

Power Systems

*Installing the IBM Power System
S822L (8247-22L)*



Power Systems

*Installing the IBM Power System
S822L (8247-22L)*



Note

Before using this information and the product it supports, read the information in “Safety notices” on page v, “Notices” on page 53, 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 POWER8 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.

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:

- If IBM supplied the power cord(s), 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.
- Do not attempt to switch on power to the machine until all possible unsafe conditions are corrected.
- Assume that an electrical safety hazard is present. Perform all continuity, grounding, and power checks specified during the subsystem installation procedures to ensure that the machine meets safety requirements.
- Do not continue with the inspection if any unsafe conditions are present.
- 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.

Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching.

(D005)

(R001 part 1 of 2):

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.

(R001 part 2 of 2):

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.

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 (compliance ID RACK-001 or 22U (compliance ID RR001) and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are little-to-no empty U-levels between devices installed in the rack cabinet below the 32U (compliance ID RACK-001 or 22U (compliance ID RR001) level, unless the received configuration specifically allowed it.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- 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)



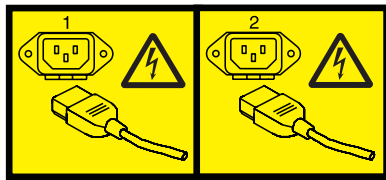
DANGER: Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label. (L001)

(L002)



DANGER: Rack-mounted devices are not to be used as shelves or work spaces. (L002)

(L003)



or



or



or



or



DANGER: Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)

(L007)



CAUTION: A hot surface nearby. (L007)

(L008)



CAUTION: Hazardous moving parts nearby. (L008)

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. Although shining light into one end and looking into the other end of a disconnected optical fiber to verify the continuity of optic fibers may not injure the eye, this procedure is potentially dangerous. Therefore, verifying the continuity of optical fibers by shining light into one end and looking at the other end is not recommended. To verify continuity of a fiber optic cable, use an optical light source and power meter. (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)

(C048)

CAUTION regarding IBM provided **VENDOR LIFT TOOL**:

- Operation of **LIFT TOOL** by authorized personnel only.
- **LIFT TOOL** intended for use to assist, lift, install, remove units (load) up into rack elevations. It is not to be used loaded transporting over major ramps nor as a replacement for such designated tools like pallet jacks, walkies, fork trucks and such related relocation practices. When this is not practicable, specially trained persons or services must be used (for instance, riggers or movers).
- Read and completely understand the contents of **LIFT TOOL** operator's manual before using. Failure to read, understand, obey safety rules, and follow instructions may result in property damage and/or personal injury. If there are questions, contact the vendor's service and support. Local paper manual must remain with machine in provided storage sleeve area. Latest revision manual available on vendor's web site.
- Test verify stabilizer brake function before each use. Do not over-force moving or rolling the **LIFT TOOL** with stabilizer brake engaged.
- Do not move **LIFT TOOL** while platform is raised, except for minor positioning.
- Do not exceed rated load capacity. See **LOAD CAPACITY CHART** regarding maximum loads at center versus edge of extended platform.
- Only raise load if properly centered on platform. Do not place more than 200 lb (91 kg) on edge of sliding platform shelf also considering the load's center of mass/gravity (CoG).
- Do not corner load the platform tilt riser accessory option. Secure platform riser tilt option to main shelf in all four (4x) locations with provided hardware only, prior to use. Load objects are designed to slide on/off smooth platforms without appreciable force, so take care not to push or lean. Keep riser tilt option flat at all times except for final minor adjustment when needed.
- Do not stand under overhanging load.
- Do not use on uneven surface, incline or decline (major ramps).
- Do not stack loads.
- Do not operate while under the influence of drugs or alcohol.
- Do not support ladder against **LIFT TOOL**.
- Tipping hazard. Do not push or lean against load with raised platform.
- Do not use as a personnel lifting platform or step. No riders.
- Do not stand on any part of lift. Not a step.
- Do not climb on mast.
- Do not operate a damaged or malfunctioning **LIFT TOOL** machine.
- Crush and pinch point hazard below platform. Only lower load in areas clear of personnel and obstructions. Keep hands and feet clear during operation.
- No Forks. Never lift or move bare **LIFT TOOL MACHINE** with pallet truck, jack or fork lift.
- Mast extends higher than platform. Be aware of ceiling height, cable trays, sprinklers, lights, and other overhead objects.
- Do not leave **LIFT TOOL** machine unattended with an elevated load.
- Watch and keep hands, fingers, and clothing clear when equipment is in motion.
- Turn Winch with hand power only. If winch handle cannot be cranked easily with one hand, it is probably over-loaded. Do not continue to turn winch past top or bottom of platform travel. Excessive unwinding will detach handle and damage cable. Always hold handle when lowering, unwinding. Always assure self that winch is holding load before releasing winch handle.
- A winch accident could cause serious injury. Not for moving humans. Make certain clicking sound is heard as the equipment is being raised. Be sure winch is locked in position before releasing handle. Read instruction page before operating this winch. Never allow winch to unwind freely. Freewheeling will cause uneven cable wrapping around winch drum, damage cable, and may cause serious injury. (C048)

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.

The dc-powered system is intended to be installed in a common bonding network (CBN) as described in GR-1089-CORE.

Installing the IBM Power System S822L (8247-22L)

Use this information to learn about installing the IBM Power[®] System S822L (8247-22L).

Determining your server type

Determine whether you are installing a rack-mounted server or a server that arrived preinstalled in a rack.

Determine which type of server you are installing. For more information, see the following table.

Table 1. Determine the type of server you are installing and follow the instructions to find related information.

Server type	Description	Where to find related information
Rack-mounted	Your system arrived without a rack, and you need to install the system into an existing rack.	"Installing a rack-based server"
Rack-based, water-cooled	Your water-cooled system arrived without a rack, and you need to install the system into an existing rack that is water-cooled capable.	"Installing a rack-based water-cooled server" on page 18
Preinstalled	Your system arrived preinstalled in a rack.	"Setting up a preinstalled server" on page 37

Installing a rack-based server

Use this information to learn about installing a rack-based server.

Prerequisite for installing the rack-mounted server

Use the information to understand the prerequisites that are required for installing the server.

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When using an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.

You might need to read the following documents before you begin to install the server:

- The latest version of this document is maintained online, see Installing the IBM Power System S822L (8247-22L)(http://www.ibm.com/support/knowledgecenter/POWER8/p8egj/p8egj_roadmap.htm).
- To plan your server installation, see Planning for the system (http://www.ibm.com/support/knowledgecenter/POWER8/p8had/p8had_8xx_kickoff.htm).
- If you are using a Hardware Management Console (HMC), see Obtaining and applying machine code updates for the HMC with an Internet connection (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/area3fixeshmc.htm>).

Consider the following prerequisites before you install the server:

1. Ensure that you have the following items before you start your installation:

- Phillips screwdriver
- Flat-head screwdriver
- Rack with two units of space

Note: If you do not have a rack that is installed, install the rack. For instructions, see Racks and rack features (http://www.ibm.com/support/knowledgecenter/POWER8/p8hbf/p8hbf_8xx_kickoff.htm).

2. Ensure that you have one of the following consoles:

- Hardware Management Console (HMC): Ensure that your HMC is at version 8 release 8.1.0, or later.
- Graphic monitor with keyboard and mouse.
- Teletype (tty) monitor with keyboard.

Completing inventory for your server

Use this information to complete inventory for your server.

To complete the inventory, complete the following steps:

1. Verify that you received all the boxes you ordered.
2. Unpack the server components as needed.
3. Complete a parts inventory before you install each server component by following these steps:
 - a. Locate the inventory list for your server.
 - b. Ensure that you received all the parts that you ordered.

Note: Your order information is included with your product. You can also obtain order information from your marketing representative or the IBM Business Partner.

If you have incorrect, missing, or damaged parts, consult any of the following resources:

- Your IBM reseller.
- IBM Rochester manufacturing automated information line at 1-800-300-8751 (United States only).
- The Directory of worldwide contacts website <http://www.ibm.com/planetwide>. Select your location to view the service and support contact information.

Determining and marking the location in the rack

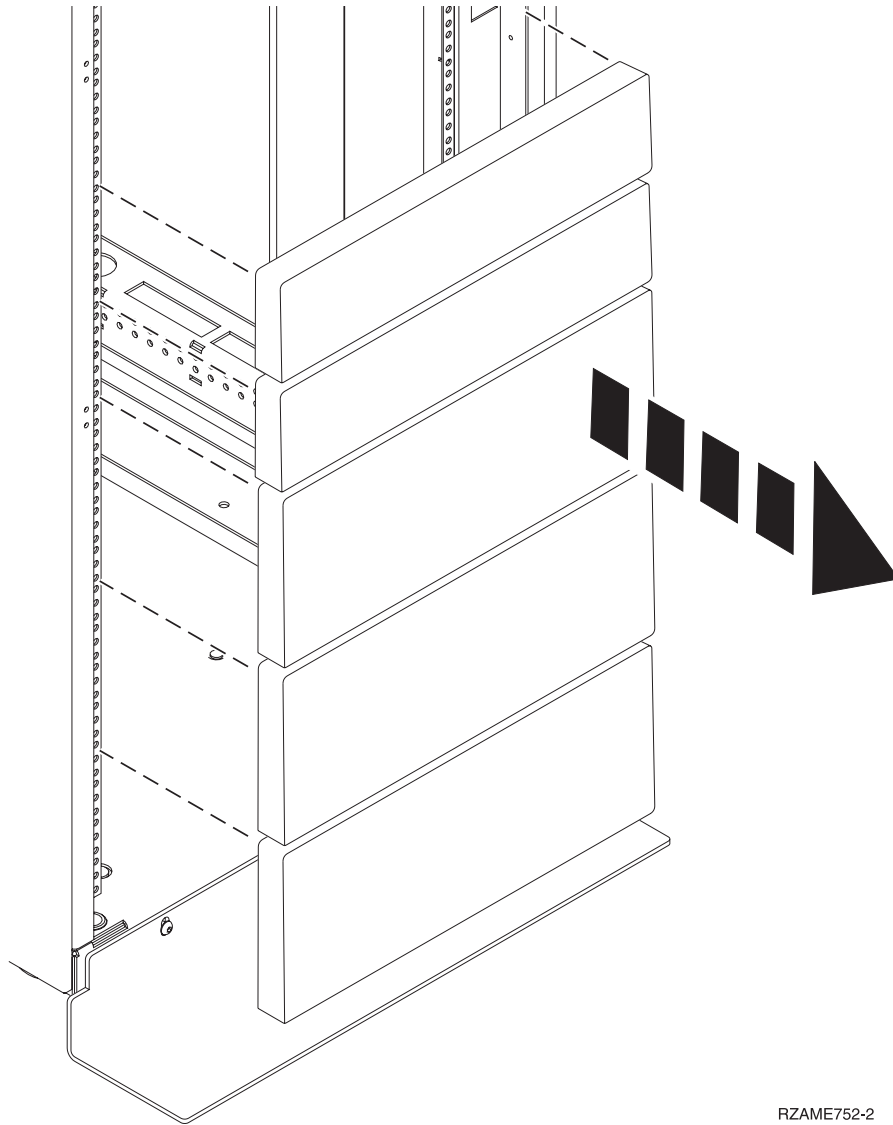
You might need to determine where to install the system unit into the rack.

To determine where to install the system unit into a rack, complete the following steps:

1. Read the Rack safety notices (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hbf/racksafety.htm>).
2. Determine where to place the system unit in the rack. As you plan for installing the system unit in a rack, consider the following information:
 - Organize larger and heavier units into the lower part of the rack.
 - Plan to install units into the lower part of the rack first.
 - Record the Electronic Industries Alliance (EIA) locations in your plan.

Note: The server is two EIA units high. An EIA unit is 44.55 mm (1.75 in.) in height. The rack contains three mounting holes for each EIA unit of height. This system unit, therefore, is 89 mm (3.5 in.) high and covers six mounting holes in the rack.

3. If necessary, remove the filler panels to allow access to the inside of the rack enclosure where you plan to place the unit, as shown in .



RZAME752-2

Figure 1. Removing the filler panels

4. Determine to place the system in the rack. Record the EIA location.
Note: An EIA unit on your rack consists of a grouping of three holes.
5. Facing the front of the rack and working from the right side, use tape, a marker, or pencil to mark the lower hole of each EIA unit.
6. Repeat step 5 for the corresponding holes located on the left side of the rack.
7. Go to the rear of the rack.
8. On the right side, find the EIA unit that corresponds to the bottom EIA unit marked on the front of the rack.
9. Place a self-adhesive dot at the bottom EIA unit.
10. Mark the corresponding holes on the left side of the rack.

Attaching the mounting hardware to the rack

You might need to attach the mounting hardware to the rack. Use the procedure to complete this task. The information is intended to promote safety and reliable operation, and includes illustrations of the related hardware components and shows how these components relate to each other.

Attention: To avoid rail failure and potential danger to yourself and to the unit, ensure that you have the correct rails and fittings for your rack. If your rack has square support flange holes or screw-thread support flange holes, ensure that the rails and fittings match the support flange holes that are used on your rack. Do not install mismatched hardware by using washers or spacers. If you do not have the correct rails and fittings for your rack, contact your IBM reseller.

To install the rack-mounting hardware into the rack, complete the following steps:

1. Each slide rail is marked with either an R (right) or an L (left), when you look from the front. Select the left slide rail, bring it to the rear of the rack, and locate the selected EIA unit that was previously marked.
2. Push up on the locking tab (1) on the front, and pull out the front latch (2) at the front of the rail. Then, remove the screw from the rear of the rail (3). For details, see Figure 2.

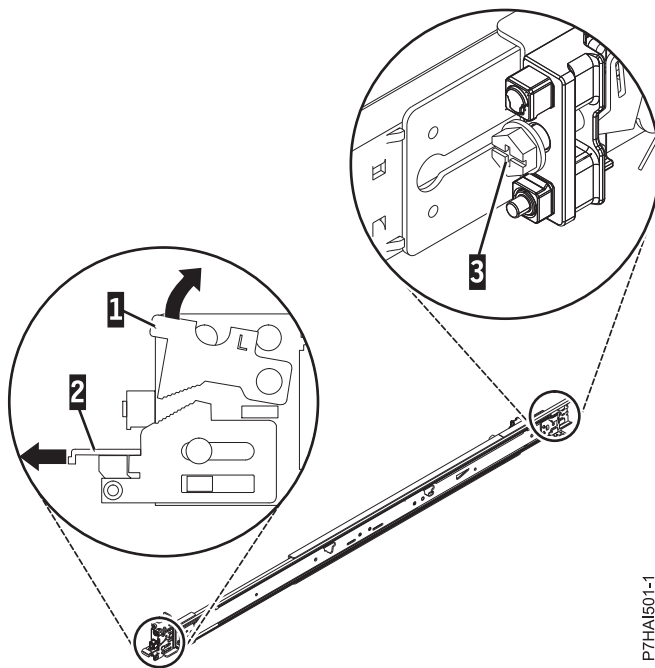


Figure 2. Opening the front latch and removing the rear screw

3. Align the two pins located on the rear of the slide rail with the top and bottom holes within the selected EIA unit that were previously marked. Pull the slide rail toward you to insert the two pins into the rack holes (1), and lower the slide rail down (2) to engage the hook feature on the top pin. For details, see Figure 3 on page 5. Ensure that the two pins protrude through the rack holes before you proceed to the next step.

Note: The pin fixtures of the slide rails support either round-hole or square-hole rack models.

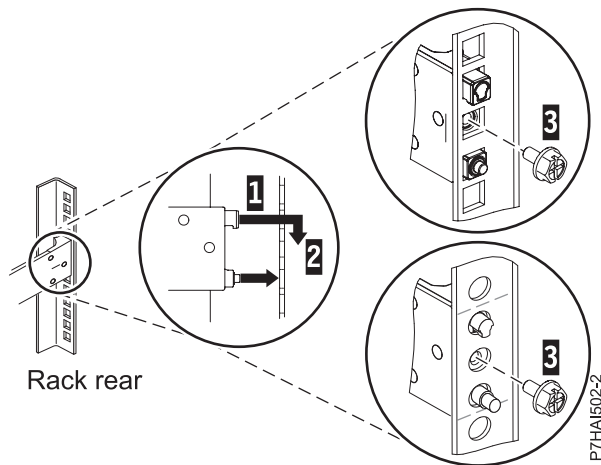


Figure 3. Aligning and engaging the pins into the holes in the rear of the rack

4. Reinstall the screw that was removed in step 2 on page 4, as shown in Figure 4.

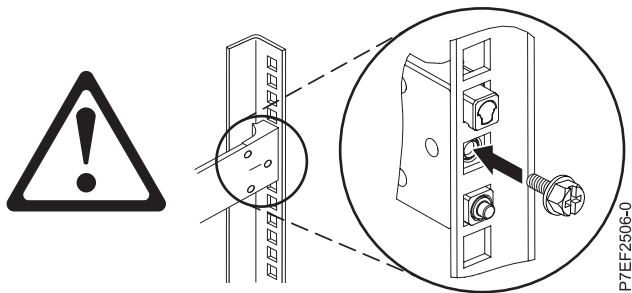


Figure 4. Reinstalling the screw

5. Return to the front of the rack. Ensure that the latch is still open on the front of the slide rail. Refer to step 2 on page 4.
6. Pull the slide rail forward and insert three pins on the front of the rail into the holes within the selected EIA unit that were previously marked. Lower the slide rail down (1) to engage the hook feature on the middle pin. For details, see Figure 5.

