



Power Systems  
Cabling your server







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**Note**

Before using this information and the product it supports, read the information in “Notices,” on page 15, “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.

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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, 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.



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## Cabling your server

Learn how to cable your server to a console, terminal, or interface (such as the Advanced System Management Interface (ASMI)), to an expansion unit, or to other adapters and peripheral equipment.

To learn more about the consoles, terminals, and interfaces that are available for your server, see the following descriptions.

### **Advanced System Management Interface (AIX®, IBM i, and Linux operating systems)**

The Advanced System Management Interface (ASMI) is the interface to the service processor on your system. From the ASMI, you can perform tasks such as controlling the firmware power-on settings, Time of Day, and network configuration. Set up access to the ASMI if you plan to manage the IBM AIX, IBM i, or Linux operating system without a Hardware Management Console (HMC). If your system is managed by an HMC, you can access the ASMI through the HMC when you need to use it.

### **Hardware Management Console (AIX, IBM i, and Linux operating systems)**

The HMC is a dedicated workstation that runs integrated system management software. The HMC manages hardware tasks and configures logical partitions on managed systems. It also acts as a focal point for hardware detection and reporting. You can use the HMC to manage System i® models, System p® servers, or the IBM Power Systems™ servers.

### **Integrated Virtualization Manager (AIX or Linux operating system)**

The Integrated Virtualization Manager provides a Web-based system-management interface and a command-line interface that you can use to manage and configure IBM System p servers or IBM Power Systems servers that run AIX or Linux and use the IBM Virtual I/O Server. On the managed system, you can create logical partitions, manage the virtual storage and virtual Ethernet, and view service information related to the server. The Integrated Virtualization Manager is packaged with the Virtual I/O Server, but it is enabled only on certain platforms and where no Hardware Management Console (HMC) is present.

### **ASCII terminal (AIX or Linux operating system)**

The ASCII terminal is connected to a server running AIX or Linux through a serial link. You can use the terminal with or without the HMC.

### **Graphics terminal (AIX or Linux operating system)**

The graphics terminal is available to customers who want to use a graphical user interface (GUI) to their AIX or Linux servers. You can use the graphics terminal with or without the HMC.

### **Operations Console (IBM i operating system)**

Use Operations Console to access and control System i models or IBM Power Systems servers that are running the IBM i operating system. You can set up Operations Console if you plan to manage the IBM i operating system in a partitioned or nonpartitioned environment. In a partitioned environment, you must also use the HMC or the ASMI to configure, manage, and maintain your hardware.

### **Twinaxial console (IBM i operating system)**

The twinaxial console uses a command-line interface to access and manage the IBM i operating system without the need for a PC to act as a console. You can use a twinaxial console to manage IBM i in a partitioned or nonpartitioned environment. In a partitioned environment, you must also use the HMC or the ASMI to configure, manage, and maintain your hardware. For POWER6® systems, an HMC or Operations Console is required for your system console. However, you can use the twinaxial console as an alternative console if you install it in an expansion unit.

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## Cabling the IBM Power 520 Express® server (model 8203-E4A, 8261-E4S (IBM Smart Cubes), 9407-M15, or 9408-M25)

Learn how to cable your server to a console, terminal, or interface, such as the Advanced System Management Interface (ASMI), to an expansion unit, or to other adapters and peripheral equipment.

If you have hardware features that are not installed, install them now. For instructions, see *Installing and configuring the system and system devices*.

### 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.

### DANGER

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

(D005)

### DANGER

**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)

To cable your server:

1. Connect a console or interface to your server.

Console, terminal, or interface	Location of instructions
Advanced System Management Interface	Accessing the ASMI using the HMC or Accessing the ASMI without an HMC
Hardware Management Console	Cabling the HMC
Integrated Virtualization Manager	Integrated Virtualization Manager and Installing the Virtual I/O Server and client logical partitions
ASCII terminal	Cabling the server with a graphics console or ASCII terminal
Graphics terminal	Cabling the server with a graphics console or ASCII terminal
Operations Console	Cabling the Operations Console to your server
Twinaxial console	Cabling your server and a twinaxial console

2. Optional: Cable the expansion units, if applicable, to your server.
  - For information about installing expansion units, see *Installing expansion units*.
  - For information about connecting expansion units, see *Connecting your expansion units*.
3. Optional: Connect all external cables to the appropriate adapter connectors on the rear of your server. For information about specific connectors and adapters, see “Connectors and adapters” on page 10.

