Power Systems

Installing the EMX0 PCIe Gen3 I/O expansion drawer

IBM

Power Systems

Installing the EMX0 PCIe Gen3 I/O expansion drawer

IBM

Contents

Safety notices

Safety notices may be printed throughout this guide:

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

World Trade safety information

Several countries require the safety information contained in product publications to be presented in their national languages. If this requirement applies to your country, 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.
  - For AC power, disconnect all power cords from their AC power source.
  - For racks with a DC power distribution panel (PDP), disconnect the customer's DC power source to the PDP.
- When connecting power to the product ensure all power cables are properly connected.

v

- For racks with AC power, 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.
  - For racks with a DC power distribution panel (PDP), connect the customer's DC power source to the PDP. Ensure that the proper polarity is used when attaching the DC power and DC power return wiring.
- 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.
- Before you open the device covers, unless instructed otherwise in the installation and configuration procedures: Disconnect the attached AC power cords, turn off the applicable circuit breakers located in the rack power distribution panel (PDP), and disconnect any telecommunications systems, networks, and modems.

DANGER:
- 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. For AC power, remove the power cords from the outlets.
  3. For racks with a DC power distribution panel (PDP), turn off the circuit breakers located in the PDP and remove the power from the Customer's DC power source.
  4. Remove the signal cables from the connectors.
  5. 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. For AC power, attach the power cords to the outlets.
  5. For racks with a DC power distribution panel (PDP), restore the power from the Customer's DC power source and turn on the circuit breakers located in the PDP.
  6. 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. In addition, do not lean on rack mounted devices and do not use them to stabilize your body position (for example, when working from a ladder).

- Each rack cabinet might have more than one power cord.
  - For AC powered racks, be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
  - For racks with a DC power distribution panel (PDP), turn off the circuit breaker that controls the power to the system unit(s), or disconnect the customer's DC power source, 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 AC power cords or multiple DC power cables. To remove all hazardous voltages, disconnect all power cords and power cables. (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 many 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)

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 an EMX0 PCIe Gen3 I/O expansion drawer

Learn how to install an EMX0 PCIe Gen3 I/O expansion drawer (EMX0 PCIe3 expansion drawer) into a rack or remove the shipping bracket from a preinstalled EMX0 PCIe3 expansion drawer. Then, learn how to connect the EMX0 PCIe3 expansion drawer to your system.

Notes:

- If you have a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system and it is being installed at the same time as your EMX0 PCIe3 expansion drawer, the service provider completes the installation of the EMX0 PCIe3 expansion drawer. If you already have the 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system installed, and you have ordered an EMX0 PCIe3 expansion drawer, the installation and setup of the EMX0 PCIe3 expansion drawer is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you for a fee.
- If you have any other type of system, the installation and setup of the EMX0 PCIe3 expansion drawer is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you for a fee.

Installing or setting up an EMX0 PCIe3 expansion drawer

Learn how to install an EMX0 PCIe3 expansion drawer into a rack or set up a preinstalled EMX0 PCIe3 expansion drawer.

Complete the following tasks to install or set up an EMX0 PCIe3 expansion drawer:

1. Preparing to install or set up an EMX0 PCIe3 expansion drawer
2. Completing inventory for the EMX0 PCIe3 expansion drawer
3. Determining and marking the location in the rack
4. Attaching the mounting hardware to the rack
5. Installing the EMX0 PCIe3 expansion drawer into the rack

Preparing to install or set up an EMX0 PCIe3 expansion drawer

Learn about the prerequisites for installing your EMX0 PCIe3 expansion drawer.

Important: Changing the cable configuration of an existing EMX0 PCIe3 expansion drawer or drawers can result in unintended I/O configuration changes, including a change to the bus numbers assigned to existing expansion drawers. When bus numbers change, partition profiles cannot find existing I/O resources.

To prepare to install an EMX0 PCIe3 expansion drawer, complete the following steps:

1. Ensure that you have a PCIe3 cable adapter installed in the host system before you install the EMX0 PCIe3 expansion drawer. For all systems except the 8408-44E system that has an installation of system firmware FW860.10 or later installed, or the 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system that has an installation of system firmware FW840.xx or later installed, you must power off the system to install the PCIe3 cable adapter.

   To install another PCIe3 cable adapter to accommodate an EMX0 PCIe3 expansion drawer, see the following topics:

   - If you must power off the system to install a PCIe adapter in your system, see PCIe adapters (http://www.ibm.com/support/knowledgecenter/POWER8/p8hak/pciadapters.htm).
   - If you can install a PCIe adapter when the system power is turned on, see Installing a part by using the HMC (http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/hmcinstall.htm).

1

- For PCIe adapter placement rules and slot priorities for your system or expansion drawer, see PCIe adapter placement rules and slot priorities (http://www.ibm.com/support/knowledgecenter/POWER8/p8hak/p8hak_pciadapters_slot_all_mtms.htm).

2. Ensure that you have the wanted number of PCIe3 6-slot fanout modules installed in the EMX0 PCIe3 expansion drawer. To install another PCIe3 6-slot fanout module, choose from the following topics:

   - If your system is not managed by an HMC, you must power off the system to install a PCIe3 6-slot fanout module, see Installing the PCIe3 6-slot fanout module in the EMX0 PCIe Gen3 I/O expansion drawer with the system power turned off (http://www.ibm.com/support/knowledgecenter/POWER8/p8egv/p8egv_emx0_kickoff.htm).

     Note: You must power off the server and the EMX0 PCIe3 expansion drawer to install an additional PCIe3 6-slot fanout module.

   - If your system is managed by an HMC, you can install a PCIe3 6-slot fanout module when the system power is turned on. For details, see Installing a part by using the HMC (http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/hmcinstall.htm).

