Power Systems

PCI adapter placement for machine types 82xx and 91xx

Power Systems

PCI adapter placement for machine types 82xx and 91xx

Note

Before using this information and the product it supports, read the information in "Notices," on page 109, "Safety notices" on page v, the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125–5823.

This edition applies to IBM Power Systems servers that contain the POWER6 processor and to all associated models.

Contents

Safety notices

Safety notices may be printed throughout this guide:

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

World Trade safety information

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

German safety information

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

Laser safety information

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

Laser compliance

All lasers are certified in the U.S. to conform to the requirements of DHHS 21 CFR Subchapter J for class 1 laser products. Outside the U.S., they are certified to be in compliance with IEC 60825 as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

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

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

(C026)

CAUTION:
Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

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

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

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

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

The equipment is suitable for installation in the following:

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

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

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

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

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

Chapter 1. What's new in PCI adapter placement for machine types 82xx and 91xx

See what is new and what has changed in the PCI adapter placement for machine types 82xx and 91xx since the last edition of this topic.

October 2009

The following updates have been made to the content:

- Added new or newly supported adapters to Chapter 2, "Supported PCI adapters," on page 3 and other sections.

May 2009

The following updates have been made to the content:

- Added a new section for the "Model 5802 and 5877 expansion units" on page 92.
- Added a new section for the "Model 5803 and 5873 expansion units" on page 93.
- Added new or newly supported adapters to Chapter 2, "Supported PCI adapters," on page 3 and other sections.

November 2008

The following updates have been made to the content:

- Added a new section for the Chapter 5, "Model 8234-EMA server," on page 43.
- Added new or newly supported adapters to Chapter 2, "Supported PCI adapters," on page 3.

Chapter 2. Supported PCI adapters

Learn about PCI, PCI-X and PCI Express™ (PCIe) adapters that are supported on IBM Power Systems™ models that contain the POWER6® processor, and their associated I/O expansion units.

This topic contains reference information that information technology (IT) personnel and service representatives can use in determining where to place Peripheral Component Interconnect (PCI) adapters in the following IBM Power Systems servers and their associated I/O expansion units: 8203-E4A, 8204-E8A, 8234-EMA, 8261-E4S, 9117-MMA, 9119-FHA, and 9125-F2A.

A separate publication, the PCI adapter placement for machine type 94xx, covers the following models and their associated I/O expansions units: 9406-MMA, 9407-M15, 9408-M25, and 9409-M50.

Adapters supported on AIX, IBM i, and Linux

Table 1 and Table 2 on page 13 list adapters supported on the AIX®, IBM i, and Linux® operating systems. Not all adapters are supported on all operating systems. Exceptions are noted in the Description column.

Important:

- Not all adapters are supported on all system configurations. This document does not replace the latest sales and marketing publications and tools that document supported features.
- Before adding or rearranging adapters, use the System Planning Tool to validate the new adapter configuration. See the System Planning Tool Web site at

  http://www.ibm.com/systems/support/tools/systemplanningtool/ .
- If you are installing a new feature, ensure that you have the software required to support the new feature and determine whether there are any existing PTF prerequisites to install. To do this, use the

  IBM Prerequisite Web site at http://www-912.ibm.com/e_dir/eServerPrereq.nsf .

IBM i operating system configuration notes:

- IOP adapters are listed in Table 53 on page 102.
- IBM i specific placement guidelines are covered in Chapter 10, “Determining the best place to install your adapter,” on page 101.
- The PCI and PCI-X adapters listed in Table 1 are IOPless unless the description states that they are IOP controlled. PCIe adapters (Table 2 on page 13) are all IOPless.

PCI and PCI-X adapters

The following table lists PCI and Peripheral Component Interconnect-X (PCI-X) adapters.

Table 1. PCI and PCI-X adapters

Feature/CCIN	Description
2738/28EF	2-Port USB PCI Adapter • Short, 32-bit, 3.3 or 5V • OS support: AIX and Linux

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
2749/2749	PCI Ultra Magnetic Media Controller • Short, 32-bit, 33 MHz • OS support: i operating system • IOP controlled – Memory value: 22 – Performance value: 25 • This adapter might encounter performance limitations in PCI-X expansion units and systems. • A maximum of two 2749 or 4805 adapters in any combination allowed per IOP, except for CCIN 289*x* IOPs.
2757/2757	PCI Ultra RAID Disk Controller • Long, 64-bit • High bandwidth • OS support: i operating system • IOP controlled – Memory value: 29 – Performance value: 30 • The controller must be mirrored to be supported. • See "SCSI RAID controller placement restrictions for IBM i" on page 104.
2780/2780	PCI-X Ultra4 RAID Disk Controller • Long, 64-Bit, 133 MHz • High bandwidth • OS support: i operating system • IOP controlled – Memory value: 29 – Performance value: 30 • The controller must be mirrored to be supported. • See "SCSI RAID controller placement restrictions for IBM i" on page 104.
2787/2787	PCI-X Fibre Channel Disk Unit Controller • Short, 64-bit, 133 MHz • High bandwidth • OS support: i operating system • For best performance, place the controller in a 64-bit slot. • IOP controlled • Only one per IOP and no other IOAs • A maximum of two 2787, 5704, 5760, or 5761 (any combination) is allowed per PCI bridge set boundary. • This IOA can be used in multipath configurations. To improve the availability provided by multipath configurations, place each IOA and its IOP on different HSL loops, in different expansion units or on different multi-adapter bridges.
2849/NA	POWER® GXT135P Graphics Accelerator with Digital Support • Short, 32 or 64-bit, 3.3V • OS support: AIX and Linux • Not hot-pluggable • Not supported in the 7311-D11 expansion unit • Not supported in the 7311-D20 expansion unit connected to a model 9117-MMA server

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
3709/2849	PCI 100/10 Mbps Ethernet IOA • Short, 32-bit, 33 MHz • OS support: i operating system • IOP controlled – Memory value: 25 – Performance value: 36 • A maximum of two 3709 in any combination is allowed per IOP
2943/3-B	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus • Short, 32-bit, 3.3 or 5V • OS support: AIX, i, and Linux operating systems
2947/9-R	ARTIC960Hx 4-Port Multiprotocol PCI Adapter • Long, 32-bit, 3.3 or 5V • OS support: AIX
2962/9-L	2-Port Multiprotocol PCI Adapter • Short, 32-bit, 3.3 or 5V • OS support: AIX
4746/2746	PCI Twinaxial Workstation Controller IOA • Short, 32-bit, 33 MHz • OS support: i operating system • IOP controlled – Memory value: 10 – Performance value: 6
4764/4764	PCI-X Cryptographic Coprocessor • Short, 64-bit, 3.3V • OS support: AIX and i operating system
4801/4758	PCI Cryptographic Coprocessor • Short, 32-bit, 33 MHz • OS support: i operating system • IOP controlled – Memory value: 11 – Performance value: 18 • The adapter cannot be controlled by the load source IOP.
4805/2058	PCI Cryptographic Accelerator • Short, 32-bit, 33 MHz • OS support: i operating system • IOP controlled – Memory value: 2 – Performance value: 26 • A maximum of two 3709 and 4805 adapters in any combination is allowed per IOP, except for CCIN 289*x* IOPs. • The adapter cannot be controlled by the load source IOP. • A maximum of two 4805 adapters are allowed per IOP, but is restricted to a maximum of one per IOP if this IOP is also driving a 5700 or 5701 adapter.

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
4812/4812 4813/4812	Base PCI Integrated xSeries® Server • Long, double-width, 64 bit, 66 MHz, 3.3 V • OS support: i operating system • Contains a 2.0 GHz processor with 2 MB integrated L2 cache • Two integrated 1000/100/10 Mbps Ethernet ports, two USB 1.1 ports, and traditional PC keyboard and mouse ports • A keyboard and mouse can either connect to the traditional ports or connect to the USB ports. • An SVGA video port for connection of a display. • This feature has two memory slots. These slots must always contain a pair of identical memory features. • Available memory features are: #9726 - Base 512 MB Server Memory (Initial order only) #8546 - Opt Base 1 Gb Server Memory (Initial order only) #0446 - 512 MB DDR Server Memory (MES only) #0447 - 1 Gb DDR Server Memory (MES only.) The #9812 requires an IOP (#2844, #9744 or #9844).
5580/2780 and 5708	2780 Controller with 5708 Auxiliary Write Cache • Long, 133 MHz, 32 or 64-bit, 3.3V • OS support: i operating system • Two adapter set, requires two open slots within the same enclosure. • The 2757 and 2780 controllers are high bandwidth • 5708 Auxiliary Write Cache is low bandwidth. • If possible, place the 2757 or 2780 controller in a 64 bit, 133 MHz slot, or better, for best performance. • IOP controlled – Memory value: 29 – Performance value: 30 • See “SCSI RAID controller placement restrictions for IBM i” on page 104.
5581/2757 and 5708	2757 Controller with 5708 Auxiliary Write Cache • Long, 133 MHz, 32 or 64-bit, 3.3V • OS support: i operating system • Two adapter set, requires two open slots within the same enclosure. • The 2757 and 2780 controllers are high bandwidth • 5708 Auxiliary Write Cache is low bandwidth. • If possible, place the 2757 or 2780 controller in a 64 bit, 133 MHz slot, or better, for best performance. • IOP controlled – Memory value: 29 – Performance value: 30 • See “SCSI RAID controller placement restrictions for IBM i” on page 104.
5583/571E and 574F	5738 Controller with 574F Auxiliary Write Cache IOA • Long, 133 MHz, 32 or 64-bit, 3.3V • OS support: i operating system • For more information about this adapter and slot restrictions, see “SCSI RAID controller placement restrictions for IBM i” on page 104 and “High-performance SCSI, disk controller placement for IBM i” on page 105.

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
5590/2780 and 574F	2780 Controller with 574F Auxiliary Write Cache IOA • Long, 133 MHz, 32 or 64-bit, 3.3V • OS support: i operating system • Place the controller side of the adapter pair in a 64 bit, 133 MHz slot, or better, for best performance. • Two adapter set requires two open slots within the same enclosure. • The 2780 and 2757 controllers are high bandwidth • The Auxiliary Write Cache is low bandwidth. • IOP controlled – Memory value: 29 – Performance value: 30 • For more information about this adapter and slot restrictions, see “SCSI RAID controller placement restrictions for IBM i” on page 104 and “High-performance SCSI, disk controller placement for IBM i” on page 105.
5591/2757 and 574F	2757 Controller with 574F Auxiliary Write Cache IOA • Long, 133 MHz, 32 or 64-bit, 3.3V • OS support: i operating system • Two adapter set requires two open slots within the same enclosure. • The 2780 and 2757 controllers are high bandwidth. • The Auxiliary Write Cache is low bandwidth. • Place the controller in a 64 bit, 133 MHz slot for best performance. • IOP controlled – Memory value: 29 – Performance value: 30 • For more information about this adapter and slot restrictions, see “SCSI RAID controller placement restrictions for IBM i” on page 104 and “High-performance SCSI, disk controller placement for IBM i” on page 105.
5700/5700	Gigabit Ethernet-SX PCI-X Adapter • Short, 32 or 64-bit, 3.3 or 5V • High bandwidth • OS support: AIX, i, and Linux operating systems • i configuration notes: – IOP controlled - Memory value: 2 - Performance value: 26 – Can be combined with a maximum of one other IOA. – A maximum of two 4805, 5700, or 5701 in any combination is allowed per IOP. – Half-duplex mode is not supported. – SNA is not supported.

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
5701/5701	10/100/1000 Base-TX Ethernet PCI-X Adapter • Short, 32 or 64-bit, 3.3 or 5V • High bandwidth • OS support: AIX, i, and Linux operating systems • i configuration notes: – IOP controlled - Memory value: 2 - Performance value: 26 – The adapter can be combined with a maximum of one other IOA. – A maximum of two 4805, 5700, or 5701 in any combination per IOP. – Half-duplex mode is not supported. – SNA is not supported.
5702/5702	PCI-X Ultra Tape Controller • Short, 64-bit, 133 MHz • OS support: i operating system • High bandwidth • IOP controlled – Memory value: 29 – Performance value: 21
5704/5704	PCI-X Fibre Channel Tape Controller • Short, 64-bit, 133 MHz • OS support: i operating system • High bandwidth • IOP controlled – Memory value: 36 – Performance value: 50 • For best performance, place the controller in a 64-bit slot. • A maximum of two 2787, 5704, 5760, or 5761 (any combination) is allowed per PCI bridge set boundary.
5706/5706	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter • Short, 32 or 64-bit, 3.3 or 5V • High bandwidth • OS support: AIX, i, and Linux operating systems
5707/5707	2-Port Gigabit Ethernet-SX PCI-X Adapter • Short, 32 or 64-bit, 3.3 or 5V • High bandwidth • OS support: AIX, i, and Linux operating systems
5710/5702	PCI-X Dual Channel Ultra320 SCSI Blind Swap Adapter • 64-bit, 3.3 volt • High bandwidth • OS support: AIX

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
5712/5702	PCI-X Dual Channel Ultra 320 SCSI Adapter • Short, 32 or 64-bit, 3.3V • High bandwidth • OS support: AIX, i, and Linux operating systems • i configuration notes: – IOP controlled - Memory value: 29 - Performance value: 21
5713/573B	1 Gigabit-TX iSCSI TOE PCI-X Adapter • Short, 32 or 64-bit, 3.3 or 5V • High bandwidth • OS support: AIX, i, and Linux operating systems
5714/573C	1 Gigabit-SX iSCSI TOE PCI-X Adapter • Short, 32 or 64-bit, 3.3 or 5V • High bandwidth • OS support: AIX, i, and Linux operating systems
5716/280B	2 Gigabit Fibre Channel PCI-X Adapter • Short, 32 or 64-bit, 3.3 or 5V • High bandwidth • OS support: AIX and Linux
5718/5718	10 Gigabit-SR Ethernet PCI-X Adapter • Short, 64-bit, 3.3V • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5719/5719	10 Gigabit-LR Ethernet PCI-X Adapter • Short, 64-bit, 3.3V • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5721/573A	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter • Short, 64 bit, 3.3 V • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5722/576A	10 Gb-LR Ethernet PCI-X 2.0 DDR Adapter • Short, 64-bit, 3.3 V • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5723/5723	2-Port EIA-232 Asynchronous PCI Adapter • Short, 32–bit, 3.3V or 5V • High bandwidth • OS support: AIX, i, and Linux operating systems

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
5736/ 571A	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter • Short, 32 to 64-bit, 3.3V • High bandwidth • OS support: AIX, i, and Linux operating systems • i configuration notes: – IOP controlled - Memory value: 29 - Performance value: 21 – See "SCSI RAID controller placement restrictions for IBM i" on page 104.
5740/5740	4-Port 10/100/1000 Base-TX PCI-X Adapter • Short, 64-bit, 3.3V • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5749/576B	4 Gigabit Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter • Short, 64-bit, 3.3V • OS support: i operating system • Extra-high bandwidth • 64-bit slot required • Recommended in DDR slot • Maximum of four per enclosure • Maximum of two per PCI host bridge
5758/280D	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter • Short, 32 or 64-bit, 3.3V • High bandwidth • OS support: AIX, i, and Linux operating systems
5759/5759	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter • Short, 64-bit, 3.3V • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5760/280E	PCI-X Fibre Channel Disk Controller • Short, 64-bit, 3.3V, 133 MHz • OS support: i operating system • Extra-high bandwidth • IOP controlled • For best performance, place the controller in a 64-bit slot. • Only one per IOP and no other IOAs. • A maximum of two 2787, 5704, 5760, or 5761 (any combination) is allowed per PCI bridge set boundary. • This IOA can be used in multipath configurations. To improve the availability provided by multipath, place each IOA and its IOP on different HSL loops, in different expansion units or on different multi-adapter bridges.

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
5761/280D	PCI-X Fibre Channel Disk Controller • Short, 64-bit, 3.3V, 133 MHz • OS support: i operating system • Extra-high bandwidth • IOP controlled – Memory value: 36 – Performance value: 50 • Extra-high bandwidth. • For best performance, place in a 64-bit position. • A maximum of two 2787, 5704, 5760, or 5761 (any combination) is allowed per PCI bridge set boundary. • For best performance, do not mix with other extra-high bandwidth adapters in the same multi-adapter bridge boundary.
5776/571B	PCI-X Disk Controller - 90 MB • Long, 64 bit, 266 MHz • OS support: i operating system • Extra-high bandwidth • Dual-mode capable adapter • The controller must be mirrored to be supported.
5777/571E	PCI-X Dual Channel Ultra320 SCSI RAID Adapter • Long, 32 or 64-bit, 3.3V, 133 MHz • OS support: i operating system • Dual-mode capable adapter • Extra-high bandwidth • The controller must be mirrored to be supported. • For more information about this adapter and slot restrictions, see “SCSI RAID controller placement restrictions for IBM i” on page 104 and “High-performance SCSI, disk controller placement for IBM i” on page 105.
5778/571F and 575B 5780/571F and 575B 5782/571F and 575B	PCI-X Dual Channel Ultra320 SCSI RAID Adapter with Auxiliary Write Cache (double-wide) • Long, 64-bit, 3.3V, 266 MHz • OS support: i operating system • Dual-mode capable adapter • Extra-high bandwidth • Double-wide adapter, requires two, adjacent slots. The SCSI controller side of the adapter pair requires a 64-bit slot. (The controller side is the side with the external SCSI connectors.) • When used in a logical partition (LPAR) environment, this double-wide adapter must have both slots of the adapter assigned to the same logical partition. When using DLPAR, both slots of the adapter must be managed together. • Because of the complexity of this adapter, concurrent maintenance is not supported through the HMC. Concurrent maintenance must be done from the Hardware Service Manager (HSM). • For more information about this adapter and slot restrictions, see “SCSI RAID controller placement restrictions for IBM i” on page 104 and “High-performance SCSI, disk controller placement for IBM i” on page 105.

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
5806/571A	PCI-X DDR Dual Channel Ultra320 SCSI Adapter • Short, 32 to 64-bit, 3.3V • High bandwidth • OS support: i operating system • i configuration notes: – IOP controlled - Memory value: 29 - Performance value: 21 – See "SCSI RAID controller placement restrictions for IBM i" on page 104.
5900/572A	PCI-X DDR Ext Dual-x4 3Gb SAS Adapter • Short, 64-bit, 3.3V • Extra-high bandwidth • OS support: AIX and Linux
5902/572B	PCI-X DDR Ext Dual-x4 3Gb SAS RAID Adapter • Long, 64-bit, 3.3V • Extra-high bandwidth • OS support: AIX and Linux • The adapter must be connected and configured in a dual controller mode, multi-initiator configuration, and this requires that the adapter be installed in pairs. • This adapter supports disk expansion units. This adapter does not support media expansion units.
5904, 5906, and 5908 / 572F and 575C	PCI-X DDR 1.5 GB cache SAS RAID Adapter • Long, 64-bit, 3.3V • Extra-high bandwidth • Double-wide adapter requires two adjacent slots: – 572F is the CCIN number on the SAS controller side of the double-wide adapter. – 575C is the CCIN number on the write-cache side of the double-wide adapter. • The different feature codes indicate whether a blind swap cassette is used and its type: – 5904 indicates no blind swap cassette. – 5906 indicates a gen-2.5 blind swap cassette. – 5908 indicates a gen-3 blind swap cassette. • OS support: AIX, i, and Linux operating systems
5912/572A	PCI-X DDR Dual-x4 3Gb SAS Adapter • Short, 64-bit, 3.3V • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems • Supports a dual controller mode, multi-initiator configuration
6312/6312	Quad Digital Trunk Telephony PCI Adapter • Long, 32 or 64-bit, 3.3 or 5V • OS support: AIX • Digital Trunk adapters have an internal cable and must be in contiguous slots.
6805/2742	PCI Two-Line WAN IOA • Short, 32-bit, 66 MHz • OS support: i operating system

Table 1. PCI and PCI-X adapters (continued)

Feature/CCIN	Description
6808/2805	PCI Quad Modem IOA • Long, 32-bit, 66 MHz • OS support: i operating system • Non-CIM
6809/2805	PCI Quad Modem IOA • Long, 32-bit, 66 MHz • OS support: i operating system • CIM
6833/2793	PCI 2-Line WAN with Modem • Short, 32-bit, 66 MHz • OS support: i operating system • Dual-mode adapter • Non-CIM
6834/2793	PCI 2-Line WAN with Modem • Short, 32-bit, 66 MHz • OS support: i operating system • Dual-mode adapter • CIM

PCI Express adapters

The following table lists PCI Express (PCIe) adapters.