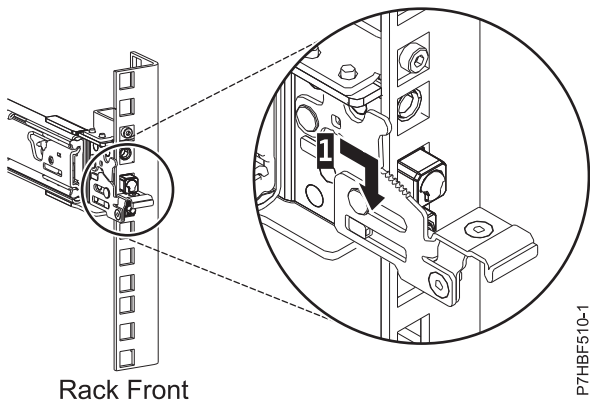


Figure 5. Pins that are seated on the front rail of the rack

7. While you pull the slide rail forward, ensure that all three pins protrude through the rack holes, then push the front latch (2) all the way in. For details, see Figure 6.

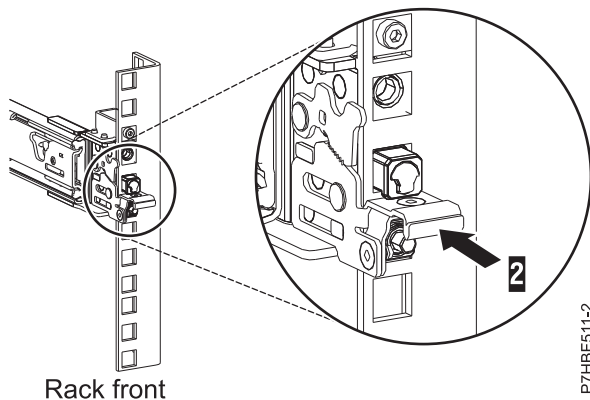


Figure 6. Latch seated on the front rail of the rack

Note: If you must reposition the rail, release the front latch (2), and while you press the blue pin at the bottom, push the rail up and toward the rear to release from the rack.

8. Repeat step 1 on page 4 through step 7 to install the right rail into the rack.

Installing the 8247-22L system into the rack

Use the procedure to install the 8247-22L system into the rack.

CAUTION:

This system requires three people to install the system into the rack.

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When using an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.

To install the system into the rack, complete the following steps:

1. Remove the shipping cover on the rear and the front of the system, if present.
2. Extend the slide rails forward (1) until they click twice into place. Carefully lift the server and tilt it into position over the slide rails so that the rear nail heads (2) on the server line up with the rear slots (3) on the slide rails. Slide the server down until the rear nail heads slip into the two rear slots. Then, slowly lower the front of the server (4) until the other nail heads slip into the other slots on the slide rails. Ensure that the front latch (5) slides over the nail heads.

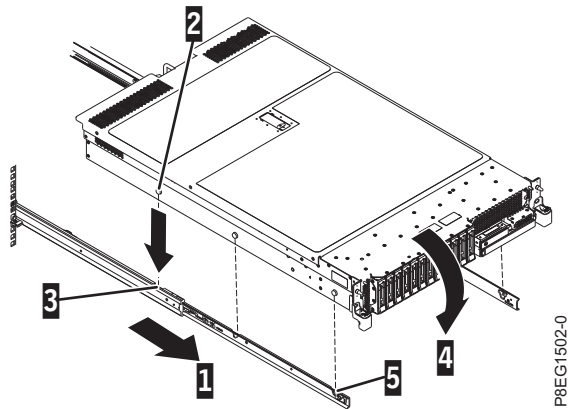


Figure 7. Extending slide rails and aligning server nail heads with the slots on the rail

3. Lift the blue release latches (1) on the slide rails and push the server (2) all the way into the rack until it clicks into place.

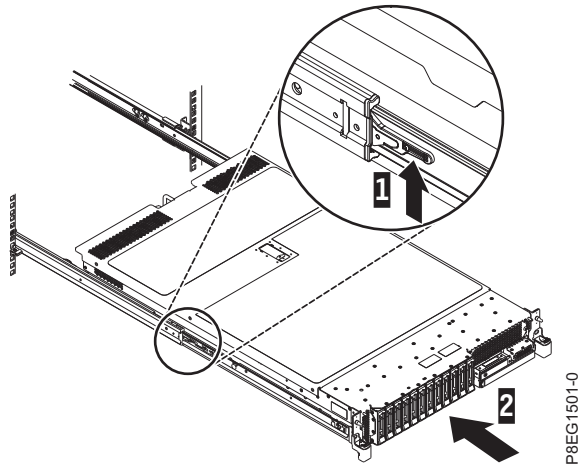


Figure 8. Lift the release latches and push the server into the rack

Installing the cable-management arm

The cable-management arm is used to efficiently route cables so that you have proper access to the rear of the system. Use the procedure to install the cable-management arm.

To install the cable-management arm, complete the following steps:

1. Ensure that you have the following parts.

- | | |
|----------|-------------------------------|
| A | Support arm |
| B | Cable-management stop bracket |
| C | Mounting bracket |
| D | Cable-management arm |
| E | Extension bracket |

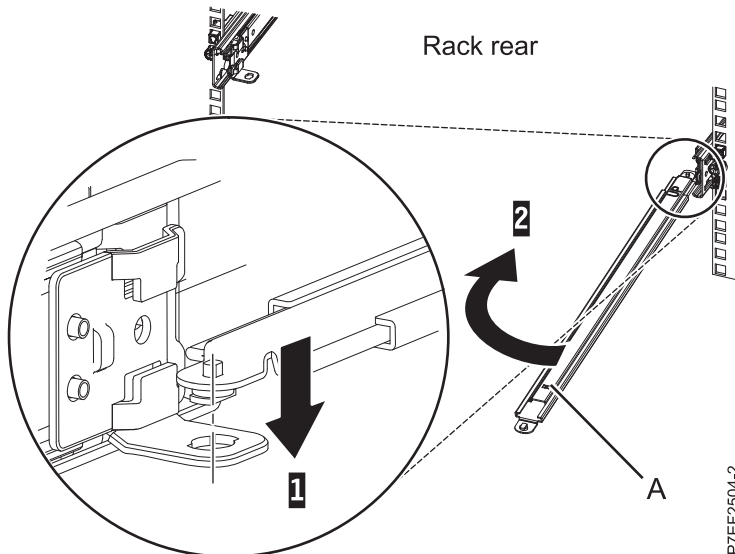


P7ED9520-1

Figure 9. Relative positions of the cable-management arm parts before assembly

2. The cable-management arm can be installed on either side of the server. For this procedure, it is illustrated that you are installing it on the right side, while you are facing the server from the rear. Connect one end of the support arm (A) to the right slide rail (1) so that you can swing the other end of the support arm toward the left side of the rack (2).

Note: The support arm (A) is labeled UP and DOWN. Ensure that the side labeled UP is facing upward and to the right.



P7EF2504-2

Figure 10. Connecting the support arm

3. Locate the hole at the bottom inside corner of the L-shaped cable-management stop bracket (B). Position the unattached end of the support arm so that the locking tab on the underside of its tip aligns with the bracket hole. Insert the tab into the hole (1) and turn the bracket (2) to secure it to the support arm. For details, see Figure 11 on page 9.

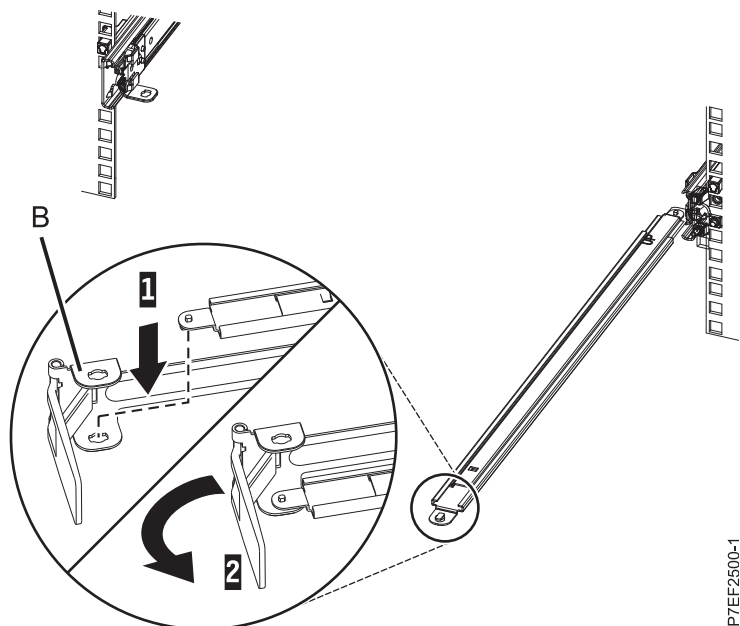


Figure 11. Securing the cable-management stop bracket to the support arm

4. Attach the cable-management stop bracket (**B**) to the slot on the inside of the left slide by sliding the stop bracket (**B**) into the slide rail until the spring-loaded pin snaps into place. For details, see Figure 12.

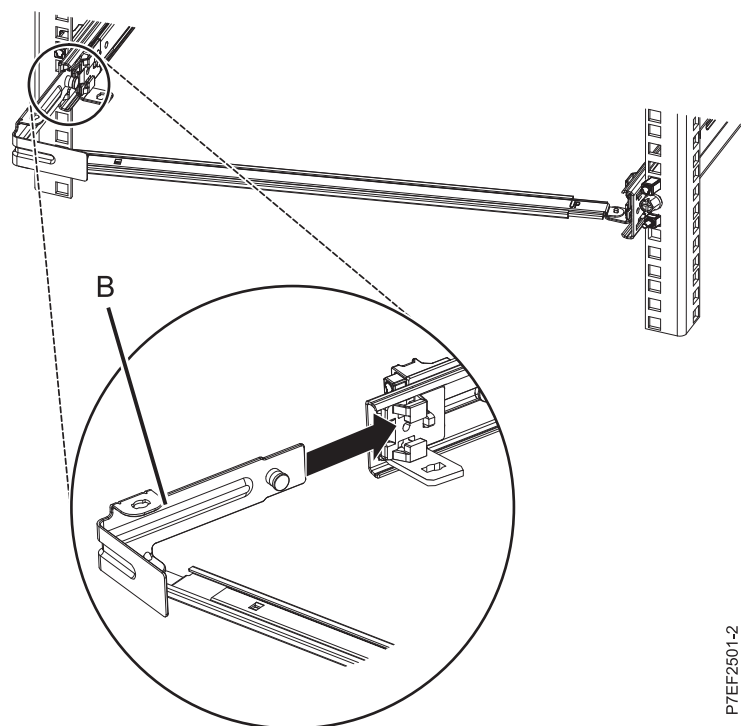


Figure 12. Extending the pin, and installing the bracket into the slide rail

5. Slide the extension bracket (**E**) into the right slide rail until the spring-loaded pin snaps into place. For details, see Figure 13 on page 10.



Figure 13. Installing the extension bracket into the slide rail

6. Attach the cable-management stop bracket (**B**) to the slot on the inside of the left slide by sliding the stop bracket (**B**) into the slide rail until the spring-loaded pin snaps into place. For details, see Figure 14.

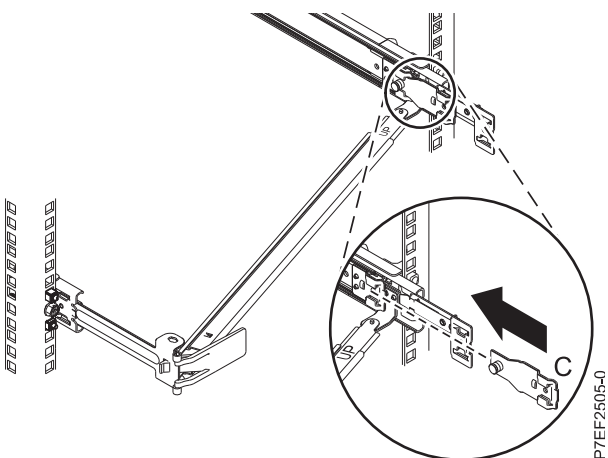


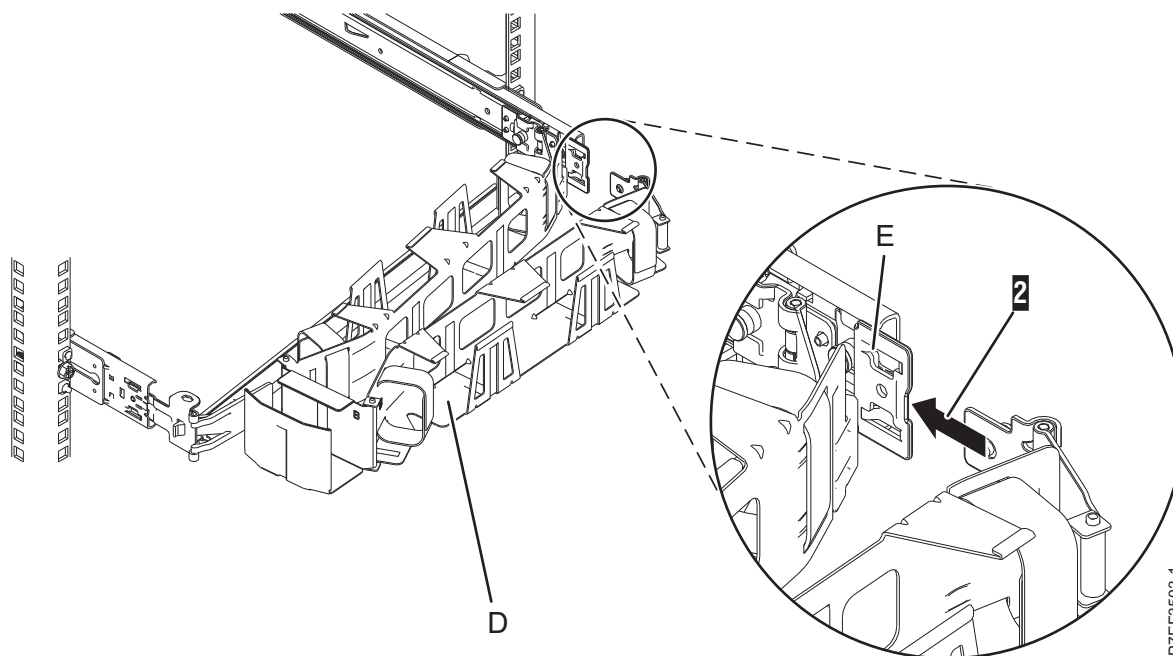
Figure 14. Installing the mounting bracket into the slide rail

7. Place the cable-management arm (**D**) on the support arm (**A**). Slide the first cable-management arm tab into the slot on the mounting bracket (**C**). Push the tab until the spring-loaded latch snaps into place. Slide the other cable-management arm tab into the extension bracket (**E**) on the outside of the right slide rail (**2**). Push the tab until the spring-loaded latch snaps into place. For details, see Figure 15 on page 11 and Figure 16 on page 11.



P7EF3502-2

Figure 15. Sliding the cable-management arm tab into the mounting bracket slot



P7EF3503-1

Figure 16. Sliding the other cable-management arm tab into the extension bracket

Cabling the server and setting up a console

Your console, monitor, or interface choices are guided by whether you create logical partitions, which operating system you install in your primary partition, and whether you install a Virtual I/O Server (VIOS) in one of your logical partitions.

Determining which console to use:

There are different console types available to manage this server. Learn more about the consoles that are available.

IBM® PowerKVM™ is an open virtualization solution that is offered for the Power® scale-out family of Linux servers built on POWER8™ technology.

PowerKVM delivers server virtualization based on open source Kernel-based Virtual Machine (KVM) Linux technology. PowerKVM virtualization technology enables you to share real compute, memory, and I/O resources through server virtualization. These virtual resources are used by virtual machines running on the PowerKVM virtualized server.

PowerKVM-based server virtualization enables optimization and the commitment of resources like CPU and memory. This helps you achieve superior resource usage, flexibility, and agility, resulting in cost reduction through economies of scale.

To get started using PowerKVM virtualization technology on your system, see IBM PowerKVM.

If you do not want to use PowerKVM, read the following section to learn more about choosing a console type. Go to the instructions for the applicable console, interface, or terminal in the following table.