3. Determine the level of software that you need to support the drawer. For instructions, see the IBM Prerequisite website (http://www-912.ibm.com/e_dir/eServerPrereq.nsf).

4. Choose from the following options:

   - If your EMX0 PCIe3 expansion drawer arrived to your site preinstalled in a rack, continue with the step 5.

   - If your EMX0 PCIe3 expansion drawer needs to be installed into a rack, continue with step 6 on page 3.

5. If your EMX0 PCIe3 expansion drawer arrived to your site preinstalled in a rack, complete the following steps:

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

      - #1 and #2 Phillips screwdriver

      - Flat-head screwdriver

   b. Remove the shipping bracket by completing the following steps:

      1) Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.

      2) Using a #1 Phillips screwdriver or 7/32 socket, remove the two M4 screws **(B)** that secure the shipping bracket **(A)** to the EMX0 PCIe3 expansion drawer.
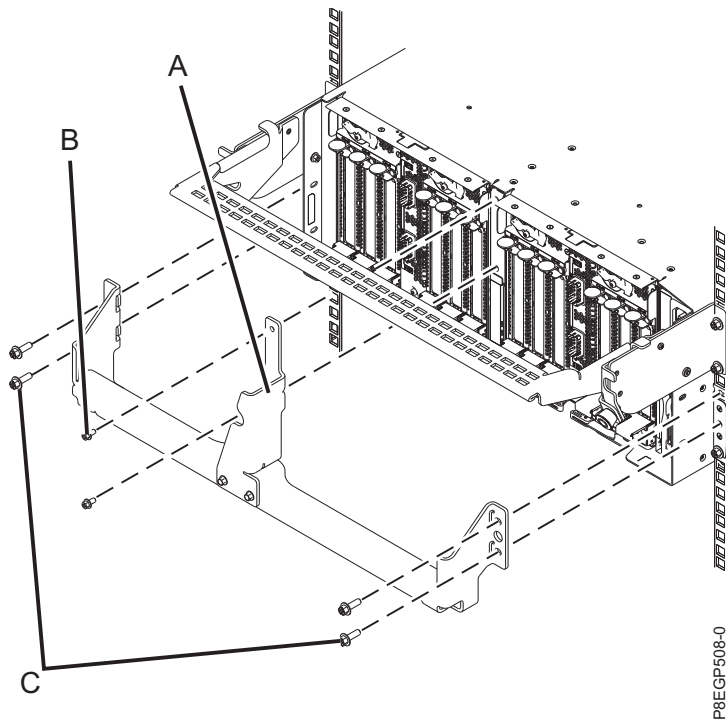
Figure 1. Removing the shipping bracket

   3) Using a #2 Phillips screwdriver or 7 mm socket, remove the four M5 screws **(C)** that attach the shipping bracket **(A)** to the left and right flanges of the rack frame. Lift the bracket out and away from the rack frame.

   Tip: Save the bracket for any future reinstallation or shipping of the drawer that might be required.

c. Continue with "Connecting an EMX0 PCIe3 expansion drawer to your system" on page 17.

6. If you need to install your EMX0 PCIe3 expansion drawer into a rack, complete the following steps:

a. Ensure that you have the following items before you start your installation:
   - #1 and #2 Phillips screwdriver
   - Flat-head screwdriver
   - Rack with four Electronic Industries Alliance (EIA) units of contiguous 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).
   - Help to lift the EMX0 PCIe3 expansion drawer into the rack, which requires three people.

b. Determine where to install a new EMX0 PCIe3 expansion drawer. Consider several elements that include size, security, and environmental factors. For more information, see Site preparation and physical planning (http://www.ibm.com/support/knowledgecenter/POWER8/p8ebe/p8ebe_kickoff.htm).

c. Continue with "Completing inventory for the EMX0 PCIe3 expansion drawer."

Completing inventory for the EMX0 PCIe3 expansion drawer

Learn how to complete inventory for the EMX0 PCIe3 expansion drawer.

To complete inventory, complete the following steps:

1. Refer to the inventory list, and verify that you received all of the parts that you ordered. At a minimum, each order contains the following items:
   - Left and right rack-mounting hardware
   - Mounting screws
   - Power supply cables
   - Expansion drawer cable pairs in 2 meter, 3 meter, 10 meter, or 20-meter lengths.

     Notes:
     – The 2-meter cables are used for intra-rack installations that are using a cable management bracket.
     – The 3-meter cables are used for intra-rack installations that are using a cable management arm.
     – The 10-meter cables are used for inter-rack installations.
     – The 20-meter cables might be needed for inter-rack installations that have a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system.

2. If your shipment contains parts that are not required to complete the installation procedure, store those parts in case they are needed in the future.

3. If you have incorrect, missing, or damaged parts, consult any of the following resources:
   - Your IBM reseller.
   - IBM Rochester manufacturing automated information at 1-800-300-8751 (United States only).
   - See 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

Learn how to determine where to install the EMX0 PCIe3 expansion drawer into the rack.

If you received a mounting template, you can use the template to mark the locations instead of using the manual method that is described in steps 6 on page 6 - 9 on page 7.

To determine where to install the drawer 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 in the rack to place the drawer in relation to other system hardware. As you plan for installing the drawer in a rack, keep in mind the following information:

   Important: If you have an 8247-21L, 8247-22L, 8247-42L, 8284-21A, 8284-22A, 8286-41A, 8286-42A, 8408-44E, or 8408-E8E system, the placement of your EMX0 PCIe3 expansion drawer in relation to your system is important. Consider the following requirements:
   - The EMX0 PCIe3 expansion drawer must be placed above an 8247-21L, 8247-22L, 8247-42L, 8284-21A, 8284-22A, 8286-41A, 8286-42A, 8408-44E, or 8408-E8E system when possible.
   - If you install an EMX0 PCIe3 expansion drawer below an 8247-21L, 8247-22L, 8247-42L, 8284-21A, 8284-22A, 8286-41A, 8286-42A, 8408-44E, or 8408-E8E system, the EMX0 PCIe3 expansion drawer must be placed at least 2 EIA units below the system so that the cable management arm can function properly.