**Note:** You must provide the cable if it was not provided with your server.

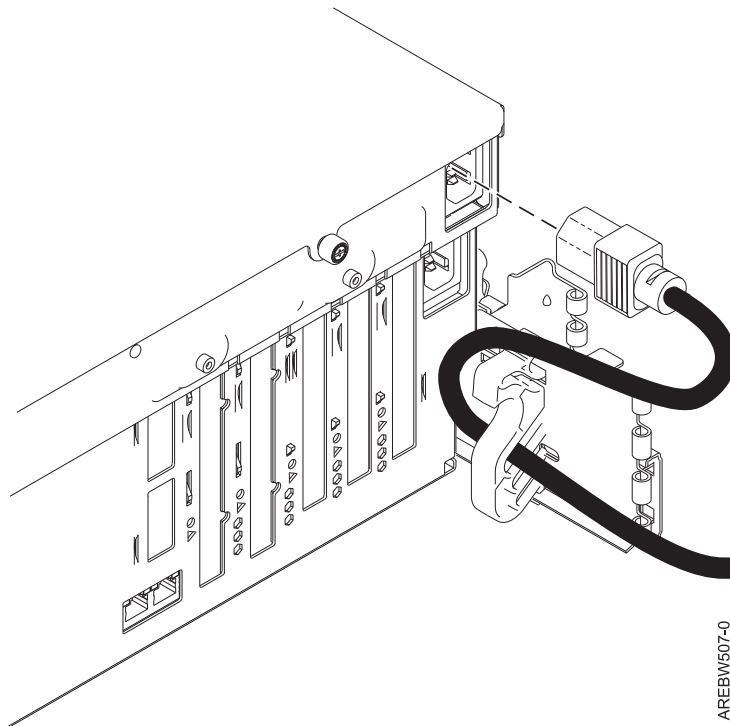
4. Optional: If you are attaching devices by using a system serial port, be aware of the following conditions and follow these instructions:
  - If you are connecting the server to an uninterruptible power supply, see the documentation that is included with your uninterruptible power supply. You might need additional hardware.
  - Each system serial port on the rear of the server is disabled when your server is connected to the HMC.
  - If you want to access the ASMI when the system is in standby mode, attach an ASCII terminal to a system serial port on the rear of the server.
  - If you want to access the ASMI remotely when the system is in standby mode, attach a modem to a system serial port on the rear of the server.

To view locations of system serial ports, see *Locations*.