Table 2. PCI Express adapters

Feature/CCIN	Description
2728/57D1	4-Port USB PCIe Adapter • Short, 1x • OS support: AIX and Linux operating systems
2893/576C 9693/576C	PCI Express 2-Line WAN with Modem • Short, 4x • OS support: i operating system • OS support: i • Non CIM
2894/576C 9694/576C	PCI Express 2-Line WAN with Modem • Short, 4x • OS support: i operating system • CIM
5708/2B3B	10 Gb FCoE PCIe Dual Port Adapter • Short, 8x • Extra-high bandwidth – If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters. • OS support: AIX and Linux operating systems

Table 2. PCI Express adapters (continued)

5717/5717	4-Port 10/100/1000 Base-TX PCI Express Adapter • Short, 4x • High bandwidth • OS support: AIX, i, and Linux operating systems
5732/5732	10 Gigabit Ethernet-CX4 PCI Express Adapter • Short, 8x • Extra-high bandwidth • OS support: AIX and Linux operating systems
5735/577D	8 Gigabit PCI Express Dual Port Fibre Channel Adapter • Short, 8x • Extra-high bandwidth – If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters. • OS support: AIX, i, and Linux operating systems
5748/5748	POWER GXT145 PCI Express Graphics Accelerator • Short, 1x • OS support: AIX and Linux operating systems • Not hot-pluggable
5767/5767	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter • Short, 4x • High bandwidth • OS support: AIX, i, and Linux operating systems
5768/5768	2-Port Gigabit Ethernet-SX PCI Express Adapter • Short, 4x • High bandwidth • OS support: AIX, i, and Linux operating systems
5769/5769	10 Gigabit Ethernet-SR PCI Express Adapter • Short, 8x • Extra-high bandwidth • OS support: AIX and Linux operating systems
5772/576E	10 Gigabit Ethernet-LR PCI Express Adapter • Short, 8x • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5773/5773	4 Gigabit PCI Express Single Port Fibre Channel Adapter • Short, 4x • High bandwidth • OS support: AIX and Linux operating systems
5774/5774	4 Gigabit PCI Express Dual Port Fibre Channel Adapter • Short, 4x • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems

Table 2. PCI Express adapters (continued)

5785	4 Port Async EIA-232 PCIe Adapter • Short, 1x • OS support: AIX and Linux operating systems
5901/57B3	PCIe Dual - x4 SAS Adapter • Short, 8x • Extra-high bandwidth • OS support: AIX, i, and Linux operating systems
5903/574E	PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter • Short, 8x • Extra-high bandwidth • The adapter must be connected and configured in a dual controller mode, multi-initiator configuration, and this requires that the adapter be installed in pairs. • OS support: AIX, i, and Linux operating systems
5909/57B9	PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and cable card • Short, 8x, PCIe adapter combined with a cable card assembly • Extra-high bandwidth • OS support: AIX and Linux operating systems
5911/57BA	SAS adapter for internal Split DASD option • Short, 8x, PCIe adapter combined with a cable card assembly • Extra-high bandwidth • OS support: AIX and Linux operating systems

PCI Express

PCI Express (PCIe) adapters use a different type of slot than Peripheral Component Interconnect (PCI) and Peripheral Component Interconnect-X (PCI-X) adapters. If you attempt to force an adapter into the wrong type of slot, you might damage the adapter or the slot. A PCI adapter can be installed in a PCI-X slot, and a PCI-X adapter can be installed in a PCI adapter slot. A PCIe adapter cannot be installed in a PCI or PCI-X adapter slot, and a PCI or PCI-X adapter cannot be installed in a PCIe slot. The following illustration shows an example of a PCI-X adapter (**A**) next to a PCIe 4x (**B**) adapter.

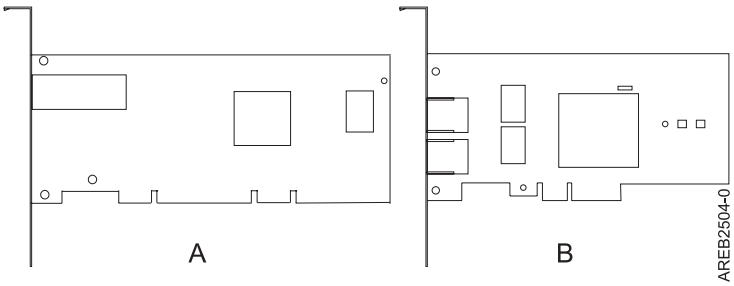


Figure 1. PCI-X adapter and PCIe 4x adapter

PCIe adapters and slots come in 4 different sizes: 1x, 4x, 8x and 16x. Smaller size adapters will fit in larger slots, but larger size adapters will not fit in smaller slots. The following table shows PCIe slot compatibility.

Table 3. PCIe slot compatibility

	1x slot	4x slot	8x slot	16x slot
1x adapter	Supported	Supported	Supported	Supported
4x adapter	Not supported	Supported	Supported	Supported
8x adapter	Not supported	Not supported	Supported	Supported
16x adapter	Not supported	Not supported	Not supported	Supported

To learn more about the PCIe standard, see the IBM Redbooks® Technote, *Introduction to PCI Express* at http://www.redbooks.ibm.com/abstracts/tips0456.html.

Related reference

PCI adapter placement for machine type 94xx
Find PCI adapter placement information for machine type 94xx

Related information

IBM Prerequisite Web page
Find prerequisite information for features you currently have or plan to add to your system.

System Planning Tool
Use the System Planning Tool to validate new or changed system configurations.

Managing PCI adapters
Find specifications, instructions, and part numbers for specific adapters.

Partitioning considerations with dual slot and multi path adapters
Learn about partitioning considerations with dual slot and multi-path adapters.

Chapter 3. Model 8203-E4A and 8261-E4S servers

Some adapters must be placed in specific PCI, Peripheral Component Interconnect-X (PCI-X), or PCI Express (PCIe) slots in order to function correctly or perform optimally. Use this information to determine where to install PCI adapters in the model 8203-E4A and 8261-E4S.

PCI slot descriptions

Figure 2 shows the back view of the system unit with the location codes for the PCI and GX+ slots. Table 4 describes the slots. Each PCI-X DDR or PCIe slot is a separate PCI host bridge (PHB).

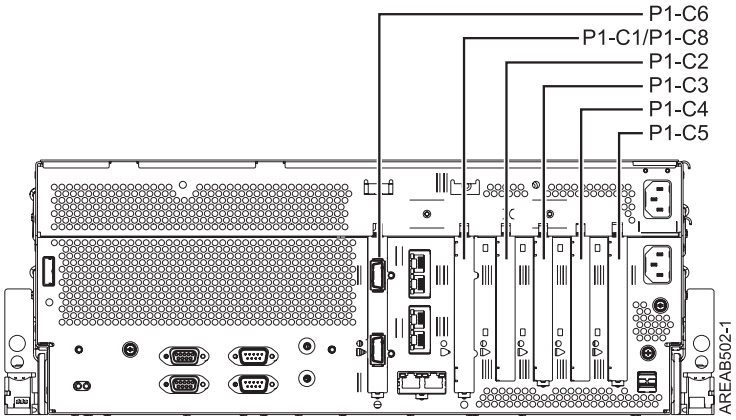


Figure 2. Back view of enclosure with location codes

Table 4. PCI slot locations and descriptions

Slot number	Location code	Description	PHB	Adapter size
Slot 1	P1-C1	PCIe 8x	PCIe PHB0	Short
	P1-C8	GX+		
Slot 2	P1-C2	PCIe 8x	PCIe PHB1	short
Slot 3	P1-C3	PCIe 8x	PCIe PHB3	Long
Slot 4	P1-C4	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB0	Long
Slot 5	P1-C5	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB1	Long
	P1-C6	GX+ or GX++		

- Slot 1 can be used for either a PCIe 8x adapter in connector P1-C1 or a GX+ adapter in connector P1-C8.
- P1-C6 is for a 2-port, GX+ or GX++ adapter. This slot is only active on 4-core systems.
- All PCIe and PCI-X slots support enhanced error handling (EEH).

PCI and PCI-X expansion units

I/O expansion units are used to increase the maximum number of adapters the 8203-E4A can support.

Expansion unit models 7311-D20, 5796, and 7314-G30, are supported on systems running AIX or Linux operating systems. The system can be configured to support up to twelve I/O expansion units. Feature

5796 is the current feature code for the expansion unit that in the past was identified as a 7314-G30. For the remainder of this section, only the 5796 feature code is used when referring to that expansion unit.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See "Performance notes" on page 27.

On a 1-core system, no I/O expansion units are supported.

5796 expansion units attach to a 12X Channel Adapter installed in one or both of the two GX slots available in the system unit. A 2-core system supports one 12X Channel Adapter with up to four drawers attached. A 4-core system supports two 12X Channel Adapters, with up to four drawers attached to each adapter.

7311-D20 expansion units attach to a RIO-2 Adapter installed in one or both of the two GX slots available in the system unit. A 2-core system supports one RIO-2 Adapter with up to six drawers attached. A 4-core system supports two RIO-2 Adapters, with up to six drawers attached to each adapter.

7311-D20 I/O drawers with RIO Ports to I/O Planar Riser Card (feature code 6413) must be upgraded to RIO-2 Ports to I/O Planar Riser Card (feature code 6417) before they can be attached to a System p® server with POWER6 processors.

Some I/O adapters supported in the 7311-D20 I/O drawers when attached to a System p5® server are not supported when attached to a System p server with POWER6 processors.

Expansion unit models 0588, 0595, 5094, 5096, 5294, 5296, 5790, and 5796 are supported on the system unit running the IBM i operating system.

PCIe expansion units

PCIe expansion unit models 5802 and 5877 are supported on the system running AIX, IBM i, or Linux operating systems. The system can be configured to support up to four I/O expansion units.

Restriction: A 12X Channel Adapter that has one or two 5802 expansion units connected cannot have anything else connected to that adapter.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See "Performance notes" on page 27.

The expansion units attach to a 12X Channel Adapter installed in one or both of the two GX slots available in the system unit.

On a 1-core system, no I/O expansion units are supported.

A 2-core system supports one 12X Channel Adapter with up to two drawers attached.

A 4-core system supports two 12X Channel Adapters, with up to two drawers attached to each adapter for a total of four drawers.

Maximum number of adapters supported

The 8203-E4A supports up to two POWER6 processor modules with 1-core, 2-core, and 4-core configurations. Unless otherwise noted in the tables that follow this list, the maximum number of adapters allowed are shown in this list:

- 1-core system:
  - No I/O expansion unit: 3 PCIe and 2 PCI-X DDR
- 2-core system:
  - No I/O expansion unit: 3 PCIe and 2 PCI-X DDR

  - System with six D20 I/O expansion units: 2 PCIe, 2 PCI-X DDR, and 42 PCI-X
  - System with four 5796 I/O expansion units: 2 PCIe and 26 PCI-X DDR
  - System with two 5802 or 5877 expansion units: 22 PCIe and 2 PCI-X DDR
- 4-core system:
  - No I/O expansion unit: 3 PCIe and 2 PCI-X DDR
  - System with twelve D20 I/O expansion units: 2 PCIe, 2 PCI-X DDR, and 84 PCI-X
  - System with eight 5796 I/O expansion units: 2 PCIe and 50 PCI-X DDR
  - System with six D20 and four 5796 I/O expansion units: 2 PCIe, 26 PCI-X DDR, and 42 PCI-X
  - System with four 5802 or 5877 expansion units: 42 PCIe and 2 PCI-X DDR

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See "Performance notes" on page 27.

PCI and PCI-X adapters

Use this information to identify slot placement priorities. Unless otherwise noted in the table, the maximum number of adapters supported is listed in "Maximum number of adapters supported" on page 18. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Table 5. Adapter slot priorities and maximums for PCI and PCI-X adapters

Feature	Description	System unit slot priority	Maximum number of adapters supported
6312[1]	Quad Digital Trunk Telephony PCI Adapter	4, 5	2 per system
5721**	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter	4, 5	16 per system
5722**	10 Gb-LR Ethernet PCI-X 2.0 DDR Adapter	4, 5	16 per system
5719**	10 Gigabit-LR Ethernet PCI-X Adapter	4, 5	16 per system
5718**	10 Gigabit-SR Ethernet PCI-X Adapter	4, 5	16 per system
5776**	PCI-X Disk Controller - 90 MB	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).

Table 5. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5777**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5778** 5782**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter with Auxiliary Write Cache (double-wide)	4, 5	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5760**	PCI-X Fibre Channel Disk Controller	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5761**	PCI-X Fibre Channel Disk Controller	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5904**	PCI-X DDR 1.5 GB cache SAS RAID Adapter	4 and 5	1 per system unit
5908**	PCI-X DDR 1.5 GB cache SAS RAID Adapter	NA	24 per system in attached expansion units
5900**	PCI-X DDR Ext Dual-x4 3Gb SAS Adapter	4, 5	58 per system
5902**	PCI-X DDR Ext Dual-x4 3Gb SAS RAID Adapter	4, 5	60 per system
5912**	PCI-X DDR Dual-x4 3Gb SAS Adapter	4, 5	58 per system

Table 5. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5749**	4 Gigabit Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5759**	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	50 per system
5740**	4-Port 10/100/1000 Base-TX PCI-X Adapter	4, 5	16 per system
5707*	2-Port Gigabit Ethernet-SX PCI-X Adapter	4, 5	32 per system
5706*	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	32 per system
5704*	PCI-X Fibre Channel Tape Controller	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5702*	PCI-X Ultra Tape Controller	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5701*	10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	• 32 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5700*	Gigabit Ethernet-SX PCI-X Adapter	4, 5	• 32 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.

Table 5. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5758*	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	50 per system
5712*	PCI-X Dual Channel Ultra 320 SCSI Adapter	4, 5	• 2 per system unit (internal) • 36 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5713*	1 Gigabit-TX iSCSI TOE PCI-X Adapter	4, 5	42 per system
5714*	1 Gigabit-SX iSCSI TOE PCI-X Adapter	4, 5	42 per system
5716*	2 Gigabit Fibre Channel PCI-X Adapter	4, 5	58 per system
5736*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	4, 5	58 per system
5806*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
2780*	PCI-X Ultra4 RAID Disk Controller	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
2757*	PCI Ultra RAID Disk Controller	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).

Table 5. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
2787*	PCI-X Fibre Channel Disk Unit Controller	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5580*	2780 Controller with 5708 Auxiliary Write Cache	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5581*	2757 Controller with 5708 Auxiliary Write Cache	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5583*	5738 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
5590*	2780 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).

Table 5. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5591*	2757 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
4812 4813	Base PCI Integrated xSeries Server	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
4805	PCI Cryptographic Accelerator	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
4801	PCI Cryptographic Coprocessor	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
4746	PCI Twinaxial Workstation Controller IOA	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).

Table 5. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
4764	PCI-X Cryptographic Coprocessor	4, 5	24 per system
2738	2-Port USB PCI Adapter	4, 5	8 per system
2749	POWER GXT135P Graphics Accelerator with Digital Support	None	• i operating system • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units that are attached to the system unit, but not the system unit (internal).
2849	POWER GXT135P Graphics Accelerator with Digital Support	4, 5	8 per system
2943	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	4, 5	18 per system
2947	ARTIC960Hx 4-Port Multiprotocol PCI Adapter	4, 5	8 per system
6805	PCI Two-Line WAN IOA	4, 5	• i only • 2 per system unit (internal) • 81 per system
6808	PCI Quad Modem IOA	4, 5	• i only • 2 per system unit (internal) • 41 per system
6809	PCI Quad Modem IOA	4, 5	• i only • 2 per system unit (internal) • 41 per system
6833	PCI 2-Line WAN with Modem	4, 5	• i only • 2 per system unit (internal) • 81 per system
6834	PCI 2-Line WAN with Modem	4, 5	• i only • 2 per system unit (internal) • 81 per system
5723	2-Port EIA-232 Asynchronous PCI Adapter	4, 5	18 per system
* High bandwidth adapter. See the "Performance notes" on page 27 before installing this adapter. **Extra-high bandwidth adapter. See the "Performance notes" on page 27 before installing this adapter. [1]Digital Trunk adapters have an internal cable and must be in contiguous slots.			

PCIe adapters

Use this information to identify slot placement priorities. Unless otherwise noted in the table, the maximum number of adapters supported is listed in "Maximum number of adapters supported" on page 18

18. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Table 6. Adapter slot priorities and maximums for PCIe adapters

Feature	Description	System unit slot priority	Maximum number of adapters supported
5732**	10 Gigabit Ethernet-CX4 PCI Express Adapter	1, 2, 3	16 per system
5769**	10 Gigabit Ethernet-SR PCI Express Adapter	1, 2, 3	16 per system
5772**	10 Gigabit Ethernet-LR PCI Express Adapter	1, 2, 3	16 per system
5708**	10 Gb FCoE PCIe Dual Port Adapter	1, 2, 3	• 16 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5774**	4 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3	42 per system
5735**	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3	• 42 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5903**	PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	1, 2, 3	42 per system
5901**	PCIe Dual - x4 SAS Adapter	1, 2, 3	42 per system
5767*	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	1, 2, 3	32 per system
5768*	2-Port Gigabit Ethernet-SX PCI Express Adapter	1, 2, 3	32 per system
5717*	4-Port 10/100/1000 Base-TX PCI Express Adapter	1, 2, 3	16 per system
5773*	4 Gigabit PCI Express Single Port Fibre Channel Adapter	1, 2, 3	42 per system
5748	POWER GXT145 PCI Express Graphics Accelerator	1, 2, 3	8 per system
5785	4 Port Async EIA-232 PCIe Adapter	1, 2, 3	18 per system
2893 9693	PCI Express 2-Line WAN with Modem	1, 2, 3	42 per system
2894 9694	PCI Express 2-Line WAN with Modem	1, 2, 3	42 per system
2728	4-Port USB PCIe Adapter	1, 2, 3	8 per system

* High bandwidth adapter. See the "Performance notes" on page 27 before installing this adapter.

**Extra-high bandwidth adapter. See the "Performance notes" on page 27 before installing this adapter.

Performance notes

Use the information in this section to help determine the maximum number of adapters that can be placed in a system while still maintaining optimum performance.

The section "Maximum number of adapters supported" on page 18 shows the maximum number of adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters.

To achieve the best performance of extra-high bandwidth storage and Ethernet adapters, limit the number of expansion units to one per 12x Channel or RIO-2 adapter. Having more than one drawer on a 12x loop does not increase the I/O bandwidth but only increases the number of slots available.

For best 12x I/O performance, use the 5608 or 5609 12x Channel Adapter in slot P1-C6. This feature is only available on 4-core systems.

The following tables provide guidelines on the maximum number of high bandwidth and extra-high bandwidth adapters you can use and still maintain optimum performance.

Note: Because of the many types of application workloads, these guidelines cannot cover all cases. The numbers in the following tables are suggestions for single types of adapters that are running exclusively. For systems with mixed adapter types or that have high aggregate bandwidth requirements, consult an IBM representative for additional guidelines.

Extra-high bandwidth storage adapters

Table 7. Maximum number of extra-high bandwidth storage adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in PCI-X I/O expansion units connected to a GX adapter in slot P1-C8	Adapters in a 5796 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C6	Adapters in5802 or 5877 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C6	System maximum
1-core	5				5
2-core	5	3			6*
4-core	5	3	6	9*	10 for 5796 12 for 5802 or 5877*
*If 5708 or 5735 adapters are used in an application with both ports active, each adapter counts as two extra-high bandwidth adapters.					

High bandwidth storage adapters

Table 8. Maximum number of high bandwidth storage adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in PCI-X I/O expansion units connected to a GX adapter in slot P1-C8	Adapters in a 5796 I/O expansion units connected to a 5608 or 5609 GX adapter in slot P1-C6	Adapters in5802 or 5877 I/O expansion units connected to a 5608 or 5609 GX adapter in slot P1-C6	System maximum
1-core	5				

Table 8. Maximum number of high bandwidth storage adapters for best performance (continued)

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in PCI-X I/O expansion units connected to a GX adapter in slot P1-C8	Adapters in a 5796 I/O expansion units connected to a 5608 or 5609 GX adapter in slot P1-C6	Adapters in5802 or 5877 I/O expansion units connected to a 5608 or 5609 GX adapter in slot P1-C6	System maximum
2-core	5	8			12
4-core	5	8	12	18	20 for 5796 24 for 5802 or 5877

Extra-high bandwidth Ethernet adapters

Table 9. Maximum number of extra-high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in PCI-X I/O expansion units	System maximum
1-core	1	1	1
2-core	1	1	1
4-core	2	2	2
For optimum performance, no more than one 10 Gb Ethernet port per two processors should be used in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports should be used. If a 5708 adapter is used in an application with both ports active, the adapter counts as two extra-high bandwidth adapters.			

High bandwidth Ethernet adapters

Table 10. Maximum number of high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in PCI-X I/O expansion units	System maximum
1-core	2		
2-core	4	4	4
4-core	5	8	8
For optimum performance, no more than two 1 Gb Ethernet ports per processor should be used in a system. If two 1 Gb Ethernet ports are present per processor, no other 1 Gb or 10 Gb ports should be used.			

Related information

Partitioning considerations with dual slot and multi path adapters

Chapter 4. Model 8204-E8A server

Some adapters must be placed in specific Peripheral Component Interconnect (PCI), Peripheral Component Interconnect-X (PCI-X), or PCI Express (PCIe) slots to function correctly or to perform optimally. Use this information to determine where to install PCI adapters.