   General location information includes the following recommendations:
   - 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 EMX0 PCIe3 expansion drawer is four EIA units high. An EIA unit is 44.50 mm (1.75 in) in height. The rack contains three mounting holes for each EIA unit of height. The EMX0 PCIe3 expansion drawer, therefore, is 177.8 mm (7 in) high and covers 12 mounting holes in the rack.

3. If necessary, open or remove the front and rear rack doors.
4. Attach the electrostatic discharge (ESD) wrist strap.

   Attention:

   - Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.

   - When you use 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.

5. If necessary, remove the filler panels to allow access to the inside of the rack enclosure where you plan to place the drawer.
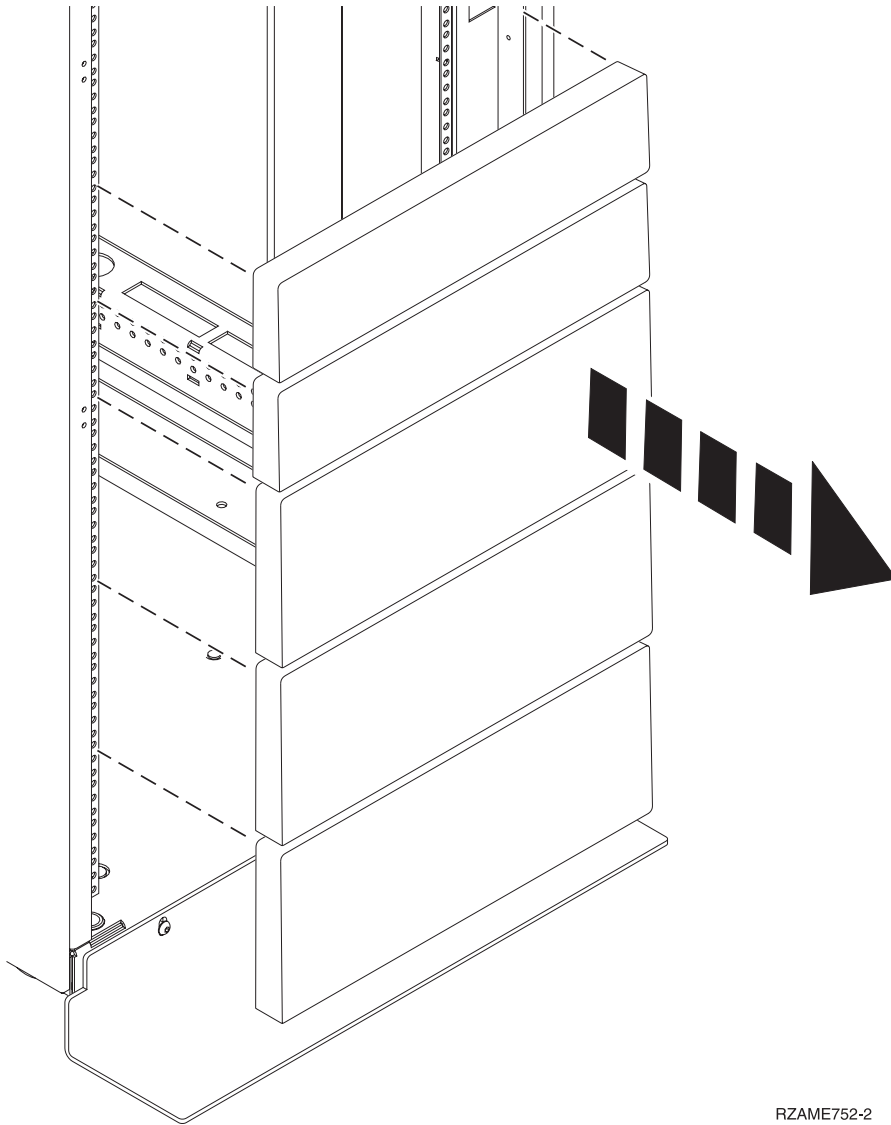
RZAME752-2

Figure 2. Removing the filler panels

6. Face the front of the rack and work from the left side to complete the following steps:

   Remember: If you received a mounting template, you can use the template to mark the locations instead of using the manual method.

   a. Make a note of both the lowest and highest EIA units to be used for the drawer.
   b. Use tape, a marker, or a pencil to mark the top mounting hole of the third EIA unit **(A)** from the lowest EIA unit you marked. Insert a nut clip at this location.
   c. Mark the top mounting hole on the lowest EIA unit **(B)**.

      Note: Mark the rack so that these marks can also be seen from the rear of the rack.
   d. Count up two holes and place another mark beside that mounting hole **(B)**. You now have two marks on the rack **(B)**, with one mounting hole between the marks.
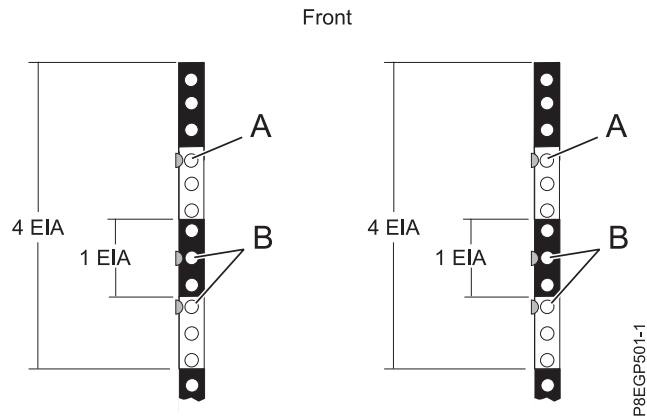
Front

Figure 3. Marking the front installation locations

> **Note:** During this procedure, put nut clips in the **(A)** marks. Then, during the procedure to attach the mounting hardware to the rack, put rail pins in the **(B)** marks.