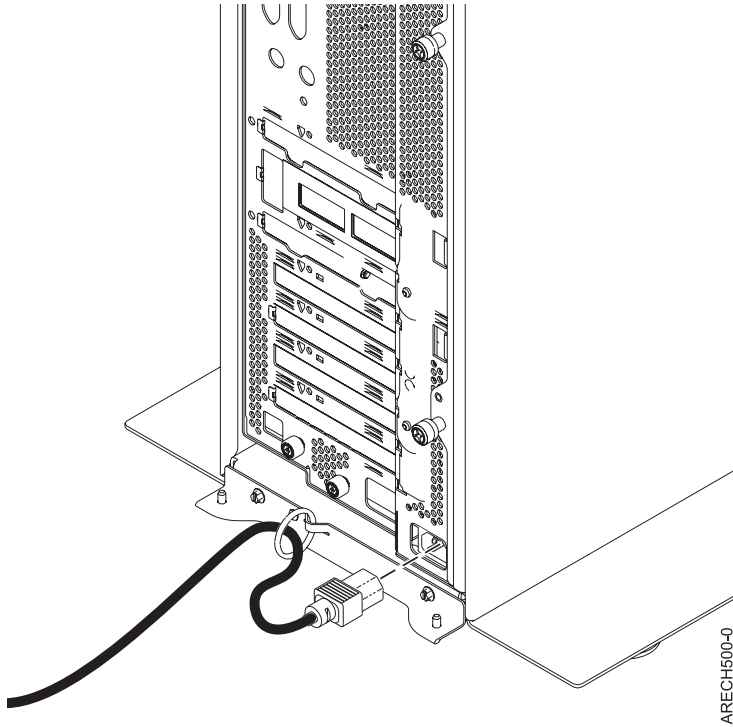
**Notes:**

- Use a system serial port for a local teletypewriter (tty) console, such as the ASCII terminal, or for support of the call home feature.
- The attachment of IBM High-Availability Cluster Multiprocessing (HACMP™) cables to a system serial port on the rear of the server is not supported.

5. Optional: If you have a PCI Cryptographic Coprocessor card to install, install it now. For instructions, see Model 8203-E4A, 9407-M15, and 9408-M25 PCI adapters.
6. After you connect other devices to your server, route the server power cord through the retention bracket or through the retention ring as follows:
  - a. If your server is equipped with a retention bracket, route the power cord through the bracket before you plug it into the rear of the server.
  - b. If your server is mounted in a rack, route the power cord through the retention bracket, as shown in the following figure.

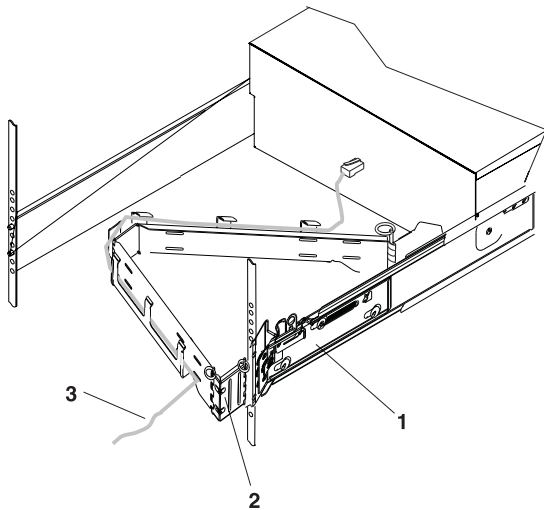


- c. If you are installing your server desk-side, route the power cord through the retention ring, as shown in the following figure.



7. Optional: If your server is installed in a rack, route the cables through the cable-management arm. Follow these steps:

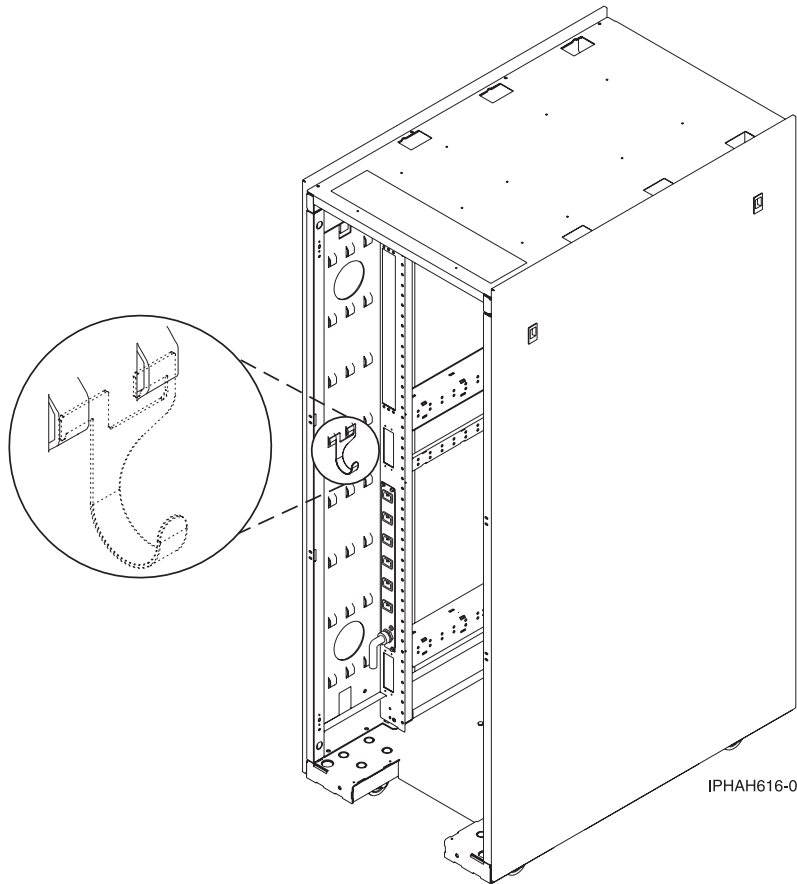
- a. Place the rack-mounted system in the service position. For instructions, see Place the rack-mounted model 8204-E8A, 8203-E4A, 9407-M15, 9408-M25, or 9409-M50 in the service position.
- b. Route the cables through the hooks that are located along the cable-management arm, and secure them with the straps that are provided, as shown in the following figure.



