3. With the cartridge lid open, slide the disc out of the cartridge.

Attention: Handle the disc only by its edges.



1 Locking Pin
2 Lock Button
3 Cartridge Lid

Returning a Disc to the Cartridge

To return a disc to the cartridge, do the following:

Note: Both the disc label and the cartridge label should be facing up.

1. Slide the disc into the cartridge.
2. Close the cartridge lid. Make sure the lock button snaps into position.
3. Install the locking pin.

Note: Handle the disc only by its edges.

Opening the Tray Manually

The tray automatically opens when you press the Load/Unload button. If it does not automatically open, follow these steps to manually open the tray:

1. Follow your operating system instructions for shutting down your system, then turn off the power to your system unit. Unplug the power cord from the wall outlet.
2. Insert the straightened end of a paper clip into the emergency eject hole until you feel some resistance.
3. Continue to push in the paper clip while you pull out the tray with your fingernail.
4. Pull the tray completely open and remove the disc. It is normal for the tray to make a clicking sound while you are pulling it open.

Parent topic: Slimline media devices

Floppy devices

Use this information to learn about floppy device features.

- **External USB 1.44 MB diskette drive (FC 2591)**

Parent topic: Managing media devices

External USB 1.44 MB diskette drive (FC 2591)

The following provides information about the external USB 1.44 MB diskette drive.

Installation and removal	To install this external USB 1.44 MB diskette drive complete the following steps: 1. Unpack the device and ensure you have all the cables and parts. 2. Connect the USB cables to an available USB port on the system unit. 3. Wait for the system to recognize the new device (approximately 1-3 minutes). To remove this external USB 1.44 MB diskette drive complete the following steps: 1. Ensure you complete any processes running from or to the diskette drive. 2. Eject any diskette you have in the device. 3. Disconnect the device from the system unit. If you are installing this device on system unit or partition running AIX operating system you can refer to the Installation and Use manual at the following URL:USB 1.44 MB External Diskette Drive Installation and Using Guide http://publib16.boulder.ibm.com/pseries/en_US/infocenter/base/hardware_docs/pdf/231332.pdf If you are installing this device on a system or partition running any other operating system see the documentation for that operating system.
Description	The externally attached USB diskette drive provides storage capacity up to 1.44 MB on a high-density (2HD) diskette KB on a double-density diskette. Includes 350mm (13.7 in) captured cable with standard USB connector. Limitations:

	• Maximum 1 USB diskette per adapter, • Up to 1 Keyboard and Mouse also supported on the adapter with the diskette drive at the same time • No system boot capability • Not to be operated upside down or with eject button down Characteristics: • Capacity - 1.44 MB (2HD disk) KB (double-density disk) • Physical Dimensions: Width=103mm (4.05 in), Height=17.6mm (.69 in), Depth=141.8-mm (5.58 in) • Color: Black • Data Rate: 12 Mbits/sec • Maximum Power Consumption: 2.36 Watt (seek) • Operates in all positions except those noted in the preceding limitations • Attributes provided: External diskette drive • Attributes required: 1 available USB port

Parent topic: Floppy devices

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Title :	ESCALA POWER5 Hardware Information Managing adapters and devices

Reference N° :	86 A1 44EW 00	**Date:**	July 2006

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