7. Repeat step 6 on page 6 to place three marks on the corresponding mounting holes on the front-right side of the rack. Insert a nut clip in the **(A)** mark.

8. Go to the rear of the rack and work from the left side to complete the following steps:

    a. Find the EIA unit that corresponds to the lowest EIA unit marked on the front of the rack.

    b. Use tape, a marker, or a pencil to mark the top mounting hole of this EIA unit **(C)**.

    c. Count up two holes and place another mark beside that mounting hole **(C)**. You now have two marks **(C)** on the rack, with one mounting hole between the marks.

    d. Count up three mounting holes from where you placed your last mark, and place another mark next to that mounting hole **(D)**.

    e. Count up three holes and place another mark beside that mounting hole **(D)**. You now have two marks on the rack **(D)**. Insert nut clips in these two locations.
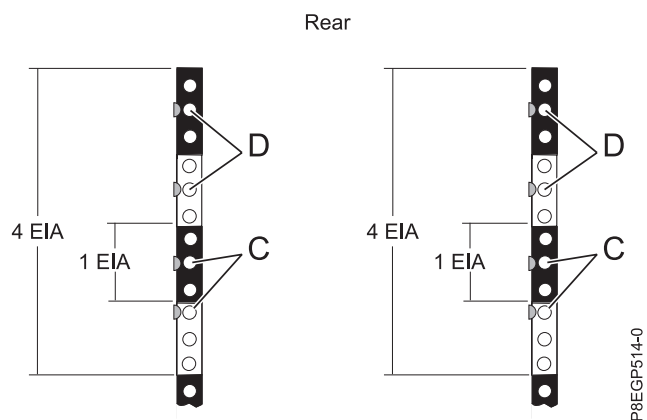
Rear

Figure 4. Marking the rear installation locations

> **Note:** During this procedure, put nut clips in the **(D)** marks. Then, during the procedure to attach the mounting hardware to the rack, put rail pins in the **(C)** marks.

9. Repeat step 8 to place four marks on the corresponding mounting holes on the rear-right side of the rack. Insert nut clips in the **(D)** marks.

Attaching the mounting hardware to the rack

Learn how to attach the mounting hardware to the rack and then install the rails into the rack. 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.

Important: To complete this procedure, it is suggested that you use two people to attach the rail assembly to the rack. Position one person in front of the rack and one person at the back of the rack.

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

1. Gather the rail kit parts that you need during this procedure.

   The rail kit includes the following parts:

   Note: The installation of the EMX0 PCIe3 expansion drawer does not require usage of all parts included in the rail kit.

   - M3 flat head screws (used only with FC 5887)
   - L-shaped brackets (used only with FC 5887)
   - M5 slotted large round head screws and M5 slotted no head screws to accommodate various racks
   - Nut clips for racks with round holes
   - Nut clips for racks with square holes
   - M5 black hex head screws
   - Rails

2. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.

3. Rotate down the front and back clamps **(C)** on the left and right rails as shown in Figure 5 on page 9.
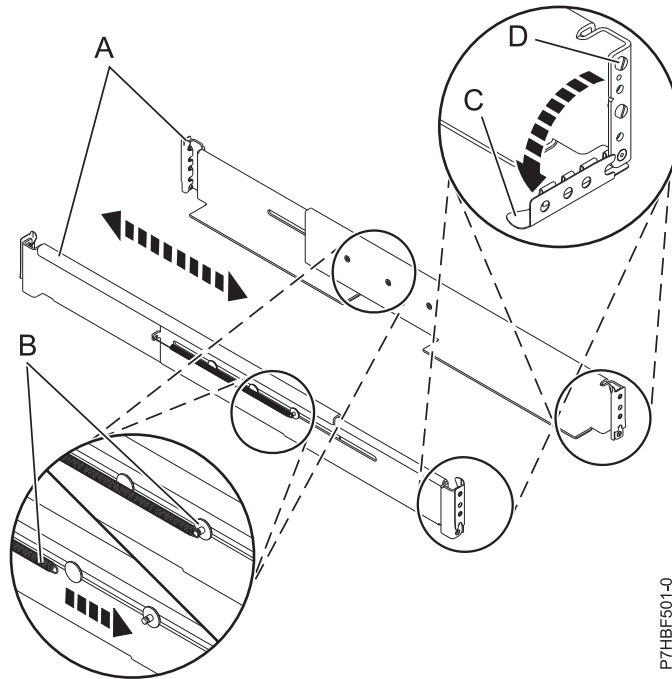
Figure 5. Installing the rails

4. On each rail, remove the tape that is holding the spring **(B)** to the rail. Hook the end of the spring around the circular standoff on the rail as shown in Figure 5.

5. Starting at the front of the rack, complete the following steps:

   a. Extend the right rail and insert the rail pins **(D)** into the two lowest mounting holes that are marked on the rack so that the rail is facing upward as shown in Figure 6 on page 10

   b. Rotate up the front clamp **(C)** to secure the rail in place as shown in Figure 6 on page 10.