PCI slot descriptions

Figure 3 shows the back view of the system unit with the location codes for the PCI and GX+ slots. Table 11 describes the slots. Each PCI-X DDR or PCIe slot is a separate PCI host bridge (PHB).

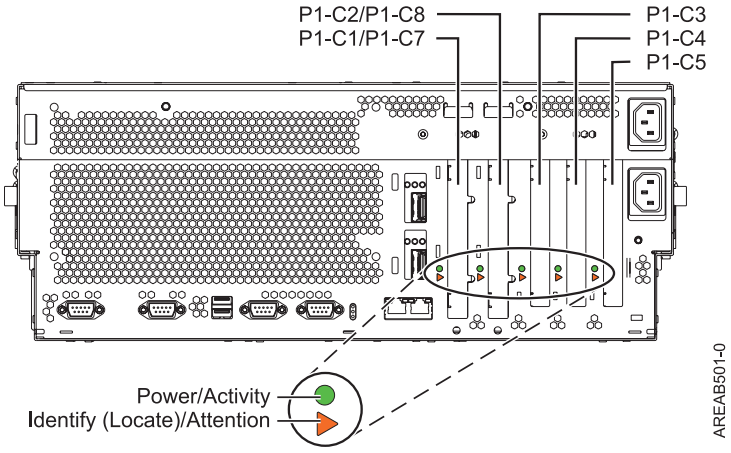


Figure 3. Back view of enclosure with location codes

Table 11. PCI slot locations and descriptions

Slot number	Location code	Description	PHB	Adapter size
Slot 1	P1-C1	PCIe 8x	PCIe PHB0	short
	P1-C7	GX+ or GX++		
Slot 2	P1-C2	PCIe 8x	PCIe PHB1	short
	P1-C8	GX+		
Slot 3	P1-C3	PCIe 8x	PCIe PHB3	long
Slot 4	P1-C4	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB0	long
Slot 5	P1-C5	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB1	long

- Slot 1 can be used for either a PCIe 8x adapter in connector P1-C1, or a GX+ or GX++ adapter in connector P1-C7.

  P1-C7 is not active on 2-core systems.

  P1-C7 provides higher bandwidth for a GX adapter than P1-C8. Use P1-C7 for the higher performance GX adapter or where the highest aggregate bandwidth is needed.
- Slot 2 can be used for either a PCIe 8x adapter in connector P1-C2, or a GX+ adapter in connector P1-C8.
- All slots support Enhanced Error Handling (EEH).

PCI and PCI-X expansion units

I/O expansion units are used to increase the maximum number of adapters that the 8204-E8A can support. Expansion units 5796, 7311-D20 and 7314-G30 are supported on systems running AIX or Linux operating systems. The system can be configured to support up to twelve I/O expansion units. Feature 5796 is the current feature code for the expansion unit that in the past was identified as a 7314-G30. For the remainder of this section, only the 5796 feature code is used when referring to that expansion unit.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See "Performance notes" on page 39.

A 2-core system supports either one 12x Channel Adapter or one RIO-2 adapter. A 4-core to 8-core system supports two 12x Channel Adapters, or two RIO-2 Adapters, or one 12x Channel Adapter and one RIO-2 adapter.

5796 expansion units attach to a 12x Channel Adapter installed in one or both of the two GX slots available in the system unit. A 2-core system supports one 12x Channel Adapter with up to 4 drawers attached. A 4-core to 8-core system supports two 12x Channel Adapters, with up to 4 drawers attached to each adapter.

7311-D20 expansion units attach to a RIO-2 Adapter installed in one or both of the two GX slots available in the system unit. A 2-core system supports one RIO-2 Adapter with up to six drawers attached. A 4-core to 8-core system supports two RIO-2 Adapters, with up to six drawers attached to each adapter.

7311-D20 I/O drawers with RIO Ports to I/O Planar Riser Card (#6413) must be upgraded to RIO-2 Ports to I/O Planar Riser Card (#6417) before they can be attached to a System p server with POWER6 processors.

Some I/O adapters supported in the 7311-D20 I/O drawers when attached to a System p5 server will not be supported when attached to an System p server with POWER6 processors. See "Adapters supported on AIX, IBM i, and Linux" on page 3 for more information on supported adapters.

Expansion unit models 0588, 0595, 5094, 5096, 5294, 5296, 5790, and 5796 are supported on systems running the IBM i operating system.

PCIe expansion units

PCIe expansion units 5802 and 5877 are supported on the system running AIX, IBM i, or Linux operating systems. The system can be configured to support up to four I/O expansion units.

Restriction: A 12X Channel Adapter that has one or two 5802 expansion units connected cannot have anything else connected to that adapter.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See "Performance notes" on page 39.

The expansion units attach to a 12X Channel Adapter installed in one or both of the two GX slots available in the system unit.

A 2-core system supports one 12x Channel Adapter with up to two drawers attached.

A 4-core to 8-core system supports two 12x Channel Adapters, with up to two drawers attached to each adapter for a total of four drawers.

Maximum number of adapters supported

The 8204-E8A supports up to four POWER6 processor cards with 2-core, 4-core, 6-core, and 8-core configurations. Unless otherwise noted in the tables that follow this list, the maximum number of adapters allowed are shown in this list:

- 2-core system:
  - No I/O expansion unit: 3 PCIe and 2 PCI-X DDR
  - System with six D20 I/O expansion units: 2 PCIe, 2 PCI-X DDR, and 42 PCI-X
  - System with four 5796 I/O expansion units: 2 PCIe and 26 PCI-X DDR
  - System with two 5802 or 5877 expansion units: 22 PCIe and 2 PCI-X DDR
- 4-core to 8-core system:
  - No I/O expansion unit: 3 PCIe and 2 PCI-X DDR
  - System with twelve D20 I/O expansion units: 1 PCIe, 2 PCI-X DDR, and 84 PCI-X
  - System with eight 5796 I/O expansion units: 1 PCIe and 50 PCI-X DDR
  - System with six D20 and four 5796 I/O expansion units: 1 PCIe, 26 PCI-X DDR, and 42 PCI-X
  - System with four 5802 or 5877 expansion units: 42 PCIe and 2 PCI-X DDR

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See "Performance notes" on page 39.

PCI and PCI-X adapters

Use this information to identify slot placement priorities. Unless otherwise noted in the table, the maximum number of adapters supported is listed in "Maximum number of adapters supported." In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters

Feature	Description	System unit slot priority	Maximum number of adapters supported
6312[1]	Quad Digital Trunk Telephony PCI Adapter	4, 5	2 per system
5721**	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter	4, 5	32 per system
5722**	10 Gb-LR Ethernet PCI-X 2.0 DDR Adapter	4, 5	32 per system
5719**	10 Gigabit-LR Ethernet PCI-X Adapter	4, 5	32 per system
5718**	10 Gigabit-SR Ethernet PCI-X Adapter	4, 5	32 per system
5776**	PCI-X Disk Controller - 90 MB	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5777**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5778** 5782**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter with Auxiliary Write Cache (double-wide)	4, 5	• i only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
5760**	PCI-X Fibre Channel Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5761**	PCI-X Fibre Channel Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5749**	4 Gigabit Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• i only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
5904**	PCI-X DDR 1.5 GB cache SAS RAID Adapter	4, 5	49 per system
5908**	PCI-X DDR 1.5 GB cache SAS RAID Adapter		24 per system
5900**	PCI-X DDR Ext Dual-x4 3Gb SAS Adapter	4, 5	58 per system

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5902**	PCI-X DDR Ext Dual-x4 3Gb SAS RAID Adapter	4, 5	60 per system
5912**	PCI-X DDR Dual-x4 3Gb SAS Adapter	4, 5	60 per system
5759**	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	50 per system
5740**	4-Port 10/100/1000 Base-TX PCI-X Adapter	4, 5	32 per system
5712*	PCI-X Dual Channel Ultra 320 SCSI Adapter	4, 5	• 2 per system unit (internal) • 36 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101.
5707*	2-Port Gigabit Ethernet-SX PCI-X Adapter	4, 5	64 per system
5706*	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	64 per system
5704*	PCI-X Fibre Channel Tape Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5702*	PCI-X Ultra Tape Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5701*	10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	• 64 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101.

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5700*	Gigabit Ethernet-SX PCI-X Adapter	4, 5	• 64 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5758*	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	50 per system
5713*	1 Gigabit-TX iSCSI TOE PCI-X Adapter	4, 5	42 per system
5714*	1 Gigabit-SX iSCSI TOE PCI-X Adapter	4, 5	42 per system
5716*	2 Gigabit Fibre Channel PCI-X Adapter	4, 5	58 per system
5736*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	4, 5	58 per system
5806*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
2780*	PCI-X Ultra4 RAID Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
2757*	PCI Ultra RAID Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
2787*	PCI-X Fibre Channel Disk Unit Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5580*	2780 Controller with 5708 Auxiliary Write Cache	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5581*	2757 Controller with 5708 Auxiliary Write Cache	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5583*	5738 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5590*	2780 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5591*	2757 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4812 4813	Base PCI Integrated xSeries Server	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4805	PCI Cryptographic Accelerator	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4801	PCI Cryptographic Coprocessor	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4764	PCI-X Cryptographic Coprocessor	4, 5	32 per system

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
4746	PCI Twinaxial Workstation Controller IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
2738	2-Port USB PCI Adapter	4, 5	8 per system
2749	POWER GXT135P Graphics Accelerator with Digital Support	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
2849	POWER GXT135P Graphics Accelerator with Digital Support	4, 5	8 per system
2943	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	4, 5	18 per system
2947	ARTIC960Hx 4-Port Multiprotocol PCI Adapter	4, 5	8 per system
6805	PCI Two-Line WAN IOA	4, 5	• i operating system only • 2 per system unit (internal) • 81 per system
6808	PCI Quad Modem IOA	4, 5	• i operating system only • 2 per system unit (internal) • 41 per system
6809	PCI Quad Modem IOA	4, 5	• i operating system only • 2 per system unit (internal) • 41 per system
6833	PCI 2-Line WAN with Modem	4, 5	• i operating system only • 2 per system unit (internal) • 81 per system
6834	PCI 2-Line WAN with Modem	4, 5	• i operating system only • 2 per system unit (internal) • 81 per system
5723	2-Port EIA-232 Asynchronous PCI Adapter	4, 5	18 per system

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
* High bandwidth adapter. See the "Performance notes" on page 39 before installing this adapter.			
**Extra-high bandwidth adapter. See the "Performance notes" on page 39 before installing this adapter.			
[1]Digital Trunk adapters have an internal cable and must be in contiguous slots.			

PCIe adapters

Use this information to identify slot placement priorities. Unless otherwise noted in the table, the maximum number of adapters supported is listed in "Maximum number of adapters supported" on page 31. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Table 13. Adapter slot priorities and maximums for PCIe adapters

Feature	Description	System unit slot priority	Maximum number of adapters supported
5732**	10 Gigabit Ethernet-CX4 PCI Express Adapter	1, 2, 3	32
5769**	10 Gigabit Ethernet-SR PCI Express Adapter	1, 2, 3	32
5772**	10 Gigabit Ethernet-LR PCI Express Adapter	1, 2, 3	32
5708**	10 Gb FCoE PCIe Dual Port Adapter	1, 2, 3	• 32 • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5735**	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3	• 41 • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5903**	PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	1, 2, 3	41
5901**	PCIe Dual - x4 SAS Adapter	1, 2, 3	41
5767*	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	1, 2, 3	41
5768*	2-Port Gigabit Ethernet-SX PCI Express Adapter	1, 2, 3	41
5717*	4-Port 10/100/1000 Base-TX PCI Express Adapter	1, 2, 3	32
5773*	4 Gigabit PCI Express Single Port Fibre Channel Adapter	1, 2, 3	41
5774**	4 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3	41

Table 13. Adapter slot priorities and maximums for PCIe adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters supported
5748	POWER GXT145 PCI Express Graphics Accelerator	1, 2, 3	8
5785	4 Port Async EIA-232 PCIe Adapter	1, 2, 3	18
2893 9693	PCI Express 2-Line WAN with Modem	1, 2, 3	41
2894 9694	PCI Express 2-Line WAN with Modem	1, 2, 3	41
2728	4-Port USB PCIe Adapter	1, 2, 3	8
* High bandwidth adapter. See the "Performance notes" before installing this adapter. **Extra-high bandwidth adapter. See the "Performance notes" before installing this adapter.			

Performance notes

Use the information in this section to help determine the maximum number of adapter that can be placed in a system while still maintaining optimum performance.

The section "Maximum number of adapters supported" on page 31 shows maximum number adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters.

To achieve the best performance of extra-high bandwidth storage and Ethernet adapters, limit the number of expansion units to one per 12x Channel or RIO-2 adapter. Having more than one drawer on a 12x loop does not increase the I/O bandwidth but only increases the number of slots available.

For best 12x I/O performance, use the 5608 or 5609 12x Channel Adapter in slot P1-C7.

The following four tables provide guidelines on the maximum number of high bandwidth and extra-high bandwidth adapters you can use and still maintain optimum performance.

Note: Because of the many types of application workloads, these guidelines cannot cover all cases. The numbers in the following tables are suggestions for single types of adapters that are running exclusively. For systems with mixed adapter types or that have high aggregate bandwidth requirements, consult an IBM representative for additional guidelines.

Extra-high bandwidth storage adapters

Table 14. Maximum number of extra-high bandwidth storage adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in a PCI-X I/O expansion unit connected to a GX adapter in slot P1-C8	Adapters in a 5796 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C7	Adapters in a 5802 or 5877 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C7*	System maximum*
2-core	5	3			6

Table 14. Maximum number of extra-high bandwidth storage adapters for best performance (continued)

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in a PCI-X I/O expansion unit connected to a GX adapter in slot P1-C8	Adapters in a 5796 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C7	Adapters in a 5802 or 5877 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C7*	System maximum*
4-core	5	3	6	9	10 for 5796 12 for 5802 or 5877
6-core	5	3	6	9	10 for 5796 12 for 5802 or 5877
8-core	5	3	6	9	10 for 5796 12 for 5802 or 5877
*If 5708 or 5735 adapters are used in an application with both ports active, each adapter counts as two extra-high bandwidth adapters.					

High bandwidth storage adapters

Table 15. Maximum number of high bandwidth storage adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in a PCI-X I/O expansion unit connected to a GX adapter in slot P1-C8	Adapters in a 5796 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C7	Adapters in a 5802 or 5877 I/O expansion unit connected to a 5608 or 5609 GX adapter in slot P1-C7	System maximum
2-core	5	8			12
4-core	5	8	12	18	20 for 5796 24 for 5802 or 5877
6-core	5	8	12	18	20 for 5796 24 for 5802 or 5877
8-core	5	8	12	18	20 for 5796 24 for 5802 or 5877

Extra-high bandwidth Ethernet adapters

Table 16. Maximum number of extra-high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in a PCI-X I/O expansion unit connected to a GX adapter in slot P1-C8	System maximum
2-core	1	1	1
4-core	2	2	2
6-core	3	3	3
8-core	4	4	4
For optimum performance, no more than one 10 Gb Ethernet port per two processors should be used in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports should be used. If a 5708 adapter is used in an application with both ports active, the adapter counts as two extra-high bandwidth adapters.			

High bandwidth Ethernet adapters

Table 17. Maximum number of high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in a PCI-X I/O expansion unit connected to a GX adapter in slot P1-C8	System maximum
2-core	4	4	4
4-core	5	8	8
6-core	5	12	12
8-core	5	16	16
For optimum performance, no more than two 1 Gb Ethernet ports per processor should be used in a system. If two 1 Gb Ethernet ports are present per processor, no other 1 Gb or 10 Gb ports should be used.			

Related information

Partitioning considerations with dual slot and multi path adapters

Chapter 5. Model 8234-EMA server

Some adapters must be placed in specific Peripheral Component Interconnect (PCI), Peripheral Component Interconnect-X (PCI-X), or PCI Express (PCIe) slots to function correctly or to perform optimally. Use this information to determine where to install PCI adapters.

PCI slot descriptions

Figure 4 shows the back view of the system unit with the location codes for the PCI and GX+ slots. Table 18 describes the slots. Each PCI-X DDR or PCIe is a separate PCI host bridge (PHB).

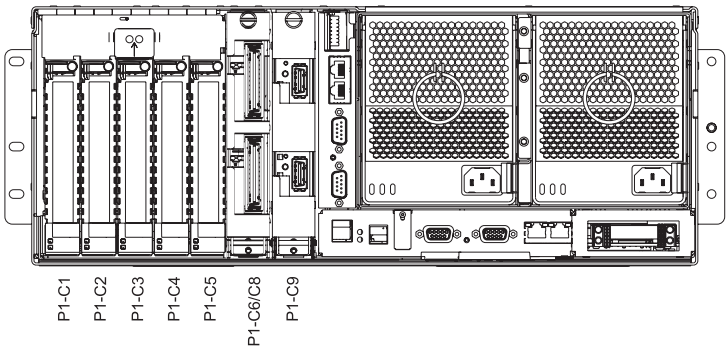


Figure 4. Back view of enclosure with location codes.

Table 18. PCI slot locations and descriptions

Slot #	Location code	Description	PHB	Adapter size
Slot 1	P1-C1	PCIe 8x	PCIe PHB0	long
Slot 2	P1-C2	PCIe 8x	PCIe PHB1	long
Slot 3	P1-C3	PCIe 8x	PCIe PHB2	long
Slot 4	P1-C4	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB0	long
Slot 5	P1-C5	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB1	long
Slot 6	P1-C6	PCIe 8x	PCIe PHB3	short
	P1-C8	GX+	NA	NA
Slot 7	P1-C9	GX+	NA	NA

- Slot 6 can be used for either a PCIe 8x adapter in connector P1-C6, or a GX+ adapter in connector P1-C8.
- Slot 7 (P1-C9) is not active on a 4-core system
- All slots support Enhanced Error Handling (EEH).
- This system uses generation 3, blind swap cassettes to manage the installation and removal of adapters. Cassettes can be installed and removed without removing the drawer from the rack. Because of the cassettes, internal SCSI connectors on PCI storage adapters are not supported for use in this system.

PCI and PCI-X expansion units

Each system unit supports one or two I/O expansion units, and two system units can be cabled together in a rack to form one system. The following I/O expansion configurations are possible:

- A 4-core single, system unit can support one GX slot with six I/O expansion units attached to a RIO-2 adapter, or four I/O expansion units attached to a 12x Channel Adapter.
-
- A 8-core single, system unit can support two 2 GX slots with twelve I/O expansion units attached to RIO-2 adapters, or eight I/O expansion units attached to 12x Channel Adapters.
- A 16-core, two-unit system can support three GX slots with eighteen I/O expansion units attached to RIO-2 adapters, or twelve I/O expansion units attached to 12x Channel Adapters.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See “Performance notes” on page 50.

Expansion units 5796, 7311-D20, and 7314-G30 are supported on the system running in the AIX or Linux operating systems. Feature 5796 is the current feature code for the expansion unit that in the past was identified as a 7314-G30. For the remainder of this section, only the 5796 feature code is used when referring to that expansion unit.

Expansion unit 5796 is supported on the system running the IBM i operating system.

The 5796 expansion units attach to a 12x Channel Adapter installed in one of the two GX slots available in each system unit.

The 7311-D20 expansion unit attaches to a RIO-2 adapter installed in one of the two GX slots available in each system unit.

7311-D20 I/O drawers with the RIO Ports to I/O Planar Riser Card (feature 6413) must be upgraded to the RIO-2 Ports to I/O Planar Riser Card (feature 6417) before the I/O drawers can be attached to a Power Systems server that has a POWER6 processor.

Some I/O adapters supported in the 7311-D20 I/O drawer when attached to a System p5 server are not supported when the I/O drawer is attached to a server with POWER6 processors. Use the System Planning Tool to validate a configuration.

PCIe expansion units

PCIe expansion units 5802 and 5877 are supported on the system running AIX, IBM i, or Linux. The system can be configured to support up to two I/O expansion units per GX adapter.

Restriction: A 12X Channel Adapter that has one or two 5802 expansion units connected cannot have anything else connected to that adapter.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See “Performance notes” on page 50.

The expansion units attach to a 12x Channel Adapter installed in one or both of the two GX slots available in the system unit.

A 4-core system supports one 12x Channel Adapters, with up to two drawers attached.

A 8-core system supports two 12x Channel Adapters, with up to two drawers attached to each adapter for a total of four drawers.

A 16-core system supports three 12x Channel Adapters, with up to two drawers attached to each adapter for a total of six drawers.

PCI and PCI-X adapters

Use this information to identify slot placement priorities and the maximum number of specified adapters allowed. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Two system units can be cabled together in a rack to form one system. The maximum number of adapters that are allowed can vary depending on whether the system is configured as a 4-, 8-, or 16-core system. For example, if the maximum number of adapters allowed is 18 for a 4-core system, 28 for an 8-core system, and 48 for a 16-core system, those maximums are expressed in the table as 18/28/48 per system. If only one number is listed per system, it means the maximum number of adapters allowed is the same for all configurations of the system.

