Power Systems

PCI adapter placement for the 9119-FHB

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Note

Before using this information and the product it supports, read the information in "Safety notices" on page v, "Notices" on page 27, 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 POWER7 processor and to all associated models.

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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, safety information documentation is included in the publications package (such as in printed documentation, on DVD, or as part of the product) shipped with the product. The documentation 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 documentation. You should also refer to the safety information documentation any time you do not clearly understand any safety information in the U.S. English publications.

Replacement or additional copies of safety information documentation can be obtained by calling the IBM Hotline at 1-800-300-8751.

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

IBM servers may be installed inside or outside of an IT equipment rack.

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DANGER

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

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

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

To Disconnect:

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

To Connect:

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

(D005)

DANGER

Observe the following precautions when working on or around your IT rack system:

- **Heavy equipment–personal injury or equipment damage might result if mishandled.**
- **Always lower the leveling pads on the rack cabinet.**
- **Always install stabilizer brackets on the rack cabinet.**
- **To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.**
- **Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.**

- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**
- **An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.**

CAUTION

- **Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.**
- **Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.**
- **Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.**
- *(For sliding drawers.)* **Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.**
- *(For fixed drawers.)* **This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack.**

(R001)

CAUTION:
Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

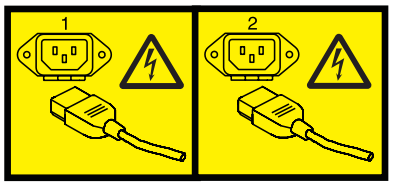
- **Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:**
  - **Remove all devices in the 32U position and above.**
  - **Ensure that the heaviest devices are installed in the bottom of the rack cabinet.**
  - **Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.**
- **If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.**
- **Inspect the route that you plan to take to eliminate potential hazards.**
- **Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.**
- **Verify that all door openings are at least 760 x 230 mm (30 x 80 in.).**
- **Ensure that all devices, shelves, drawers, doors, and cables are secure.**
- **Ensure that the four leveling pads are raised to their highest position.**
- **Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.**
- **Do not use a ramp inclined at more than 10 degrees.**
- **When the rack cabinet is in the new location, complete the following steps:**
  - **Lower the four leveling pads.**
  - **Install stabilizer brackets on the rack cabinet.**
  - **If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.**
- **If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.**

(R002)

(L001)

(L002)

(L003)



or

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)

CAUTION:
The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do Not:
- **___ Throw or immerse into water**
- **___ Heat to more than 100°C (212°F)**
- **___ Repair or disassemble**

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C003)

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.

PCI adapter placement for the 9119-FHB

Find information about the Peripheral Component Interconnect (PCI), PCI-X, and PCI Express (PCIe) adapters that are supported for the IBM Power® 795 (9119-FHB) systems that contain the POWER7® processor and the associated I/O expansion units.

The following features are electromagnetic compatibility (EMC) Class B features. See the Class B Notices in the Hardware Notices section.

Table 1. Electromagnetic compatibility (EMC) Class B features

Feature	Description
1912, 5736	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter
1983, 5706	Port 10/100/1000 Base-TX Ethernet PCI-X Adapter
1986, 5713	1 Gb iSCSI TOE PCI-X Adapter
2728	4-port USB PCIe Adapter
4764	PCI-X Cryptographic Coprocessor
4807	PCIe Cryptographic Coprocessor
5717	4-port 10/100/1000 Base-TX PCI Express Adapter
5732	10 Gb Ethernet-CX4 PCI Express Adapter
5748	POWER® GXT145 PCI Express Graphics Accelerator
5767	2-port 10/100/1000 Base-TX Ethernet PCI Express Adapter
5768	2-port Gb Ethernet-SX PCI Express Adapter
5769	10 Gb Ethernet-SR PCI Express Adapter
5772	10 Gb Ethernet-LR PCI Express Adapter
5785	4 Port Async EIA-232 PCIe Adapter
EC2G and EL39	PCIe LP 2-Port 10 GbE SFN6122F Adapter
EC2H and EL3A	PCIe LP 2-Port 10 GbE SFN5162F Adapter
EC2J	PCIe 2-Port 10 GbE SFN6122F Adapter
EC2K	PCIe 2-Port 10 GbE SFN5162F Adapter

Supported PCI adapters for the 9119-FHB

Find information about the placement rules and slot priorities for the Peripheral Component Interconnect (PCI), PCI-X, and PCI Express (PCIe) adapters that are supported for the 9119-FHB systems that contain the POWER7 processor and the associated I/O expansion units.

This section provides reference information that information technology (IT) personnel and service representatives can use in determining where to place PCI, PCI-X, and PCIe adapters.

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

- Feature code (FC) 5797 and FC 5798 expansion units
- FC 5803 and FC 5873 expansion units

Table 2 on page 2 and Table 3 on page 5 list the PCI, PCI-X, and PCIe adapters, which are supported in the expansion units that can be attached to the 9119-FHB.

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Adapters supported on the AIX®, IBM i, or Linux operating system

Table 2 and Table 3 on page 5 list adapters supported on the IBM AIX, IBM i, or Linux operating systems. Not all adapters are supported on all operating systems. Exceptions are noted in the Description column.

Important:

- 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 IBM System Planning Tool website (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 you must install any existing program temporary fix (PTF) prerequisites. To do this, use the IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf).