Figure 6. Attaching the rails

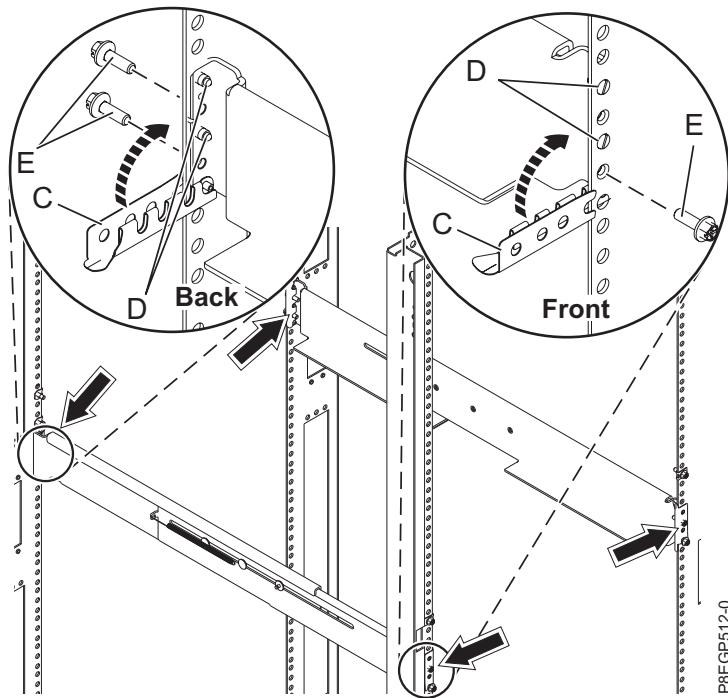> **Remember:** If your rack has square mounting holes, use the larger rail pins that are provided with the rack installation kit.

   c. Extend the left rail and insert the rail pins **(D)** into the two lowest mounting holes that are marked on the rack. Rotate up the front clamp **(C)** to secure the rail in place.

6. Move to the rear of the rack, and complete the following steps:

   a. Extend the right rail, and insert the rail pins **(D)** into the two lowest mounting holes that are marked on the rack. Rotate up the back clamp **(C)** to secure the rail in place.

   b. Extend the left rail and insert the rail pins **(D)** into the two lowest mounting holes that are marked on the rack. Rotate up the back clamp **(C)** to secure the rail in place.

   c. Use two M5 screws **(E)**, one below each rail pin **(D)** to secure the left rail to the back of the rack.

   d. Use two M5 screws **(E)**, one below each rail pin **(D)** to secure the right rail to the back of the rack.

7. Move to the front of the rack and complete the following steps:

   a. Use one M5 screw **(E)** below the lower rail pin **(D)** to secure the left rail to the front of the rack.

   b. Use one M5 screw **(E)**, below the lower rail pin **(D)** to secure the right rail to the front of the rack.

Installing the EMX0 PCIe3 expansion drawer into the rack

Learn how to install the EMX0 PCIe3 expansion drawer into the rack. In addition to related safety information, illustrations of the related hardware components are provided.

Important: Three people are required to safely lift the drawer. Using fewer than three people to lift the drawer can result in injury.

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

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.

2. Remove the four thumb screws **(B)** that are used to secure the shipping cover **(A)** to the rear of the drawer, as shown in Figure 7 on page 11. Remove the shipping cover.

Note: The shipping cover is secured to the drawer by two thumb screws on the top of the cover and one thumb screw on each side.
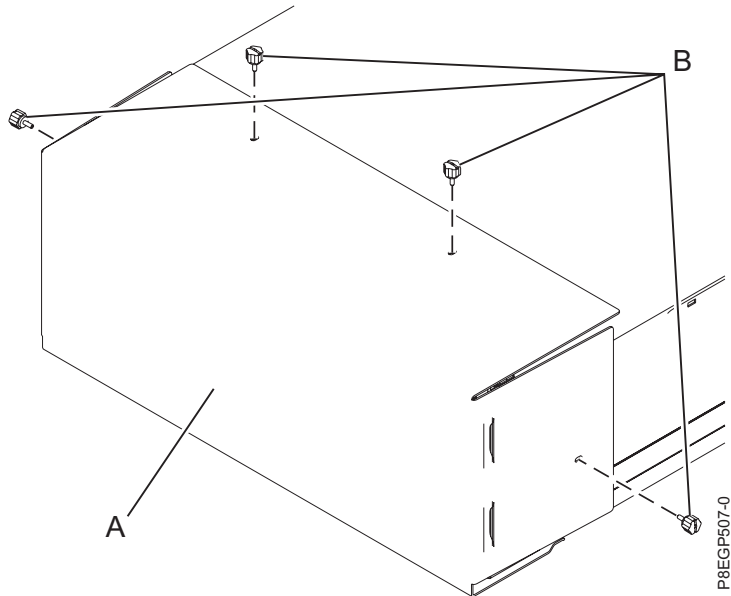
Figure 7. Removing the shipping cover

Tip: Save the shipping cover and screws that you remove for any future shipping of the drawer that might be required.

3. If the cover is installed on the front of the drawer, remove it by completing the following steps:

    a. If there are M5 securing screws on the cover, remove them.

    b. Using the two blue touch points on each side of the drawer, pull the cover straight out to remove the cover from the front of the drawer as shown in Figure 8.

    c. Remove the service information card from the slot in the cover.