Table 19. Adapter slot priorities and maximums for PCI and PCI-X adapters

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5721**	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter	4, 5	• 2 per system unit (internal) • 16/32/64 per system
5908**	PCI-X DDR 1.5 GB cache SAS RAID Adapter	4 and 5	• 1 per system unit (internal) • 9/17/26 per system
5912**	PCI-X DDR Dual-x4 3Gb SAS Adapter	4, 5	• 2 per system unit (internal) • 26/48/48 per system
5902**	PCI-X DDR Ext Dual-x4 3Gb SAS RAID Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system
5759**	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system
5749**	4 Gigabit Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, “Determining the best place to install your adapter,” on page 101.
5776**	PCI-X Disk Controller - 90 MB	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 19. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5777**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5782**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter with Auxiliary Write Cache (double-wide)	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
5740**	4-Port 10/100/1000 Base-TX PCI-X Adapter	4, 5	• 2 per system unit (internal) • 16/32/64 per system
5707*	2-Port Gigabit Ethernet-SX PCI-X Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system
5706*	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system
5701*	10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system • When the adapter is used with the i operating system, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5700*	Gigabit Ethernet-SX PCI-X Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system • When the adapter is used with the i operating system, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5758*	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system
5713*	1 Gigabit-TX iSCSI TOE PCI-X Adapter	4, 5	• 2 per system unit (internal) • 26/50/76 per system
5736*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	4, 5	• 2 per system unit (internal) • 2/26/48 per system

Table 19. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5583*	5738 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4764	PCI-X Cryptographic Coprocessor	4, 5	• 2 per system unit (internal) • 16/16/32 per system
2738	2-Port USB PCI Adapter	4, 5	• 2 per system unit (internal) • 8 per system
2849	POWER GXT135P Graphics Accelerator with Digital Support	4, 5	• 2 per system unit (internal) • 8 per system
2943	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	4, 5	• 2 per system unit (internal) • 18/26/42 per system
6805	PCI Two-Line WAN IOA	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
6808	PCI Quad Modem IOA	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
6809	PCI Quad Modem IOA	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
6833	PCI 2-Line WAN with Modem	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.

Table 19. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
6834	PCI 2-Line WAN with Modem	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
5723	2-Port EIA-232 Asynchronous PCI Adapter	4, 5	• 2 per system unit (internal) • 18/26/42 per system
* High bandwidth adapter. See the "Performance notes" on page 50 before installing this adapter. **Extra-high bandwidth adapter. See the "Performance notes" on page 50 before installing this adapter.			

PCIe adapters

Use this information to identify slot placement priorities and the maximum number of specified adapters allowed. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Two system units can be cabled together in a rack to form one system. Each system unit has four PCIe slots.

Table 20. Adapter slot priorities and maximums for PCIe adapters

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5732**	10 Gigabit Ethernet-CX4 PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 16/32/64 per system
5769**	10 Gigabit Ethernet-SR PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 16/32/64 per system
5772**	10 Gigabit Ethernet-LR PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 16/32/64 per system
5708**	10 Gb FCoE PCIe Dual Port Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 16/32/64 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5735**	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 23/43/67 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.

Table 20. Adapter slot priorities and maximums for PCIe adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5903**	PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 23/43/67 per system
5901**	PCIe Dual - x4 SAS Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 23/43/67 per system
5909**	PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and cable card	3	• 1 per system unit (internal) • 1/1/2 per system
5911**	SAS adapter for internal Split DASD option	3	• 1 per system unit (internal) • 1/1/2 per system
5767*	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 16/32/64 per system
5768*	2-Port Gigabit Ethernet-SX PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 16/32/64 per system
5717*	4-Port 10/100/1000 Base-TX PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 16/32/64 per system
5773*	4 Gigabit PCI Express Single Port Fibre Channel Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 23/43/67 per system
5774**	4 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 23/43/67 per system
5785	4 Port Async EIA-232 PCIe Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 18/26/42 per system
5748	POWER GXT145 PCI Express Graphics Accelerator	1, 2, 3, 6	• 4 per system unit (internal) • 8 per system
2728	4-Port USB PCIe Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 8 per system

* High bandwidth adapter. See the "Performance notes" on page 50 before installing this adapter.

**Extra-high bandwidth adapter. See the "Performance notes" on page 50 before installing this adapter.

SAS cable cards

The following serial-attached SCSI (SAS) card is not a PCI adapters; however, it does occupy PCIe slot 3. This feature allows internal SAS disk slots in a system unit to be controlled by a PCI SAS controller adapter in the same enclosure. With this feature the connection to the internal SAS disk slots is transferred from the internal controller to a mini SAS 4x receptacle on the rear bulkhead of the enclosure at adapter slot location P1-C3. A second PCI slot is required to hold the SAS controller adapter.

Table 21. SAS cable cards

Feature	Description	System unit slot priority	Maximum number of SAS cable cards allowed
3651	External connection for the six internal SAS disk slots	3	1

For information about cabling these features, see Serial attached SCSI cable planning.

Performance notes

Use the information in this section to help determine the maximum number of adapters that can be placed in a system while still maintaining optimum performance.

Table 19 on page 45 and Table 20 on page 48 identify the slot placement priorities and the maximum number of specified adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters.

To achieve the best performance of extra-high bandwidth storage and Ethernet adapters, limit the number of expansion units to one per 12x Channel or RIO-2 adapter. Having more than one drawer on a 12x loop does not increase the I/O bandwidth but only increases the number of slots available.

The following tables provide guidelines on the maximum number of high bandwidth and extra-high bandwidth adapters you can use and still maintain optimum performance.

Note: Because of the many types of application workloads, these guidelines cannot cover all cases. The numbers in the following tables are suggestions for single types of adapters that are running exclusively. For systems with mixed adapter types or that have high aggregate bandwidth requirements, consult an IBM representative for additional guidelines.

Extra-high bandwidth storage adapters

Table 22. Maximum number of extra-high bandwidth storage adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8***	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*, ***	Adapters in 5796, 5802, or 5877, I/O expansion units connected to a GX adapter on slot P1-C9**, ***	System maximum ***
4-core	6	3	6		6
8-core	6	6	6	4	10
16-core	12	6	12	8	20

* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.

** This configuration requires a GX Host Channel Adapter in P1-C9 for each 4U system unit and one or more 5796, 5802, or 5877, drawers per GX adapter.

***If 5708 or 5735 adapters are used in an application with both ports active, each adapter counts as two extra-high bandwidth adapters.

Slot P1-C9 is not active on a 4-core system

High bandwidth storage adapters

Table 23. Maximum number of high bandwidth storage adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in 5796, 5802, or 5877, I/O expansion units connected to a GX adapter on slot P1-C9**	System maximum
4-core	6	6	12		12

Table 23. Maximum number of high bandwidth storage adapters for best performance (continued)

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in 5796, 5802, or 5877, I/O expansion units connected to a GX adapter on slot P1-C9**	System maximum
8-core	6	6	12	8	20
16-core	12	12	24	16	40

* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.

** This configuration requires a GX Host Channel Adapter in P1-C9 for each 4U system unit and one or more 5796, 5802, or 5877, drawers per GX adapter.

Slot P1-C9 is not active on a 4-core system

Extra-high bandwidth Ethernet adapters

Table 24. Maximum number of extra-high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
4-core	2	2	2		2
8-core	4	4	4	4	4
16-core	8	8	8	8	8

* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.

For optimum performance, no more than one 10 Gb Ethernet port per two processors should be used in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports should be used.

If a 5708 adapter is used in an application with both ports active, the adapter counts as two extra-high bandwidth adapters.

Slot P1-C9 is not active on a 4-core system

High bandwidth Ethernet adapters

Table 25. Maximum number of high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
4-core	6	6	6		6
8-core	12	12	12	12	16
16-core	24	24	24	24	32

Table 25. Maximum number of high bandwidth Ethernet adapters for best performance (continued)

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots. For optimum performance, no more than two 1 Gb Ethernet ports per processor should be used in a system. If two 1 Gb Ethernet ports are present per processor, no other 1 Gb or 10 Gb ports should be used. Slot P1-C9 is not active on a 4-core system					

Related tasks

System Planning Tool
Use the System Planning Tool to validate new or changed system configurations.

Related reference

Serial attached SCSI cable planning
Serial attached SCSI (SAS) cables provide serial communication for transfer of data for directly attached devices, such as hard drives and CD-ROM drives.

Related information

Managing PCI adapters
Find specifications, instructions, and part numbers for specific adapters.

Chapter 6. Model 9117-MMA server

Some adapters must be placed in specific Peripheral Component Interconnect (PCI), Peripheral Component Interconnect-X (PCI-X), or PCI Express (PCIe) slots to function correctly or to perform optimally. Use this information to determine where to install PCI adapters.

PCI slot descriptions

Figure 5 shows the back view of the system unit with the location codes for the PCI and GX+ slots. Table 26 describes the slots. Each PCI-X DDR or PCIe is a separate PCI host bridge (PHB).

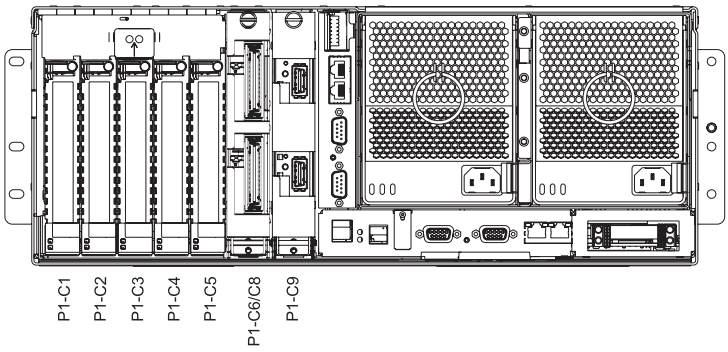


Figure 5. Back view of enclosure with location codes

Table 26. PCI slot locations and descriptions

Slot #	Location code	Description	PHB	Adapter size
Slot 1	P1-C1	PCIe 8x	PCIe PHB0	long
Slot 2	P1-C2	PCIe 8x	PCIe PHB1	long
Slot 3	P1-C3	PCIe 8x	PCIe PHB2	long
Slot 4	P1-C4	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB0	long
Slot 5	P1-C5	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB1	long
Slot 6	P1-C6	PCIe 8x	PCIe PHB3	short
	P1-C8	GX+	NA	NA
Slot 7	P1-C9	GX+	NA	NA

- Slot 6 can be used for either a PCIe 8x adapter in connector P1-C6, or a GX+ adapter in connector P1-C8.
- All slots support Enhanced Error Handling (EEH).
- This system uses generation 3, blind swap cassettes to manage the installation and removal of adapters. Cassettes can be installed and removed without removing the drawer from the rack. Because of the cassettes, internal SCSI connectors on PCI storage adapters are not supported for use in this system.
- Slot 7 (P1-C9) is not active on a 2-core system, or a 4-core system with a #7540 processor feature.

PCI and PCI-X expansion units

Each system supports up to eight I/O expansion units attached to 12x Channel Adapters, or twelve I/O expansion units attached to RIO-2 adapters. I/O expansion units are usually required to achieve the maximum number of adapters listed in Table 27 on page 55

Expansion units 7311-D11, 7311-D20, 5796, and 7314-G30 are supported on the systems running AIX or Linux operating systems. Feature 5796 is the current feature code for the expansion unit that in the past was identified as a 7314-G30. For the remainder of this section, only the 5796 feature code is used when referring to that expansion unit.

The 5796 attaches to a 12x Channel Adapter installed in one of the two GX slots available in each system unit.

The 7311 drawers attach to a RIO-2 Adapter installed in one of the two GX slots available in each system.

7311-D20 I/O drawers with RIO Ports to I/O Planar Riser Card (#6413) must be upgraded to RIO-2 Ports to I/O Planar Riser Card (#6417) before they can be attached to a System p or Power Systems server with a POWER6 processor.

Some I/O adapters supported in the 7311-D11 and the 7311-D20 I/O drawers when attached to a System p5 server will not be supported when attached to a server with POWER6 processors. Use the System Planning Tool to validate a configuration.

Expansion units 0588, 0595, 5094, 5096, 5294, 5296, 5790, and 5796 are supported on the system running the IBM i operating system.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See “Performance notes” on page 64.

The maximum number of attached remote I/O drawers depends on the number processor features configured in the system, and the I/O attachment type.

- For RIO-2 attached I/O drawers:
  - Systems with one processor feature (and one system unit) support up to six I/O drawers.
  - Systems with two processor features (and one system unit) support up to twelve I/O drawers.
  - Systems with four processor features (and two system units) support up to 24 I/O drawers.
  - Systems with six processor features (and three system units) support up to 36 I/O drawers.
  - Systems with eight processor features (and four system units) support up to 48 I/O drawers.
- For 12x Host Channel attached I/O drawers:
  - Systems with one processor feature (and one system unit) support up to 4 I/O drawers.
  - Systems with two processor features (and one system unit) support up to 8 I/O drawers.
  - Systems with four processor features (and two system units) support up to 16 I/O drawers.
  - Systems with six processor features (and three system units) support up to 24 I/O drawers.
  - Systems with eight processor features (and four system units) support up to 32 I/O drawers.

PCIe expansion units

PCIe expansion units 5802 and 5877 are supported on the system running AIX, IBM i, or Linux. The system can be configured to support up to two I/O expansion units per GX adapter.

Restriction: A 12X Channel Adapter that has one or two 5802 expansion units connected cannot have anything else connected to that adapter.

Note: For optimum performance, you might want to limit the total number of expansion units containing high bandwidth and extra-high bandwidth adapters. See "Performance notes" on page 64.

The expansion units attach to a 12x Channel Adapter installed in one or both of the two GX slots available in the system unit.

The maximum number of attached remote I/O drawers depends on the number of system units in the system.

- Systems with one system unit support up to 4 I/O drawers.
- Systems with two system units support up to 8 I/O drawers.
- Systems with three system units support up to 12 I/O drawers.
- Systems with four system units support up to 16 I/O drawers.

PCI and PCI-X adapters

Use this information to identify slot placement priorities and the maximum number of specified adapters allowed. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Up to four system units can be cabled together in a rack to form one system. The maximum number of adapters that are allowed can vary depending on whether the system is configured as a 2, 4, 6, or 8-processor system. For example, if the maximum number of adapters allowed is 18 for a 2-processor system, 28 for an 4-processor system, 38 for a 6-processor system, and 48 for a 8-processor system, those maximums are expressed in the table as 18/28/38/48 per system. If only one number is listed per system, it means the maximum number of adapters allowed is the same for all configurations of the system.

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5721**	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter	4, 5	• 2 per system unit (internal) • 32/64/96/128 per system
5722**	10 Gb-LR Ethernet PCI-X 2.0 DDR Adapter	4, 5	• 2 per system unit (internal) • 32/64/96/128 per system
5719**	10 Gigabit-LR Ethernet PCI-X Adapter	4, 5	• 2 per system unit (internal) • 12/24/36/48 per system
5718**	10 Gigabit-SR Ethernet PCI-X Adapter	4, 5	• 2 per system unit (internal) • 12/24/36/48 per system
5904**	PCI-X DDR 1.5 GB cache SAS RAID Adapter	None	• 0 per system unit (internal) • 24/48/72/96 per system
5908**	PCI-X DDR 1.5 GB cache SAS RAID Adapter	4, 5	• 1 per system unit (internal) • 25/50/75/96 per system
5900**	PCI-X DDR Ext Dual-x4 3Gb SAS Adapter	4, 5	• 2 per system unit (internal) • 48/96/144/192 per system
5912**	PCI-X DDR Dual-x4 3Gb SAS Adapter	4, 5	• 2 per system unit (internal) • 48/96/144/192 per system
5902**	PCI-X DDR Ext Dual-x4 3Gb SAS RAID Adapter	4, 5	• 2 per system unit (internal) • 48/96/144/192 per system

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5759**	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• 2 per system unit (internal) • 50/100/150/200 per system
5749**	4 Gigabit Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
5776**	PCI-X Disk Controller - 90 MB	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5777**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5778** 5782**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter with Auxiliary Write Cache (double-wide)	4, 5	• i operating system only • To determine the maximum numbers, see the description of this adapter in Table 1 on page 3 and the guidelines provided in Chapter 10, "Determining the best place to install your adapter," on page 101.
5760**	PCI-X Fibre Channel Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5761**	PCI-X Fibre Channel Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5740**	4-Port 10/100/1000 Base-TX PCI-X Adapter	4, 5	• 2 per system unit (internal) • 32/64/96/128 per system
5707*	2-Port Gigabit Ethernet-SX PCI-X Adapter	4, 5	• 2 per system unit (internal) • 64/128/192/256 per system
5706*	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	• 2 per system unit (internal) • 64/128/192/256 per system
5704*	PCI-X Fibre Channel Tape Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5702*	PCI-X Ultra Tape Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5701*	10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	• 2 per system unit (internal) • 64/128/192/256 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5700*	Gigabit Ethernet-SX PCI-X Adapter	4, 5	• 2 per system unit (internal) • 64/128/192/256 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
5758*	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	• 2 per system unit (internal) • 50/100/150/200 per system
5713*	1 Gigabit-TX iSCSI TOE PCI-X Adapter	4, 5	• 2 per system unit (internal) • 42/84/126/168 per system
5714*	1 Gigabit-SX iSCSI TOE PCI-X Adapter	4, 5	• 2 per system unit (internal) • 42/84/126/168 per system
5716*	2 Gigabit Fibre Channel PCI-X Adapter	4, 5	• 2 per system unit (internal) • 86/172/258/344 per system
5736*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	4, 5	• 2 per system unit (internal) • 86/172/258/344 per system
5806*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5712*	PCI-X Dual Channel Ultra 320 SCSI Adapter	4, 5	• 2 per system unit (internal) • 62 per system • When the adapter is used with i, see the i configuration notes in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101.
2780*	PCI-X Ultra4 RAID Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
2757*	PCI Ultra RAID Disk Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
2787*	PCI-X Fibre Channel Disk Unit Controller	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5580*	2780 Controller with 5708 Auxiliary Write Cache	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5581*	2757 Controller with 5708 Auxiliary Write Cache	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5583*	5738 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, “Determining the best place to install your adapter,” on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5590*	2780 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
5591*	2757 Controller with 574F Auxiliary Write Cache IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4812 4813	Base PCI Integrated xSeries Server	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4805	PCI Cryptographic Accelerator	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
4801	PCI Cryptographic Coprocessor	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
4764	PCI-X Cryptographic Coprocessor	4, 5	• 2 per system unit (internal) • 8/16/24/32 per system
4746	PCI Twinaxial Workstation Controller IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
3709	PCI 100/10 Mbps Ethernet IOA	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
2738	2-Port USB PCI Adapter	4, 5	• 2 per system unit (internal) • 8 per system
2749	POWER GXT135P Graphics Accelerator with Digital Support	None	• i operating system only • To determine maximum numbers, see the notes for this adapter in the Description column of Table 1 on page 3 and the guidelines in Chapter 10, "Determining the best place to install your adapter," on page 101. • This adapter is supported in expansion units attached to the system unit, but not the system unit (internal).
2849	POWER GXT135P Graphics Accelerator with Digital Support	4, 5	• 2 per system unit (internal) • 8 per system
2943	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	4, 5	• 2 per system unit (internal) • 18/26/34/42 per system
2947	ARTIC960Hx 4-Port Multiprotocol PCI Adapter	4, 5	• 2 per system unit (internal) • 8/12/16/20 per system
2962	2-Port Multiprotocol PCI Adapter	4, 5	• 2 per system unit (internal) • 86/172/258/344 per system
6805	PCI Two-Line WAN IOA	4, 5	• i operating system only • 2 per system unit (internal) • 55/110/165/220 per system

Table 27. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
6808	PCI Quad Modem IOA	4, 5	• i operating system only • 2 per system unit (internal) • 50/100/120/120 per system
6809	PCI Quad Modem IOA	4, 5	• i operating system only • 2 per system unit (internal) • 50/100/120/120 per system
6833	PCI 2-Line WAN with Modem	4, 5	• i operating system only • 2 per system unit (internal) • 55/110/165/220 per system
6834	PCI 2-Line WAN with Modem	4, 5	• i operating system only • 2 per system unit (internal) • 55/110/165/220 per system
5723	2-Port EIA-232 Asynchronous PCI Adapter	4, 5	• 2 per system unit (internal) • 18/26/34/42 per system
* High bandwidth adapter. See the "Performance notes" on page 64 before installing this adapter. **Extra-high bandwidth adapter. See the "Performance notes" on page 64 before installing this adapter.			

PCIe adapters

Use this information to identify slot placement priorities and the maximum number of specified adapters allowed. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Up to four system units can be cabled together in a rack to form one system. The maximum number of adapters that are allowed can vary depending on whether the system is configured as a 2, 4, 6, or 8-processor system. For example, if the maximum number of adapters allowed is 18 for a 2-processor system, 28 for an 4-processor system, 38 for a 6-processor system, and 48 for a 8-processor system, those maximums are expressed in the table as 18/28/38/48 per system. If only one number is listed per system, it means the maximum number of adapters allowed is the same for all configurations of the system.