PCI and PCI-X adapters

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

Table 2. PCI and PCI-X adapters

Feature code (FC)	CCIN	Description
2943	3-B	8-port Asynchronous EIA-232E/RS-422A PCI Adapter (FC 2943; CCIN 3-B) • PCI bus • 8 Async ports • OS support: AIX operating system
5723	5723	2-port Asynchronous EIA-232 PCI Adapter (FC 5723; CCIN 5723) • PCI adapter • 2-port EIA-232 asynchronous serial communications • 16C850 UART equivalent • OS support: AIX and Linux operating systems
5716[2]	280B	2 Gb Fibre Channel PCI-X Adapter (FC 5716; CCIN 280B) • PCI-X, 64-bit • High bandwidth • OS support: AIX and Linux operating systems
5749[1]	576B	4 Gb Dual-port Fibre Channel PCI-X 2.0 DDR Adapter (FC 5749; CCIN 576B) • Short, 64-bit, 3.3 V • OS support: IBM i operating system • Extra-high bandwidth • 64-bit slot required • Recommended in DDR slot • Maximum of 24 adapters • Maximum of four per enclosure • Maximum of two per PCI host bridge • OS support: IBM i operating system

Table 2. PCI and PCI-X adapters (continued)

Feature code (FC)	CCIN	Description
5758[2]	1910	4 Gb Single-port Fibre Channel PCI-X 2.0 DDR Adapter (FC 5758; CCIN 1910) • PCI-X 2.0a, PCI 3.0, PCI-X Mode 2 - 266 MHz, PCI-X Mode 1 - 133 MHz, PCI - 66 MHz • High-speed data networking • OS support: AIX and Linux operating systems
5759[1]	5759	4 Gb Dual-port Fibre Channel PCI-X 2.0 DDR Adapter (FC 5759; CCIN 5759) • Short, 64-bit, 3.3 V • High-speed data networking • Extra-high bandwidth • OS support: AIX and Linux operating systems
2849[2]	2849	GXT135P Graphics Accelerator with digital support (FC 2849; CCIN 2849) • Short, 32 or 64-bit, 3.3 V • High bandwidth • Not hot-pluggable • OS support: AIX and Linux operating systems
5700[2]	5700	IBM Gigabit Ethernet-SX PCI-X Adapter (FC 5700; CCIN 5700) • One full-duplex 1000 Base-SX fiber connection to a gigabit Ethernet LAN • High bandwidth • OS support: AIX, IBM i, and Linux operating systems
5701[2]	5701	IBM 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5701; CCIN 5701) • One full-duplex 10/100/1000 Base-TX UTP connection to a gigabit Ethernet • OS support: AIX, IBM i, and Linux operating systems
5706[2]	5706	2-port 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5706; CCIN 5706) • Short, 32-bit or 64-bit, 3.3 V or 5 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems
5713[2]	573B	1 Gb-TX iSCSI TOE PCI-X Adapter (FC 5713; CCIN 573B) • Short, 32-bit or 64-bit, 3.3 V or 5 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems
5714[2]	573C	1 Gb iSCSI TOE PCI-X on Optical Media Adapter (FC 5714; CCIN 573C) • Short, 32-bit or 64-bit, 3.3 V or 5 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems
5721[1]	573A	10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter (FC 5721; CCIN 573A) • High bandwidth • OS support: AIX, IBM i, and Linux operating system
5722[1]	573A	10 Gb Ethernet-LR PCI-X 2.0 DDR Adapter (FC 5722; CCIN 573A) • High bandwidth • OS support: AIX, IBM i, and Linux operating systems

Table 2. PCI and PCI-X adapters (continued)

Feature code (FC)	CCIN	Description
5740[2]	1954	4-port 10/100/1000 Base-TX PCI-X adapter (FC 5740; CCIN 1954) • PCI-X 1.0a • Full-height, 64-bit • High bandwidth • OS support: AIX and Linux operating systems
2738	28EF	2-port USB PCI Adapter (FC 2738; CCIN 28EF) • Short, 32-bit • 3.3 or 5 V • OS support: AIX and Linux operating systems
4764	4764	PCI-X Cryptographic Coprocessor (FC 4764; CCIN 4764) • Short, 64-bit, 3.3 V • OS support: AIX, IBM i, and Linux operating systems
5902[1]	572B	PCI-X DDR Ext Dual-x4 3 Gb SAS RAID Adapter (FC 5902; CCIN 572B) • Long, 64-bit, 3.3 V • Extra-high bandwidth • The adapter must be connected and configured in a dual controller mode in a multi-initiator configuration, and this configuration requires that the adapters are installed in pairs. • This adapter supports disk expansion units. This adapter does not support media expansion units. • OS support: AIX and Linux operating systems
5906[1]	572F, 575C	PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5906; CCIN 572F, 575C) • Long, 64-bit, 3.3 V • Extra-high bandwidth • Generation 2.5 blind-swap cassette • Double-wide adapter requires two adjacent slots: – 572F is the CCIN on the SAS controller side of the double-wide adapter. – 575C is the CCIN on the write-cache side of the double-wide adapter. • OS support: AIX, IBM i, and Linux operating systems
5912[1]	572A	PCI-X DDR Dual-x4 3 Gb SAS Adapter (FC 5912; CCIN 572A) • Short, 64-bit, 3.3 V • Extra-high bandwidth • Supports a dual controller mode in a multi-initiator configuration • OS support: AIX, IBM i, and Linux operating systems
5736 or 1912[2]	571A	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter (FC 5736; CCIN 571A) • Short, 32-bit or 64-bit, 3.3 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems
2947		IBM ARTIC960Hx 4-port Multiprotocol PCI Adapter (FC 2947) • 32-bit PCI • Provides 4-ports with different protocols, EIA-232, EIA530, RS-449, X.21, or V.35 • OS support: AIX operating system

Table 2. PCI and PCI-X adapters (continued)

Feature code (FC)	CCIN	Description
2962		2-port Multiprotocol PCI Adapter (FC 2962) • Provides a two-port connection to X.25 packet switched networks • Two high-speed WAN connections • OS support: AIX operating system
6805	2742	PCI 2-Line WAN IOA (FC 6805; CCIN 2742) • Short, 32-bit, 66 MHz • No IOP • OS support: IBM i and Linux operating systems
6808	2805	PCI Quad Modem IOA (FC 6808; CCIN 2805) • Long, 32-bit, 66 MHz • Non-CIM • OS support: IBM i operating system
6809	2805	PCI Quad Modem IOA (FC 6809; CCIN 2805) • Long, 32-bit, 66 MHz • CIM • OS support: IBM i operating system
6833	2793	PCI 2-Line WAN with Modem No IOP (FC 6833; CCIN 2793) • Two lines per port WAN with modem adapter • Non-CIM • OS support: IBM i and Linux operating systems
6834	2793	PCI 2-Line WAN with Modem No IOP CIM (FC 6834; CCIN 2793) • Two lines per port WAN with modem adapter • CIM • OS support: IBM i and Linux operating systems
[1]Extra-high Bandwidth adapter [2]High Bandwidth adapter		

PCIe adapters

The following table lists PCIe adapters.