Figure 8. Removing the cover and the service information card

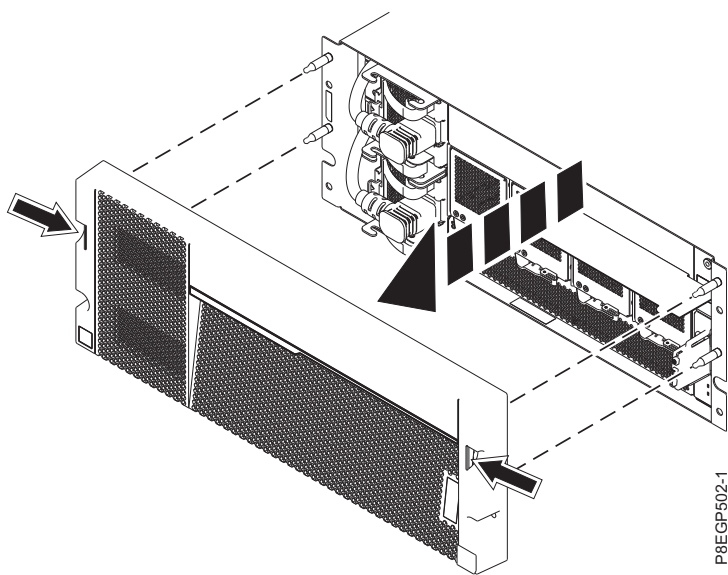4. Using three people, have two people hold onto the four handles **(I)**, as shown in Figure 9, and one person in front of the drawer to guide the drawer. Lift the drawer and position it over the front of the rails.

   Attention: Three people are required to safely lift the drawer. Using fewer than three people to lift the drawer can result in injury.

5. Slide the drawer into position over the slide rails and slide the drawer into the rack.

6. Install the two M5 securing screws **(J)** through the drawer and into the nut clips on the left and right rails. See Figure 9.
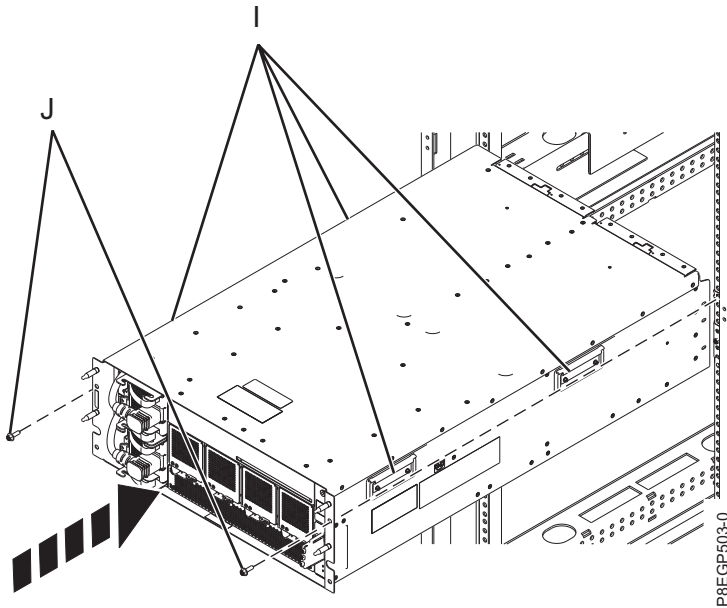

Figure 9. Installing the drawer into a rack

7. Install the cover **(L)** onto the drawer. Press the cover into place and secure it with two M5 screws **(M)** on the left and right rails. See Figure 10 on page 13.

8. Insert the service information card **(N)** into the slot in the cover.
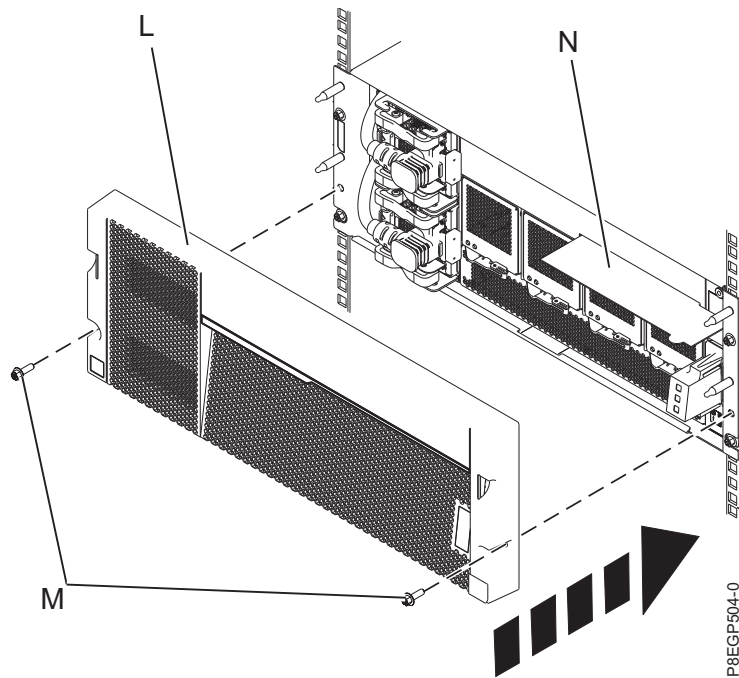
Figure 10. Installing the cover and service information card