Table 28. Adapter slot priorities and maximums for PCIe adapters

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5732**	10 Gigabit Ethernet-CX4 PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 32/64/96/128 per system
5769**	10 Gigabit Ethernet-SR PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 32/64/96/128 per system
5772**	10 Gigabit Ethernet-LR PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 18/28/38/48 per system

Table 28. Adapter slot priorities and maximums for PCIe adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
5708**	10 Gb FCoE PCIe Dual Port Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 32/64/96/128 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5911**	SAS adapter for internal Split DASD option	3	• 1 per system unit (internal) • 1/2/3/4 per system
5909**	Alternate SAS controller for 3 of 6 internal SAS Disk Slots	3	• 1 per system unit (internal) • 1/2/3/4 per system
5735**	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5903**	PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
5901**	PCIe Dual - x4 SAS Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
5767*	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
5768*	2-Port Gigabit Ethernet-SX PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
5717*	4-Port 10/100/1000 Base-TX PCI Express Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
5773*	4 Gigabit PCI Express Single Port Fibre Channel Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
5774**	4 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
5785	4 Port Async EIA-232 PCIe Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 18/26/34/42 per system
5748	POWER GXT145 PCI Express Graphics Accelerator	1, 2, 3, 6	• 4 per system unit (internal) • 8 per system
2893 9693	PCI Express 2-Line WAN with Modem	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system

Table 28. Adapter slot priorities and maximums for PCIe adapters (continued)

Feature	Description	System unit slot priority	Maximum number of adapters allowed
2894 9694	PCI Express 2-Line WAN with Modem	1, 2, 3, 6	• 4 per system unit (internal) • 43/86/129/172 per system
2728	4-Port USB PCIe Adapter	1, 2, 3, 6	• 4 per system unit (internal) • 8 per system
* High bandwidth adapter. See the "Performance notes" before installing this adapter. **Extra-high bandwidth adapter. See the "Performance notes" before installing this adapter.			

SAS cable cards

The following serial-attached SCSI (SAS) cards are not PCI adapters; however, they do occupy PCIe slot 3. These features allow internal SAS disk slots in a system unit to be controlled by a PCI SAS controller adapter (5900) in the same enclosure. With these features the connection to the internal SAS disk slots is transferred from the internal controller to a mini SAS 4x receptacle on the rear bulkhead of the enclosure at adapter slot location P1-C3. A second PCI slot is required to hold the SAS controller adapter.

Table 29. SAS cable cards

Feature	Description	System unit slot priority	Maximum number of SAS cable cards allowed
3650	External connection for 3 of 6 internal SAS Disk Slots	3	1
3651	External connection for the 6 internal SAS Disk slots	3	1

If you encounter difficulties inserting the 3650 or 3651 card assembly, see Installing feature code 3650 or 3651 in a model 9406-MMA.

For information about cabling these features, see Serial attached SCSI cable planning.

Feature 5909, the PCI Express x8 Ext Dual-x4 3Gb SAS Adapter and cable card listed in Table 28 on page 62, combines a SAS cable card and PCIe SAS adapter in a single cassette that occupies a single slot, P1-C3. For more information about feature 5909, see Managing PCI adapters.

Performance notes

Use the information in this section to help determine the maximum number of adapters that can be placed in a system while still maintaining optimum performance.

Table 27 on page 55 and Table 28 on page 62 identify the slot placement priorities and the maximum number of specified adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. If you need to expand the I/O capacity of the system for extra-high bandwidth adapters, consider using high-performance I/O expansion units like the 5796, 5802, or 5877.

The following four tables provide guidelines on the maximum number of high bandwidth and extra-high bandwidth adapters you can use and still maintain optimum performance.

Note: Because of the many types of application workloads, these guidelines cannot cover all cases. The numbers in the following tables are suggestions for single types of adapters that are running exclusively. For systems with mixed adapter types or that have high aggregate bandwidth requirements, consult an IBM representative for additional guidelines.

Extra-high bandwidth storage adapters

Table 30. Maximum number of extra-high bandwidth storage adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8***	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*, ***	Adapters in 5796, 5802, or 5877, I/O expansion units connected to a GX adapter on slot P1-C9**, ***	System maximum ***
One processor feature, one system unit	6	3	6		6
Two processor features, one system unit	6	3	6	4	10
Four processor features, two system units	12	6	12	8	20
Six processor features, three system units	18	9	18	12	30
Eight processor features, four system units	24	12	24	16	40

* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.

** This option requires a GX Host Channel adapter in P1-C9 for each 4U system unit and one or more 5796, 5802, or 5877, drawers per GX adapter.

***If 5708 or 5735 adapters are used in an application with both ports active, each adapter counts as two extra-high bandwidth adapters.

Slot P1-C9 is not active with only one processor feature.

High bandwidth storage adapters

Table 31. Maximum number of high bandwidth storage adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in 5796, 5802, or 5877, I/O expansion units connected to a GX adapter on slot P1-C9**	System maximum
One processor feature, one system unit	6	6	12		12
Two processor features, one system unit	6	6	12	8	20

Table 31. Maximum number of high bandwidth storage adapters for best performance (continued)

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in 5796, 5802, or 5877, I/O expansion units connected to a GX adapter on slot P1-C9**	System maximum
Four processor features, two system units	12	12	24	16	40
Six processor features, three system units	18	18	36	24	60
Eight processor features, four system units	24	24	48	32	80

* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.

** This option requires a GX Host Channel adapter in P1-C9 for each 4U system unit and one or more 5796, 5802, or 5877, drawers per GX adapter.

Slot P1-C9 is not active with only one processor feature.

Extra-high bandwidth Ethernet adapters

Table 32. Maximum number of extra-high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
One processor feature, one system unit	1	1	1		1
Two processor features, one system unit	2	2	2	2	2
Four processor features, two system units	4	4	4	4	4
Six processor features, three system units	6	6	6	6	6
Eight processor features, four system units	8	8	8	8	8

Table 32. Maximum number of extra-high bandwidth Ethernet adapters for best performance (continued)

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots. For optimum performance, no more than one 10 Gb Ethernet port per two processors should be used in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports should be used. If a 5708 adapter is used in an application with both ports active, the adapter counts as two extra-high bandwidth adapters. Slot P1-C9 is not active with only one processor feature.					

High bandwidth Ethernet adapters

Table 33. Maximum number of high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system units including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system units plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
One processor feature, one system unit	4	4	4		4
Two processor features, one system unit	6	6	6	6	8
Four processor features, two system units	12	12	12	12	16
Six processor features, three system units	18	18	18	18	24
Eight processor features, four system units	24	24	24	24	32
* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots. For optimum performance, no more than two 1 Gb Ethernet ports per processor should be used in a system. If two 1 Gb Ethernet ports are present per processor, no other 1 Gb or 10 Gb ports should be used. Slot P1-C9 is not active with only one processor feature.					

Related reference

Serial attached SCSI cable planning
Serial attached SCSI (SAS) cables provide serial communication for transfer of data for directly attached devices, such as hard drives and CD-ROM drives.

Related information

Managing PCI adapters
Find specifications, instructions, and part numbers for specific adapters.

Partitioning considerations with dual slot and multi path adapters

Chapter 7. Model 9119-FHA server

Some adapters must be placed in specific PCI slots to function correctly or perform optimally. Use this information to determine where to install PCI adapters.

The model 9119-FHA server does not have any internal PCI slots. PCI adapters can be placed in I/O expansion units attached to the server. The following expansion units are supported:

- "Model 5791 and 5794 expansion units" on page 82
- "Model 5797 and 5798 expansion units" on page 88
- "Model 5803 and 5873 expansion units" on page 93

Chapter 8. Model 9125-F2A server

Some adapters must be placed in specific Peripheral Component Interconnect (PCI), Peripheral Component Interconnect-X (PCI-X), or PCI Express (PCIe) slots to function correctly or to perform optimally. Use this information to determine where to install PCI adapters.

PCI slot descriptions

The 9125-F2A supports up to four internal PCI Express (PCIe) slots using the two PCI riser units that make up feature 6389.. Additional I/O capacity can be added using expansion units.

Figure 6 shows a system with the two PCI riser units detached from the system.

Figure 7 shows a system configured with two PCI riser units providing four internal PCI slots.

Figure 8 shows a system configured with two PCI riser units where the lower half of each riser unit is occupied by a GX adapter. Anytime a GX adapter is plugged into one of the risers, the lower PCIe slot is blocked.

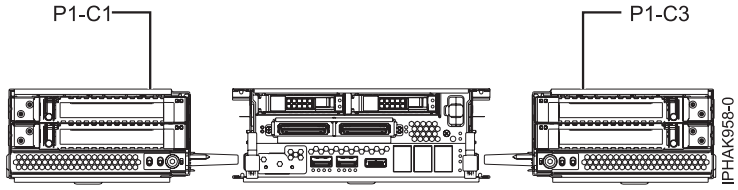


Figure 6. Back view of the system unit with the PCI riser units detached

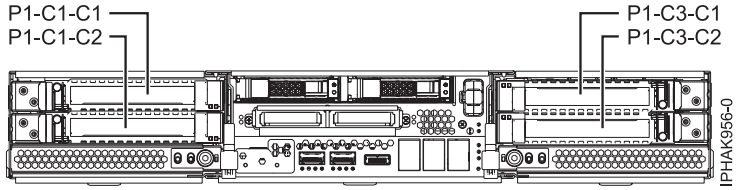


Figure 7. Back view of the system unit with four PCIe slots

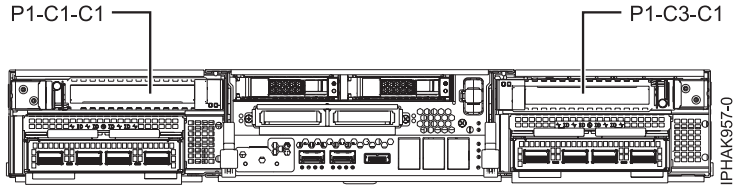


Figure 8. Back view of the system unit with two PCIe slots and two GX adapters in place

Two different types of risers are available.

- A type EE riser contains one PCIe 16x connector and one PCIe 8x connector. The 16x connector only supports 8x PCIe adapters, or lower. Anytime a GX adapter is plugged into the lower half of the riser (P1-C2 or P1-C3), the lower PCI slot is not available. The PCIe adapters listed in Table 35 on page 73 are all compatible with either PCIe slot.
- An empty riser with no PCI slots is also available.

The PCI riser can be removed and replaced from the system unit as a single, field replaceable unit. Field replacement should only be performed by an authorized service provider.

The PCI risers are not hot pluggable.

Expansion units

The base unit supports one model 5798, 5803, or 5873 expansion unit. An expansion unit is needed to accommodate the maximum number of adapters listed in Table 34 and Table 35 on page 73.

PCI and PCI-X adapters

Use this information to identify the adapters supported on the 9125-F2A and to determine the maximum number allowed. PCI and PCI-X adapters can be placed in any available PCI-X slot. In the following table, adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Table 34. PCI and PCI-X adapters

Feature	Description	Maximum number of adapters supported
5721**	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter	16 per system
5722**	10 Gb-LR Ethernet PCI-X 2.0 DDR Adapter	16 per system
5719**	10 Gigabit-LR Ethernet PCI-X Adapter	8 per system
5718**	10 Gigabit-SR Ethernet PCI-X Adapter	8 per system
5740**	4-Port 10/100/1000 Base-TX PCI-X Adapter	22 per system
5707*	2-Port Gigabit Ethernet-SX PCI-X Adapter	22 per system
5706*	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	22 per system
5701*	10/100/1000 Base-TX Ethernet PCI-X Adapter	22 per system
5700*	Gigabit Ethernet-SX PCI-X Adapter	22 per system
5900** 5912**	PCI-X DDR Ext Dual-x4 3Gb SAS Adapter	8 per system
5902**	PCI-X DDR Ext Dual-x4 3Gb SAS RAID Adapter	8 per system
5759**	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	18 per system
5758*	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter	18 per system
5713*	1 Gigabit-TX iSCSI TOE PCI-X Adapter	20 per system
5714*	1 Gigabit-SX iSCSI TOE PCI-X Adapter	20 per system
5716*	2 Gigabit Fibre Channel PCI-X Adapter	22 per system

Table 34. PCI and PCI-X adapters (continued)

Feature	Description	Maximum number of adapters supported
5736*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	8 per system
4764	PCI-X Cryptographic Coprocessor	10 per system
2738	2-Port USB PCI Adapter	6 per system
2849	POWER GXT135P Graphics Accelerator with Digital Support	6 per system
2943	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	18 per system
2947	ARTIC960Hx 4-Port Multiprotocol PCI Adapter	8 per system
5723	2-Port EIA-232 Asynchronous PCI Adapter	18 per system
* High bandwidth adapter. See the "Performance notes" on page 74 before installing this adapter. **Extra-high bandwidth adapter. See the "Performance notes" on page 74 before installing this adapter.		

PCIe adapters

Use this information to identify the adapters supported on the 9125-F2A and the maximum number allowed. PCIe adapters can be placed in any available PCIe slot.

Table 35. PCIe adapters

Feature	Description	Maximum number of adapters supported
5732**	10 Gigabit Ethernet-CX4 PCI Express Adapter	16 per system
5769**	10 Gigabit Ethernet-SR PCI Express Adapter	16 per system
5774**	4 Gigabit PCI Express Dual Port Fibre Channel Adapter	24 per system
5772**	10 Gigabit Ethernet-LR PCI Express Adapter	24 per system
5735**	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	• 24 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5708**	10 Gb FCoE PCIe Dual Port Adapter	• 16 per system • If only one port is planned to be active in normal operation, the adapter is counted as an extra-high bandwidth adapter. If both ports are planned to be active, the adapter needs to be treated as two extra-high bandwidth adapters.
5773*	4 Gigabit PCI Express Single Port Fibre Channel Adapter	24 per system
5903**	PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	24 per system
5901**	PCIe Dual - x4 SAS Adapter	24 per system

Table 35. PCIe adapters (continued)

Feature	Description	Maximum number of adapters supported
5767*	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	24 per system
5768*	2-Port Gigabit Ethernet-SX PCI Express Adapter	24 per system
5717*	4-Port 10/100/1000 Base-TX PCI Express Adapter	24 per system
5785	4 Port Async EIA-232 PCIe Adapter	18 per system
5748	POWER GXT145 PCI Express Graphics Accelerator	8 per system
2728	4-Port USB PCIe Adapter	8 per system
* High bandwidth adapter. See the "Performance notes" before installing this adapter. **Extra-high bandwidth adapter. See the "Performance notes" before installing this adapter.		

Performance notes

Use the information in this section to help determine the maximum number of adapters that can be placed in a system while still maintaining optimum performance.

The previous tables show the maximum number adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters.

The following tables provide guidelines on the maximum number of high bandwidth and extra-high bandwidth adapters you can use and still maintain optimum performance.

Note: Because of the many types of application workloads, these guidelines cannot cover all cases. The numbers in the following tables are suggestions for single types of adapters that are running exclusively. For systems with mixed adapter types or that have high aggregate bandwidth requirements, consult an IBM representative for additional guidelines.

Extra-high bandwidth storage adapters

Table 36. Maximum number of extra-high bandwidth storage adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in I/O expansion units	System maximum
16-core	4	4	6
32-core	4	4	6

High bandwidth storage adapters

Table 37. Maximum number of high bandwidth storage adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in I/O expansion units	System maximum
16-core	4	8	10
32-core	4	8	10

Extra-high bandwidth Ethernet adapters

Table 38. Maximum number of extra-high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in I/O expansion units	System maximum
16-core	4	4	6
32-core	4	4	6
For optimum performance, no more than one 10 Gb Ethernet port per two processors should be used in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports should be used. If a 5708 adapter is used in an application with both ports active, the adapter counts as two extra-high bandwidth adapters.			

High bandwidth Ethernet adapters

Table 39. Maximum number of high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit including both PCI-X DDR and PCIe slots	Adapters in I/O expansion units	System maximum
16-core	4	8	10
32-core	4	8	10
For optimum performance, no more than two 1 Gb Ethernet ports per processor should be used in a system. If two 1 Gb Ethernet ports are present per processor, no other 1 Gb or 10 Gb ports should be used.			

Related information

Partitioning considerations with dual slot and multi path adapters

Chapter 9. I/O expansion units

Learn about I/O expansion units that are supported on IBM Power Systems models that contain the POWER6 processor.

Supported I/O expansion units

Identify which I/O expansion units are supported on which IBM Power Systems models that contain the POWER6 processor.

Not all I/O expansion units are supported on all system configurations. This topic does not replace the latest sales and marketing publications and tools that document supported features. Before adding an I/O expansion unit, use the System Planning Tool to validate the configuration.

The following table identifies the I/O expansion units covered in this topic collection.

Table 40. Supported I/O expansion units

I/O expansion unit	Supported servers	Supported operating systems
5088 0588	8203-E4A 8204-E8A 9117-MMA 9119-FHA	IBM i
5094 5096 5294 5296	8203-E4A 8204-E8A 9117-MMA 9119-FHA	i
5790	8203-E4A 8204-E8A 9117-MMA 9119-FHA	AIX i Linux
5791 5794	9119-FHA	AIX Linux
5796	8203-E4A 8204-E8A 8234-EMA 9117-MMA	AIX i Linux
5797 5798	9119-FHA	AIX i Linux
5802 5877	8203-E4A 8204-E8A 8234-EMA 9117-MMA	AIX i Linux
5803 5873	9125-F2A 9119-FHA	AIX i Linux
7311-D11	9117-MMA	AIX Linux

Table 40. Supported I/O expansion units (continued)

I/O expansion unit	Supported servers	Supported operating systems
7311-D20	8203-E4A 8204-E8A 8234-EMA 9117-MMA	AIX Linux
7314-G30	8203-E4A 8204-E8A 8234-EMA 9117-MMA	AIX Linux

Related tasks

System Planning Tool
Use the System Planning Tool to validate new or changed system configurations.

Model 5088 or 0588 expansion units

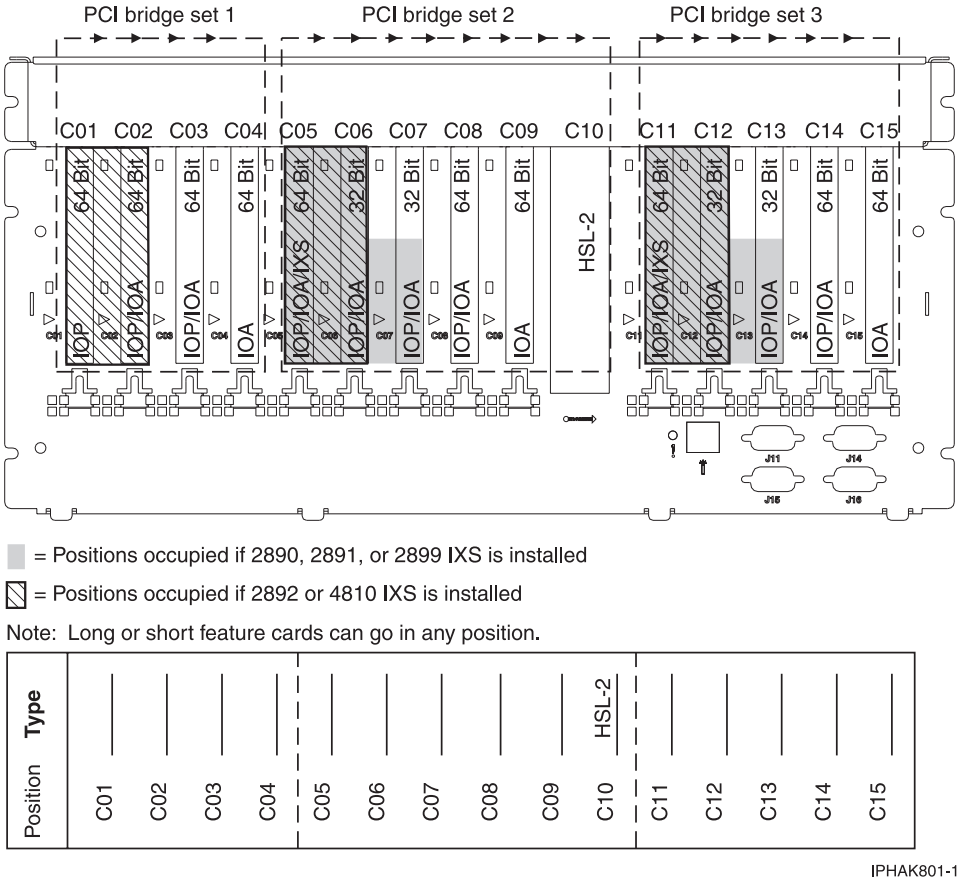
Some adapters must be placed in specific Peripheral Component Interconnect-X (PCI-X) slots to function correctly or perform optimally. Use this information to determine where to install PCI and PCI-X adapters.

The 5088 or 0588 are 19-inch, I/O expansion units.

Configuration notes:

- The second PCI-X bridge set is designed for higher performance than the first and third PCI-X bridge sets. Place the highest bandwidth adapters in the second PCI-X bridge set.
- Maximum of 3 IXS (CCIN 4812) per expansion unit.
- IOPs control IOAs in the direction of the arrows in the PCI-X bridge sets.