- 1 System rail
- 2 Cable management arm
- 3 Cable

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- c. After you attach the cables to the cable-management arm, go to the front of the rack and move the system drawer in and out. Observe the cables and cable-management-arm movement to verify that the cables are not binding.
8. Optional: If you have a cable hook for your rack, slide the cable hook into the slots, which are located on the rear of the rack. See the following figure.



The cable hook can help manage the server cables in the rear of the rack.

#### Related information

- [8203-E4A \(IBM Power 520 Express\)](#)
- [8261-E4S \(IBM Power 520 Express\)](#)
- [9407-M15 \(IBM Power 520 Express\)](#)
- [9408-M25 \(IBM Power 520 Express\)](#)

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## Cabling the 8204-E8A and 9409-M50

Learn how to cable your server to a console, terminal, or interface, such as the Advanced System Management Interface (ASMI), to an expansion unit, or to other adapters and peripheral equipment.

If you have hardware features that are not installed, install them now. For instructions, see *Installing and configuring the system and system devices*.

**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.

**DANGER**

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

(D005)

**DANGER**

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)

To cable your server:

1. Connect a console or interface to your server.

Console, terminal, or interface	Location of instructions
Advanced System Management Interface	Accessing the ASMI using the HMC or Accessing the ASMI without an HMC
Hardware Management Console	Cabling the HMC

Console, terminal, or interface	Location of instructions
Integrated Virtualization Manager	Integrated Virtualization Manager and Installing the Virtual I/O Server and client logical partitions
ASCII terminal	Cabling the server with a graphics console or ASCII terminal
Graphics terminal	Cabling the server with a graphics console or ASCII terminal
Operations Console	Cabling the Operations Console to your server
Twinaxial console	Cabling your server and a twinaxial console

2. Optional: Cable the expansion units, if applicable, to your server.
  - For information about installing expansion units, see *Installing expansion units*.
  - For information about connecting expansion units, see *Connecting your expansion units*.
3. Optional: Connect all external cables to the appropriate adapter connectors on the rear of your server. For information about specific connectors and adapters, see “Connectors and adapters” on page 10.