Table 2. Available console types

Console type	Operating system	Logical partitions	Cable required	Cabling setup instructions
ASCII terminal	AIX®, Linux, or VIOS	Yes for VIOS, no for AIX and Linux	Serial cable equipped with a null modem	"Cabling the server with an ASCII terminal"
Hardware Management Console (HMC)	AIX, Linux, or VIOS	Yes	Ethernet (or cross-over cable)	"Cabling the server to the HMC" on page 13.
Integrated Virtualization Manager for VIOS	AIX or Linux	Yes	Serial cable	"Cabling the server and accessing the IVM" on page 15
Keyboard, video, and mouse	Linux or VIOS	Yes	Monitor and USB cables equipped with keyboard, video, and mouse	"Cabling the server with keyboard, video, and mouse" on page 16

Cabling the server with an ASCII terminal:

If you are not creating logical partitions, you can use an ASCII terminal to manage a server that is running the AIX, Linux, or VIOS operating systems. From the ASCII terminal, you can access the Advanced System Management Interface (ASMI) to complete more installation tasks.

The ASCII terminal is connected to the server through a serial link. The ASCII interface to the ASMI provides a subset of the web interface functions. The ASCII terminal for the ASMI interface is available only when the system is in the standby state. It is not available during the initial program load (IPL) or run time.

Note: If you are using a serial connection to the ASMI terminal, you must use a conversion cable. This cable (part number 46K5108) is used to convert the ASCII terminal 9-pin Dshell connector to an RJ45 serial port connector on the system. For information about the locations of the connectors on the system, see Part locations and location codes (http://www.ibm.com/support/knowledgecenter/POWER8/p8ecs/p8ecs_locations.htm).

To cable an ASCII terminal to the server, complete the following steps:

1. Using a serial cable that is equipped with a null modem, connect the ASCII terminal to the serial port on the rear of the server.
2. Complete the following steps:
 - a. Plug the power cord into the power supply.
 - b. Plug the system power cords and the power cords for any other attached devices into the power source.
 - c. If your system uses a power distribution unit (PDU), complete the following steps:
 - 1) Connect the system power cords from the server and I/O drawers to the PDU with an IEC 320 type receptacle.
 - 2) Attach the PDU input power cord and plug it into the power source.
 - 3) If your system uses two PDUs for redundancy, complete the following steps:
 - If your system has two power supplies, attach one power supply to each of the two PDUs.
 - If your system has four power supplies, plug E1 and E2 to **PDU A** and E3 and E4 to **PDU B**.

Note: Confirm that the system is in standby mode. The green power status indicator on the front control panel is flashing, and the dc out indicator lights on the power supplies are flashing. If none of the indicators are flashing, check the power cord connections.

3. Wait for the green light on the control panel to start flashing.
4. Ensure that your ASCII terminal is set to the following general attributes.
These attributes are the default settings for the diagnostic programs. Be sure that your terminal is set according to these attributes before proceeding to the next step.

Table 3. Default settings for the diagnostic programs

General setup attributes	3151 /11/31/41 settings	3151 /51/61 settings	3161 /64 settings	Description
Line speed	19,200	19,200	19,200	Uses the 19,200 (bits per second) line speed to communicate with the system unit.
Word length (bits)	8	8	8	Selects 8 bits as a data word length (byte).
Parity	No	No	No	Does not add a parity bit and is used together with the word length attribute to form the 8-bit data word (byte).
Stop bit	1	1	1	Places a bit after a data word (byte).

5. Press a key on the ASCII terminal to allow the service processor to confirm the presence of the ASCII terminal.
6. When the login display appears for the ASMI, enter admin for the user ID and password.
7. Change the default password when you are prompted.
8. Press Enter until the server information appears. You have completed the setup for an ASCII terminal, and have started the ASMI.
9. Continue with “Completing the server setup without using an HMC” on page 17.

Cabling the server to the HMC:

The Hardware Management Console (HMC) controls managed systems, including the management of logical partitions, the creation of a virtual environment, and the use of capacity on demand. Using service applications, the HMC can also communicate with managed systems to detect, consolidate, and forward information to IBM service for analysis.

If you have not installed and configured your HMC, do so now. For instructions, see Installation and configuration scenarios (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/basichmcinstallationandconfigurationtaskflow.htm>).

To manage POWER8 processor-based servers, the HMC must be at version 8 release 8.1.0, or later. To view the HMC version and release, complete the following steps:

1. In the navigation area, click **Updates**.
2. In the work area, view and record the information that appears in the HMC Code Level section, including the HMC version, release, Service Pack, build level, and base versions.

To cable the server to the HMC, complete the following steps:

1. If you want to directly attach your HMC to the managed system, connect **Ethernet Connector 1** on the HMC to the **HMC1** port on the managed system. See Figure 17.

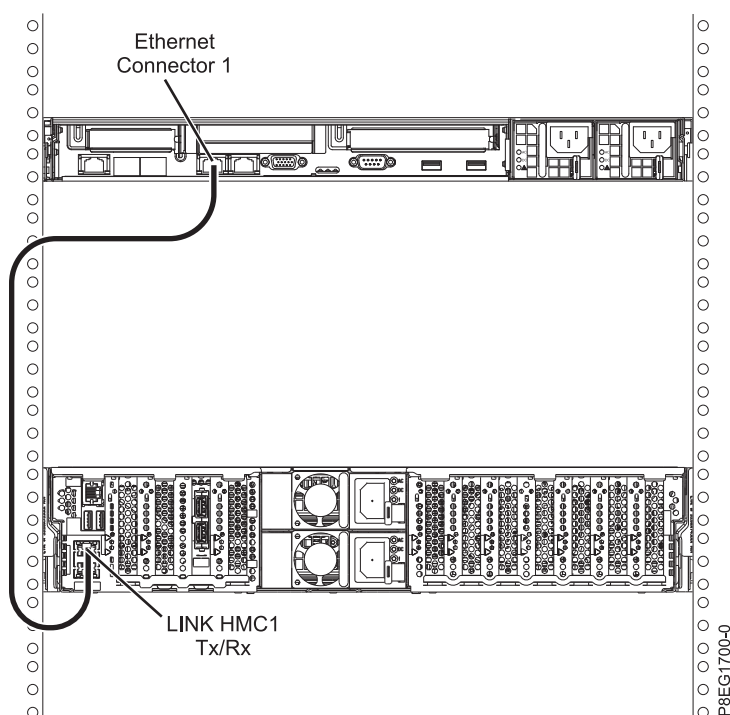


Figure 17. Attaching the HMC to the managed system

2. To learn how to connect an HMC to a private network so that it can manage more than one managed system, see HMC network connections (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/netconhmc.htm>).

Notes:

- You can also have multiple systems that are attached to a switch that is then connected to the HMC. For instructions, see HMC network connections (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/netconhmc.htm>).
 - If you are using a switch, ensure that the speed in the switch is set to **Autodetection**. If the server is directly attached to the HMC, ensure the Ethernet adapter speed on the HMC is set to **Autodetection**. For information about how to set media speeds, see Setting the media speed (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/lanmediaspeed.htm>).
3. If you are connecting a second HMC to your managed server, connect it to the Ethernet port that is labeled **HMC2** on the managed server.

4. Continue with “Routing cables through the cable-management arm and connecting expansion units” on page 44.

Cabling the server and accessing the IVM:

When you install the Virtual I/O Server (VIOS) in an environment where no Hardware Management Console (HMC) is present, the VIOS automatically creates a management partition whose interface is the Integrated Virtualization Manager (IVM).

To prepare for and install the VIOS and to enable the IVM, complete the following steps:

1. Connect a serial cable from a PC or ASCII terminal to a system port on the server. For details, see “Cabling the server with an ASCII terminal” on page 12.
2. Complete the following steps:
 - a. Verify that you have access to the Advanced System Management Interface (ASMI) by using the web interface. For details, see Accessing the ASMI using a web browser.
 - b. Verify that you have administrator or authorized service provider authority in ASMI.
 - c. Using the Web-based ASMI, change the following settings as appropriate for the type of partition on which you are installing the Integrated Virtualization Manager:
For an AIX or Linux partition, complete the following steps to change the partition boot mode:
 - 1) In the navigation area, expand **Power/Restart Control**.
 - 2) Click **Power On/Off System**.
 - 3) Select **Boot to SMS menu** in the **AIX or Linux partition mode** by boot field.
 - 4) If you are installing the Integrated Virtualization Manager on an IBM System i[®] model, select **AIX or Linux** in the **Default partition environment** field.
 - 5) Click **Save settings and power on**.
 - d. Open a terminal session on the PC, using an application such as HyperTerminal, and wait for the SMS menu to appear. Be sure that the line speed is set to 19,200 bits per second to communicate with the system unit.
 - e. Using the Web-based ASMI, change the partition boot mode back so that the server loads the operating environment during startup:
 - 1) Expand **Power/Restart Control**.
 - 2) Click **Power On/Off System**.
 - 3) Select **Continue to operating system** in the **AIX or Linux partition mode** boot field.
 - 4) Click **Save settings**.
3. Insert the *Virtual I/O Server* CD or DVD into the optical drive.
4. In SMS, select the CD or DVD as the boot device:
 - a. Select **Select Boot Options**, and press Enter.
 - b. Select **Select Install/Boot Device**, and press Enter.
 - c. Select **CD/DVD**, and press Enter.
 - d. Select the media type that corresponds to the optical device, and press Enter.
 - e. Select the device number that corresponds to the optical device, and press Enter.
 - f. Select **Normal Boot**, and confirm that you want to exit SMS.
5. Install the Virtual I/O Server:
 - a. Select the console, and press Enter.
 - b. Select a language for the BOS menus, and press Enter.
 - c. Select **Start Install Now with Default Settings**.
 - d. Select **Continue with Install**. The managed system restarts after the installation is complete, and the login prompt is displayed on the ASCII terminal.

6. After you install the IVM, finish the installation by accepting the license agreement, checking for updates, and configuring the TCP/IP connection.
7. Continue with “Cabling the server and connecting expansion units.”

Cabling the server with keyboard, video, and mouse:

Before you start the system, you might need to connect the keyboard, video, and mouse to the system, if a graphics card is present.

To connect the keyboard, video, and mouse, complete the following steps:

1. Locate the graphics card and Universal Serial Bus (USB) ports at the rear of the system. You might need a connector converter.
2. Connect the monitor cable to the graphics card.
3. Connect a keyboard and mouse to the USB ports.
4. Power on the console.
5. Continue with “Cabling the server and connecting expansion units.”

Cabling the server and connecting expansion units

Learn how to cable the server and to connect expansion units.

To cable the server and to connect expansion units, complete the following steps:

1. Complete the following steps:
 - a. Plug the power cord into the power supply.
 - b. Plug the system power cords and the power cords for any other attached devices into the power source.
 - c. If your system uses a power distribution unit (PDU), complete the following steps:
 - 1) Connect the system power cords from the server and I/O drawers to the PDU with an IEC 320 type receptacle.
 - 2) Attach the PDU input power cord and plug it into the power source.
 - 3) If your system uses two PDUs for redundancy, complete the following steps:
 - If your system has two power supplies, attach one power supply to each of the two PDUs.
 - If your system has four power supplies, plug E1 and E2 to **PDU A** and E3 and E4 to **PDU B**.

Note: Confirm that the system is in standby mode. The green power status indicator on the front control panel is flashing, and the dc out indicator lights on the power supplies are flashing. If none of the indicators are flashing, check the power cord connections.

- d. If your system uses a DC power distribution panel (PDP), complete the following steps:
 - 1) Connect the system power cables from the server and I/O drawers to the PDP.
 - 2) If your system uses redundant power supplies, complete the following steps:
 - If your system has two power supplies, attach one power supply to the 'A' feed and the other to the 'B' feed of the PDP.
 - If your system has four power supplies, attach two power supplies to the 'A' feed and the other two to the 'B' feed of the PDP.
 - 3) Place the applicable circuit breakers in the ON position.
2. For information about connecting enclosures and expansion units, see Enclosures and expansion units (http://www.ibm.com/support/knowledgecenter/POWER8/p8ham/p8ham_kickoff.htm).

Completing the server setup

Learn about the tasks you must complete to set up your managed system.

One of the tasks you can perform to complete your server setup is to virtualize your server. IBM® PowerKVM™ is an open virtualization solution that is offered for the Power® scale-out family of Linux servers built on POWER8™ technology.

PowerKVM delivers server virtualization based on open source Kernel-based Virtual Machine (KVM) Linux technology. PowerKVM virtualization technology enables you to share real compute, memory, and I/O resources through server virtualization. These virtual resources are used by virtual machines running on the PowerKVM virtualized server.

PowerKVM-based server virtualization enables optimization and the commitment of resources like CPU and memory. This helps you achieve superior resource usage, flexibility, and agility, resulting in cost reduction through economies of scale.

To get started using PowerKVM virtualization technology on your system, see Quick start guide for IBM PowerKVM (<http://www.ibm.com/support/knowledgecenter/linuxonibm/liabq/liabqquick.htm>). Then return to this document to continue to complete your server setup.

Completing the server setup without using an HMC:

If you do not have an Hardware Management Console (HMC), use this procedure to complete the server setup.

To complete the server setup without using a management console, complete the following steps:

1. Attach the server to the rack using the shipping screws that were provided with your system.
2. To check the firmware level on the managed system and to update the time of day, complete the following steps:
 - a. Access the Advanced System Management Interface (ASMI). For instructions, see [Accessing the ASMI without an HMC](http://www.ibm.com/support/knowledgecenter/POWER8/p8hby/connect_asmi.htm) (http://www.ibm.com/support/knowledgecenter/POWER8/p8hby/connect_asmi.htm).
 - b. On the ASMI Welcome pane, note the existing level of server firmware in the upper-right corner under the copyright statement.
 - c. Update the time of day. In the navigation area, expand **System Configuration**.
 - d. Click **Time of Day**. The content pane displays a form that shows the current date (month, day, and year) and time (hours, minutes, and seconds).
 - e. Change the date value, the time value, or both, and click **Save settings**.
3. To start a system, complete the following steps:
 - a. Open the front door of the managed system.
 - b. Press the power button on the control panel.

The power-on light begins to flash faster.

- a. The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
- b. Progress indicators appear on the control panel display while the system is being started.
- c. The power-on light on the control panel stops flashing and remains on, indicating that the system is powered on.

For instructions, see [Starting a system that is not managed by an HMC](http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/startsysnohmc.htm) (<http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/startsysnohmc.htm>).

4. Install an operating system and update the operating system.
 - Install the AIX operating system. For instructions, see [Installing AIX](http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installaix.htm) (http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installaix.htm).
 - Install the Linux operating system. For instructions, see [Installing Linux](http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installlinux.htm) (http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installlinux.htm).

- Install the VIOS operating system. For instructions, see Installing VIOS (http://www.ibm.com/support/knowledgecenter/POWER8/p8hch/p8hch_installvios.htm).
5. Update the system firmware, if required.
 - For instructions to get firmware fixes through the AIX or Linux operating system, see Getting server firmware fixes through AIX or Linux without a management console (http://www.ibm.com/support/knowledgecenter/POWER8/p8ha5/fix_firm_no_hmc_aix.htm).
 - If you are using VIOS, see Updating the Virtual I/O Server's firmware and device microcode with an Internet connection (http://www.ibm.com/support/knowledgecenter/POWER8/p8ha5/fix_virtual_firm_ivm.htm).
 6. You have now completed the steps to install your server.

Installing a rack-based water-cooled server

Use this information to learn about installing a rack-based water-cooled server.

Prerequisites for installing the water-cooled system

Use the information to understand the prerequisites that are required for installing the server.

You might need to read the following documents before you begin to install the server:

- The latest version of this document is maintained online, see (http://www.ibm.com/support/knowledgecenter/POWER8/p8egi/p8egi_roadmap.htm).
- To plan your server installation, see Planning for the system (http://www.ibm.com/support/knowledgecenter/POWER8/p8had/p8had_8xx_kickoff.htm).
- To plan for water-cooling, see **Model 8247-22L and 8284-22A water cooling option (Feature code ER2C)** (http://www.ibm.com/support/knowledgecenter/POWER8/p8had/p8had_watercool.htm).
- If you are using a Hardware Management Console (HMC), see Obtaining and applying machine code updates for the HMC with an Internet connection (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/area3fixeshmc.htm>).

Consider the following prerequisites before you install the server:

1. Ensure that you have the following items before you start your installation:
 - Phillips screwdriver
 - Flat-head screwdriver
 - Rack with two units of space

Note: If you do not have a rack that is installed, install the rack. For instructions, see Racks and rack features (http://www.ibm.com/support/knowledgecenter/POWER8/p8hbf/p8hbf_8xx_kickoff.htm).

2. Ensure that you have one of the following consoles:
 - Hardware Management Console (HMC): Ensure that your HMC is at version 8 release 8.1.0, or later.
 - Graphic monitor with keyboard and mouse.
 - Teletype (tty) monitor with keyboard.

Completing inventory for your server

Use this information to complete inventory for your server.

To complete the inventory, complete the following steps:

1. Verify that you received all the boxes you ordered.
2. Unpack the server components as needed.
3. Complete a parts inventory before you install each server component by following these steps:
 - a. Locate the inventory list for your server.

- b. Ensure that you received all the parts that you ordered.