  Resource name: _____



Model 0595 or 5095 expansion units

Some adapters must be placed in specific Peripheral Component Interconnect-X (PCI-X) slots to function correctly or perform optimally. Use this information to determine where to install PCI and PCI-X adapters.

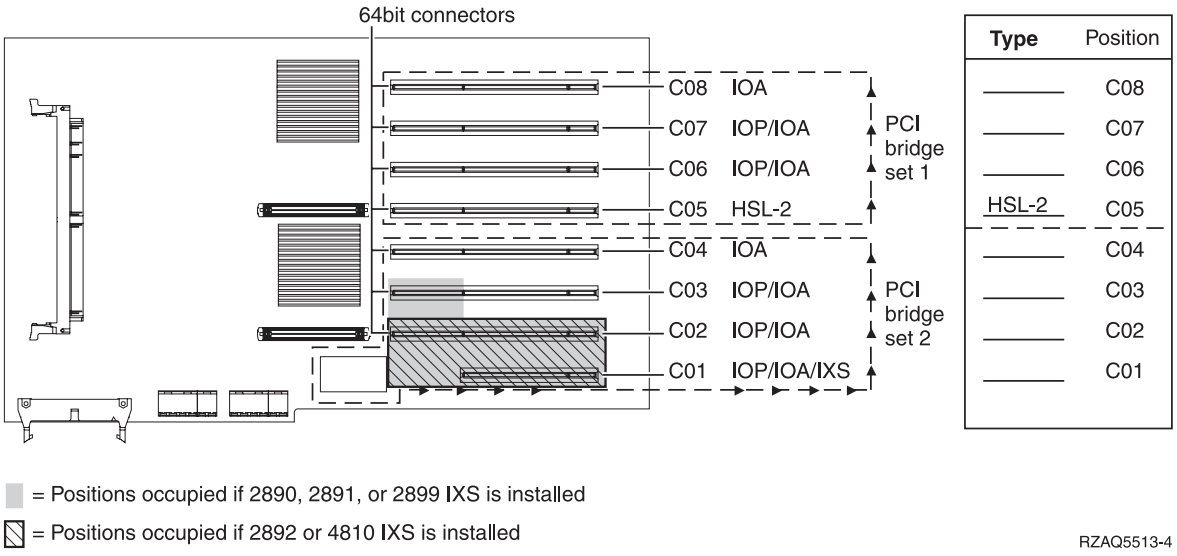
The 0595 and 5095 are 19-inch, I/O expansion units.

You need one diagram for each expansion unit that is attached to the system unit. Copy the diagram for your use.

Configuration notes:

- IOPs control IOAs in the direction of the arrows in the PCI-X bridge set.
- SCSI in the diagram indicates the disk unit controller position.

  Resource name: _____



Model 5094, 5096, 5294, 5296, 8294 and 9194 expansion units

Some adapters must be placed in specific Peripheral Component Interconnect-X (PCI-X) slots to function correctly or perform optimally. Use this information to determine where to install PCI and PCI-X adapters.

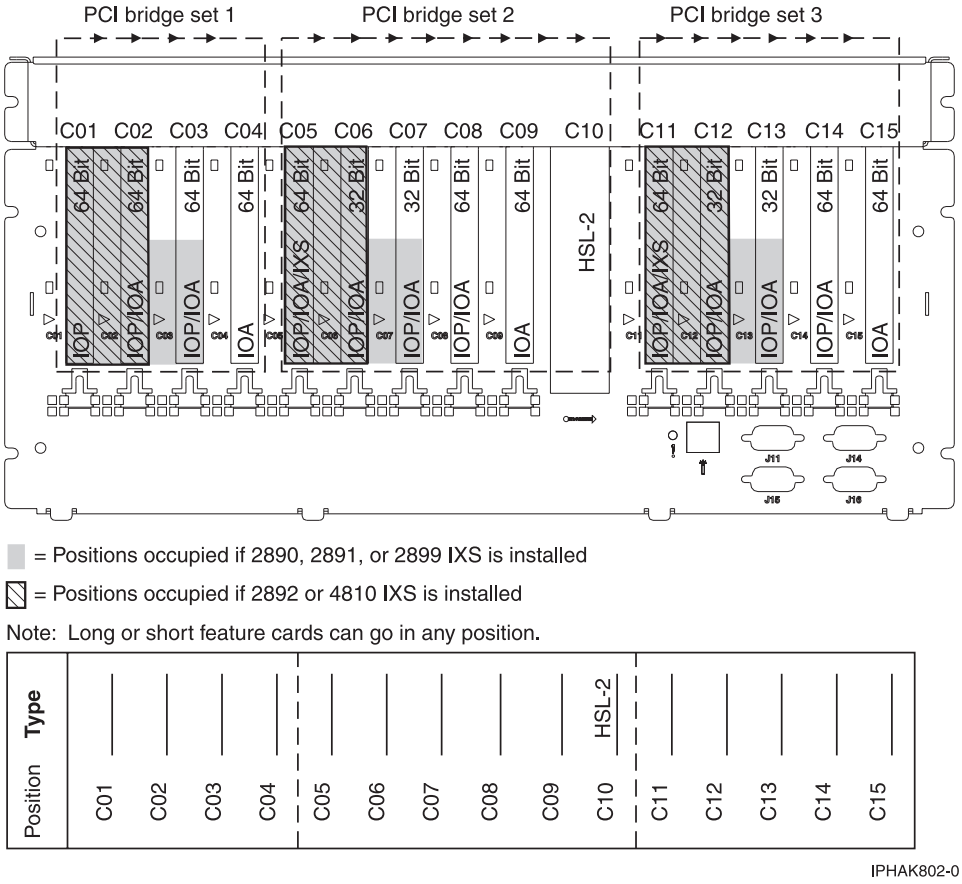
You need one diagram for each expansion unit that is attached to the system unit. Copy the diagram for your use.

Configuration notes:

- The second PCI-X bridge set is designed for higher performance than the first and third PCI-X bridge sets. Place the highest bandwidth adapters in the second PCI-X bridge set.
- The 5294, 5296, and 8294 are two units in a 1.8 meter tower. The diagram below shows one unit.
- In a 5094, 5294, 8294, or 9194, place the first disk unit controller adapter in position C02, C03, C04, C05, C06, C07, C08, or C09.
- The 5096 and 5296 do not support internal disks, internal media devices, or internal only disk and media adapters.
- There is a maximum of 3 IXS (CCIN 4812) per expansion unit.
- IOPs control IOAs in the direction of the arrows in the PCI-X bridge sets.

  Resource name: _____

  Important: Cooling fans and fan flaps are located at the back of the PCI-X adapter area. To ensure proper cooling, arrange the PCI-X adapter cables (if applicable) to allow air to circulate within the PCI-X adapter area. Do not place adapter cables too close to the fan vents, and do not bunch cables together in way that blocks airflow around the PCI-X adapters.



Model 5790 expansion unit

Some adapters must be placed in specific Peripheral Component Interconnect-X (PCI-X) slots to function correctly or perform optimally. Use this information to determine where to install PCI and PCI-X adapters.

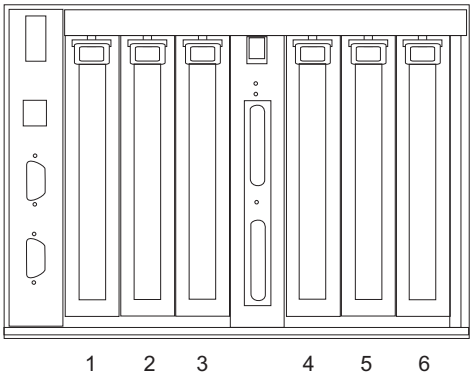
The 5790 is a 19-inch, four EIA unit I/O expansion drawer that provides six full length, 64-bit, 3.3-V, 133 MHz hot-plug PCI-X slots. The I/O Expansion drawer is attached to the system using a RIO-2 bus interface adapter. The 5790 includes redundant concurrently maintainable power and cooling and the blind swap PCI mechanism allows for PCI card servicing without removing the I/O expansion drawer The 5790 mounts in a 19-inch rack using a 7307 Dual I/O Unit Enclosure or a 7311 Dual I/O Unit Enclosure. Two 5790 drawers can be mounted side by side in a single 7307 or 7311 and are not required to be attached to the same system

You need one diagram for each expansion unit that is attached to the system unit. Copy the diagram for your use.

Configuration notes:

- IOPs control IOAs in the direction of slots 1 → 3, and 4→ 6.

  Resource name: _____



- The following table shows the slot properties and PHB connections.

Table 41. Slot location descriptions

PHB1			PHB2		
Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Long	Long	Long	Long	Long	Long
64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz
Un-P1-C1	Un-P1-C2	Un-P1-C3	Un-P1-C4	Un-P1-C5	Un-P1-C6

- Slots C1 through C6 are compatible with PCI, PCI-X, and PCI-X DDR adapters. PCI-X DDR would operate at PCI-X speeds.
- Short adapters can go in short or long slots.

Model 5791 and 5794 expansion units

Some adapters must be placed in specific PCI slots to function correctly or perform optimally. Use this information to determine where to install PCI adapters.

Expansion unit back view

The 5791 and 5794 are 24-inch, 4U high I/O expansion units that attach to the system unit using RIO-2 cables.

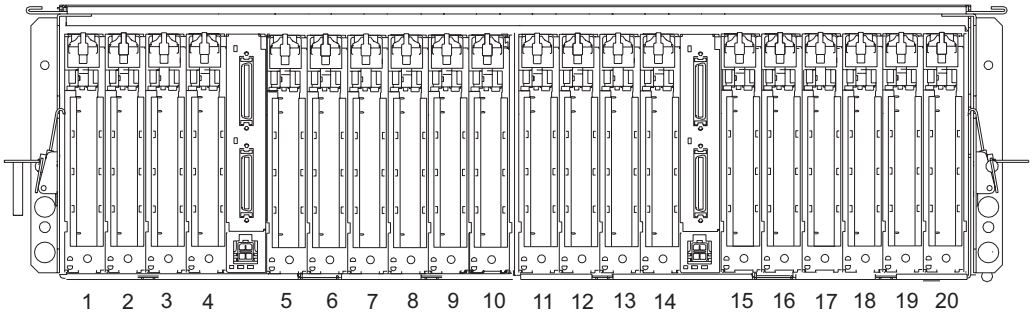


Figure 9. Expansion unit back view with numbered slots

PCI slot descriptions

The following tables show the slot properties and PHB connections.

Table 42. PCI slot descriptions (PHB 1 and 2)

	PHB0				PHB2			
Planar 1	1	2	3	4	5	6	7	Integrated SCSI U160
Planar 2	11	12	13	14	15	16	17	
	Long	Long	Long	Long	Long	Long	Long	66 MHz
	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	

Table 43. PCI slot descriptions (PHB 3)

	PHB3			
Planar 1	8	9	10	Integrated SCSI U160
Planar 2	18	19	20	
	Long	Long	Long	66 MHz
	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	

- Slots 1 through 20 are compatible with PCI or PCI-X adapters.
- Short adapters can go in short or long slots.
- All slots support Enhanced Error Handling (EEH).

Note: The U*fffff.ccc.sssssss*.Pn.Cm..... represents the physical location code, which provides information that identifies the enclosure, backplane, PCI adapter(s), and connectors in the system. The *fffff.ccc.sssssss* in the location code represents the following:

- *fffff* = feature code of the enclosure (drawer or node)
- *ccc* = the sequence number of the enclosure
- *sssssss* = the serial number of the enclosure.

System slot placement and maximums

The following table shows slot placement priorities and the maximum number of specified adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. See the performance notes that follow the table. Adapters are sorted in descending order by priority. The highest priority adapters are first in the table.

Feature code	Expansion unit slot priority	Expansion unit maximum	System maximum
5721**	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	12	
5722**	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	12	
5719**	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	4	
5718**	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	4	

Feature code	Expansion unit slot priority	Expansion unit maximum	System maximum
5900** 5912**	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20		
5902**	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	12	
5740 *	1 ,5 ,8, 11, 15, 18, 2, 6, 9, 12, 16, 19, 3, 7, 10, 13, 17, 20, 4, 14	12	
5707*	1, 11 ,6, 16, 9, 19, 2, 12, 7, 17, 4, 14		
5706*	1, 11 ,6, 16, 9, 19, 2, 12, 7, 17, 4, 14		
5701*	1, 11 ,6, 16, 9, 19, 2, 12, 7, 17, 4, 14		
5700*	1, 11 ,6, 16, 9, 19, 2, 12, 7, 17, 4, 14		
5759**	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	12	
5758*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	12	
5713*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	12	
5714*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	12	
5716*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	20	
6228*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20		
6239*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20		
5736*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20		
5710*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	20	62
5711*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	20	62
6203*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	20	62
6230*	1, 11 , 5, 15 , 8, 18, 2, 12, 6, 16, 9, 19, 3, 13, 4, 14, 7, 17, 10, 20	20	62
4764	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	8	32
2738	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	4	16
2848	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	4	16

Feature code	Expansion unit slot priority	Expansion unit maximum	System maximum
2849	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	4	16
2943	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	20	32
2944	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	20	32
4953	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11		
4957	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11		
4960	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11		
4961	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11		
4963	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11		
4964	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11		
2946	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11		
2947	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	16	16
2962	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	20	32
4959	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	20	20
4962	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	20	
5723	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	20	32
6204	10, 20, 9, 19, 8, 18, 7, 17 , 6, 16, 5, 15, 4, 14, 3, 13, 2, 12, 1, 11	20	32

Feature code	Expansion unit slot priority	Expansion unit maximum	System maximum
**Extra-high Bandwidth (EHB) adapter. See the "Performance notes (for optimum performance)" before installing this adapter. * High Bandwidth (HB) adapter. See the "Performance notes (for optimum performance)" before installing this adapter. These maximums are for connectivity. The following additional restrictions should also be taken into account: • No more than four EHB Ethernet adapters per processor. Any additional EHB or HB adapters would require additional processors. • No more than eight HB Ethernet adapters per processor. Any additional EHB or HB adapters would require additional processors.			

For more information about the adapters that are listed, see Chapter 2, "Supported PCI adapters," on page 3.

Performance notes (for optimum performance)

Use the information in this section to help determine the maximum number of adapters that can be placed in a system while still maintaining optimum performance.

The previous table show the maximum number adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. The following list provides guidelines:

- No more than three Gb Ethernet ports per PHB.
- No more than three high bandwidth adapters per PHB.
- No more than one Extra-high bandwidth adapter per PHB.
- No more than one 10 Gb Ethernet port per two processors in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports allowed for optimum performance.
- No more than two 1 Gb Ethernet ports per one processor in a system. More Ethernet adapters can be added for connectivity.
- If a model 5718 or 5719 adapter is placed in the system, it must be the only high-performance adapter attached to the PHB it uses. No other adapters attached to the same PHB as one of these adapters can be a high-performance adapter.

  Note: The combined cumulative total for feature 5718, 5719, 5721, and 5722 is 12.

Model 5796 expansion unit

Learn about the PCI-X DDR slots in the 5796 expansion unit.

System description

The 5796 expansion unit is a rack-mountable, I/O expansion drawer that is designed to be attached to the system unit using the 12X Channel bus and 12X cables. There is a limit of four 5796 per 12X loop. The 5796 can accommodate 6, Generation 3 blind swap adapter cassettes. Cassettes can be installed and removed without removing the drawer from the rack. The 5796 does not support I/O processor (IOP) adapters.

The following figure shows the back view of the expansion unit.

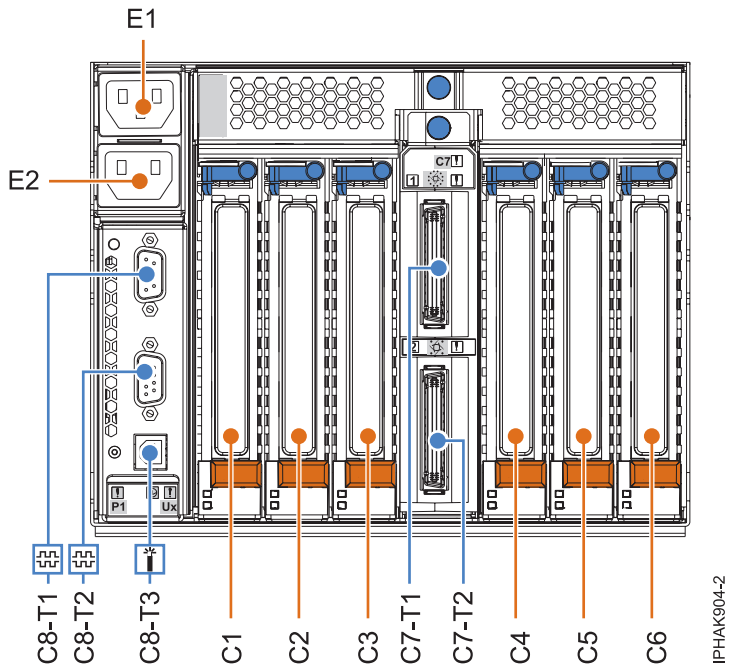


Figure 10. Back view

Table 44 describes the location codes that are shown in Figure 10.

Table 44. Location code descriptions

Location code	Description
C1, C2, C3, C4, C5, and C6	PCI-X DDR slots. See also "PCI-X DDR slot descriptions."
C7-T1 and C7-T2	12X Channel remote I/O ports
C8-T1 and C8-T2	Dual port SPCN connectors.
E1 and E2	Power supply connectors.

PCI-X DDR slot descriptions

The following table describes the PCI-X DDR slots.

Table 45. PCI-X DDR slot properties

PHB-A1	PHB-A2	PHB-A3	PHB-B2	PHB-B2	PHB-B3
Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Long	Long	Long	Long	Long	Long
64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz
C1	C2	C3	C4	C5	C6
• There are two I/O chips, each with three PCI host busses (PHB)s. Each PCI-X DDR slot connects directly to a PHB • All slots are compatible with PCI, PCI-X and PCI-X DDR adapters. • Short adapters can go in long slots.					

Slot priority

The slot priority for all adapters is 1, 4, 2, 5, 3, and 6.

Model 5797 and 5798 expansion units

Some adapters must be placed in specific PCI slots to function correctly or perform optimally. Use this information to determine where to install PCI adapters.

Expansion unit back view

The 5797 and 5798 are 24-inch, I/O expansion units that attach to the system unit using 12x cables.

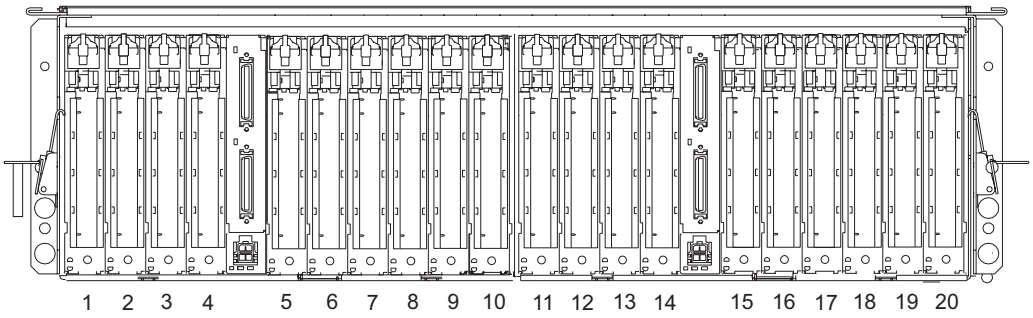


Figure 11. Expansion unit back view with numbered slots.

PCI-X slot descriptions

The following table shows the slot properties for this expansion unit. All slots are long. Slots 1-7 and 11-17 each have a dedicated PCI host bridge (PHB). Slots 8-10 share a PHB with each other and two SCSI buses (SCSI-1 and SCSI-2) on the same planar. Slots 18-20 share a PHB with each other and two SCSI buses (SCSI-3 and SCSI-4) on the same planar.

Slot number	Location code	PHB	Description
1	Ux-P1-C1	A1	PCI-X DDR, 64-bit, 266 MHz
2	Ux-P1-C2	A2	
3	Ux-P1-C3	A3	
4	Ux-P1-C4	A4	
5	Ux-P1-C5	B1	
6	Ux-P1-C6	B2	
7	Ux-P1-C7	B3	
8	Ux-P1-C8	B4	PCI-X, 64-bit , 133 MHz
9	Ux-P1-C9		
10	Ux-P1-C10		

Slot number	Location code	PHB	Description
11	Ux-P2-C1	C1	PCI-X DDR, 64-bit, 266 MHz
12	Ux-P2-C2	C2	
13	Ux-P2-C3	C3	
14	Ux-P2-C4	C4	
15	Ux-P2-C5	D1	
16	Ux-P2-C6	D2	
17	Ux-P2-C7	D3	
18	Ux-P2-C8	D4	PCI-X, 64-bit , 133 MHz
19	Ux-P2-C9		
20	Ux-P2-C10		

- All are compatible with PCI or PCI-X adapters.
- All slots are long slots. Short adapters can go in long slots.
- All slots support Enhanced Error Handling (EEH).