9. Attach the cable management bracket to the rack by completing the following steps:
   a. At the rear of the rack, partially tighten two M5 screws **(A)** directly above the drawer rail clamps where nut clips are installed. These two screws become the bottom screws that support the cable management bracket against the rack. See Figure 11 on page 14.
   b. Place the bottom of the mounting flanges on the cable management bracket **(B)** over the two M5 screws to support the bracket flanges against the rack.
   c. Align the bracket so that its mounting flanges **(B)** align with the top holes in the rack flanges, as shown in Figure 11 on page 14.
   d. Completely tighten the top two M5 screws **(C)** above the rail clamp where nut clips are installed.
   e. Finish tightening the bottom two M5 screws **(A)**.
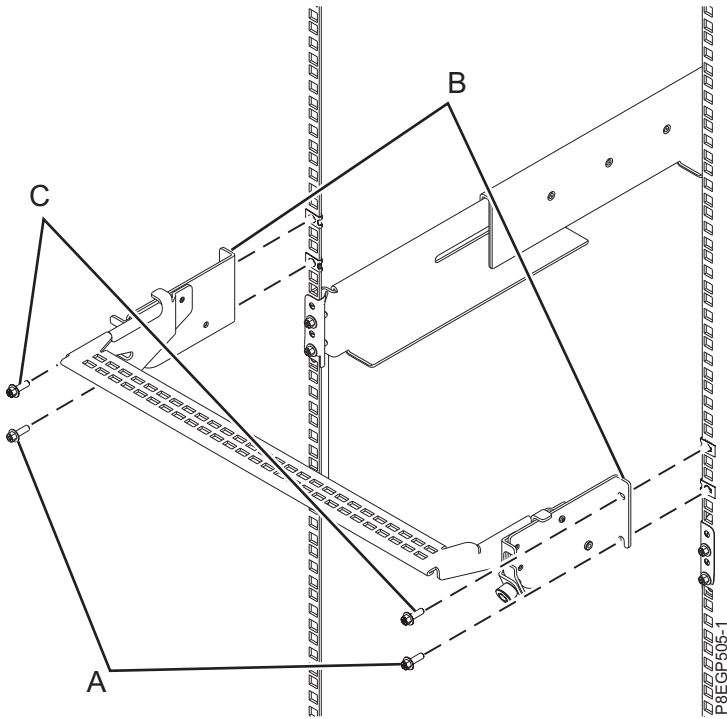
Figure 11. Installing the cable management bracket

10. To put the cable management bracket in the service position, complete the following steps:
    a. Pull out the quarter-turn fasteners **(B)** and turn them to disengage them while you lift the cable management bracket **(A)** to its raised position **(1)**.
    b. Turn the quarter-turn fasteners **(B)** to engage and lock the bracket into position.
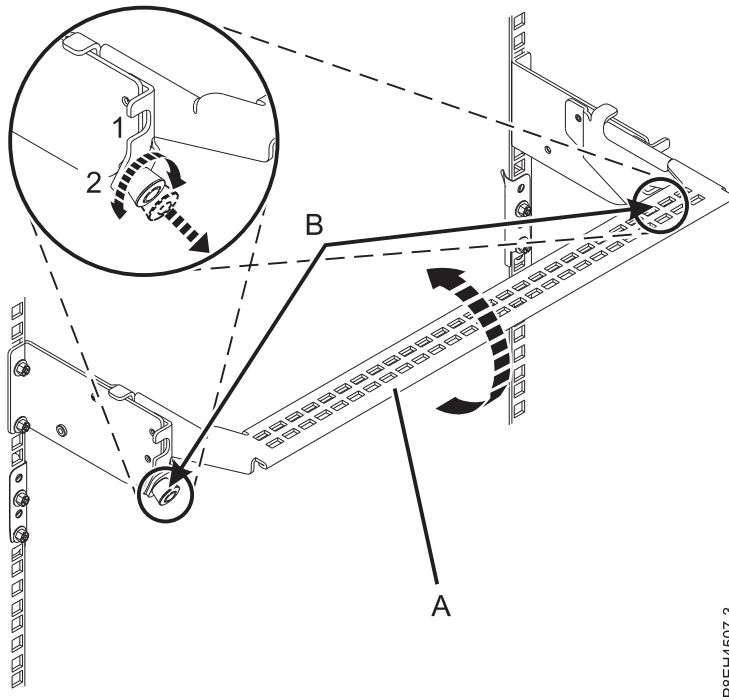
Figure 12. Placing the cable management bracket in the service position

11. To put the cable management bracket in the operating position, complete the following steps:

   a. Pull the quarter-turn fasteners **(B)** out and turn them to disengage them while moving the cable management bracket **(A)** to its lower position **(2)**. See Figure 13 on page 16.

   b. Turn the quarter-turn fasteners **(B)** to engage and lock the bracket into position.
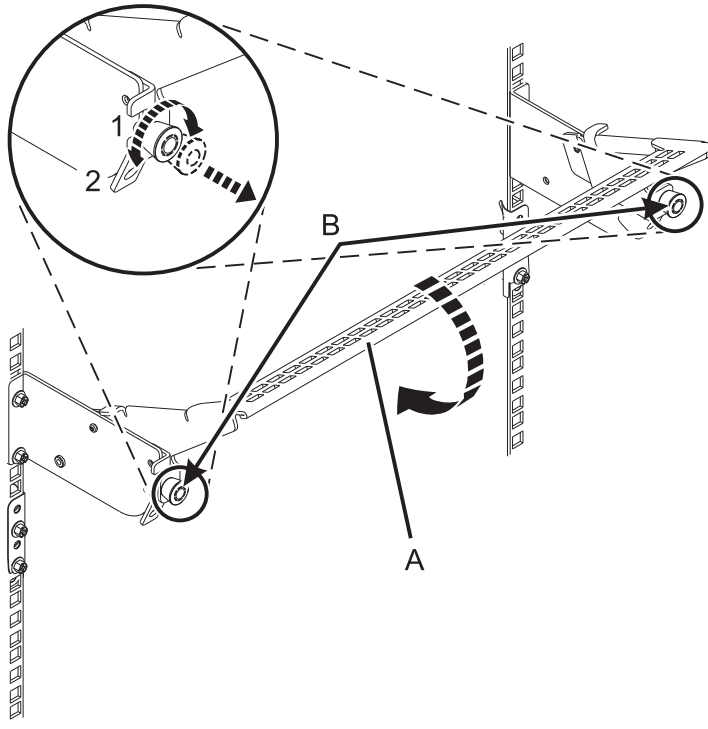
Figure 13. Placing the cable management bracket in the operating position

12. If you are using a ruggedized rack or relocating a rack with the EMX0 PCIe3 expansion drawer in it, secure the drawer to the rear of the rack by using the two securing screws (B) as shown in Figure 14.