Note: Your order information is included with your product. You can also obtain order information from your marketing representative or the IBM Business Partner.

If you have incorrect, missing, or damaged parts, consult any of the following resources:

- Your IBM reseller.
- IBM Rochester manufacturing automated information line at 1-800-300-8751 (United States only).
- The Directory of worldwide contacts website <http://www.ibm.com/planetwide>. Select your location to view the service and support contact information.

Determining and marking the location in the rack

Water-cooled systems have unique rack location requirements. Where you mount the system is dependent on whether your water hoses are routed toward the top or the bottom of the rack.

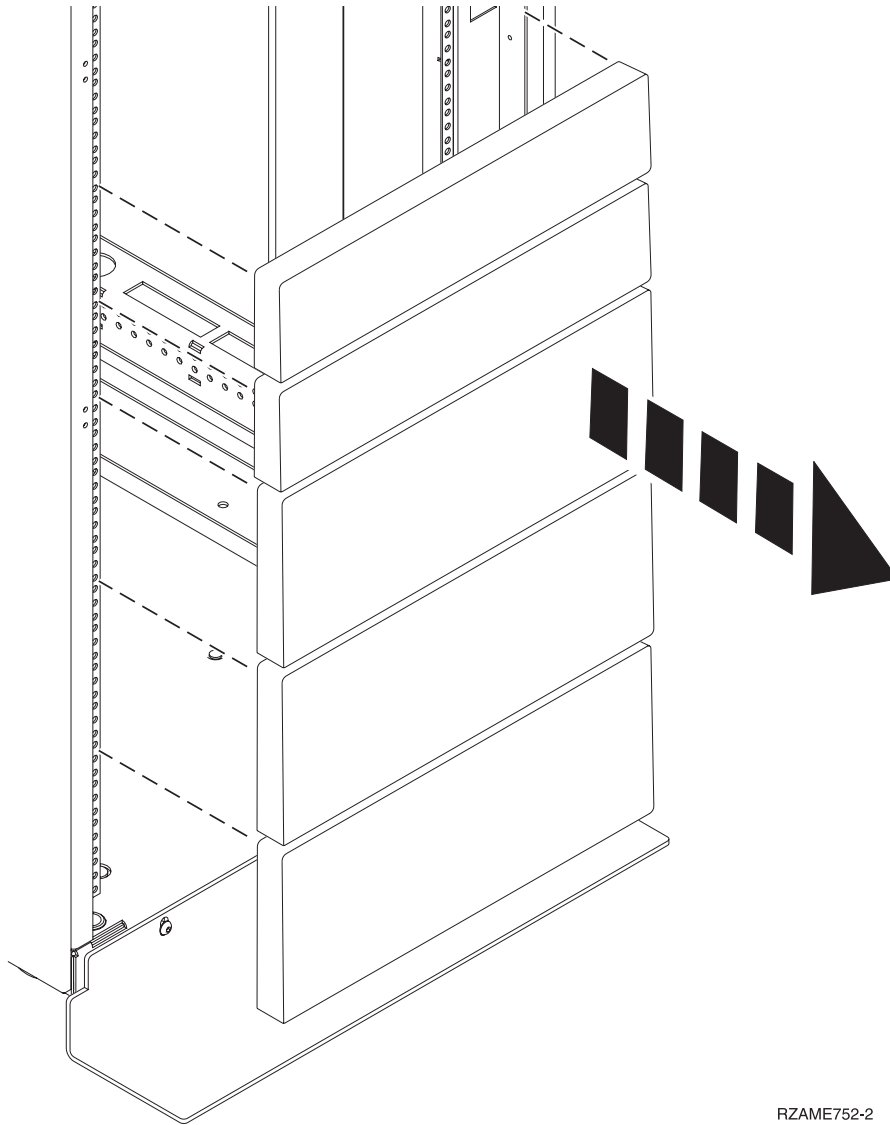
A rack-mounting template is not included with this system. These systems are 2 Electronic Industries Alliance (EIA) units high.

To determine the mounting location, complete the following steps:

1. Read the Rack safety notices (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hbf/racksafety.htm>).
2. Determine where to place the system unit in the rack. As you plan for installing the system unit in a rack, consider the following information:
 - Organize larger and heavier units into the lower part of the rack.
 - Plan to install units into the lower part of the rack first.
 - Record the Electronic Industries Alliance (EIA) locations in your plan.

Note: The server is two EIA units high. An EIA unit is 44.55 mm (1.75 in.) in height. The rack contains three mounting holes for each EIA unit of height. This system unit, therefore, is 89 mm (3.5 in.) high and covers six mounting holes in the rack.

3. If the hoses on the rack are routed so that they go down the rack toward the floor, you choose one of the following options:
 - Ensure that the bottom EIA unit is left open. If you choose this option, the bottom of the system chassis should align with an even EIA unit number on the rack flange.
 - Ensure that the bottom two EIA units are left open. If you choose this option, the bottom of the system chassis should align with an odd EIA unit number on the rack flange.
4. If the hoses on your rack are routed so that they go up through the top of the rack, ensure that the top two EIA units are left open. The bottom of the system chassis that you are installing should align with an odd EIA unit number on the rack flange.
5. If necessary, remove the filler panels to allow access to the inside of the rack enclosure where you plan to place the unit, as shown in Figure 18 on page 20



RZAME752-2

Figure 18. Removing the filler panels

6. Determine to place the system in the rack. Record the EIA location.
Note: An EIA unit on your rack consists of a grouping of three holes.
7. Facing the front of the rack and working from the right side, use tape, a marker, or pencil to mark the lower hole of each EIA unit.
8. Repeat step 7 for the corresponding holes located on the left side of the rack.
9. Go to the rear of the rack.
10. On the right side, find the EIA unit that corresponds to the bottom EIA unit marked on the front of the rack.
11. Place a self-adhesive dot at the bottom EIA unit.
12. Mark the corresponding holes on the left side of the rack.

Attaching the mounting hardware to the rack

You might need to attach the mounting hardware to the rack. Use the procedure to complete this task. The information is intended to promote safety and reliable operation, and includes illustrations of the related hardware components and shows how these components relate to each other.

Attention: To avoid rail failure and potential danger to yourself and to the unit, ensure that you have the correct rails and fittings for your rack. If your rack has square support flange holes or screw-thread support flange holes, ensure that the rails and fittings match the support flange holes that are used on your rack. Do not install mismatched hardware by using washers or spacers. If you do not have the correct rails and fittings for your rack, contact your IBM reseller.

To install the rack-mounting hardware into the rack, complete the following steps:

1. Each slide rail is marked with either an R (right) or an L (left), when you look from the front. Select the left slide rail, bring it to the rear of the rack, and locate the selected EIA unit that was previously marked.
2. Push up on the locking tab (1) on the front, and pull out the front latch (2) at the front of the rail. Then, remove the screw from the rear of the rail (3). For details, see Figure 19.

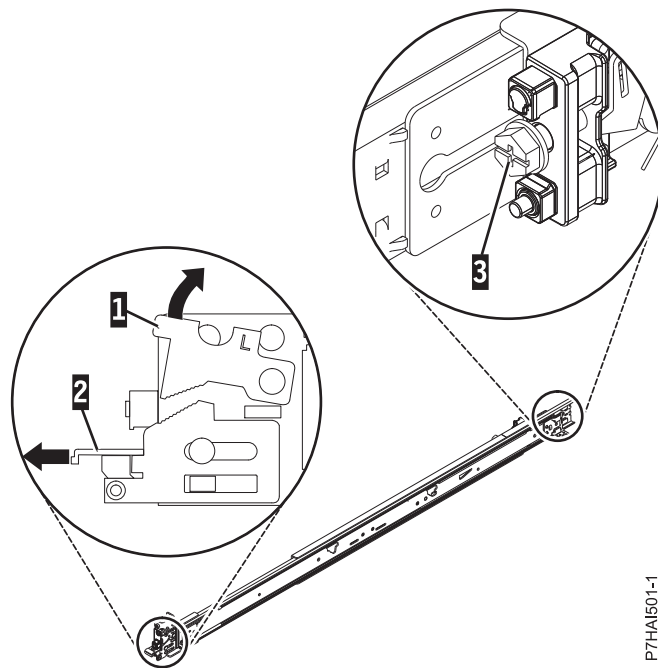


Figure 19. Opening the front latch and removing the rear screw

3. Align the two pins located on the rear of the slide rail with the top and bottom holes within the selected EIA unit that were previously marked. Pull the slide rail toward you to insert the two pins into the rack holes (1), and lower the slide rail down (2) to engage the hook feature on the top pin. For details, see Figure 20 on page 22. Ensure that the two pins protrude through the rack holes before you proceed to the next step.

Note: The pin fixtures of the slide rails support either round-hole or square-hole rack models.

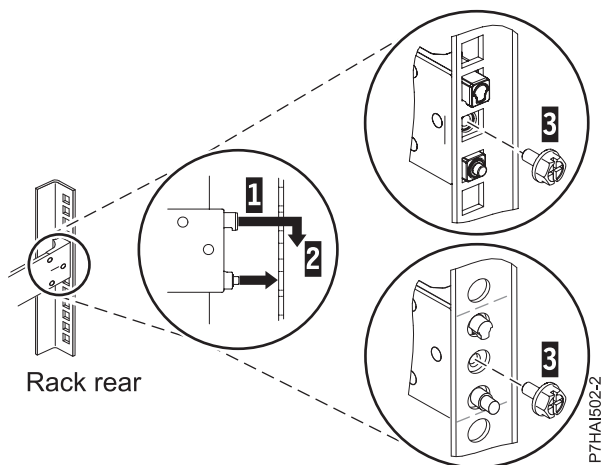


Figure 20. Aligning and engaging the pins into the holes in the rear of the rack

4. Reinstall the screw that was removed in step 2 on page 21, as shown in Figure 21.

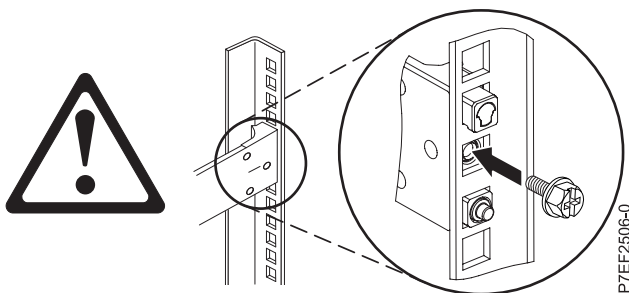


Figure 21. Reinstalling the screw

5. Return to the front of the rack. Ensure that the latch is still open on the front of the slide rail. Refer to step 2 on page 21.
6. Pull the slide rail forward and insert three pins on the front of the rail into the holes within the selected EIA unit that were previously marked. Lower the slide rail down (1) to engage the hook feature on the middle pin. For details, see Figure 22.

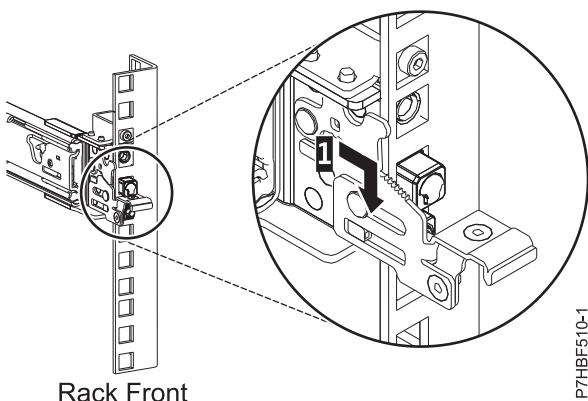


Figure 22. Pins that are seated on the front rail of the rack

7. While you pull the slide rail forward, ensure that all three pins protrude through the rack holes, then push the front latch (2) all the way in. For details, see Figure 23.

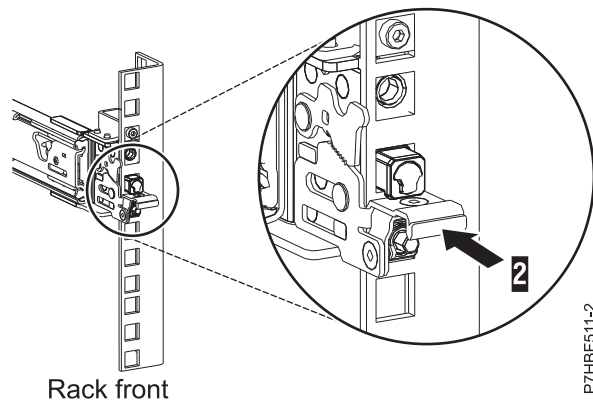


Figure 23. Latch seated on the front rail of the rack

Note: If you must reposition the rail, release the front latch (2), and while you press the blue pin at the bottom, push the rail up and toward the rear to release from the rack.

8. Repeat these steps to install the right rail into the rack.

Installing the cable-management arm

The cable-management arm is used to efficiently route cables so that you have proper access to the rear of the system. Use the procedure to install the cable-management arm.

To install the cable-management arm, complete the following steps:

1. Ensure that you have the following parts.

- | | |
|----------|-------------------------------|
| A | Support arm |
| B | Cable-management stop bracket |
| C | Mounting bracket |
| D | Cable-management arm |
| E | Extension bracket |

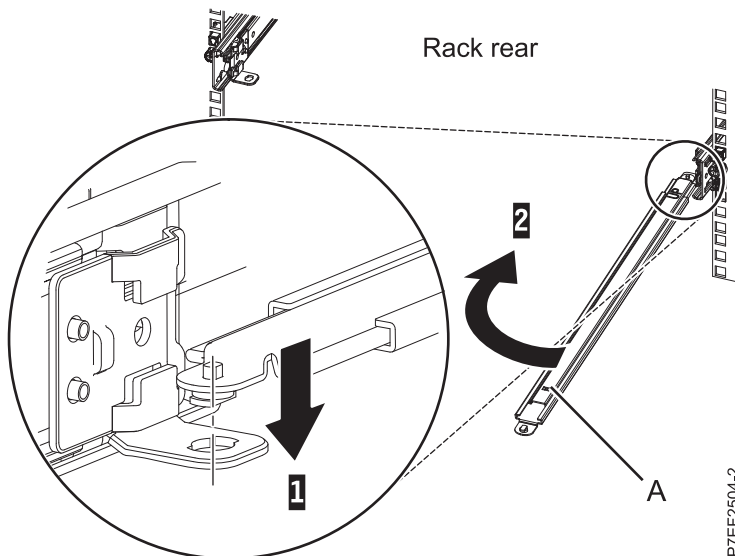


P7ED9520-1

Figure 24. Relative positions of the cable-management arm parts before assembly

2. The cable-management arm can be installed on either side of the server. For this procedure, it is illustrated that you are installing it on the right side, while you are facing the server from the rear. Connect one end of the support arm (A) to the right slide rail (1) so that you can swing the other end of the support arm toward the left side of the rack (2).

Note: The support arm (A) is labeled UP and DOWN. Ensure that the side labeled UP is facing upward and to the right.



P7EF2504-2

Figure 25. Connecting the support arm

3. Locate the hole at the bottom inside corner of the L-shaped cable-management stop bracket (B). Position the unattached end of the support arm so that the locking tab on the underside of its tip aligns with the bracket hole. Insert the tab into the hole (1) and turn the bracket (2) to secure it to the support arm. For details, see Figure 11 on page 9.

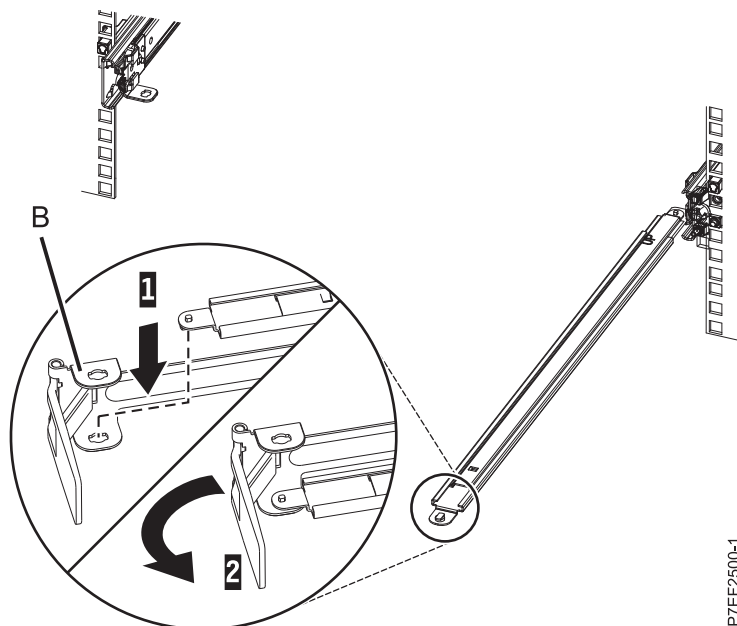


Figure 26. Securing the cable-management stop bracket to the support arm

4. Attach the cable-management stop bracket (**B**) to the slot on the inside of the left slide by sliding the stop bracket (**B**) into the slide rail until the spring-loaded pin snaps into place. For details, see Figure 12 on page 9.