**Note:** You must provide the cable if it was not provided with your server.

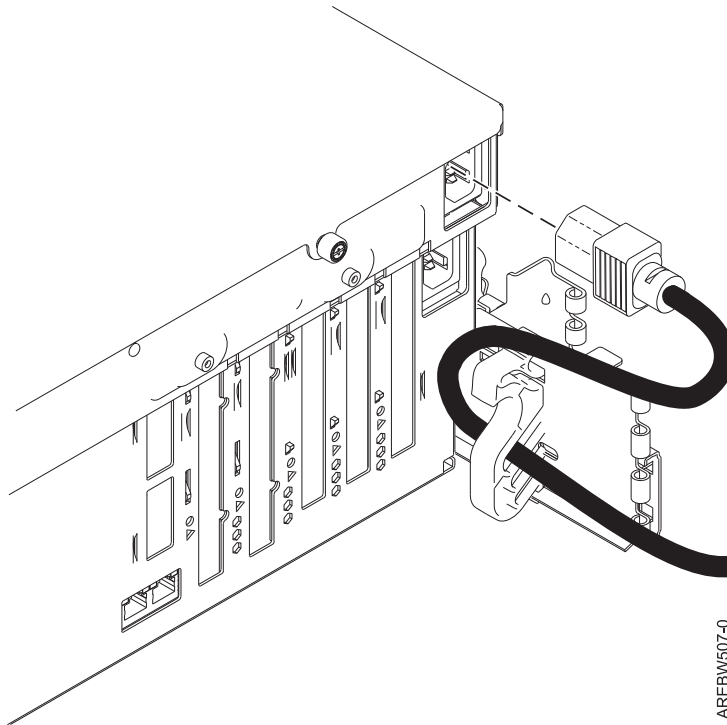
4. Optional: If you are attaching devices by using a system serial port, be aware of the following conditions and follow these instructions:
  - If you are connecting the server to an uninterruptible power supply, see the documentation that is included with your uninterruptible power supply. You might need additional hardware.
  - Each system serial port on the rear of the server is disabled when your server is connected to the HMC.
  - If you want to access the ASMI when the system is in standby mode, attach an ASCII terminal to a system serial port on the rear of the server.
  - If you want to access the ASMI remotely when the system is in standby mode, attach a modem to a system serial port on the rear of the server.

To view locations of system serial ports, see *Locations*.

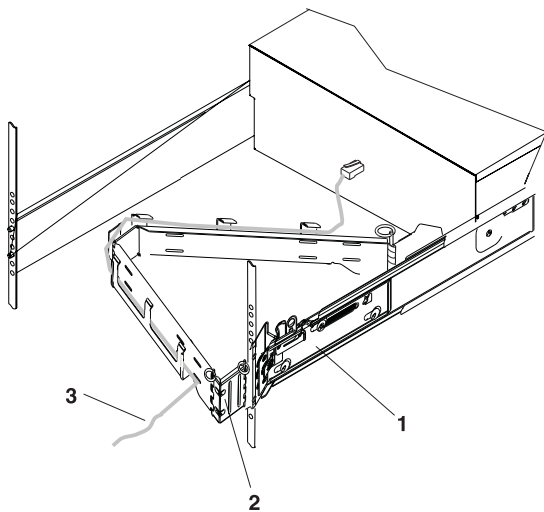
**Notes:**

- Use a system serial port for a local teletypewriter (tty) console, such as the ASCII terminal, or for support of the call home feature.
  - The attachment of IBM High-Availability Cluster Multiprocessing (HACMP) cables to a system serial port on the rear of the server is not supported.
5. Optional: If you have a PCI Cryptographic Coprocessor card, install it now. For instructions, see Model 8204-E8A and 9409-M50 PCI adapters.
  6. After you connect other devices to your server, route the server power cord through the provided retention bracket as follows:
    - a. Route the power cord through the retention bracket before you plug the cord into the rear of the server. See the following figure.