System unit slot placement and maximums

The following table shows slot placement priorities and the maximum number of specified adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. See the performance notes that follow the table.

System maximums are for model 9119-FHA. To see the systems maximums for model 9125-F2A, refer to Chapter 8, "Model 9125-F2A server," on page 71.

Feature code	Description	Expansion unit slot priority	Expansion unit maximum[2]	System maximum for model 9119-FHA[2]
5721**	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	14	256
5722**	10 Gb-LR Ethernet PCI-X 2.0 DDR Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	14	256
5719**	10 Gigabit-LR Ethernet PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	72
5718**	10 Gigabit-SR Ethernet PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	72
5778** 5780** 5782**	PCI-X Dual Channel Ultra320 SCSI RAID Adapter with Auxiliary Write Cache (double-wide)	See the footnote for these feature numbers at the end of the table.		
5906**	PCI-X DDR 1.5 GB cache SAS RAID Adapter	(1, 2), (11, 12), (5, 6), (15, 16), (3, 4), (13, 14), (9, 10), (19, 20), (2, 3), (12, 13), (6, 7), (16, 17), (8, 9), (18, 19)	8	240

Feature code	Description	Expansion unit slot priority	Expansion unit maximum[2]	System maximum for model 9119-FHA[2]
5740 *	4-Port 10/100/1000 Base-TX PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	18	256
5707*	2-Port Gigabit Ethernet-SX PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5706*	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5701*	10/100/1000 Base-TX Ethernet PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5700*	Gigabit Ethernet-SX PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5900** 5912**	PCI-X DDR Ext Dual-x4 3Gb SAS Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5902**	PCI-X DDR Ext Dual-x4 3Gb SAS RAID Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5759**	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	16	192
5758*	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	16	192
5713*	1 Gigabit-TX iSCSI TOE PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	18	216
5714*	1 Gigabit-SX iSCSI TOE PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	18	216
5716*	2 Gigabit Fibre Channel PCI-X Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5736*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
5710*	PCI-X Dual Channel Ultra320 SCSI Blind Swap Adapter	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	240
4764	PCI-X Cryptographic Coprocessor	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	240
2849	POWER GXT135P Graphics Accelerator with Digital Support	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	4	48

Feature code	Description	Expansion unit slot priority	Expansion unit maximum[2]	System maximum for model 9119-FHA[2]
2943	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	240
2947	ARTIC960Hx 4-Port Multiprotocol PCI Adapter	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	16	192
2962	2-Port Multiprotocol PCI Adapter	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	240
5723	2-Port EIA-232 Asynchronous PCI Adapter	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	240

**Extra-high Bandwidth (EHB) adapter. See the "Performance notes" before installing this adapter.

* High Bandwidth (HB) adapter. See the "Performance notes" before installing this adapter.

[2]These maximums are for connectivity. The following additional restrictions should also be taken into account:

- No more than four EHB Ethernet adapters per processor. Any additional EHB or HB adapters would require additional processors.
- No more than eight HB Ethernet adapters per processor. Any additional EHB or HB adapters would require additional processors.

5778, 5780, and 5782 are feature codes for a double-wide adapter pair. For slot placement information, see "High-performance SCSI, disk controller placement for IBM i" on page 105.

Performance notes

Use the information in this section to help determine the maximum number of adapters that can be placed in a system while still maintaining optimum performance.

The previous table show the maximum number adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. The following list provides guidelines:

- No more than three Gb Ethernet ports per PHB.
- No more than three high bandwidth adapters per PHB.
- No more than one Extra-high bandwidth adapter per PHB.
- No more than one 10 Gb Ethernet port per two processors in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports allowed for optimum performance.
- No more than two 1 Gb Ethernet ports per one processor in a system. More Ethernet adapters can be added for connectivity.
- If a model 5718 or 5719 adapter is placed in the system, it must be the only high-performance adapter attached to the PHB it uses. No other adapters attached to the same PHB as one of these adapters can be a high-performance adapter.

  Note: The combined cumulative total for feature 5718, 5719, 5721, and 5722 is 12.

Note: When using extra-high performance adapters, cable the 5797 and 5798 drawers point-to-point rather than daisy chained. Daisy chaining drawers puts more adapter slots onto the 12x links and this degrades the performance.

Model 5802 and 5877 expansion units

Learn about the PCI Express (PCIe) slots in the 5802 and 5877 expansion units.

System description

The 5802 and 5877 expansion units are 19-inch, rack-mountable, I/O expansion drawers that are designed to be attached to the system using 12x double date rate (DDR) cables.

The expansion units can accommodate 10, generation 3 cassettes. These cassettes can be installed and removed without removing the drawer from the rack. The expansion units do not support I/O processor (IOP) adapters.

The following figure shows the back view of the expansion unit.

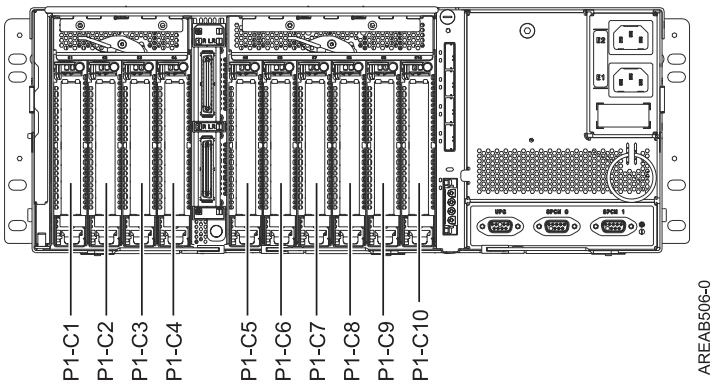


Figure 12. Back view

Table 46 describes the location codes that are shown in Figure 12.

Table 46. Location code descriptions

Location code	I/O chip	PCI host bridge (PHB)	Description
P1-C1	I/O chip 1	PHB1	PCIe 8x slot.
P1-C2		PHB2	
P1-C3		PHB3	
P1-C4	I/O chip 2	PHB4	
P1-C5		PHB5	
P1-C6		PHB6	
P1-C7	I/O chip 3	PHB7	
P1-C8		PHB8	
P1-C9		PHB9	
P1-C10		PHB10	

Slot priority

The slot priority for all adapters is P1-C1, P1-C4, P1-C2, P1-C5, P1-C3, P1-C6, P1-C7, P1-C8, P1-C9, P1-C10.

There are three I/O chips. Each I/O chip controls three or 4 PCI host bridges (PHBs) and each PCIe slot connects directly to a PHB.

- One I/O chip controls slots P1-C1, P1-C2, and P1-C3.
- A second I/O chip controls slots P1-C4, P1-C5, and P1-C6.
- A third I/O chips controls slots P1-C7, P1-C8, P1-C9, and P1-C10.

For best performance, fill P1-C1, P1-C4, P1-C2, P1-C5, P1-C3, and P1-C6 first with the highest bandwidth adapters. Then fill the remaining slots.

Model 5803 and 5873 expansion units

Learn about the PCI Express (PCIe) slots in the 5803 and 5873 expansion units.

System description

The 5803 and 5873 expansion units are 24-inch, rack-mountable, I/O expansion drawers that are designed to be attached to the system using 12x double data rate (DDR) cables.

The expansion units can accommodate 20, Generation 3 cassettes. These cassettes can be installed and removed without removing the drawer from the rack. The expansion units do not support I/O processor (IOP) adapters.

The following figure shows the back view of the expansion unit.

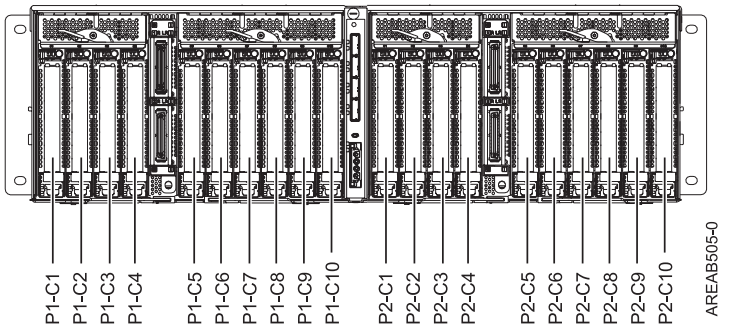


Figure 13. Back view

Table 47 describes the location codes that are shown in Figure 13 on page 93.

Table 47. Location code descriptions

Location code	I/O chip	PCI host bridge (PHB)	Description
P1-C1	I/O chip 1	PHB1	PCIe 8x slot.
P1-C2		PHB2	
P1-C3		PHB3	
P1-C4	I/O chip 2	PHB4	
P1-C5		PHB5	
P1-C6		PHB6	
P1-C7	I/O chip 3	PHB7	
P1-C8		PHB8	
P1-C9		PHB9	
P1-C10		PHB10	
P2-C1	I/O chip 4	PHB11	PCIe 8x slot.
P2-C2		PHB12	
P2-C3		PHB13	
P2-C4	I/O chip 5	PHB14	
P2-C5		PHB15	
P2-C6		PHB16	
P2-C7	I/O chip 6	PHB17	
P2-C8		PHB18	
P2-C9		PHB19	
P2-C10		PHB20	

Slot priority

If the expansion unit is connected to a 9125-F2A, and if you are installing a SAS adapter, give the slots in the expansion unit priority over the slots in the server. For all other types of adapters, give the slots in the server priority over the slots in the expansion unit.

2 planar loop

The following sequence is the slot priority for all adapters using a two planar loop:

P1-C1, P2-C1, P1-C4, P2-C4, P1-C2, P2-C2, P1-C5, P2-C5, P1-C3, P2-C3, P1-C6, P2-C6, P1-C7, P2-C7, P1-C8, P2-C8, P1-C9, P2-C9, P1-C10, P2-C10

1 planar loop, planar 1

The following sequence is the slot priority for all adapters using a 1 planar loop on planar 1:

P1-C1, P1-C4, P1-C2, P1-C5, P1-C3, P1-C6, P1-C7, P1-C8, P1-C9, P1-C10

1 planar loop, planar 2

The following sequence is the slot priority for all adapters using a 1 planar loop on planar 2:

P2-C1, P2-C4, P2-C2, P2-C5, P2-C3, P2-C6, P2-C7, P2-C8, P2-C9, P2-C10

I/O chip descriptions

The expansion drawer has two I/O planar boards, and each planar has three I/O chips. Each I/O chip controls 3 or 4 PCI host bridges (PHBs) and each PCIe slot connects directly to a PHB.

On the first I/O planar board (P1), the three I/O chips control the following slots:

- One I/O chip controls slots P1-C1, P1-C2, and P1-C3
- A second I/O chip controls slots P1-C4, P1-C5, and P1-C6
- A third I/O chips controls slots P1-C7, P1-C8, P1-C9, and P1-C10

On the second I/O planar board (P2), the three I/O chips control the following slots:

- One I/O chip controls slots P2-C1, P2-C2, and P2-C3
- A second I/O chip controls slots P2-C4, P2-C5, and P2-C6
- A third I/O chips controls slots P2-C7, P2-C8, P2-C9, and P2-C10

Slots P1-C1 through P1-C6 and P2-C1 through P2-C6 provide the best performance. Place the highest performance adapters in these slots in the slot priority order listed in previous priority lists.

Slot placement and maximums

The following table shows slot placement priorities and the maximum number of specified adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. See the performance notes that follow the table.

System maximums are for the 9119-FHA. To see the systems maximums for the 9125-F2A, refer to Chapter 8, “Model 9125-F2A server,” on page 71.

Table 48. Slot placement and maximums

Feature code	Description	Expansion unit maximum	System maximum for model 9119-FHA
5732**	10 Gigabit Ethernet-CX4 PCI Express Adapter	20	256
5769**	10 Gigabit Ethernet-SR PCI Express Adapter	20	256
5774**	4 Gigabit PCI Express Dual Port Fibre Channel Adapter	20	512
5772**	10 Gigabit Ethernet-LR PCI Express Adapter	20	256
5708***	10 Gb FCoE PCIe Dual Port Adapter	20	256
5735***	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	20	256
5773*	4 Gigabit PCI Express Single Port Fibre Channel Adapter	20	512
5903**	PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	20	240
5901**	PCIe Dual - x4 SAS Adapter	20	240
5767*	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	20	512

Table 48. Slot placement and maximums (continued)

Feature code	Description	Expansion unit maximum	System maximum for model 9119-FHA
5768*	2-Port Gigabit Ethernet-SX PCI Express Adapter	20	512
5717*	4-Port 10/100/1000 Base-TX PCI Express Adapter	20	256
5785	4 Port Async EIA-232 PCIe Adapter	18	18
5748	POWER GXT145 PCI Express Graphics Accelerator	4	8
2728	4-Port USB PCIe Adapter	8	8

***Extra-high Bandwidth (EHB) adapter. If 5708 or 5735 adapters are used in an application with both ports active, each adapter counts as two extra-high bandwidth adapters. See the "Performance notes" before installing this adapter.

**Extra-high Bandwidth (EHB) adapter. See the "Performance notes" before installing this adapter.

* High Bandwidth (HB) adapter. See the "Performance notes"before installing this adapter.

Performance notes

Use the information in this section to help determine the maximum number of adapters that can be placed in a system while still maintaining optimum performance.

The previous table show the maximum number adapters allowed for connectivity. However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. The following list provides guidelines:

- No more than three Gb Ethernet ports per I/O chip.
- No more than three high bandwidth adapters per I/O chip.
- No more than one Extra-high bandwidth adapter per I/O chip.
- No more than one 10 Gb Ethernet port per two processors in a system. If one 10 Gb Ethernet port is present per two processors, no other 10 Gb or 1 Gb ports allowed for optimum performance.
- No more than two 1 Gb Ethernet ports per one processor in a system. More Ethernet adapters can be added for connectivity.
- For best performance, connect each 5803 and 5873 half-drawer (10 slots) to a feature 1816, 12X DDR IB I/O hub controller, in the 9119-FHA system.

Model 7311-D11 expansion unit

Learn about the PCI slots in the 7311-D11 expansion unit.

The 7311-D11 is a 19-inch, four EIA unit I/O expansion drawer that provides six full length ,64-bit, 3.3-V, 133 MHz hot-plug PCI-X slots. The I/O Expansion drawer is attached to the system using a RIO-2 bus interface adapter.

The 7311-D11 expansion unit is supported on the model 9117-MMA server, but not on the model 8204-E8A server.

PCI slot descriptions

The following figure shows the back view of the expansion unit.

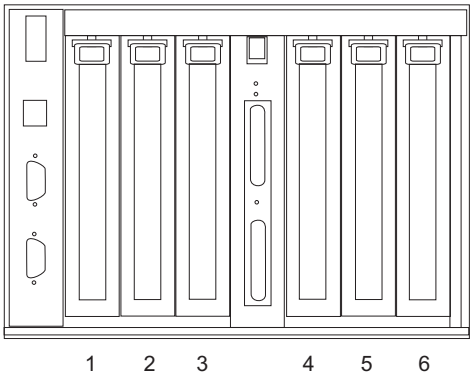


Figure 14. Back view

The following table describes the PCI slots and the PCI host bus (PHB) connections.

Table 49. PCI slot descriptions

PHB1			PHB2		
Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Long	Long	Long	Long	Long	Long
64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz
Un-P1-C1	Un-P1-C2	Un-P1-C3	Un-P1-C4	Un-P1-C5	Un-P1-C6

- The 7311-D11 can accommodate 6, generation 3 blind swap adapter cassettes. Cassettes can be installed and removed without removing the drawer from the rack.
- All slots are compatible with PCI and PCI-X adapters.
- Short adapters can go in short or long slots.
- All slots support Enhanced Error Handling (EEH).

Slot priority

Slot priority for all adapters is 1, 4, 2, 5, 3, and 6. For a list of supported adapters, refer to the placement information for the base system unit to which the expansion unit is attached. If the adapter is supported by the base unit, it is supported by the expansion unit. If the adapter is not supported by the base unit, it is not supported by the expansion unit.

Note: Feature 2849, POWER GXT135P Graphics Accelerator with Digital Support, is not supported in the 7311-D11 expansion unit.

Performance notes

For optimum performance, you might want to limit the total number of high bandwidth and extra-high bandwidth adapters in a system. The performance notes for this type of I/O expansion unit are covered in the performance notes for the server. See the Contents page of this topic collection for a list of servers covered in this collection.

Model 7311-D20 expansion unit

Learn about the PCI slots in the 7311-D20 expansion unit.

PCI slot descriptions

The 7311-D20 is 19-inch, I/O expansion unit.

The following figure shows the back view of the expansion unit.

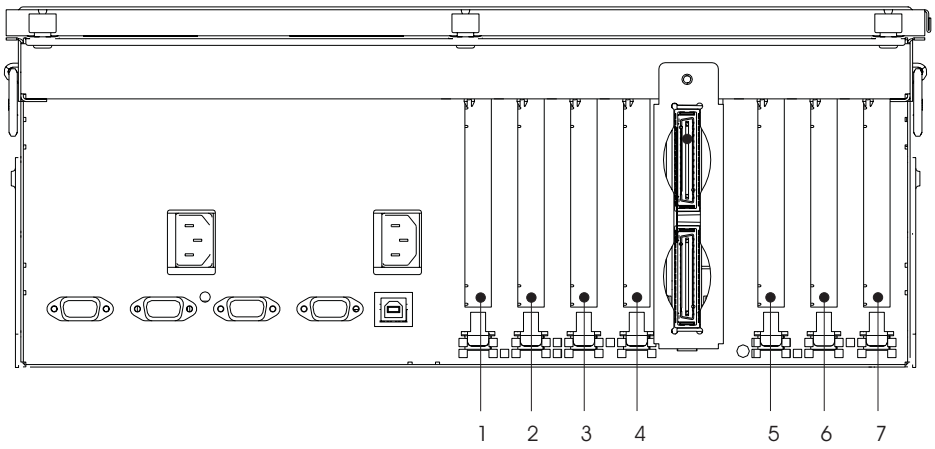


Figure 15. Back view

PCI slot description

The following table describes the PCI slots and the PCI host bridge (PHB) connections.

Table 50. PCI slot descriptions

PHB1				PHB2		
Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7
Long	Long	Long	Long	Long	Long	Long
64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz
Un-P1-C1	Un-P1-C2	Un-P1-C3	Un-P1-C4	Un-P1-C5	Un-P1-C6	Un-P1-C7
• All slots are compatible with PCI and PCI-X adapters. • Short adapters can go in short or long slots. • All slots support Enhanced Error Handling (EEH).						

Slot priorities

Slot priority for all adapters is 1, 5, 2, 6, 3, 7, and 4. For a list of supported adapters, refer to the placement information for the base system unit to which the expansion unit is attached. If the adapter is supported by the base unit, it is supported by the expansion unit. If the adapter is not supported by the base unit, it is not supported by the expansion unit.

Note: Feature 2849, POWER GXT135P Graphics Accelerator with Digital Support, is not supported in a 7311-D20 expansion unit connected to a model 9117-MMA server.

Performance notes

For optimum performance, you might want to limit the total number of high bandwidth and extra-high bandwidth adapters in a system. The performance notes for this type of I/O expansion unit are covered in the performance notes for the server. See the Contents page of this topic collection for a list of servers covered in this collection.

Model 7314-G30 expansion unit

Learn about the PCI slots in the 7314-G30 expansion unit.

System description

The 7314-G30 expansion unit is a 19-inch, rack-mountable, I/O expansion drawer that is designed to be attached to the system unit using the 12x Channel bus and 12x cables.

The 7314-G30 can accommodate 6, generation 3 blind swap adapter cassettes. Cassettes can be installed and removed without removing the drawer from the rack.

The following figure shows the back view of the expansion unit.

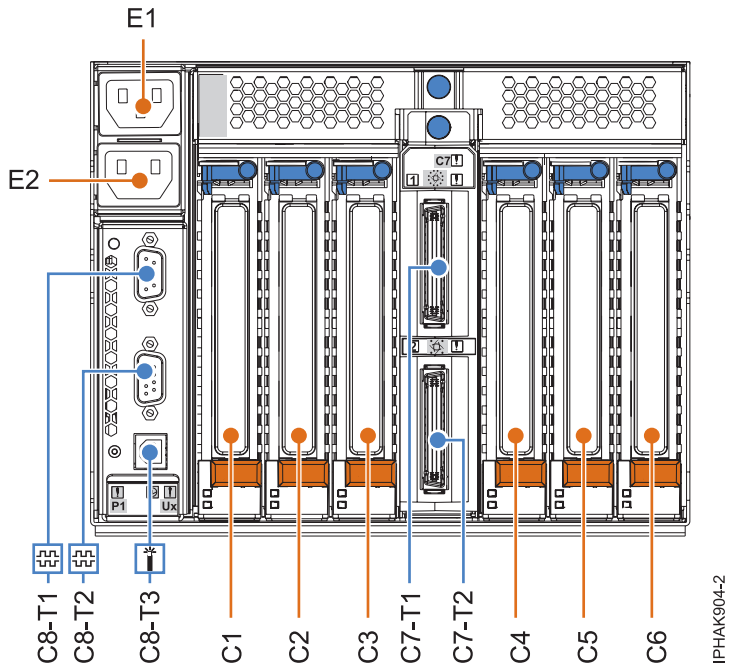


Figure 16. Back view

Table 51 describes the location codes that are shown in Figure 16.