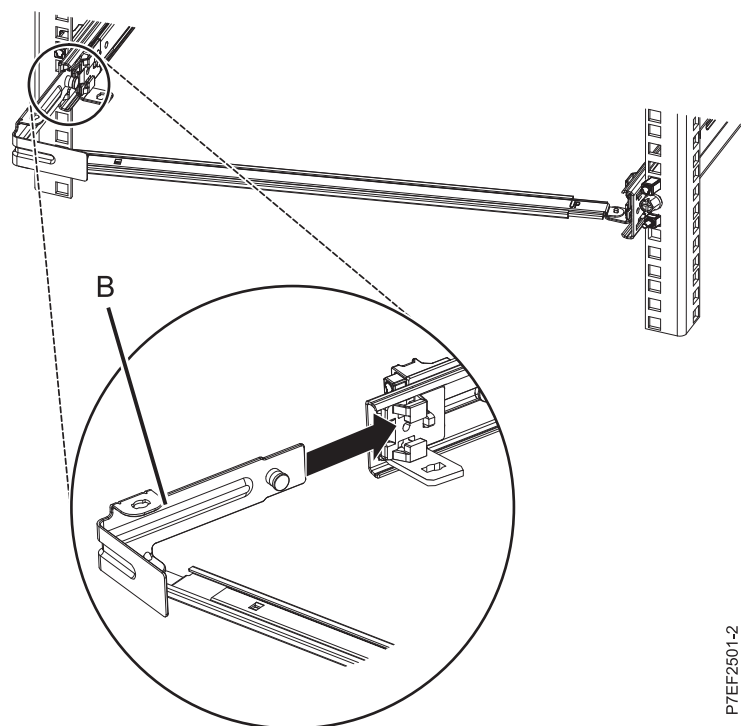


Figure 27. Extending the pin, and installing the bracket into the slide rail

5. Slide the extension bracket (**E**) into the right slide rail until the spring-loaded pin snaps into place. For details, see Figure 13 on page 10.



Figure 28. Installing the extension bracket into the slide rail

6. Attach the cable-management stop bracket (**B**) to the slot on the inside of the left slide by sliding the stop bracket (**B**) into the slide rail until the spring-loaded pin snaps into place. For details, see Figure 14 on page 10.

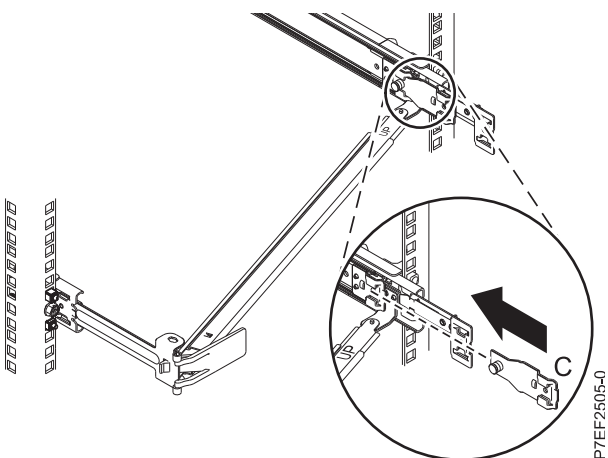


Figure 29. Installing the mounting bracket into the slide rail

7. Place the cable-management arm (**D**) on the support arm (**A**). Slide the first cable-management arm tab into the slot on the mounting bracket (**C**). Push the tab until the spring-loaded latch snaps into place. Slide the other cable-management arm tab into the extension bracket (**E**) on the outside of the right slide rail (**2**). Push the tab until the spring-loaded latch snaps into place. For details, see Figure 15 on page 11 and Figure 16 on page 11.



Figure 30. Sliding the cable-management arm tab into the mounting bracket slot

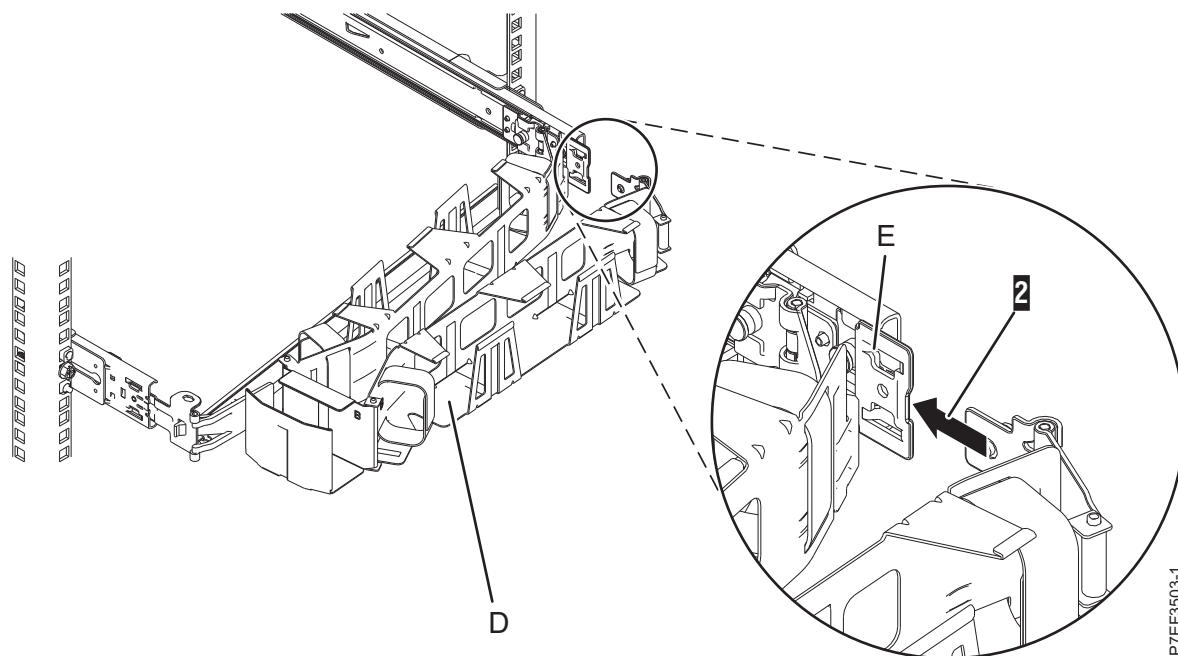


Figure 31. Sliding the other cable-management arm tab into the extension bracket

Installing the water-cooled 8247-21L system into the rack

Use the procedure to install the water-cooled 8247-21L system into the rack.

CAUTION:

This system requires three people to install the system into the rack.

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When using an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.

To install the system into the rack, complete the following steps:

1. Remove the shipping cover on the rear and the front of the system, if present.
2. Extend the slide rails forward (1) until they click twice into place. Carefully lift the server and tilt it into position over the slide rails so that the rear nail heads (2) on the server line up with the rear slots (3) on the slide rails. Slide the server down until the rear nail heads slip into the two rear slots. Then, slowly lower the front of the server (4) until the other nail heads slip into the other slots on the slide rails. Ensure that the front latch (5) slides over the nail heads.

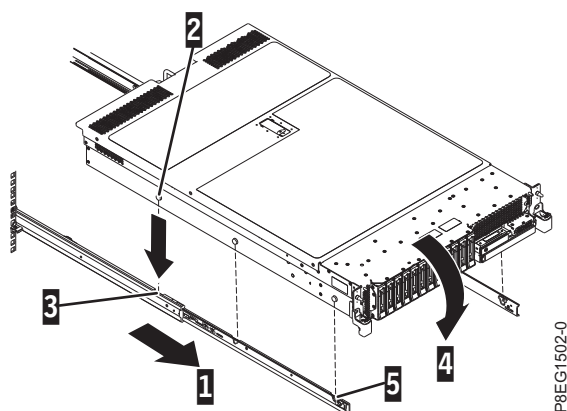


Figure 32. Extending slide rails and aligning server nail heads with the slots on the rail

3. Route the hoses that extend through the rear of the system through the cable-management arm.
4. Lift the blue release latches (1) on the slide rails and push the server (2) all the way into the rack until it clicks into place.

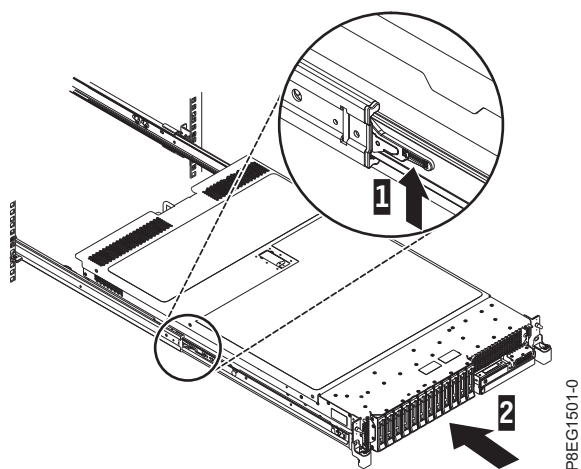


Figure 33. Install the server into the rack

Connecting the supply and return hoses to the manifold

Attach quick-connects to the supply and return hoses.

The quick-connects press onto the mating half on the manifold. To install the quick-connects to the supply and return hoses, complete the following step.

Press the hose end of the quick-connect onto the manifold end, until it clicks into place.

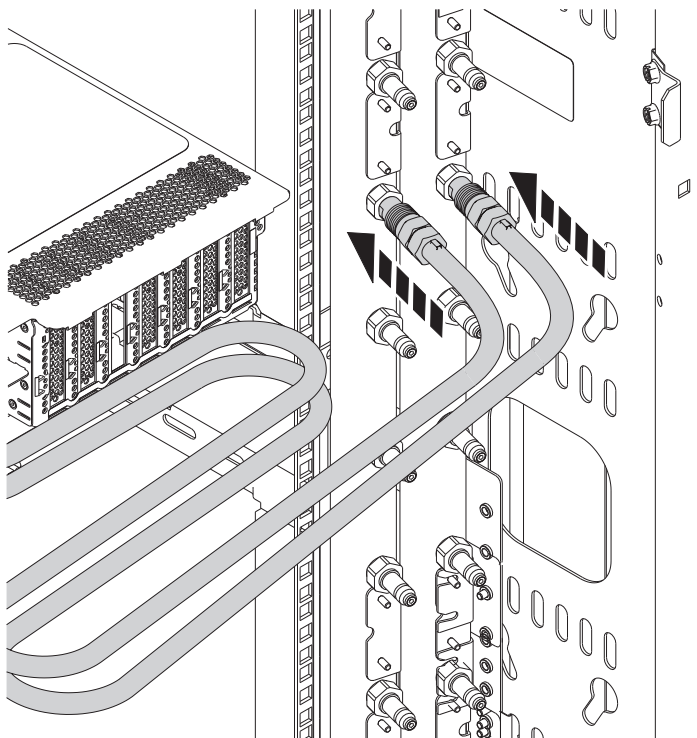


Figure 34. Installing the quick-connects to the supply and return hoses

Note: Connect one hose to the inner circuit of the manifold and the other hose to the outer circuit of the manifold.

Routing the hoses from the system to the manifold

You must attach and route the hoses from the system to the manifold.

To route the hoses from the system to the manifold, complete the following steps:

1. Route the hoses through the cable-management arm so that the hoses exit on the side of the rack that has the manifold installed.

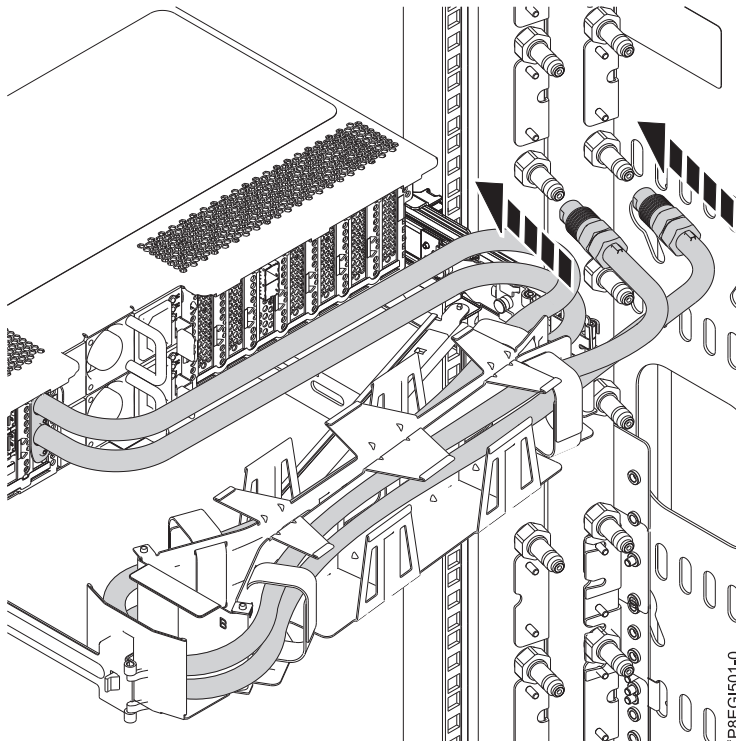


Figure 35. Routing the hoses from the system to the manifold, through the cable-management arm

Note: It is not required for the supply hose to be connected to the supply connection on the manifold, and the return hose to be connected to the return connection on the manifold.

2. To avoid pinching the hoses when sliding the system in and out of the rack, use a velcro strap to tie the supply and return hoses together between where they enter the system and where they enter the cable-management arm. Ensure that each hose is fully routed through the cable-management arm, so that the hoses will not be kinked if the cable-management arm extends.

Note: Ensure that the hoses do not extend past the plane of the rack door.

Turning on the water source and bleeding air from the system

You must turn on the water source in your location so that the water flows to the rack.

You can turn on the cooling distribution unit (CDU) after you have connected the manifold to your CDU and after you have plugged your system into the manifold. To fill the system with water and to bleed the air from the loop, follow the instructions that were provided with the CDU.

Note: The water that is used to cool the system must adhere to the water chemistry specifications. For more information, see **Water cooling system specification and requirements** (http://www.ibm.com/support/knowledgecenter/POWER8/p8had/p8had_wc_overview.htm).

Cabling the server and setting up a console

Your console, monitor, or interface choices are guided by whether you create logical partitions, which operating system you install in your primary partition, and whether you install a Virtual I/O Server (VIOS) in one of your logical partitions.

Determining which console to use:

There are different console types available to manage this server. Learn more about the consoles that are available.

IBM® PowerKVM™ is an open virtualization solution that is offered for the Power® scale-out family of Linux servers built on POWER8™ technology.

PowerKVM delivers server virtualization based on open source Kernel-based Virtual Machine (KVM) Linux technology. PowerKVM virtualization technology enables you to share real compute, memory, and I/O resources through server virtualization. These virtual resources are used by virtual machines running on the PowerKVM virtualized server.

PowerKVM-based server virtualization enables optimization and the commitment of resources like CPU and memory. This helps you achieve superior resource usage, flexibility, and agility, resulting in cost reduction through economies of scale.

To get started using PowerKVM virtualization technology on your system, see IBM PowerKVM.

If you do not want to use PowerKVM, read the following section to learn more about choosing a console type. Go to the instructions for the applicable console, interface, or terminal in the following table.

Table 4. Available console types

Console type	Operating system	Logical partitions	Cable required	Cabling setup instructions
ASCII terminal	AIX, Linux, or VIOS	Yes for VIOS, no for AIX and Linux	Serial cable equipped with a null modem	"Cabling the server with an ASCII terminal" on page 12
Hardware Management Console (HMC)	AIX, Linux, or VIOS	Yes	Ethernet (or cross-over cable)	"Cabling the server to the HMC" on page 13.
Integrated Virtualization Manager for VIOS	AIX or Linux	Yes	Serial cable	"Cabling the server and accessing the IVM" on page 15
Keyboard, video, and mouse	Linux or VIOS	Yes	Monitor and USB cables equipped with keyboard, video, and mouse	"Cabling the server with keyboard, video, and mouse" on page 16

Cabling the server with an ASCII terminal:

If you are not creating logical partitions, you can use an ASCII terminal to manage a server that is running the AIX, Linux, or VIOS operating systems. From the ASCII terminal, you can access the Advanced System Management Interface (ASMI) to complete more installation tasks.

The ASCII terminal is connected to the server through a serial link. The ASCII interface to the ASMI provides a subset of the web interface functions. The ASCII terminal for the ASMI interface is available only when the system is in the standby state. It is not available during the initial program load (IPL) or run time.

Note: If you are using a serial connection to the ASMI terminal, you must use a conversion cable. This cable (part number 46K5108) is used to convert the ASCII terminal 9-pin Dshell connector to an RJ45 serial port connector on the system. For information about the locations of the connectors on the system, see Part locations and location codes (http://www.ibm.com/support/knowledgecenter/POWER8/p8ecs/p8ecs_locations.htm).