Table 3. PCIe adapters

Feature code (FC)	CCIN	Description
5289	57D4	PCIe 2-port Async EIA-232 PCIe 1X LPC Adapter (FC 5289; CCIN 57D4) • Short, x1 • PCIe 1.1 • Two ports through RJ45 by using the DB9 connector • EIA-232 Compatible • OS support: AIX, IBM i, and Linux operating systems
5785	57D2	4 Port Async EIA-232 PCIe Adapter (FC 5785; CCIN 57D2) • Short, x1 • OS support: AIX and Linux operating systems

Table 3. PCIe adapters (continued)

Feature code (FC)	CCIN	Description
5735[1]	577D	8 Gb PCI Express Dual-port Fibre Channel Adapter (FC 5735; CCIN 577D) • Short, x8 • 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 must be treated as two extra-high bandwidth adapters. • OS support: AIX, IBM i, and Linux operating systems
5773[2]	5773	4 Gb PCI Express Single Port Fibre Channel Adapter (FC 5773; CCIN 5773) • Short, x4 • High bandwidth • OS support: AIX and Linux operating systems
5774[1]	5774	4 Gb PCI Express Dual-port Fibre Channel Adapter (FC 5774; CCIN 5774) • Short, x4 • Extra-high bandwidth • OS support: AIX, IBM i, and Linux operating systems
5748	5748	POWER GXT145 PCI Express Graphics Accelerator (FC 5748; CCIN 5748) • Short, x1 • Not hot-pluggable • OS support: AIX and Linux operating systems
EJ0J	57B4	PCIe3 RAID SAS Adapter (FC EJ0J; CCIN 57B4) • Regular-height adapter • PCIe3, short, x8 • Transfer speed of 6 Gbps • No write cache • One PCIe x8 slot per adapter • Adapters can be installed singly or in pairs • OS support: AIX, IBM i, and Linux operating systems
EJ0L	EJ0L	PCIe3 12 GB Cache RAID SAS quad-port 6 Gb Adapter (FC EJ0L; CCIN 57CE) • Regular-height adapter, short • PCIe3 x8 • Transfer speed of 6 Gbps • 12 GB write cache • One PCIe x8 slot per adapter • Adapters are installed in pairs • OS support: AIX, IBM i, and Linux operating systems
EJ0X	57B4	PCIe3 SAS Tape Adapter Quad-port 6Gb x8 (FC EJ0X; CCIN 57B4) • Regular-height adapter • PCIe3 x8 • Transfer speed of 6 Gbps • Supports LTO-5 or LTO-6 tape drives • No write cache • One PCIe x8 slot per adapter • OS support: AIX, IBM i, and Linux operating systems

Table 3. PCIe adapters (continued)

Feature code (FC)	CCIN	Description
EJ10	EJ10	PCIe3 4 x8 SAS Port Adapter (FC EJ10; CCIN 57B4) • Regular-height adapter • PCIe3 x8 • Transfer speed of 6 Gbps • Supports DVD and tape drives • No write cache • One PCIe x8 slot per adapter • OS support: AIX, IBM i, and Linux operating systems
5708[1]	2B3B	10 Gb FCoE PCIe Dual-port Adapter (FC 5708; CCIN 2B3B) • Low-profile capable • Extra-high bandwidth • PCIe 2.0 adapter with x8 generation 1 • Convergence enhanced Ethernet (CEE) supported • OS support: AIX, IBM i with VIOS, and Linux operating systems
5717[2]	5717	4-port 10/100/1000 Base-TX PCI Express Adapter (FC 5717; CCIN 5717) • Short, x4 • High bandwidth • OS support: AIX and Linux operating systems
5732[1]	2B43	10 Gb Ethernet-CX4 PCI Express Adapter (FC 5732; CCIN 2B43) • Short, x8 • Extra-high bandwidth • OS support: AIX and Linux operating systems
5767[2]	5767	2-port 10/100/1000 Base-TX Ethernet PCI Express Adapter (FC 5767; CCIN 5767) • Short, x4 • High bandwidth • OS support: AIX, IBM i, and Linux operating systems
5768[2]	5768	2-port Gigabit Ethernet-SX PCI Express Adapter (FC 5768; CCIN 5768) • Short, x4 • High bandwidth • OS support: AIX, IBM i, and Linux operating systems
5769[1]	2B44	10 Gb Ethernet-SR PCI Express Adapter (FC 5769; CCIN 2B44) • Short, full-high, x8 • Regular-height • Extra-high bandwidth • OS support: AIX and Linux operating systems
5772[1]	576E	10 Gb Ethernet-LR PCI Express Adapter (FC 5772; CCIN 576E) • Short, x8 • Regular-height card • Extra-high bandwidth • OS support: AIX, IBM i, and Linux operating systems

Table 3. PCIe adapters (continued)