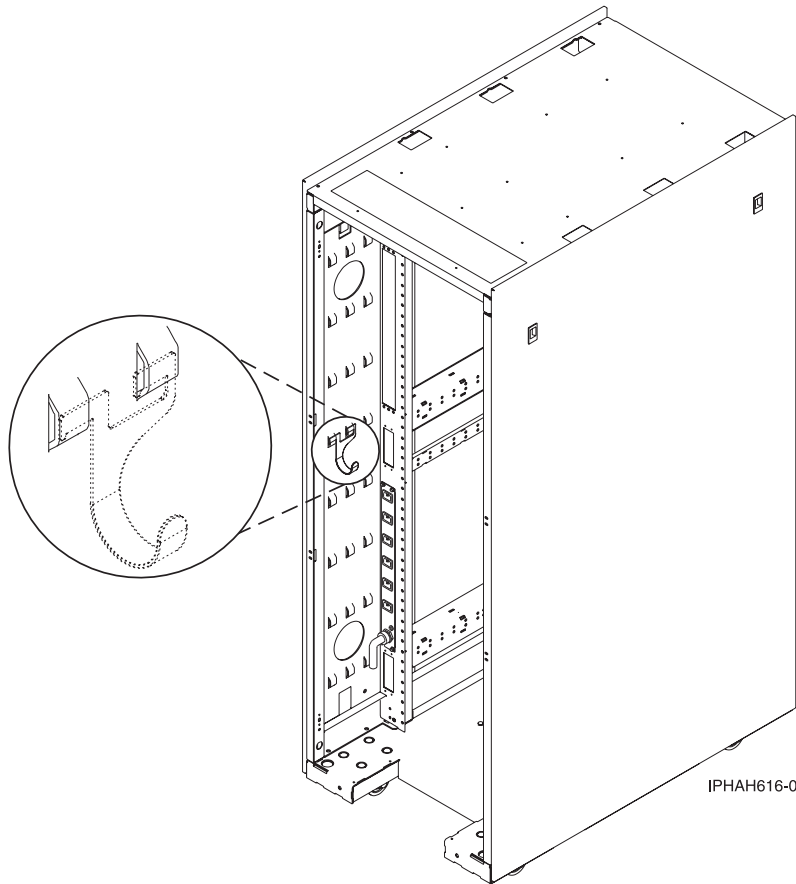
7. Optional: If your server is installed in a rack, route the cables through the cable-management arm. Follow these steps:
- a. Place the rack-mounted system in the service position. For instructions, see Place the rack-mounted model 8204-E8A, 8203-E4A, 9407-M15, 9408-M25, or 9409-M50 in the service position.
  - b. Route the cables through the hooks that are located along the cable-management arm, and secure them with the straps that are provided, as shown in the following figure.



- 1 System rail
- 2 Cable management arm
- 3 Cable

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- c. After you attach the cables to the cable-management arm, go to the front of the rack and move the system drawer in and out. Observe the cables and cable-management-arm movement to verify that the cables are not binding.
- 8. Optional: If you have a cable hook for your rack, slide the cable hook into the slots, which are located on the rear of the rack. See the following figure.



The cable hook can help manage the server cables in the rear of the rack.

**Related information**

- 8204-E8A (IBM Power 550 Express)
- 9409-M50 (IBM Power 550 Express)

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## Connectors and adapters

Learn about the connectors and adapters that might be installed on your model.

The following table shows some of the connectors and adapters that support the IBM i operating system.

*Table 1. Connectors and adapters that support the IBM i operating system*


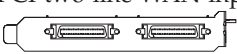
Connectors	Adapter type numbers	Adapters (located on the back of the server)
<b>PCI two-line WAN</b>		
44H7xxx or 97H73xx 	2742/2745/4745 <b>Note:</b> This adapter is supported only on the POWER5 platform.	PCI two-line WAN input/output adapter 

Table 1. Connectors and adapters that support the IBM i operating system (continued)

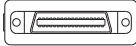



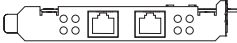

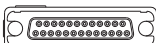
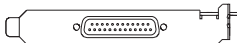