To cable an ASCII terminal to the server, complete the following steps:

1. Using a serial cable that is equipped with a null modem, connect the ASCII terminal to the serial port on the rear of the server.
2. Complete the following steps:
 - a. Plug the power cord into the power supply.
 - b. Plug the system power cords and the power cords for any other attached devices into the power source.
 - c. If your system uses a power distribution unit (PDU), complete the following steps:
 - 1) Connect the system power cords from the server and I/O drawers to the PDU with an IEC 320 type receptacle.
 - 2) Attach the PDU input power cord and plug it into the power source.
 - 3) If your system uses two PDUs for redundancy, complete the following steps:
 - If your system has two power supplies, attach one power supply to each of the two PDUs.
 - If your system has four power supplies, plug E1 and E2 to **PDU A** and E3 and E4 to **PDU B**.

Note: Confirm that the system is in standby mode. The green power status indicator on the front control panel is flashing, and the dc out indicator lights on the power supplies are flashing. If none of the indicators are flashing, check the power cord connections.

3. Wait for the green light on the control panel to start flashing.
4. Ensure that your ASCII terminal is set to the following general attributes.
These attributes are the default settings for the diagnostic programs. Be sure that your terminal is set according to these attributes before proceeding to the next step.

Table 5. Default settings for the diagnostic programs

General setup attributes	3151 /11/31/41 settings	3151 /51/61 settings	3161 /64 settings	Description
Line speed	19,200	19,200	19,200	Uses the 19,200 (bits per second) line speed to communicate with the system unit.
Word length (bits)	8	8	8	Selects 8 bits as a data word length (byte).
Parity	No	No	No	Does not add a parity bit and is used together with the word length attribute to form the 8-bit data word (byte).
Stop bit	1	1	1	Places a bit after a data word (byte).

5. Press a key on the ASCII terminal to allow the service processor to confirm the presence of the ASCII terminal.
6. When the login display appears for the ASMI, enter admin for the user ID and password.
7. Change the default password when you are prompted.
8. Press Enter until the server information appears. You have completed the setup for an ASCII terminal, and have started the ASMI.
9. Continue with “Completing the server setup without using an HMC” on page 17.

Cabling the server to the HMC:

The Hardware Management Console (HMC) controls managed systems, including the management of logical partitions, the creation of a virtual environment, and the use of capacity on demand. Using service applications, the HMC can also communicate with managed systems to detect, consolidate, and forward information to IBM service for analysis.

If you have not installed and configured your HMC, do so now. For instructions, see Installation and configuration scenarios (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/basichmcinstallationandconfigurationtaskflow.htm>).

To manage POWER8 processor-based servers, the HMC must be at version 8 release 8.1.0, or later. To view the HMC version and release, complete the following steps:

1. In the navigation area, click **Updates**.
2. In the work area, view and record the information that appears in the HMC Code Level section, including the HMC version, release, Service Pack, build level, and base versions.

To cable the server to the HMC, complete the following steps:

1. If you want to directly attach your HMC to the managed system, connect **Ethernet Connector 1** on the HMC to the **HMC1** port on the managed system. See Figure 17 on page 14.

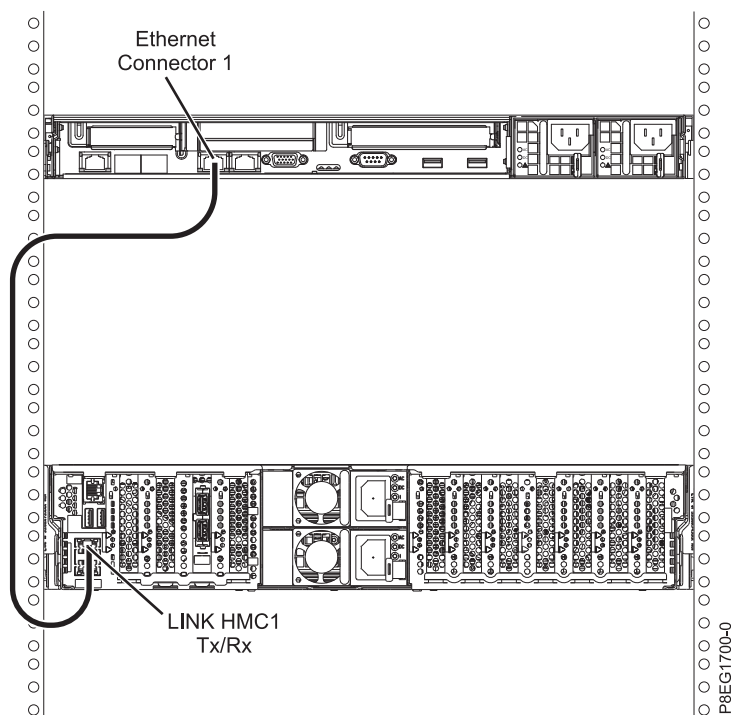


Figure 36. Attaching the HMC to the managed system

2. To learn how to connect an HMC to a private network so that it can manage more than one managed system, see HMC network connections (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/netconhmc.htm>).

Notes:

- You can also have multiple systems that are attached to a switch that is then connected to the HMC. For instructions, see HMC network connections (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/netconhmc.htm>).

- If you are using a switch, ensure that the speed in the switch is set to **Autodetection**. If the server is directly attached to the HMC, ensure the Ethernet adapter speed on the HMC is set to **Autodetection**. For information about how to set media speeds, see *Setting the media speed* (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/lanmediaspeed.htm>).
- 3. If you are connecting a second HMC to your managed server, connect it to the Ethernet port that is labeled **HMC2** on the managed server.
- 4. Continue with “Routing cables through the cable-management arm and connecting expansion units” on page 44.

Cabling the server and accessing the IVM:

When you install the Virtual I/O Server (VIOS) in an environment where no Hardware Management Console (HMC) is present, the VIOS automatically creates a management partition whose interface is the Integrated Virtualization Manager (IVM).

To prepare for and install the VIOS and to enable the IVM, complete the following steps:

1. Connect a serial cable from a PC or ASCII terminal to a system port on the server. For details, see “Cabling the server with an ASCII terminal” on page 12.
2. Complete the following steps:
 - a. Verify that you have access to the Advanced System Management Interface (ASMI) by using the web interface. For details, see *Accessing the ASMI using a web browser*.
 - b. Verify that you have administrator or authorized service provider authority in ASMI.
 - c. Using the Web-based ASMI, change the following settings as appropriate for the type of partition on which you are installing the Integrated Virtualization Manager:
For an AIX or Linux partition, complete the following steps to change the partition boot mode:
 - 1) In the navigation area, expand **Power/Restart Control**.
 - 2) Click **Power On/Off System**.
 - 3) Select **Boot to SMS menu** in the **AIX or Linux partition mode** by boot field.
 - 4) If you are installing the Integrated Virtualization Manager on an IBM System i model, select **AIX or Linux** in the **Default partition environment** field.
 - 5) Click **Save settings and power on**.
 - d. Open a terminal session on the PC, using an application such as HyperTerminal, and wait for the SMS menu to appear. Be sure that the line speed is set to 19,200 bits per second to communicate with the system unit.
 - e. Using the Web-based ASMI, change the partition boot mode back so that the server loads the operating environment during startup:
 - 1) Expand **Power/Restart Control**.
 - 2) Click **Power On/Off System**.
 - 3) Select **Continue to operating system** in the **AIX or Linux partition mode** boot field.
 - 4) Click **Save settings**.
3. Insert the *Virtual I/O Server* CD or DVD into the optical drive.
4. In SMS, select the CD or DVD as the boot device:
 - a. Select **Select Boot Options**, and press Enter.
 - b. Select **Select Install/Boot Device**, and press Enter.
 - c. Select **CD/DVD**, and press Enter.
 - d. Select the media type that corresponds to the optical device, and press Enter.
 - e. Select the device number that corresponds to the optical device, and press Enter.
 - f. Select **Normal Boot**, and confirm that you want to exit SMS.
5. Install the Virtual I/O Server:

- a. Select the console, and press Enter.
 - b. Select a language for the BOS menus, and press Enter.
 - c. Select **Start Install Now with Default Settings**.
 - d. Select **Continue with Install**. The managed system restarts after the installation is complete, and the login prompt is displayed on the ASCII terminal.
6. After you install the IVM, finish the installation by accepting the license agreement, checking for updates, and configuring the TCP/IP connection.
 7. Continue with “Cabling the server and connecting expansion units” on page 16.

Cabling the server with keyboard, video, and mouse:

Before you start the system, you might need to connect the keyboard, video, and mouse to the system, if a graphics card is present.

To connect the keyboard, video, and mouse, complete the following steps:

1. Locate the graphics card and Universal Serial Bus (USB) ports at the rear of the system. You might need a connector converter.
2. Connect the monitor cable to the graphics card.
3. Connect a keyboard and mouse to the USB ports.
4. Power on the console.
5. Continue with “Cabling the server and connecting expansion units” on page 16.

Cabling the server and connecting expansion units

Learn how to cable the server and to connect expansion units.

To cable the server and to connect expansion units, complete the following steps:

1. Complete the following steps:
 - a. Plug the power cord into the power supply.
 - b. Plug the system power cords and the power cords for any other attached devices into the power source.
 - c. If your system uses a power distribution unit (PDU), complete the following steps:
 - 1) Connect the system power cords from the server and I/O drawers to the PDU with an IEC 320 type receptacle.
 - 2) Attach the PDU input power cord and plug it into the power source.
 - 3) If your system uses two PDUs for redundancy, complete the following steps:
 - If your system has two power supplies, attach one power supply to each of the two PDUs.
 - If your system has four power supplies, plug E1 and E2 to **PDU A** and E3 and E4 to **PDU B**.

Note: Confirm that the system is in standby mode. The green power status indicator on the front control panel is flashing, and the dc out indicator lights on the power supplies are flashing. If none of the indicators are flashing, check the power cord connections.

- d. If your system uses a DC power distribution panel (PDP), complete the following steps:
 - 1) Connect the system power cables from the server and I/O drawers to the PDP.
 - 2) If your system uses redundant power supplies, complete the following steps:
 - If your system has two power supplies, attach one power supply to the 'A' feed and the other to the 'B' feed of the PDP.
 - If your system has four power supplies, attach two power supplies to the 'A' feed and the other two to the 'B' feed of the PDP.
 - 3) Place the applicable circuit breakers in the ON position.

2. For information about connecting enclosures and expansion units, see Enclosures and expansion units (http://www.ibm.com/support/knowledgecenter/POWER8/p8ham/p8ham_kickoff.htm).

Completing the server setup

Learn about the tasks you must complete to set up your managed system.

One of the tasks you can perform to complete your server setup is to virtualize your server. IBM® PowerKVM™ is an open virtualization solution that is offered for the Power® scale-out family of Linux servers built on POWER8™ technology.

PowerKVM delivers server virtualization based on open source Kernel-based Virtual Machine (KVM) Linux technology. PowerKVM virtualization technology enables you to share real compute, memory, and I/O resources through server virtualization. These virtual resources are used by virtual machines running on the PowerKVM virtualized server.

PowerKVM-based server virtualization enables optimization and the commitment of resources like CPU and memory. This helps you achieve superior resource usage, flexibility, and agility, resulting in cost reduction through economies of scale.

To get started using PowerKVM virtualization technology on your system, see Quick start guide for IBM PowerKVM (<http://www.ibm.com/support/knowledgecenter/linuxonibm/liabq/liabqquick.htm>). Then return to this document to continue to complete your server setup.

Completing the server setup without using an HMC:

If you do not have an Hardware Management Console (HMC), use this procedure to complete the server setup.

To complete the server setup without using a management console, complete the following steps:

1. Attach the server to the rack using the shipping screws that were provided with your system.
2. To check the firmware level on the managed system and to update the time of day, complete the following steps:
 - a. Access the Advanced System Management Interface (ASMI). For instructions, see Accessing the ASMI without an HMC (http://www.ibm.com/support/knowledgecenter/POWER8/p8hby/connect_asmi.htm).
 - b. On the ASMI Welcome pane, note the existing level of server firmware in the upper-right corner under the copyright statement.
 - c. Update the time of day. In the navigation area, expand **System Configuration**.
 - d. Click **Time of Day**. The content pane displays a form that shows the current date (month, day, and year) and time (hours, minutes, and seconds).
 - e. Change the date value, the time value, or both, and click **Save settings**.
3. To start a system, complete the following steps:
 - a. Open the front door of the managed system.
 - b. Press the power button on the control panel.

The power-on light begins to flash faster.

- a. The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
- b. Progress indicators appear on the control panel display while the system is being started.
- c. The power-on light on the control panel stops flashing and remains on, indicating that the system is powered on.

For instructions, see Starting a system that is not managed by an HMC (<http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/startsysnohmc.htm>).

4. Install an operating system and update the operating system.
 - Install the AIX operating system. For instructions, see Installing AIX (http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installaix.htm).
 - Install the Linux operating system. For instructions, see Installing Linux (http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installlinux.htm).
 - Install the VIOS operating system. For instructions, see Installing VIOS (http://www.ibm.com/support/knowledgecenter/POWER8/p8hch/p8hch_installvios.htm).
5. Update the system firmware, if required.
 - For instructions to get firmware fixes through the AIX or Linux operating system, see Getting server firmware fixes through AIX or Linux without a management console (http://www.ibm.com/support/knowledgecenter/POWER8/p8ha5/fix_firm_no_hmc_aix.htm).
 - If you are using VIOS, see Updating the Virtual I/O Server's firmware and device microcode with an Internet connection (http://www.ibm.com/support/knowledgecenter/POWER8/p8ha5/fix_virtual_firm_ivm.htm).
6. You have now completed the steps to install your server.

Setting up a preinstalled server

Use this information to learn about setting up a server that is preinstalled in the rack.

Prerequisite for installing the preinstalled server

Use the information to understand the prerequisites that are required for setting up the preinstalled server.

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When using an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.

You might need to read the following documents before you begin to install the server:

- The latest version of this document is maintained online, see Installing the IBM Power System S822 (8284)Installing the IBM Power System S822 (8284) (http://www.ibm.com/support/knowledgecenter/POWER8/p8egh/p8egh_roadmap.htm).
- To plan your server installation, see Planning for the system (http://www.ibm.com/support/knowledgecenter/POWER8/p8had/p8had_8xx_kickoff.htm).
- If you are using a Hardware Management Console (HMC), see Obtaining and applying machine code updates for the HMC with an Internet connection (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/area3fixeshmc.htm>).

Consider the following prerequisites before you install the server:

1. Ensure that you have the following items before you start your installation:
 - Phillips screwdriver
 - Flat-head screwdriver
2. Ensure that you have one of the following consoles:
 - Hardware Management Console (HMC): Ensure that your HMC is at version 8 release 8.1.0, or later.
 - Graphic monitor with keyboard and mouse.

- Teletype (tty) monitor with keyboard.

Completing inventory for your preinstalled server

Use this information to complete inventory for your server.

To complete the inventory, complete the following steps:

1. Verify that you received all the boxes you ordered.
2. Unpack the server components as needed.
3. Complete a parts inventory before you install each server component by following these steps:
 - a. Locate the inventory list for your server.
 - b. Ensure that you received all the parts that you ordered.

Note: Your order information is included with your product. You can also obtain order information from your marketing representative or the IBM Business Partner.

If you have incorrect, missing, or damaged parts, consult any of the following resources:

- Your IBM reseller.
- IBM Rochester manufacturing automated information line at 1-800-300-8751 (United States only).
- The Directory of worldwide contacts website <http://www.ibm.com/planetwide>. Select your location to view the service and support contact information.

Removing the shipping bracket and connecting power cords and power distribution unit (PDU) for your preinstalled server

Before you set up a console, you must remove the shipping brackets and connect power cords.

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When using an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.

To remove the shipping bracket and connect power cords, do the following:

1. Remove the four screws that secure the shipping brackets to the chassis.

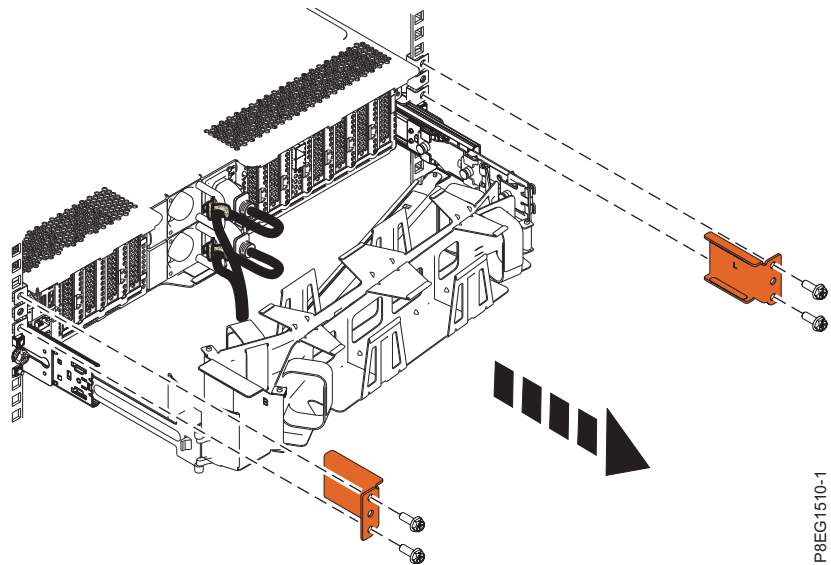


Figure 37. Removing the shipping brackets from the rear of the chassis

Store the shipping brackets if you want to move your system at a later date.