Feature code (FC)	CCIN	Description
5899[2]	576F	PCIe2 4-port 1 GbE Adapter (FC 5899; CCIN 576F) • Regular-height adapter • PCIe generation 1 or generation 2, x4 • High bandwidth • Four-port 1 Gb Ethernet • OS support: AIX, IBM i, and Linux operating systems
EC28[1]	EC27	PCIe2 2-port 10 GbE RoCE SFP+ adapter (FC EC28; CCIN EC27) • Regular-height adapter • PCIe generation 2, x8 • Extra-high bandwidth, low latency 10 Gb Ethernet • OS support: AIX and Linux operating systems • Firmware level 7.6, or later
EC30[1]	EC29	PCIe2 2-port 10 GbE RoCE SR adapter (FC EC30; CCIN EC29) • Regular-height adapter • PCIe generation 2, x8 • Extra-high bandwidth, low latency 10 Gb Ethernet • OS support: AIX and Linux operating systems • Firmware level 7.6, or later
2728	57D1	4-port USB PCIe Adapter (FC 2728; CCIN 57D1) • Regular-height adapter • Single-slot, half-length PCIe adapter • PCIe 1.1 • OS support: AIX and Linux operating systems
4808	4765	PCIe Cryptographic Coprocessor (FC 4808; CCIN 4765) • Generation 3 blind-swap cassette • PCIe x4, full-height, half-length • OS support: AIX and IBM i operating systems
5901[1]	57B3	PCIe Dual - x4 SAS Adapter (FC 5901; CCIN 57B3) • Short • Extra-high bandwidth • OS support: AIX, IBM i, and Linux operating systems
5903[1]	574E	PCIe 380 MB Cache Dual x4 3 Gb SAS RAID Adapter (FC 5903; CCIN 574E) • Short • Extra-high bandwidth • Installed in pairs • OS support: AIX and Linux operating systems
5906[1]	572F, 575C	PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5906; CCIN 572F, 575C) • Long, 64-bit, 3.3 V • Extra-high bandwidth • Generation 2.5 blind-swap cassette • Double-wide adapter requires two adjacent slots: – 572F is the CCIN on the SAS controller side of the double-wide adapter. – 575C is the CCIN on the write-cache side of the double-wide adapter. • OS support: AIX, IBM i, and Linux operating systems

Table 3. PCIe adapters (continued)

Feature code (FC)	CCIN	Description
5908[1]	572F, 575C	PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5908; CCIN 572F, 575C) • Long, 64-bit, 3.3 V • Extra-high bandwidth • Generation 3 blind-swap cassette • Double-wide adapter requires two adjacent slots: – 572F is the CCIN on the SAS controller side of the double-wide adapter. – 575C is the CCIN on the write-cache side of the double-wide adapter. • OS support: AIX, IBM i, and Linux operating systems
5913	57B5	PCIe2 1.8 GB Cache RAID SAS Tri-port 6 Gb Adapter (FC 5913; CCIN 57B5) • Full-height, short, PCIe2 x8 • Transfer speed of 6 Gbps • Write cache backup of 1.8 GB • One PCIe x8 slot per adapter • Adapters are installed in pairs • OS support: AIX, IBM i, and Linux operating systems
ESA1	57B4	PCIe2 RAID SAS Adapter Dual-port 6 Gb (FC ESA1; CCIN 57B4) • Regular-height adapter • PCIe generation 2, x8 • OS support: AIX, IBM i, and Linux operating systems
2893	576C	PCI Express 2-Line WAN with Modem (FC 2893; CCIN 576C) • Short, x4 • Non-CIM • OS support: AIX, IBM i, and Linux operating systems
2894	576C	PCI Express 2-Line WAN with Modem (FC 2894; CCIN 576C) • Short, x4 • CIM • OS support: AIX, IBM i, and Linux operating systems
EN13	576C	PCI Express 2-Line WAN with Modem (FC EN13; CCIN 576C) • Short, x4 • Non-CIM • OS support: IBM i operating system
EN14	576C	PCI Express 2-Line WAN with Modem (FC EN14; CCIN 576C) • Short, x4 • CIM • OS support: IBM i operating system
[1]Extra-high Bandwidth adapter [2]High Bandwidth adapter		

I/O expansion units

Find information about the Peripheral Component Interconnect (PCI), PCI-X, and PCI Express (PCIe) adapters supported in the I/O expansion units that are supported for the IBM Power Systems™ servers that contain the POWER7 processor.

PCI slot priorities for the 5797 and 5798 expansion units

Find information about the placement rules and slot priorities for the Peripheral Component Interconnect (PCI), PCI-X, and PCI Express (PCIe) adapters that are supported for the I/O expansion units.

Expansion unit rear view

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

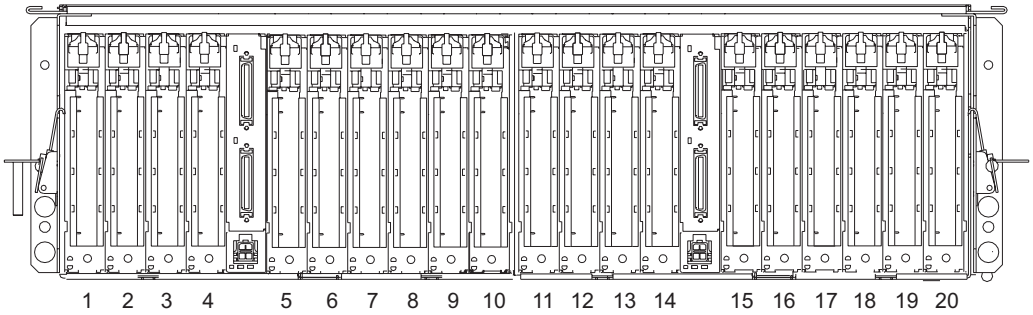

Figure 1. Expansion unit rear view with numbered slots

PCI-X slot descriptions

Table 4 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 with two Small Computer System Interface (SCSI) buses (SCSI-1 and SCSI-2) on the same planar. Slots 18 - 20 share a PHB with each other and with two SCSI buses (SCSI-3 and SCSI-4) on the same planar.