Table 51. Location code descriptions

Location code	Description
C1, C2, C3, C4, C5, and C6	PCI-X DDR slots. See also “PCI slot descriptions” on page 100.
C7-T1 and C7-T2	12x Channel remote I/O ports
C8-T1 and C8-T2	Dual port SPCN connectors.

Table 51. Location code descriptions (continued)

Location code	Description
E1 and E2	Power supply connectors.

PCI slot descriptions

The following table describes the PCI-X DDR slots.

Table 52. Slot properties

PHB2 A	PHB3 A	PHB4 A	PHB1 B	PHB2 B	PHB3 B
Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Long	Long	Long	Long	Long	Long
64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz
C1	C2	C3	C4	C5	C6
• Each PCI-X DDR slot is a separate PCI host bridge (PHB). • All slots are compatible with PCI and PCI-X DDR adapters. • Short adapters can go in long slots.					

Slot priorities

Slot priority for all adapters is 1, 2, 3, 4, 5, and 6. For a list of supported adapters, refer to the placement information for the base system unit to which the expansion unit is attached. If the adapter is supported by the base unit, it is supported by the expansion unit. If the adapter is not supported by the base unit, it is not supported by the expansion unit.

Performance notes

For optimum performance, you might want to limit the total number of high bandwidth and extra-high bandwidth adapters in a system. The performance notes for this type of I/O expansion unit are covered in the performance notes for the server. See the Contents page of this topic collection for a list of servers covered in this collection.

Chapter 10. Determining the best place to install your adapter

You can use the placement guidelines and reference tables in this section to determine the best place to install your adapter on systems running the IBM i operating system.

Find your current system configuration in IBM i

You can use the System Service Tools in the i operating system to find your current system configuration.

Before you begin, you need to know the location codes used for the PCI adapter slots on the system with which you are working. See the following topics as needed to identify the location codes for specific system units:

- Chapter 3, "Model 8203-E4A and 8261-E4S servers," on page 17
- Chapter 4, "Model 8204-E8A server," on page 29
- Chapter 5, "Model 8234-EMA server," on page 43
- Chapter 6, "Model 9117-MMA server," on page 53

To find your current system configuration, start an i session and sign on. If you have more than one system, start a session on the system that is being upgraded and for which you have service tools authority. Follow these steps:

1. Type **strsst** on the command line of the Main Menu and press Enter.
2. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display and press Enter.
3. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
4. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
5. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display and press Enter.
6. Type **9** on the **System Unit** line and press Enter.
7. Select **Include empty positions**.
8. Look for the PCI adapter location codes in the Location column.
9. Write down the Type-Model number for each PCI adapter location. Some adapters can show multiple, virtual ports. It is not necessary to write down these virtual locations.
10. Write down any PCI adapter locations that are listed in the Description column as an Empty Position. The Type-Model number is blank for empty positions.
11. Press F12 to return to the previous window.
12. Do you have an expansion unit attached?
    - **No:** Go to "Placing adapters in the system" on page 102.
    - **Yes:** Do the following:
      a. Type **9** for the **System Expansion Unit** field and press Enter.
      b. Repeat steps 7-11 for each expansion unit.
      c. Go to "Placing an adapter in an expansion unit" on page 102.

IOP PCI adapters

Learn about IOP adapters that are supported on expansion units connected to IBM Power Systems models that contain the POWER6 processor.

I/O processor (IOP) adapters process instructions from the server and work with IOP controlled I/O adapters (IOAs) to control the I/O devices. IOP adapters are only used with the IBM i operating system.

Expansion unit 5796 does not support IOPs. PCI Express (PCIe) slots do not support IOPs or IOP-controlled IOAs.

Note: The internal PCI-X DDR and PCIe slots on the system unit are designed for IOPless adapters. IOP adapters are not supported in the Power Systems servers that contain the POWER6 processor.

Table 53. IOP adapters

Feature	CCIN	Description
2843	2843	PCI IOP • Short adapter, can go in short or long slot • 3 v slot required • Maximum number of IOAs: 4 • Memory value: 211 • Performance value: 100
2847	2847	PCI IOP for SAN Load Source • Maximum number of IOAs: 1 • This is a dedicated IOP for SAN load Source and is only supported with 2787 and 5760 IOAs • IOP can not be placed where embedded adapters require an IOP
2844	2844	• Short adapter, can go in short or long slot • 3 v slot required • Maximum number of IOAs: 4 • Memory value: 211 • Performance value: 100

Placing adapters in the system

Select an available slot by using the reference information for the system.

The following list shows the systems covered in this topic:

- Chapter 3, “Model 8203-E4A and 8261-E4S servers,” on page 17
- Chapter 4, “Model 8204-E8A server,” on page 29
- Chapter 6, “Model 9117-MMA server,” on page 53
- Chapter 8, “Model 9125-F2A server,” on page 71

Placing an adapter in an expansion unit

Determine the best place to install your adapter in an expansion unit connected to a system running the IBM i operating system.

If you are installing an IOPless adapter, see the section “IOPless adapters.” If you are installing an IOP adapter, see the section “IOP adapters” on page 103.

IOPless adapters

To install an IOPless adapter, select an available slot in the expansion unit. The following expansion units are supported for the IBM i operating system, and they support IOPless adapters: 0588, 5088, 5094, 5096, 5294, 5296, 5790, 5796, 5797, and 5798.

IOP adapters

Use these instructions to determine where to place IOP adapters in an expansion unit that requires or supports IOP adapters. The following expansion units are supported for i, and they support adapters that require IOPs, as well as adapters that do not require IOPs: 5088, 0588, 5094, 5096, 5294, 5296, 0595, and 5790.

The 5797 and 5798 also support IOPs in a limited number of slots. Slots 8, 9, 10 and 18, 19, 20 are PHBs that support IOPs and adapters that require IOPs.

When doing the following steps, refer to the "Examples: IOP placement tables" to determine the best place to install or move your IOA.

To determine where to place IOP adapters in an expansion unit, follow these steps:

1. Use "IOP PCI adapters" on page 101 to locate the values of your current configuration, then continue to the next step.

   Note:

   a. You can install the IOP in any adapter position labeled **IOP**. For the IOP locations, refer to the expansion unit profiles listed at the beginning of this section.
   b. You might need to move an IOA to install your IOP.
   c. By installing an IOP, you are creating a new IOP adapter group.
   d. IOPs cannot be placed in consecutive positions.
2. Locate the first IOP (2843, 2844, or 2847).
3. Determine the IOAs controlled by the IOP (IOP adapter group).
   - An IOP adapter group is an IOP and all IOAs controlled by that IOP.
   - IOP adapter groups cannot cross PCI bridge set boundaries. To identify the PCI bridge set boundaries, refer to the expansion unit profiles listed at the beginning of this section.
4. Locate the first IOP adapter group that has an empty position.
5. Find and enter (on the placement table) the values of each IOA that is currently installed in this IOP adapter group that has an empty position. To find the values, see "Adapters supported on AIX, IBM i, and Linux" on page 3.
6. Install the new adapter in the next available position in the IOP adapter group.

   Do not leave open positions if possible. You should try to not move your console position.
7. Write down the feature number or CCIN of the new adapter in the table.
8. Find and enter the values of the new adapter in the placement table.
9. Add together the IOA *Memory Values* and record it in the *IOA totals*.
10. Add together the IOA *Performance Values* and record it in the *IOA totals*.
11. If the totals are not greater than the value of the IOP for that adapter group, verify the restrictions, such as adapter length, to make sure the adapter can be installed in the empty position. If the restrictions are not met, choose another empty position and repeat the process. Otherwise, you are ready to install the new adapter in that empty position.
12. If the totals are greater than either IOP adapter value, move to the next available IOP adapter group that has an empty adapter position and repeat the steps to complete another placement worksheet.

Examples: IOP placement tables

Use one worksheet for each IOP in all of your units.

Table 54. 2843 IOP

IOP adapter group	Adapter position	Feature number or CCIN number from type column	Memory value	Performance value
	C	**2843**	**211**	**100**
	C			
	C			
	C			
	C			
	IOA totals			

Table 55. 2844 IOP

IOP adapter group	Adapter position	Feature number or CCIN number from type column	Memory value	Performance value
	C	**2844**	**211**	**100**
	C			
	C			
	C			
	C			
	IOA totals			

IOP adapter group	Adapter position	Feature number or CCIN number from adapter position
	C	
	C	
	C	
	C	

SCSI RAID controller placement restrictions for IBM i

Learn about restrictions that must be taken into consideration when placing SCSI RAID controllers in a system unit running the IBM i operating system.

Observe the following restrictions when placing the SCSI RAID controllers that are identified in the following list:

- The following disk controllers cannot be placed in the system unit: 2757, 2780, 5580, 5581, 5583, 5590, 5591, and 5777. These controllers can be placed in an attached expansion unit.
- A maximum of three of the following disk controllers allowed per IOP in any combination: 2757, 2780, 5580, 5581, 5583, 5590, 5591, and 5736.
- The following feature codes contain two adapters: 5580, 5581, 5583, 5590, 5591, 5781, and 5799. An auxiliary write cache IOA also counts as one IOA towards the maximum of three. For example, 5580 consists of 2 adapters so 5580 counts as two towards the three maximum when located under the same IOP.
- A maximum of six of the following controllers allowed per 0694, 5094, and 5294 expansion unit enclosure: 2757, 2780, 5580, 5581, 5583, 5590, 5591, 5777, and 5778.

  For features that include a SCSI controller paired with an auxiliary write-cache IOA CCIN 574F or CCIN 575B, the pair counts as only 1 adapter towards the 6 maximum.

For features that include a SCSI controller paired with an auxiliary write-cache IOA CCIN 5708, the pair count as 2 adapters towards the 6 maximum.

High-performance SCSI, disk controller placement for IBM i

Determine which PCI slots can accommodate the 2780, 5580, 5583, 5590, 5746, 5777, 5778, 5781, and 5782 SCSI controllers on IBM Power Systems models running the IBM i operating system.

Overview and prerequisites

This section provides special placement information for the SCSI controllers and auxiliary-write cache adapters listed in Table 56.

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.

Use the list in Table 56 to cross-reference adapter feature codes with their CCIN numbers and descriptions. See also the adapter tables in "Adapters supported on AIX, IBM i, and Linux" on page 3 for more detailed descriptions, notes, and restrictions for these adapters.

Then go to one of the following system or expansion unit tables to determine which PCI slots can accommodate these adapters.

- "5094 or 5294 expansion unit" on page 106
- "5096 or 5296 expansion unit" on page 106
- "5088 or 0588 expansion unit" on page 106
- "5095 or 0595 expansion unit" on page 107
- "5790 expansion unit" on page 107
- "5796 expansion unit" on page 107
- "5797 expansion unit" on page 108
- "8234-EMA and 9117-MMA system" on page 108

Attention: Place these adapters only in an allowed slot. Placing these adapters in an unsupported slot may result in early-life adapter failure.

Table 56. High performance SCSI controllers.

Feature codes	CCIN numbers	Description	Variables
2780	2780	PCI-X Ultra 4 RAID Disk Unit Controller	IOP controlled
5580, 5590	2780 and 574F	2780 Disk Controller with a secondary, auxiliary-write cache IOA	IOP controlled
5582	571E and 574F	5738 Disk Controller with a secondary, auxiliary-write cache IOA	IOP controlled
5777	571E	PCI-X Ultra320 SCSI Disk Controller	IOPless
5583	571E and 574F	5777 Disk Controller with a secondary, auxiliary-write cache IOA	IOPless
5746, 5781	571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache Double-wide adapter. 571F is the controller. 575B is the auxiliary-write cache.	IOP controlled

Table 56. High performance SCSI controllers (continued).

Feature codes	CCIN numbers	Description	Variables
5778, 5782	571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache Double-wide adapter. 571F is the controller. 575B is the auxiliary-write cache.	IOPless

5094 or 5294 expansion unit

Adapters are supported in the slots shown in the Allowed slots column.

CCIN numbers	Description	Variables	Allowed slots
2780	PCI-X Ultra 4 RAID Disk Unit Controller	IOP controlled	2, 3, 4, 6, 7, 8, 9, 12, 13, 14, 15
		AIX or Linux controlled	2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15
574F	Auxiliary-Write Cache IOA	IOP controlled	2, 3, 4, 6, 7, 8, 9, 12, 13, 14, 15
		IOPless or direct attach	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15
571E	PCI-X Ultra320 SCSI Disk Controller	IOP controlled	3, 6, 7, 8, 9
		IOPless or direct attach	1, 3, 5, 6, 7, 8, 9
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOP controlled double-wide*	**2**, 3, 4, **8**, 9
		IOPless double-wide*	**1**, 2, 3, 4, **5**, 6, **8**, 9
* Double-wide adapter, requires 2 adjacent slots. The SCSI controller side of the adapter pair requires a 64-bit slot. Slots with **bold** numbers can be used for the SCSI controller side of the adapter. Slots where the number is underlined can be used for either side of the adapter. The remaining slot numbers can be used for the cache side (575B) of the adapter.			

5096 or 5296 expansion unit

The 2780, 574F, and 571E adapters are not supported on the 5096 or 5296.

The double-wide 571F/575B adapter is supported in the slots shown in the Allowed slots column.

CCIN numbers	Description	Variables	Allowed slots
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOP controlled double-wide*	**2**, 3, 4, **8**, 9
		IOPless double-wide*	**1**, 2, 3, 4, **5**, 6, **8**, 9
* Double-wide adapter, requires 2 adjacent slots. The SCSI controller side of the adapter pair requires a 64-bit slot. Slots with **bold** numbers can be used for the SCSI controller side of the adapter. Slots where the number is underlined can be used for either side of the adapter. The remaining slot numbers can be used for the cache side (575B) of the adapter.			

5088 or 0588 expansion unit

The 2780, 574F, and 571E adapters are not supported on the 5088 or 0588.

The double-wide 571F/575B adapter is supported in the slots shown in the Allowed slots column.

CCIN numbers	Description	Variables	Allowed slots
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOP controlled double-wide*	**8**, 9
		IOPless double-wide*	**8**, 9
* Double-wide adapter, requires 2 adjacent slots. The SCSI controller side of the adapter pair can be placed in slot 8. The cache side of the adapter would then go in slot 9.			

5095 or 0595 expansion unit

The following adapters are supported in the slots shown in the Allowed slots column.

CCIN numbers	Description	Variables	Allowed slots
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOP controlled double-wide*	**2**, 3, 4
		IOPless double-wide*	**1**, 2, 3, 4
571E	PCI-X Ultra320 SCSI Disk Controller Maximum of one 571E	IOP controlled	2, 3, 4
		IOPless or direct attach	1, 2, 3, 4
2780	PCI-X Ultra 4 RAID Disk Unit Controller	IOP controlled	2, 3, 4, 7, 8
		AIX or Linux controlled	1, 2, 3, 4, 6, 7, 8
574F	Auxiliary-Write Cache IOA	IOP controlled	2, 3, 4, 7, 8
		IOPless or direct attach	1, 2, 3, 4, 6, 7, 8
* Double-wide adapter, requires 2 adjacent slots. Slots with **bold** numbers can be used for the SCSI controller side of the adapter. Slots where the number is underlined can be used for either side of the adapter. The remaining slot numbers can be used for the cache side (575B) of the adapter.			

5790 expansion unit

The 2780, 574F, and 571E adapters are not supported on the 5790.

The double-wide 571F/575B adapter is supported in the slots shown in the Allowed slots column.

CCIN numbers	Description	Variables	Allowed slots
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOP controlled double-wide*	**2**, 3, **6**, 7
		IOPless double-wide*	**1**, 2, 3 **5**, 6, 7
* Double-wide adapter, requires 2 adjacent slots. The SCSI controller side of the adapter pair requires a 64-bit slot. Slots with **bold** numbers can be used for the SCSI controller side (571F) of the adapter. Slots where the number is underlined can be used for either side of the adapter. The remaining slot numbers can be used for the cache side (575B) of the adapter.			

5796 expansion unit

The 2780, 574F, and 571E adapters are not supported on the 5796.

The double-wide 571F/575B adapter is supported in the slots shown in the Allowed slots column.

CCIN numbers	Description	Variables	Allowed slots
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOPless double-wide*	**1**, 2, 3, **4**, 5, 6
* Double-wide adapter, requires 2 adjacent slots. The SCSI controller side of the adapter pair requires a 64-bit slot. Slots with **bold** numbers can be used for the SCSI controller side (571F) of the adapter. Slots where the number is underlined can be used for either side of the adapter. The remaining slot numbers can be used for the cache side (575B) of the adapter.			

5797 expansion unit

The 2780, 574F, and 571E adapters are not supported on the 5797.

The double-wide 571F/575B adapter is supported in the slots shown in the Allowed slots column.

CCIN numbers	Description	Variables	Allowed slots
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOPless double-wide*	**1**, 2, 3, 4, 5, 6, 7 **11**, 12, 13, 14, 15, 16, 17
* Double-wide adapter, requires 2 adjacent slots. The SCSI controller side of the adapter pair requires a 64-bit slot. Slots with **bold** numbers can be used for the SCSI controller side (571F) of the adapter. Slots where the number is underlined can be used for either side of the adapter. The remaining slot numbers can be used for the cache side (575B) of the adapter.			

8234-EMA and 9117-MMA system

The 2780, 574F, and 571E adapters are not supported in the 8234-EMA and 9117-MMA system.

The double-wide 571F/575B adapter is supported in the slots shown in the Allowed slots column.

CCIN number(s)	Description	Variables	Allowed slots
571F and 575B	PCI-X Ultra320 SCSI Disk Controller with auxiliary-write cache	IOPless double-wide*	**4**, 5
* Double-wide adapter, requires 2 adjacent slots. Slot 4 can be used for the SCSI controller side (571F) of the adapter. Slot 5 number can be used for the cache side (575B) of the adapter.			

Appendix. Notices

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

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

The manufacturer may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to the manufacturer.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: THIS INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. The manufacturer may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to Web sites not owned by the manufacturer are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this product and use of those Web sites is at your own risk.

The manufacturer may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning products not produced by this manufacturer was obtained from the suppliers of those products, their published announcements or other publicly available sources. This manufacturer has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to products not produced by this manufacturer. Questions on the capabilities of products not produced by this manufacturer should be addressed to the suppliers of those products.

All statements regarding the manufacturer's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

The manufacturer's prices shown are the manufacturer's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

If you are viewing this information in softcopy, the photographs and color illustrations may not appear.

The drawings and specifications contained herein shall not be reproduced in whole or in part without the written permission of the manufacturer.

The manufacturer has prepared this information for use with the specific machines indicated. The manufacturer makes no representations that it is suitable for any other purpose.

The manufacturer's computer systems contain mechanisms designed to reduce the possibility of undetected data corruption or loss. This risk, however, cannot be eliminated. Users who experience unplanned outages, system failures, power fluctuations or outages, or component failures must verify the accuracy of operations performed and data saved or transmitted by the system at or near the time of the outage or failure. In addition, users must establish procedures to ensure that there is independent data verification before relying on such data in sensitive or critical operations. Users should periodically check the manufacturer's support websites for updated information and fixes applicable to the system and related software.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at Copyright and trademark information at www.ibm.com/legal/copytrade.shtml.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

Electronic emission notices

Class A Notices

The following Class A statements apply to the IBM servers that contain the POWER6 processor.

Federal Communications Commission (FCC) statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Industry Canada Compliance Statement

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

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A respecte est conforme à la norme NMB-003 du Canada.

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

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

European Community contact:
IBM Technical Regulations
Pascalstr. 100, Stuttgart, Germany 70569
Tele: 0049 (0)711 785 1176
Fax: 0049 (0)711 785 1283
E-mail: tjahn@de.ibm.com

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

VCCI Statement - Japan

この装置は、クラスA 情報技術装置です。この装置を家庭環境で使用すると電波妨害
を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求され
ることがあります。 VCCI－A

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

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

高調波ガイドライン適合品

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline with Modifications (products greater than 20 A per phase)

高調波ガイドライン準用品

Electromagnetic Interference (EMI) Statement - People's Republic of China

声　明

此为A级产品，在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Declaration: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may need to perform practical action.

Electromagnetic Interference (EMI) Statement - Taiwan

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

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

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

IBM Taiwan Contact Information:

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

Electromagnetic Interference (EMI) Statement - Korea

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

Germany Compliance Statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:
"Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Konformitätserklärung nach des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Electromagnetic Interference (EMI) Statement - Russia

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать
радиопомехи, для снижения которых необходимы
дополнительные меры

Terms and conditions

Permissions for the use of these publications is granted subject to the following terms and conditions.

Personal Use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative works of these publications, or any portion thereof, without the express consent of the manufacturer.

Commercial Use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of the manufacturer.

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any data, software or other intellectual property contained therein.

The manufacturer reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by the manufacturer, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

THE MANUFACTURER MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THESE PUBLICATIONS ARE PROVIDED ″AS-IS″ AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

Printed in USA