2. Cable the server.

- a. Plug the two power cords into the power supplies (A) and attach the cables to the handles on the power supply using cable ties or hook-and-loop fasteners (B).

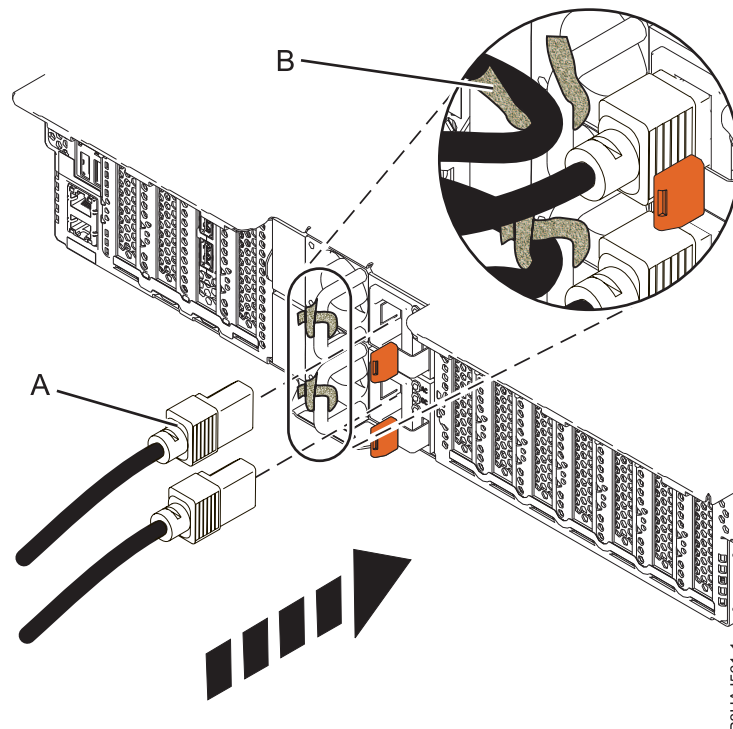


Figure 38. Plugging the power cords into the power supply and attaching cables to the power supply handles

- b. Connect the system power cords from the server and I/O drawers to the PDU with an IEC 320 type receptacle.
- c. Attach the PDU input power cord and plug it into the power source.

Cabling the server and setting up a console

Your console, monitor, or interface choices are guided by whether you create logical partitions, which operating system you install in your primary partition, and whether you install a Virtual I/O Server (VIOS) in one of your logical partitions.

Determining which console to use:

There are different console types available to manage this server. Learn more about the consoles that are available.

IBM® PowerKVM™ is an open virtualization solution that is offered for the Power® scale-out family of Linux servers built on POWER8™ technology.

PowerKVM delivers server virtualization based on open source Kernel-based Virtual Machine (KVM) Linux technology. PowerKVM virtualization technology enables you to share real compute, memory, and I/O resources through server virtualization. These virtual resources are used by virtual machines running on the PowerKVM virtualized server.

PowerKVM-based server virtualization enables optimization and the commitment of resources like CPU and memory. This helps you achieve superior resource usage, flexibility, and agility, resulting in cost reduction through economies of scale.

To get started using PowerKVM virtualization technology on your system, see IBM PowerKVM.

If you do not want to use PowerKVM, read the following section to learn more about choosing a console type. Go to the instructions for the applicable console, interface, or terminal in the following table.

Table 6. Available console types

Console type	Operating system	Logical partitions	Cable required	Cabling setup instructions
ASCII terminal	AIX, Linux, or VIOS	Yes for VIOS, no for AIX and Linux	Serial cable equipped with a null modem	"Cabling the server with an ASCII terminal" on page 12
Hardware Management Console (HMC)	AIX, Linux, or VIOS	Yes	Ethernet (or cross-over cable)	"Cabling the server to the HMC" on page 13.
Integrated Virtualization Manager for VIOS	AIX or Linux	Yes	Serial cable	"Cabling the server and accessing the IVM" on page 15
Keyboard, video, and mouse	Linux or VIOS	Yes	Monitor and USB cables equipped with keyboard, video, and mouse	"Cabling the server with keyboard, video, and mouse" on page 16

Cabling the server with an ASCII terminal:

If you are not creating logical partitions, you can use an ASCII terminal to manage a server that is running the AIX, Linux, or VIOS operating systems. From the ASCII terminal, you can access the Advanced System Management Interface (ASMI) to complete more installation tasks.

The ASCII terminal is connected to the server through a serial link. The ASCII interface to the ASMI provides a subset of the web interface functions. The ASCII terminal for the ASMI interface is available only when the system is in the standby state. It is not available during the initial program load (IPL) or run time.

Note: If you are using a serial connection to the ASMI terminal, you must use a conversion cable. This cable (part number 46K5108) is used to convert the ASCII terminal 9-pin Dshell connector to an RJ45 serial port connector on the system. For information about the locations of the connectors on the system, see Part locations and location codes (http://www.ibm.com/support/knowledgecenter/POWER8/p8ecs/p8ecs_locations.htm).

To cable an ASCII terminal to the server, complete the following steps:

1. Using a serial cable that is equipped with a null modem, connect the ASCII terminal to the serial port on the rear of the server.
2. Ensure that your ASCII terminal is set to the following general attributes.
These attributes are the default settings for the diagnostic programs. Be sure that your terminal is set according to these attributes before proceeding to the next step.

Table 7. Default settings for the diagnostic programs

General setup attributes	3151 /11/31/41 settings	3151 /51/61 settings	3161 /64 settings	Description
Line speed	19,200	19,200	19,200	Uses the 19,200 (bits per second) line speed to communicate with the system unit.
Word length (bits)	8	8	8	Selects 8 bits as a data word length (byte).
Parity	No	No	No	Does not add a parity bit and is used together with the word length attribute to form the 8-bit data word (byte).
Stop bit	1	1	1	Places a bit after a data word (byte).

3. Press a key on the ASCII terminal to allow the service processor to confirm the presence of the ASCII terminal.
4. When the login display appears for the ASMI, enter admin for the user ID and password.
5. Change the default password when you are prompted.
6. Press Enter until the server information appears. You have completed the setup for an ASCII terminal, and have started the ASMI.
7. Continue with “Completing the server setup without using an HMC” on page 44.

Cabling the server to the HMC:

The Hardware Management Console (HMC) controls managed systems, including the management of logical partitions, the creation of a virtual environment, and the use of capacity on demand. Using service applications, the HMC can also communicate with managed systems to detect, consolidate, and forward information to IBM service for analysis.

If you have not installed and configured your HMC, do so now. For instructions, see Installation and configuration scenarios (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/basichmcinstallationandconfigurationtaskflow.htm>).

To manage POWER8 processor-based servers, the HMC must be at version 8 release 8.1.0, or later. To view the HMC version and release, complete the following steps:

1. In the navigation area, click **Updates**.
2. In the work area, view and record the information that appears in the HMC Code Level section, including the HMC version, release, Service Pack, build level, and base versions.

To cable the server to the HMC, complete the following steps:

1. If you want to directly attach your HMC to the managed system, connect **Ethernet Connector 1** on the HMC to the **HMC1** port on the managed system. See Figure 17 on page 14.

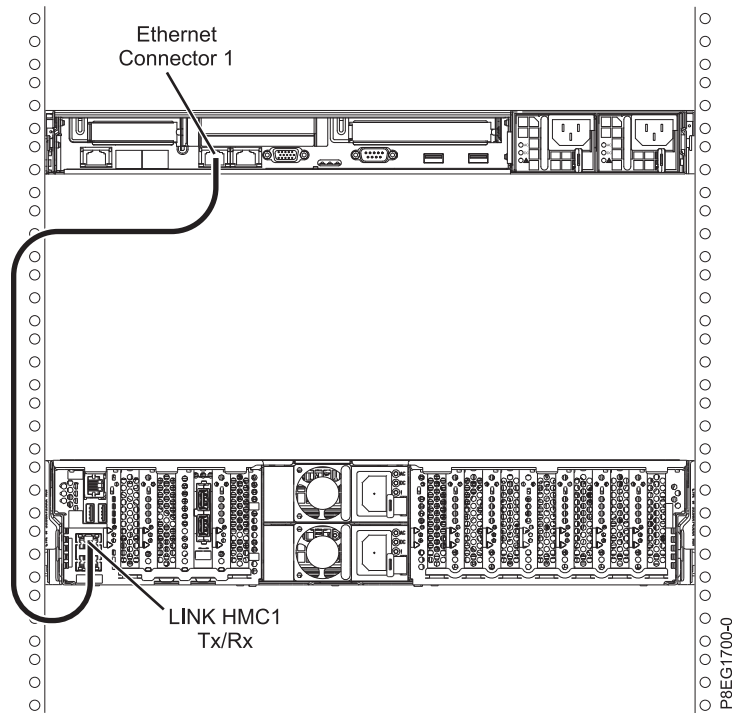


Figure 39. Attaching the HMC to the managed system

2. To learn how to connect an HMC to a private network so that it can manage more than one managed system, see HMC network connections (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/netconhmc.htm>).

Notes:

- You can also have multiple systems that are attached to a switch that is then connected to the HMC. For instructions, see HMC network connections (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/netconhmc.htm>).
 - If you are using a switch, ensure that the speed in the switch is set to **Autodetection**. If the server is directly attached to the HMC, ensure the Ethernet adapter speed on the HMC is set to **Autodetection**. For information about how to set media speeds, see Setting the media speed (<http://www.ibm.com/support/knowledgecenter/POWER8/p8hai/lanmediaspeed.htm>).
3. If you are connecting a second HMC to your managed server, connect it to the Ethernet port that is labeled **HMC2** on the managed server.
 4. Continue with “Routing cables through the cable-management arm and connecting expansion units” on page 44.

Cabling the server and accessing the IVM:

When you install the Virtual I/O Server (VIOS) in an environment where no Hardware Management Console (HMC) is present, the VIOS automatically creates a management partition whose interface is the Integrated Virtualization Manager (IVM).

To prepare for and install the VIOS and to enable the IVM, complete the following steps:

1. Connect a serial cable from a PC or ASCII terminal to a system port on the server. For details, see “Cabling the server with an ASCII terminal” on page 40.

2. Complete the following steps:
 - a. Verify that you have access to the Advanced System Management Interface (ASMI) by using the web interface. For details, see *Accessing the ASMI using a web browser*.
 - b. Verify that you have administrator or authorized service provider authority in ASMI.
 - c. Using the Web-based ASMI, change the following settings as appropriate for the type of partition on which you are installing the Integrated Virtualization Manager:
For an AIX or Linux partition, complete the following steps to change the partition boot mode:
 - 1) In the navigation area, expand **Power/Restart Control**.
 - 2) Click **Power On/Off System**.
 - 3) Select **Boot to SMS menu** in the **AIX or Linux partition mode** by boot field.
 - 4) If you are installing the Integrated Virtualization Manager on an IBM System i model, select **AIX or Linux** in the **Default partition environment** field.
 - 5) Click **Save settings and power on**.
 - d. Open a terminal session on the PC, using an application such as HyperTerminal, and wait for the SMS menu to appear. Be sure that the line speed is set to 19,200 bits per second to communicate with the system unit.
 - e. Using the Web-based ASMI, change the partition boot mode back so that the server loads the operating environment during startup:
 - 1) Expand **Power/Restart Control**.
 - 2) Click **Power On/Off System**.
 - 3) Select **Continue to operating system** in the **AIX or Linux partition mode** boot field.
 - 4) Click **Save settings**.
3. Insert the *Virtual I/O Server* CD or DVD into the optical drive.
4. In SMS, select the CD or DVD as the boot device:
 - a. Select **Select Boot Options**, and press Enter.
 - b. Select **Select Install/Boot Device**, and press Enter.
 - c. Select **CD/DVD**, and press Enter.
 - d. Select the media type that corresponds to the optical device, and press Enter.
 - e. Select the device number that corresponds to the optical device, and press Enter.
 - f. Select **Normal Boot**, and confirm that you want to exit SMS.
5. Install the Virtual I/O Server:
 - a. Select the console, and press Enter.
 - b. Select a language for the BOS menus, and press Enter.
 - c. Select **Start Install Now with Default Settings**.
 - d. Select **Continue with Install**. The managed system restarts after the installation is complete, and the login prompt is displayed on the ASCII terminal.
6. After you install the IVM, finish the installation by accepting the license agreement, checking for updates, and configuring the TCP/IP connection.
7. Continue with "Routing cables through the cable-management arm and connecting expansion units" on page 44.

Cabling the server with keyboard, video, and mouse:

Before you start the system, you might need to connect the keyboard, video, and mouse to the system, if a graphics card is present.

To connect the keyboard, video, and mouse, complete the following steps:

1. Locate the graphics card and Universal Serial Bus (USB) ports at the rear of the system. You might need a connector converter.
2. Connect the monitor cable to the graphics card.
3. Connect a keyboard and mouse to the USB ports.
4. Power on the console.
5. Continue with “Routing cables through the cable-management arm and connecting expansion units.”

Routing cables through the cable-management arm and connecting expansion units

Use this procedure to route cables through the cable-management arm and to connect expansion units.

To route cables through the cable-management arm and to connect expansion units, complete the following steps:

1. Route the console cable through the cable management arm.
2. Connect expansion units that were shipped with the system. Tasks must be performed on the expansion unit before it can be powered on. For more information, see the expansion unit installation documentation that was shipped with the system. Complete the tasks associated with connecting a preinstalled expansion unit or disk drive enclosure, then return to this document to complete your server setup.
3. Continue with “Completing the server setup.”

Completing the server setup

Learn about the tasks you must complete to set up your managed system.

One of the tasks you can perform to complete your server setup is to virtualize your server. IBM® PowerKVM™ is an open virtualization solution that is offered for the Power® scale-out family of Linux servers built on POWER8™ technology.

PowerKVM delivers server virtualization based on open source Kernel-based Virtual Machine (KVM) Linux technology. PowerKVM virtualization technology enables you to share real compute, memory, and I/O resources through server virtualization. These virtual resources are used by virtual machines running on the PowerKVM virtualized server.

PowerKVM-based server virtualization enables optimization and the commitment of resources like CPU and memory. This helps you achieve superior resource usage, flexibility, and agility, resulting in cost reduction through economies of scale.

To get started using PowerKVM virtualization technology on your system, see Quick start guide for IBM PowerKVM (<http://www.ibm.com/support/knowledgecenter/linuxonibm/liabq/liabqquick.htm>). Then return to this document to continue to complete your server setup.

Completing the server setup without using an HMC:

If you do not have an Hardware Management Console (HMC), use this procedure to complete the server setup.

To complete the server setup without using a management console, complete the following steps:

1. To check the firmware level on the managed system and to update the time of day, complete the following steps:
 - a. Access the Advanced System Management Interface (ASMI). For instructions, see Accessing the ASMI without an HMC (http://www.ibm.com/support/knowledgecenter/POWER8/p8hbby/connect_asmi.htm).

- b. On the ASMI Welcome pane, note the existing level of server firmware in the upper-right corner under the copyright statement.
 - c. Update the time of day. In the navigation area, expand **System Configuration**.
 - d. Click **Time of Day**. The content pane displays a form that shows the current date (month, day, and year) and time (hours, minutes, and seconds).
 - e. Change the date value, the time value, or both, and click **Save settings**.
2. To start a system, complete the following steps:
 - a. Open the front door of the managed system.
 - b. Press the power button on the control panel.

The power-on light begins to flash faster.

 - a. The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
 - b. Progress indicators appear on the control panel display while the system is being started.
 - c. The power-on light on the control panel stops flashing and remains on, indicating that the system is powered on.

For instructions, see Starting a system that is not managed by an HMC (<http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/startsysnohmc.htm>).
3. Install an operating system and update the operating system.
 - Install the AIX operating system. For instructions, see Installing AIX (http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installaix.htm).
 - Install the Linux operating system. For instructions, see Installing Linux (http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/p8hdx_installlinux.htm).
 - Install the VIOS operating system. For instructions, see Installing VIOS (http://www.ibm.com/support/knowledgecenter/POWER8/p8hch/p8hch_installvios.htm).
4. Update the system firmware, if required.
 - For instructions to get firmware fixes through the AIX or Linux operating system, see Getting server firmware fixes through AIX or Linux without a management console (http://www.ibm.com/support/knowledgecenter/POWER8/p8ha5/fix_firm_no_hmc_aix.htm).
 - If you are using VIOS, see Updating the Virtual I/O Server's firmware and device microcode with an Internet connection (http://www.ibm.com/support/knowledgecenter/POWER8/p8ha5/fix_virtual_firm_ivm.htm).
5. You have now completed the steps to install your server.

Common information for installing servers

Use this information to learn more about the tasks associated with a system installation.