Table 4. Slot descriptions for the expansion unit

Slot number	Location code	PHB	Description
1	U*x*-P1-C1	A1	PCI-X DDR, 64-bit, 266 MHz
2	U*x*-P1-C2	A2	
3	U*x*-P1-C3	A3	
4	U*x*-P1-C4	A4	
5	U*x*-P1-C5	B1	
6	U*x*-P1-C6	B2	
7	U*x*-P1-C7	B3	
8	U*x*-P1-C8	B4	PCI-X, 64-bit , 133 MHz
9	U*x*-P1-C9		
10	U*x*-P1-C10		
11	U*x*-P2-C1	C1	PCI-X DDR, 64-bit, 266 MHz
12	U*x*-P2-C2	C2	
13	U*x*-P2-C3	C3	
14	U*x*-P2-C4	C4	
15	U*x*-P2-C5	D1	
16	U*x*-P2-C6	D2	
17	U*x*-P2-C7	D3	

Table 4. Slot descriptions for the expansion unit (continued)

Slot number	Location code	PHB	Description
18	U*x*-P2-C8	D4	PCI-X, 64-bit , 133 MHz
19	U*x*-P2-C9		
20	U*x*-P2-C10		
• All slots 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).			

Slot placement and maximums

Table 5 shows slot placement priorities and the maximum number of specified adapters allowed for connectivity by feature code (FC). However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. Performance notes follow the table.

Table 5. Slot placement priorities and maximums

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
2943	8-port Asynchronous EIA-232E/RS-422A PCI Adapter (FC 2943; CCIN 3-B) • PCI bus • 8 Async ports • OS support: AIX operating system	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	18
5723	2-port Asynchronous EIA-232 PCI Adapter (FC 5723; CCIN 5723) • PCI adapter • 2-port EIA-232 asynchronous serial communications • 16C850 UART equivalent • OS support: AIX and Linux operating systems	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	18
5716[3]	2 Gb Fibre Channel PCI-X Adapter (FC 5716; CCIN 280B) • PCI-X, 64-bit • High bandwidth • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	600

Table 5. Slot placement priorities and maximums (continued)

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
5749[2]	4 Gb Dual-port Fibre Channel PCI-X 2.0 DDR Adapter (FC 5749; CCIN 576B) • Short, 64-bit, 3.3 V • OS support: IBM i operating system • Extra-high bandwidth • 64-bit slot required • Recommended in DDR slot • Maximum of 24 adapters • Maximum of four per enclosure • Maximum of two per PCI host bridge • OS support: IBM i operating system	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	16	480
5758[3]	4 Gb Single-port Fibre Channel PCI-X 2.0 DDR Adapter (FC 5758; CCIN 1910) • PCI-X 2.0a, PCI 3.0, PCI-X Mode 2 - 266 MHz, PCI-X Mode 1 - 133 MHz, PCI - 66 MHz • High-speed data networking • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	16	480
5759[2]	4 Gb Dual-port Fibre Channel PCI-X 2.0 DDR Adapter (FC 5759; CCIN 5759) • Short, 64-bit, 3.3 V • High-speed data networking • Extra-high bandwidth • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	16	480
5761	4 Gb Single-port Fibre Channel PCI-X 2.0 DDR Adapter (FC 5761; CCIN 1910) • PCI-X 2.0a, PCI 3.0, PCI-X Mode 2 - 266 MHz, PCI-X Mode 1 - 133 MHz, PCI - 66 MHz • High-speed data networking • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	16	480
2849[3]	GXT135P Graphics Accelerator with digital support (FC 2849; CCIN 2849) • Short, 32 or 64-bit, 3.3 V • High bandwidth • Not hot-pluggable • OS support: AIX and Linux operating systems	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	4	8

Table 5. Slot placement priorities and maximums (continued)

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
5700[3]	IBM Gigabit Ethernet-SX PCI-X Adapter (FC 5700; CCIN 5700) • One full-duplex 1000 Base-SX fiber connection to a gigabit Ethernet LAN • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	512
5701[3]	IBM 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5701; CCIN 5701) • One full-duplex 10/100/1000 Base-TX UTP connection to a gigabit Ethernet • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	512
5706[3]	2-port 10/100/1000 Base-TX Ethernet PCI-X Adapter (FC 5706; CCIN 5706) • Short, 32-bit or 64-bit, 3.3 V or 5 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	512
5707[3]	IBM 2-port Gb Ethernet-SX PCI-X Adapter (FC 5707; CCIN 5706) • Short, 32-bit or 64-bit, 3.3 V or 5 V • High bandwidth • OS support: AIX, IBM i, and Linux operating system	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	20	512
5713[3]	1 Gb-TX iSCSI TOE PCI-X Adapter (FC 5713; CCIN 573B) • Short, 32-bit or 64-bit, 3.3 V or 5 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	18	160
5714[3]	1 Gb iSCSI TOE PCI-X on Optical Media Adapter (FC 5714; CCIN 573C) • Short, 32-bit or 64-bit, 3.3 V or 5 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	18	160
5718[2]	10 Gb Ethernet-SR PCI-X Adapter (FC 5718; CCIN 5718) • Short, x4 • Extra-high bandwidth • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	14	192

Table 5. Slot placement priorities and maximums (continued)

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
5719[2]	10 Gb Ethernet-LR PCI-X Adapter (FC 5719; CCIN 5719) • Short, x4 • Extra-high bandwidth • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	14	192
5721[2]	10 Gb Ethernet-SR PCI-X 2.0 DDR Adapter (FC 5721; CCIN 573A) • High bandwidth • OS support: AIX, IBM i, and Linux operating system	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	14	256
5722[2]	10 Gb Ethernet-LR PCI-X 2.0 DDR Adapter (FC 5722; CCIN 573A) • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	14	256
5740 [3]	4-port 10/100/1000 Base-TX PCI-X adapter (FC 5740; CCIN 1954) • PCI-X 1.0a • Full-height, 64-bit • High bandwidth • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	14	256
2738	2-port USB PCI Adapter (FC 2738; CCIN 28EF) • Short, 32-bit • 3.3 or 5 V • OS support: AIX and Linux operating systems	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	4	16
4764	PCI-X Cryptographic Coprocessor (FC 4764; CCIN 4764) • Short, 64-bit, 3.3 V • OS support: AIX, IBM i, and Linux operating systems	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	8, 20 in IBM i	32