Connectors	Adapter type numbers	Adapters (located on the back of the server)
<p>44H7xxx, 97H73xx, or 44H748x</p>  <p><b>Integrated modem</b></p> <p>87G62xx, 21H49xx, or 75G38xx</p> 	2771/2793/2794	<p>PCI two-line WAN with modem input/output adapter</p> 
<b>PCI dual WAN</b>		
<p><b>Integrated modem</b></p> <p>87G62xx, 21H49xx, or 75G38xx</p> 	2772/2773	<p>PCI dual WAN with modem input/output adapter</p> 
<p><b>Bell-2 adapter</b></p>	5289/5290	<p>Async 2-port adapter</p> 
<b>PCI twinaxial</b>		
<p>Part number 12F5093</p> 	2746/4746/9746	<p>PCI twinaxial workstation controller input/output adapter</p> 
<b>PCI token-ring</b>		
<p>RJ45 token-ring</p>  <p>Filter P75G5958 or 75G2865</p>  <p>6339098</p> 	2744/4959	<p>PCI 4/16/100 Mbps token-ring input/output adapter</p> 
<b>PCI Quad</b>		
	2805/2806	<p>PCI Quad modem input/output adapter</p> 
	6312	<p>PCI Quad digital trunk adapter</p> 
<b>Ethernet</b>		

Table 1. Connectors and adapters that support the IBM i operating system (continued)


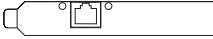

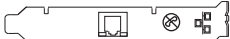
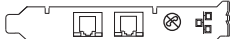


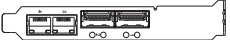





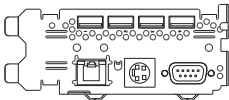


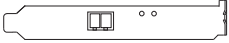

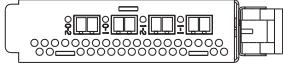
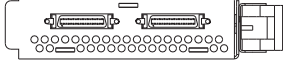

Connectors	Adapter type numbers	Adapters (located on the back of the server)
RJ45 Ethernet 	2838/2849 <b>Note:</b> This adapter is supported only on the POWER®5 platform.	PCI 100/10 Mbps Ethernet input/output adapter 
	5700	PCI 1 Gbps Ethernet input/output adapter 
	5701	PCI 1 Gbps Ethernet UTP input/output adapter 
	5706	PCI 1 Gbps Ethernet TX input/output adapter 
	5707	PCI 1 Gbps Ethernet SX input/output adapter 
	5718	PCI 10 Gbps Ethernet input/output adapter 
	5745/5274	Red River-2 4-port adapter. 2-port is 1 Gb Copper port and the other 2-port is 10 Gb SFP copper port 
	5744/5280	Red River-2 4-port adapter. 2-port is 1 Gb Copper part and other 2 port is 10 Gb SFP with SR fiber port 
	5765/5525	Red River-2 4-port adapter with 1 Gb Copper port. 
<b>Server cards</b>		
Part number 45H2433 44H8677 connects to cable 45H2433  Video extension cable, 44H8676 	2891/2892	IBM Netfinity® Server Card 

Table 1. Connectors and adapters that support the IBM i operating system (continued)

Connectors	Adapter type numbers	Adapters (located on the back of the server)
	4810/9710	Integrated IBM xSeries® server card 
	4821/9712	Integrated xSeries server card
<b>RAID disk unit controllers</b>		
	2757	PCI Ultra RAID disk unit controller
	2780	PCI-X Ultra4 RAID disk unit controller
	4778/5703	PCI-X RAID disk unit controller 
	5709	RAID enabler card
<b>Fibre channel disk unit controllers</b>		
	2787	PCI-X Fibre channel disk unit controller
<b>PCI cryptography</b>		
	4758-023/4801	PCI cryptographic coprocessor 
	2058/4805	PCI cryptographic accelerator
<b>PCI-X tape unit controllers</b>		
	5704	PCI-X fibre channel tape unit controller 
	5702/5712/5715	PCI-X U320 tape/disk unit controller 
<b>Bus adapters</b>		
	2886	Optical bus adapter 
	2887	HSL-2 bus adapter 
	28E7/6417	HSL-2/RIO-G bus adapter 

### Related information

 [Managing PCI adapters](#)



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## Appendix. Notices

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### Class A Notices

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### 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.

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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.

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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

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VCCI-A

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**声 明**

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種情況下，使用者會被要  
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**IBM Taiwan Contact Information:**

台灣IBM 產品服務聯絡方式：  
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Verantwortlich für die Konformitätserklärung nach des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

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