Common system attention LEDs and system reference codes

Find LED and system reference code (SRC) information for recovering recover from common installation problems.

The following table describes light-emitting diode (LED) status behaviors and describes the meaning of each behavior.

Table 8. Common installation system attention LEDs

Front power status LED (green)	ac in (green)	dc out (green)	Fault (yellow)	Description
On	On	On	Off	Power is being supplied to the system and the system is powered on.
Flashing	On	Flashing	Off	Power is being supplied to the system.
Flashing	Off	Flashing	Off	Power is not being supplied to one of the power supplies, but power is being supplied to the second power supply, and the system is in standby mode.
On	Off	Flashing	Off	Power is not being supplied to one of the power supplies, but power is being supplied to the second power supply, and the system is powered on.
Off	Off	Off	Off	Power is not being supplied to either power supply.
Flashing	On	Off or flashing	On	Power is being applied, but the power supply is not functioning properly and the system is in standby mode.
On	On	Off or flashing	On	Power is being applied, but the power supply is not functioning properly and the system is powered on.
Flashing	On	On	On	110 volts are being applied. This system requires 220 volts.

The following table describes system reference codes (SRCs) that you might encounter during installation.

Table 9. Common installation SRCs

SRC	Error description	Recovery steps
1000xxx 1100xxx 509Axxx 509Dxxx 50A4xxx 50ADxxx 50B1xxx	ac input and power supply connections	<ol style="list-style-type: none"> 1. Verify that power cords are plugged in correctly in the following locations: <ul style="list-style-type: none"> • Drawer • Power distribution unit (PDU), if applicable • Battery backup unit (BBU), if applicable • Input source power receptacle 2. Verify that the power supplies are seated and latched into position.
11002613	Your power voltages do not match	Ensure that you are using the correct power voltage. Refer to your server's specifications to learn more about the power voltage that your server requires.
Starts with 27xxx, 28xx, 57xxx and ends with xxxx3120, xxxx3121	Fibre Channel port failure	These errors are often caused by ports that are not used. Every port must have a cable or wrap plug installed. Whenever a cable is not installed, ensure that a wrap plug is installed for each unused port. Wrap plugs are shipped automatically when a Fibre Channel feature code is ordered.
B1A38B24	Network configuration	Ensure that you have entered the correct IP address.

Best practices for integrating cable and system placement

These guidelines ensure that your system and its cables have optimal clearance for maintenance and other operations. The guidelines also provide guidance in correctly cabling your system and using the appropriate cables.

The following guidelines provide cabling information for installing, migrating, relocating, or upgrading your system:

- Position drawers in racks to allow enough space, where possible, for routing cables on the bottom and top of the rack, and between drawers.
- Shorter drawers are not placed between longer drawers in the rack (for example, do not place a 19-inch drawer between two 24-inch drawers).
- When a specific cable plugging sequence is required, for example, for concurrent maintenance (symmetric multiprocessing cables), label the cables appropriately and note the sequence order.
- To facilitate cable routing, install cables in the following order:
 1. System power control network (SPCN) cables
 2. Power cables
 3. Communications (serial-attached SCSI, InfiniBand, remote input/output, and peripheral component interconnect express) cables

Note: Install and route the communications cables, starting with the smallest diameter first and then progressing to the largest diameter. This applies to installing them into the cable management arm and retaining them to the rack, brackets, and other features that may be provided for cable management.

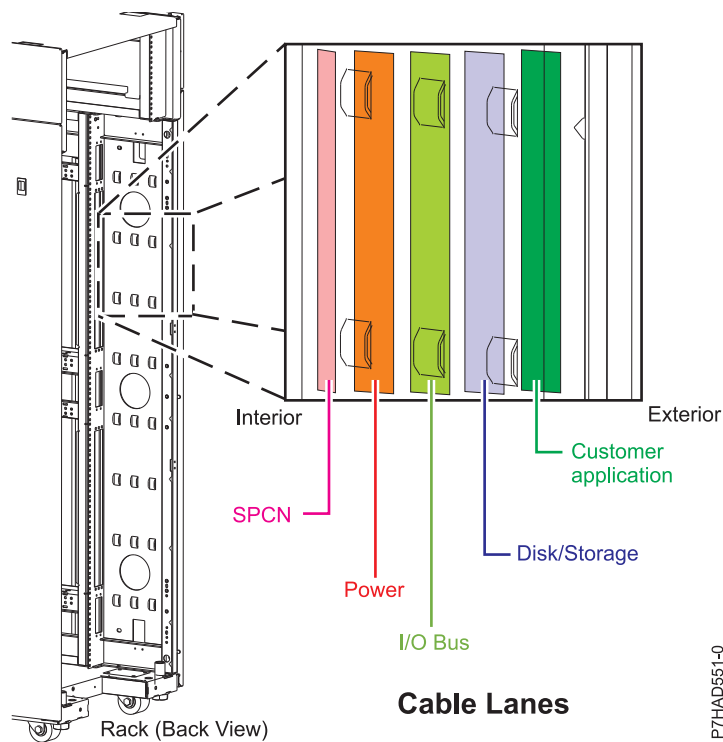


Figure 40. Cable management cable lanes

- Use the innermost cable-management bridge lanes for SPCN cables.
- Use the middle cable-management bridge lanes for power and communications cables.
- The outermost row of cable-management bridge lanes are available for use when routing cables.
- Use the cable lanes on the sides of the rack to manage excess SPCN and power cables.
- Four cable-management bridge lanes on the top of the rack. Use these bridge lanes to route the cables from one side of the rack to the other, by routing to the top of the rack, where possible. This routing helps to avoid having a cable bundle that blocks the cable exit opening at the bottom of the rack.
- Use the cable-management brackets that are provided with the system to maintain concurrent maintenance routing.

Cable bend radius

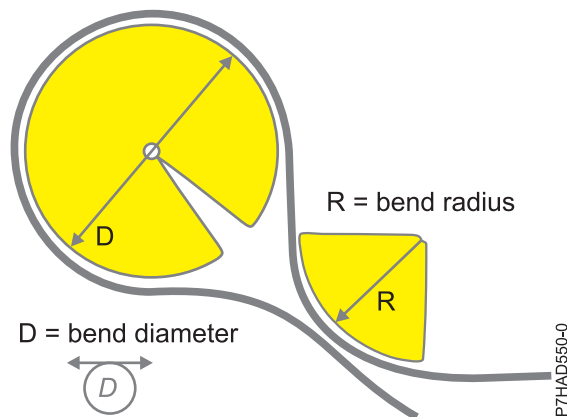


Figure 41. Cable bend radius

- Maintain a minimum bend diameter of 101.6 mm (4 in.) for communications (SAS, IB, RIO, and PCIe) cables.
- Maintain a minimum bend diameter of 50.8 mm (2 in.) for power cables.
- Maintain a minimum bend diameter of 25.4 mm (1 in.) for SPCN cables.
- Use the shortest-length cable available for each point-to-point connection.
- If cables must be routed across the rear of a drawer, leave enough slack to reduce the tension on the cables for maintenance of the drawer.
- When routing cables, leave enough slack around the power connection on the power distribution unit (PDU) so that the wall-to-PDU line cord can be attached to the PDU.
- Use hook-and-loop fasteners where necessary.

Supporting information for setting up consoles

Use this information if you need to access the Advanced System Management Interface by using a web browser if you need to set IP addresses on your notebook, or if you need to troubleshoot a connection.

Accessing the ASMI by using a web browser

If your system is not managed by a Hardware Management Console (HMC), you can connect a PC or notebook to the server to access the Advanced System Management Interface (ASMI). You need to configure the Web browser address on the PC or notebook to match the manufacturing default address on the server.

To set up the Web browser for direct or remote access to the ASMI, complete the following steps:

1. If the server is not powered on, perform the following steps:
 - a. Connect your power cord or cords to the server.
 - b. Plug the power cord or cords into the power source.
 - c. Wait for the control panel to display 01. A series of progress codes are shown before 01 appears.

Notes:

- The system is powered on if the light on the control panel is green.
- To view the control panel, press the blue switch to the left, then pull out the control panel all the way, and then pull it down.

Important: Do not connect an Ethernet cable to either the HMC1 port or the HMC2 port until you are directed to do so later in this procedure.

2. Select a PC or notebook that has Netscape 9.0.0.4, Microsoft Internet Explorer 7.0, Opera 9.24, or Mozilla Firefox 2.0.0.11 to connect to your server.

Note: If the PC or notebook on which you are viewing this document does not have two Ethernet connections, another PC or notebook needs to be connected to your server to access the ASMI.

If you do not plan to connect your server to your network, this PC or notebook is your ASMI console.

If you plan to connect your server to your network, this PC or notebook temporarily connects directly to the server for setup purposes only. After setup, you can use any PC or notebook on your network that is running Netscape 9.0.0.4, Microsoft Internet Explorer 7.0, Opera 9.24, or Mozilla Firefox 2.0.0.11 as your ASMI console.

Note: Complete the following steps to disable the TLS 1.0 option in Microsoft Internet Explorer to access the ASMI using Microsoft Internet Explorer 7.0 running on Windows XP:

- a. From the **Tools** menu in Microsoft Internet Explorer, select **Internet Options**.
- b. From the Internet Options window, click the **Advanced** tab.
- c. Clear the **Use TLS 1.0** check box (in the Security category) and click **OK**.

3. Connect an Ethernet cable from the PC or notebook to the Ethernet port labeled **HMC1 (T4)** on the back of the managed system. If **HMC1 (T4)** is occupied, connect an Ethernet cable from the PC or notebook to the Ethernet port labeled **HMC2 (T5)** on the rear of the managed system.

Important: If you attach an Ethernet cable to the service processor before the system reaches power off standby, the IP address shown in Table 10 might not be valid. For details, see “Correcting an IP address” on page 52.

4. Use Table 10 to help you determine and record the information needed to set the IP address of the service processor on the PC or notebook. The Ethernet interface on the PC or notebook needs to be configured within the same subnet mask as the service processor so that they can communicate with each other. For example, if you connected your PC or notebook to HMC1, the IP address for your PC or notebook could be 169.254.2.140 and the subnet mask would be 255.255.255.0. Set the gateway IP address to the same IP address as the PC or notebook

Table 10. Network configuration information for the service processor in a POWER8 processor-based system

POWER8® processor-based systems	Server connector	Subnet mask	IP address of the service processor	Example of an IP address for your PC or notebook
Service processor A	HMC1	255.255.255.0	169.254.2.147	169.254.2.140
	HMC2	255.255.255.0	169.254.3.147	169.254.3.140

5. Set the IP address on your PC or notebook by using the values from the table. For details, see “Setting the IP address on your PC or notebook.”
6. To access the ASMI by using a web browser, complete the following steps:
 - a. Use Table 10 to determine the IP address of the service processor Ethernet port that your PC or notebook is connected to.
 - b. Type the IP address in the **Address** field on the Web browser of your PC or notebook and press Enter. For example, if you connected your PC or notebook to HMC1, type <https://169.254.2.147> in the Web browser on your PC or notebook.

Note: It might take up to 2 minutes for the ASMI login display to be shown in the Web browser after the Ethernet cable is plugged into the service processor in step 3. During this time, if you use control panel function 30 to view the IP addresses on the service processor, incomplete or inaccurate data is shown.

7. When the Login display appears, enter admin for the user ID and password.
8. Change the default password when prompted.
9. Choose from the following options:
 - If you do not plan to connect your PC or notebook to your network, this ends this procedure. You can now perform tasks such as changing the time of day or changing the altitude setting.
 - If you plan to connect your PC or notebook to your network, see Accessing the ASMI without an HMC (http://publib.boulder.ibm.com/infocenter/systems/scope/hw/topic/p8hby/connect_asmi.htm).

Setting the IP address on your PC or notebook

To access the Advanced System Management Interface (ASMI) through a web browser, you first need to set the IP address on a PC or notebook. The following procedures describe setting the IP address on a PC or notebook that is running the Linux operating system and the Microsoft Windows XP, 2000, and Vista operating systems.

You need the information that you recorded in step 4 in the “Accessing the ASMI by using a web browser” on page 50 topic to complete the following procedure.

Windows Vista

To set the IP address within Windows Vista, complete the following steps:

1. Click **Start > Control Panel**.
2. Ensure **Classic View** is selected.
3. Click **Network and Sharing Center**.
4. Click **View status** in the Public network area.
5. Click **Properties**.
6. If the Security window is shown, click **Continue**.
7. Highlight **Internet Protocol Version 4** and click **Properties**.
8. Select **Use the following IP address**.
9. Complete the **IP address**, **Subnet mask**, and **Default gateway** fields by using the values that you recorded in the “Accessing the ASMI by using a web browser” on page 50 topic.
10. Click **OK > Close > Close**.

Windows 7

To set the IP address within Windows 7, complete the following steps:

1. Click **Start > Control Panel > Network and Internet > Network and Sharing Center**.
2. Click **Change adapter settings** to choose your network adapter.
3. Right-click the adapter and choose **Properties** to open up the properties window.
4. Select **Internet Protocol Version 4(TCP/IPv4)**, and then click **Properties**.
Attention: Record the current settings before you make any changes. Use this information to restore these settings if you disconnect the PC or notebook after you set up the ASMI web interface.
5. Select **Use the Following IP Address**.
6. Complete the **IP address**, **Subnet mask**, and **Default gateway** fields by using the values that you recorded in the “Accessing the ASMI by using a web browser” on page 50 topic.
7. In the Local Area Connection Properties window, click **OK**. It is not necessary to restart your PC.

Correcting an IP address

If you attach an Ethernet cable to the service processor before the system reaches power off standby, the IP address shown in the service processor network configuration table might not be valid.

If a cable is attached and not connected to anything, nothing happens. The address could potentially change if an Ethernet cable that is attached to a network is connected to that port and if the system is turned on. If you are unable to access the Advanced System Management Interface (ASMI) by using a network connection, complete one of the following tasks:

- Using a serial cable that is equipped with a null modem, connect the ASCII terminal to the serial port on the rear of the server.
- Determine the current IP address. For details, see Function 30: Service processor IP address and port location(<http://publib.boulder.ibm.com/infocenter/systems/scope/hw/topic/p8hb5/func30.htm>).
- Move the reset toggle switches on the service processor from their current position to the opposite position. To perform this task, you must remove and replace the service processor. For details, contact your next level of support.

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Electronic emission notices

When attaching a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices supplied with the monitor.

Class A Notices

The following Class A statements apply to the IBM servers that contain the POWER8 processor and its features unless designated as electromagnetic compatibility (EMC) Class B in the feature information.

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 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 Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 (0) 800 225 5423 or +49 (0) 180 331 3233
email: halloibm@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

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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.

Japan Electronics and Information Technology Industries Association Statement

This statement explains the Japan JIS C 61000-3-2 product wattage compliance.

(一社) 電子情報技術産業協会 高調波電流抑制対策実施
要領に基づく定格入力電力値: Knowledge Centerの各製品の
仕様ページ参照

This statement explains the Japan Electronics and Information Technology Industries Association (JEITA) statement for products less than or equal to 20 A per phase.

高調波電流規格 JIS C 61000-3-2 適合品

This statement explains the JEITA statement for products greater than 20 A, single phase.

高調波電流規格 JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」対象機器（高調波発生機器）です。

- 回路分類 : 6 (単相、PFC回路付)
- 換算係数 : 0

This statement explains the JEITA statement for products greater than 20 A per phase, three-phase.

高調波電流規格 JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」対象機器（高調波発生機器）です。

- 回路分類 : 5 (3相、PFC回路付)
- 換算係数 : 0

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

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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.

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"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 Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.

New Orchard Road

Armonk, New York 10504

Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland GmbH

Technical Regulations, Abteilung M372

IBM-Allee 1, 71139 Ehningen, Germany

Tel: +49 (0) 800 225 5423 or +49 (0) 180 331 3233

email: halloibm@de.ibm.com

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

Class B Notices

The following Class B statements apply to features designated as electromagnetic compatibility (EMC) Class B in the feature installation information.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM-authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM-authorized dealers. IBM is not responsible for any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate this 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 B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe B 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 B Information Technology Equipment according to European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication equipment.

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Technical Regulations, Department M372
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取扱説明書に従って正しい取り扱いをして下さい。

VCCI-B

Japan Electronics and Information Technology Industries Association Statement

This statement explains the Japan JIS C 61000-3-2 product wattage compliance.

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仕様ページ参照

This statement explains the Japan Electronics and Information Technology Industries Association (JEITA) statement for products less than or equal to 20 A per phase.

高調波電流規格 JIS C 61000-3-2 適合品

This statement explains the JEITA statement for products greater than 20 A, single phase.

高調波電流規格 JIS C 61000-3-2 準用品

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- ・換算係数：0

This statement explains the JEITA statement for products greater than 20 A per phase, three-phase.

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- ・回路分類：5（3相、P F C回路付）
- ・換算係数：0

IBM Taiwan Contact Information

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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 B

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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 914-499-1900

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IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 (0) 800 225 5423 or +49 (0) 180 331 3233
email: halloibm@de.ibm.com

Generelle Informationen:

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

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