Table 5. Slot placement priorities and maximums (continued)

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
5902[2]	PCI-X DDR Ext Dual-x4 3 Gb SAS RAID Adapter (FC 5902; CCIN 572B) • Long, 64-bit, 3.3 V • Extra-high bandwidth • The adapter must be connected and configured in a dual controller mode in a multi-initiator configuration, and this configuration requires that the adapters are installed in pairs. • This adapter supports disk expansion units. This adapter does not support media expansion units. • OS support: AIX and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	180
5904[2]	PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5904; CCIN 572F, 575C) • Long, 64-bit, 3.3 V • Extra-high bandwidth • No blind-swap cassette • Double-wide adapter requires two adjacent slots: – 572F is the CCIN on the SAS controller side of the double-wide adapter. – 575C is the CCIN on the write-cache side of the double-wide adapter. • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	180
5906[2]	PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5906; CCIN 572F, 575C) • Long, 64-bit, 3.3 V • Extra-high bandwidth • Generation 2.5 blind-swap cassette • Double-wide adapter requires two adjacent slots: – 572F is the CCIN on the SAS controller side of the double-wide adapter. – 575C is the CCIN on the write-cache side of the double-wide adapter. • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	180

Table 5. Slot placement priorities and maximums (continued)

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
5908[2]	PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5908; CCIN 572F, 575C) • Long, 64-bit, 3.3 V • Extra-high bandwidth • Generation 3 blind-swap cassette • Double-wide adapter requires two adjacent slots: – 572F is the CCIN on the SAS controller side of the double-wide adapter. – 575C is the CCIN on the write-cache side of the double-wide adapter. • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	180
5912[2]	PCI-X DDR Dual-x4 3 Gb SAS Adapter (FC 5912; CCIN 572A) • Short, 64-bit, 3.3 V • Extra-high bandwidth • Supports a dual controller mode in a multi-initiator configuration • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	180
5736 or 1912[3]	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter (FC 5736; CCIN 571A) • Short, 32-bit or 64-bit, 3.3 V • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17, 8, 18, 9, 19, 10, 20	6	180
5782[2], [4]	PCI-X Dual Channel Ultra320 SCSI RAID Adapter with Auxiliary Write Cache (double-wide) (FC 5782; CCIN 571F and 575B) • Long, 64-bit, 3.3 V, 266 MHz • 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. • OS support: IBM i operating system	See the footnote for these feature numbers at the end of the table.	8 in IBM i	384
2947	IBM ARTIC960Hx 4-port Multiprotocol PCI Adapter (FC 2947) • 32-bit PCI • Provides 4-ports with different protocols, EIA-232, EIA530, RS-449, X.21, or V.35 • OS support: AIX operating system	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	16	16

Table 5. Slot placement priorities and maximums (continued)

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
2962	2-port Multiprotocol PCI Adapter (FC 2962) • Provides a two-port connection to X.25 packet switched networks • Two high-speed WAN connections • OS support: AIX operating system	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	20
6805	PCI 2-Line WAN IOA (FC 6805; CCIN 2742) • Short, 32-bit, 66 MHz • No IOP • OS support: IBM i and Linux operating systems	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	300
6808	PCI Quad Modem IOA (FC 6808; CCIN 2805) • Long, 32-bit, 66 MHz • Non-CIM • OS support: IBM i operating system	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	150
6809	PCI Quad Modem IOA (FC 6809; CCIN 2805) • Long, 32-bit, 66 MHz • CIM • OS support: IBM i operating system	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	150
6833	PCI 2-Line WAN with Modem No IOP (FC 6833; CCIN 2793) • Two lines per port WAN with modem adapter • Non-CIM • OS support: IBM i and Linux operating systems	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	239
6834	PCI 2-Line WAN with Modem No IOP CIM (FC 6834; CCIN 2793) • Two lines per port WAN with modem adapter • CIM • OS support: IBM i and Linux operating systems	8, 18, 9, 19, 10, 20, 1, 11, 2, 12, 3, 13, 4, 14, 5, 15, 6, 16, 7, 17	20	239

Table 5. Slot placement priorities and maximums (continued)

FC	Description	Expansion unit slot priority	Maximum number per expansion unit [1]	System maximum
[1]These maximums are for connectivity. The following items are additional restrictions: • Maximum of four extra-high bandwidth (EHB) Ethernet adapters per processor. Any additional EHB or high bandwidth (HB) adapters would require additional processors. • Maximum of eight HB Ethernet adapters per processor. Any additional EHB or HB adapters would require additional processors. [2]Extra-high bandwidth (EHB) adapter. See the "Performance notes" before installing this adapter. [3]High bandwidth (HB) adapter. See the "Performance notes" before installing this adapter. [4]FC 5782 is a double-wide adapter pair. The CCIN 571F and 575B adapters can be placed in slots 1, 2, 3, 4, 5, 6, 7, 11, 12, 13, 14, 15, 16, and 17. The double-wide adapter requires two adjacent slots. The SCSI controller side of the adapter pair requires a 64-bit slot. Slots 1 and 11 can be used to install the SCSI controller side (571F) of the adapter. Slots 2, 3, 4, 5, 6, 12, 13, 14, 15, and 16 can be used for either side of the adapter. Slots 7 and 17 can be used for the cache side (575B) of the 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.

Table 5 on page 11 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. Use the following guidelines for connecting the adapters:

- Attach no more than three Gb Ethernet ports per PHB.
- Attach no more than three high-bandwidth adapters per PHB.
- Attach no more than one extra-high bandwidth adapter per PHB.
- Attach 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 are allowed for optimum performance.
- Attach 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 can be attached to the same PHB because one of these adapters can be a high-performance adapter.

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

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

PCI slot priorities for the 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 attached to the system by using 12X double data rate (DDR) cables.

The expansion units can accommodate 20 PCIe, 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.

Figure 2 shows the rear view of the expansion unit.

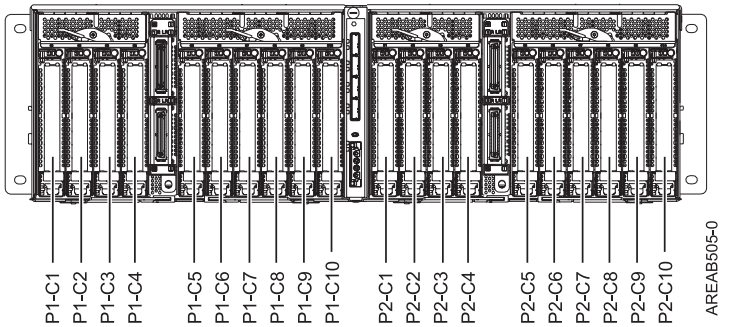

Figure 2. Rear view

Table 6 describes the location codes that are shown in Figure 2.

Table 6. Location code descriptions

Location code	I/O chip	PCI host bridge (PHB)	Description
P1-C1	I/O chip 1	PHB1	PCIe x8 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	

Table 6. Location code descriptions (continued)

Location code	I/O chip	PCI host bridge (PHB)	Description
P2-C1	I/O chip 4	PHB11	PCIe x8 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 9119-FHB system, place the adapters in the slots with the following slot priorities:

2 planar loop

The following sequence is the slot priority for all adapters that use 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 that use 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 that use 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 three or four 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 slots 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 maximums for supported adapters

Table 7 shows the maximum number of supported adapters allowed for connectivity by feature code (FC). However, for optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. Performance notes follow the table.

Table 7. Slot maximums

FC	Description	Maximum numbers per Expansion unit	System maximum for the 9119-FHB
2943	8-port Asynchronous EIA-232E/RS-422A PCI Adapter (FC 2943; CCIN 3-B) • PCI bus • 8 Async ports • OS support: AIX operating system	18	18
5289	PCIe 2-port Async EIA-232 PCIe 1X LPC Adapter (FC 5289; CCIN 57D4) • Short, x1 • PCIe 1.1 • Two ports through RJ45 by using the DB9 connector • EIA-232 Compatible • OS support: AIX, IBM i, and Linux operating systems	20	60
5723	2-port Asynchronous EIA-232 PCI Adapter (FC 5723; CCIN 5723) • PCI adapter • 2-port EIA-232 asynchronous serial communications • 16C850 UART equivalent • OS support: AIX and Linux operating systems	18	18
5785	4 Port Async EIA-232 PCIe Adapter (FC 5785; CCIN 57D2) • Short, x1 • OS support: AIX and Linux operating systems	20	18
5735[1]	8 Gb PCI Express Dual-port Fibre Channel Adapter (FC 5735; CCIN 577D) • Short, x8 • 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 must be treated as two extra-high bandwidth adapters. • OS support: AIX, IBM i, and Linux operating systems	20	256
5773[3]	4 Gb PCI Express Single Port Fibre Channel Adapter (FC 5773; CCIN 5773) • Short, x4 • High bandwidth • OS support: AIX and Linux operating systems	20	512

Table 7. Slot maximums (continued)

FC	Description	Maximum numbers per Expansion unit	System maximum for the 9119-FHB
5774[2]	4 Gb PCI Express Dual-port Fibre Channel Adapter (FC 5774; CCIN 5774) • Short, x4 • Extra-high bandwidth • OS support: AIX, IBM i, and Linux operating systems	20	512
5748	POWER GXT145 PCI Express Graphics Accelerator (FC 5748; CCIN 5748) • Short, x1 • Not hot-pluggable • OS support: AIX and Linux operating systems	4	8
EJ0J	PCIe3 RAID SAS Adapter (FC EJ0J; CCIN 57B4) • Regular-height adapter • PCIe3, short, x8 • Transfer speed of 6 Gbps • No write cache • One PCIe x8 slot per adapter • Adapters can be installed singly or in pairs • OS support: AIX, IBM i, and Linux operating systems	8	256
EJ0L	PCIe3 12 GB Cache RAID SAS quad-port 6 Gb Adapter (FC EJ0L; CCIN 57CE) • Regular-height adapter, short • PCIe3 x8 • Transfer speed of 6 Gbps • 12 GB write cache • One PCIe x8 slot per adapter • Adapters are installed in pairs • OS support: AIX, IBM i, and Linux operating systems	8	256
EJ0X	PCIe3 SAS Tape Adapter Quad-port 6Gb x8 (FC EJ0X; CCIN 57B4) • Regular-height adapter • PCIe3 x8 • Transfer speed of 6 Gbps • Supports LTO-5 or LTO-6 tape drives • No write cache • One PCIe x8 slot per adapter • OS support: AIX, IBM i, and Linux operating systems	8	256
EJ10	PCIe3 4 x8 SAS Port Adapter (FC EJ10; CCIN 57B4) • Regular-height adapter • PCIe3 x8 • Transfer speed of 6 Gbps • Supports DVD and tape drives • No write cache • One PCIe x8 slot per adapter • OS support: AIX, IBM i, and Linux operating systems	8	256

Table 7. Slot maximums (continued)

FC	Description	Maximum numbers per Expansion unit	System maximum for the 9119-FHB
5708[1]	10 Gb FCoE PCIe Dual-port Adapter (FC 5708; CCIN 2B3B) • Low-profile capable • Extra-high bandwidth • PCIe 2.0 adapter with x8 generation 1 • Convergence enhanced Ethernet (CEE) supported • OS support: AIX, IBM i with VIOS, and Linux operating systems	20	256
5717[3]	4-port 10/100/1000 Base-TX PCI Express Adapter (FC 5717; CCIN 5717) • Short, x4 • High bandwidth • OS support: AIX and Linux operating systems	20	256
5732[2]	10 Gb Ethernet-CX4 PCI Express Adapter (FC 5732; CCIN 2B43) • Short, x8 • Extra-high bandwidth • OS support: AIX and Linux operating systems	20	256
5767[3]	2-port 10/100/1000 Base-TX Ethernet PCI Express Adapter (FC 5767; CCIN 5767) • Short, x4 • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	20	512
5768[3]	2-port Gigabit Ethernet-SX PCI Express Adapter (FC 5768; CCIN 5768) • Short, x4 • High bandwidth • OS support: AIX, IBM i, and Linux operating systems	20	512
5769[2]	10 Gb Ethernet-SR PCI Express Adapter (FC 5769; CCIN 2B44) • Short, full-high, x8 • Regular-height • Extra-high bandwidth • OS support: AIX and Linux operating systems	20	256
5772[2]	10 Gb Ethernet-LR PCI Express Adapter (FC 5772; CCIN 576E) • Short, x8 • Regular-height card • Extra-high bandwidth • OS support: AIX, IBM i, and Linux operating systems	20	256
5899[3]	PCIe2 4-port 1 GbE Adapter (FC 5899; CCIN 576F) • Regular-height adapter • PCIe generation 1 or generation 2, x4 • High bandwidth • Four-port 1 Gb Ethernet • OS support: AIX, IBM i, and Linux operating systems	14	256

Table 7. Slot maximums (continued)

FC	Description	Maximum numbers per Expansion unit	System maximum for the 9119-FHB
EC28[2]	PCIe2 2-port 10 GbE RoCE SFP+ adapter (FC EC28; CCIN EC27) • Regular-height adapter • PCIe generation 2, x8 • Extra-high bandwidth, low latency 10 Gb Ethernet • OS support: AIX and Linux operating systems • Firmware level 7.6, or later	8	128
EC30[2]	PCIe2 2-port 10 GbE RoCE SR adapter (FC EC30; CCIN EC29) • Regular-height adapter • PCIe generation 2, x8 • Extra-high bandwidth, low latency 10 Gb Ethernet • OS support: AIX and Linux operating systems • Firmware level 7.6, or later	8	128
2728	4-port USB PCIe Adapter (FC 2728; CCIN 57D1) • Regular-height adapter • Single-slot, half-length PCIe adapter • PCIe 1.1 • OS support: AIX and Linux operating systems	20	8
4808	PCIe Cryptographic Coprocessor (FC 4808; CCIN 4765) • Generation 3 blind-swap cassette • PCIe x4, full-height, half-length • OS support: AIX and IBM i operating systems	4	10
5901[2]	PCIe Dual - x4 SAS Adapter (FC 5901; CCIN 57B3) • Short • Extra-high bandwidth • OS support: AIX, IBM i, and Linux operating systems	20	240
5903[2]	PCIe 380 MB Cache Dual x4 3 Gb SAS RAID Adapter (FC 5903; CCIN 574E) • Short • Extra-high bandwidth • Installed in pairs • OS support: AIX and Linux operating systems	20	240
5906[2]	PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5906; CCIN 572F, 575C) • Long, 64-bit, 3.3 V • Extra-high bandwidth • Generation 2.5 blind-swap cassette • Double-wide adapter requires two adjacent slots: – 572F is the CCIN on the SAS controller side of the double-wide adapter. – 575C is the CCIN on the write-cache side of the double-wide adapter. • OS support: AIX, IBM i, and Linux operating systems	4	180

Table 7. Slot maximums (continued)

FC	Description	Maximum numbers per Expansion unit	System maximum for the 9119-FHB
5913	PCIe2 1.8 GB Cache RAID SAS Tri-port 6 Gb Adapter (FC 5913; CCIN 57B5) • Full-height, short, PCIe2 x8 • Transfer speed of 6 Gbps • Write cache backup of 1.8 GB • One PCIe x8 slot per adapter • Adapters are installed in pairs • OS support: AIX, IBM i, and Linux operating systems	16	256
ESA1	PCIe2 RAID SAS Adapter Dual-port 6 Gb (FC ESA1; CCIN 57B4) • Regular-height adapter • PCIe generation 2, x8 • OS support: AIX, IBM i, and Linux operating systems	20	256
2893	576C	PCI Express 2-Line WAN with Modem (FC 2893; CCIN 576C) • Short, x4 • Non-CIM • OS support: AIX, IBM i, and Linux operating systems	
2894	576C	PCI Express 2-Line WAN with Modem (FC 2894; CCIN 576C) • Short, x4 • CIM • OS support: AIX, IBM i, and Linux operating systems	
EN13	PCI Express 2-Line WAN with Modem (FC EN13; CCIN 576C) • Short, x4 • Non-CIM • OS support: IBM i operating system	20	300

Table 7. Slot maximums (continued)

FC	Description	Maximum numbers per Expansion unit	System maximum for the 9119-FHB
EN14	PCI Express 2-Line WAN with Modem (FC EN14; CCIN 576C) • Short, x4 • CIM • OS support: IBM i operating system	20	300
[1]Extra-high bandwidth (EHB) adapter. If FC 5708 or FC 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. [2]Extra-high bandwidth (EHB) adapter. See the "Performance notes" before installing this adapter. [3]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.

Table 7 on page 21 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. Use the following guidelines for connecting the adapters:

- Attach no more than three Gb Ethernet ports per PHB.
- Attach no more than three high-bandwidth adapters per PHB.
- Attach no more than one extra-high bandwidth adapter per PHB.
- Attach 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 are allowed for optimum performance.
- Attach 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 InfiniBand I/O hub controller, in the 9119-FHB system.

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European Community contact:
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IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 7032 15 2941
email: lugi@de.ibm.com

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