    Note: If you have a different scenario, the securing screws are optional.
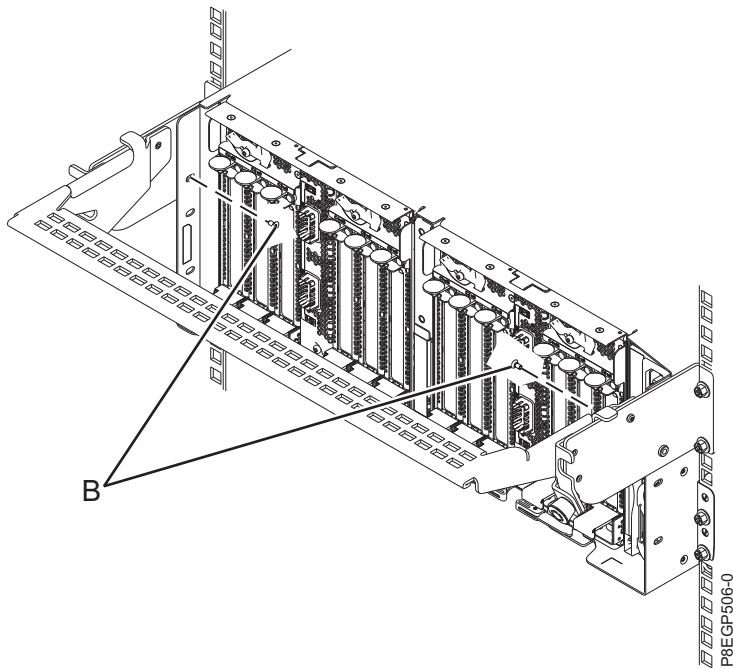
Figure 14. Inserting the securing screws at the rear of the system

13. Continue with "Connecting an EMX0 PCIe3 expansion drawer to your system" on page 17.

Connecting an EMX0 PCIe3 expansion drawer to your system

Learn how to connect an EMX0 PCIe3 expansion drawer to your system.

Use the following criteria to determine whether you can connect an EMX0 PCIe3 expansion drawer with the system power turned on.

- If you have an 8408-44E system with firmware FW860.10 or later installed, or a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system with firmware FW840.xx or later installed, you can connect the EMX0 PCIe3 expansion drawer to the system with the system power turned on. For instructions, see "Connecting an EMX0 PCIe3 expansion drawer to your system with the system power turned on."

  Note: For instructions to view system firmware levels, see Viewing existing firmware levels (http://www.ibm.com/support/knowledgecenter/POWER8/p8ha5/viewexistlevel.htm).

- If you do not meet the criteria for connecting an EMX0 PCIe3 expansion drawer with the system power turned on, or you want to connect your EMX0 PCIe3 expansion drawer with the system power turned off, see "Connecting an EMX0 PCIe3 expansion drawer to your system with the system power turned off" on page 21.

Connecting an EMX0 PCIe3 expansion drawer to your system with the system power turned on

Learn how to connect an EMX0 PCIe3 expansion drawer to your system with the system power turned on.

Remember: Before you can connect a system to an EMX0 PCIe3 expansion drawer, the system must have the required number of PCIe3 cable adapters installed and the EMX0 PCIe3 expansion drawer must have the wanted number of PCIe3 6-slot fanout modules installed.

- For instructions about installing a PCIe3 cable adapter or PCIe3 6-slot fanout module when the system power is turned on, see Installing a part by using the HMC (http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/hmcinstall.htm).
- For PCIe adapter placement rules and slot priorities for your system or expansion drawer, see PCIe adapter placement rules and slot priorities (http://www.ibm.com/support/knowledgecenter/POWER8/p8hak/p8hak_pciadapters_slot_all_mtms.htm).

Important: To avoid damage to the connectors on the expansion drawer cables, do not remove the protective covers until just before you need to plug the cable into the host system or the EMX0 PCIe3 expansion drawer.

To connect the EMX0 PCIe3 expansion drawer to a system, complete the following steps:

Note: During steps 1 - 14 on page 20, label and route the expansion drawer cables but do not connect them to the host system or the EMX0 PCIe3 expansion drawer. Later in this procedure, you access the HMC and are instructed to connect the cables and activate the link.

1. Determine the expansion drawer cable pair that can be used to connect the system to the EMX0 PCIe3 expansion drawer.

   Notes:
   - Each cable pair must be the same length. You can verify the cable lengths by viewing the length labels that are on the plug ends or near the pull tabs on each cable.
   - If your system and EMX0 PCIe3 expansion drawer are in the same rack and the system uses a cable management bracket, use the 2-meter cables.
   - If your system and EMX0 PCIe3 expansion drawer are in the same rack and the system uses a cable management arm, use the 3-meter cables.

- If your system and EMX0 PCIe3 expansion drawer are in separate racks, use the 10-meter cables.
- If you have a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system and the EMX0 PCIe3 expansion drawer is in a separate rack, you might need to use the 20-meter cables.

2. If the system has a rear cover, remove or open it.

3. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.

4. Carefully remove the expansion drawer cable from the packaging. Do not remove the protective covers now.

5. Select from the following options:
   - If you are connecting the EMX0 PCIe3 expansion drawer to a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system, you will need to label the cables. Continue with step 6.
   - If you are not connecting the EMX0 PCIe3 expansion drawer to a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system, continue with step 13 on page 20.

6. Locate the following items that you need later in the procedure:
   - Expansion drawer cable pairs
   - Host system label sheet
   - EMX0 PCIe3 expansion drawer label sheet
   - Optional: Labeling diagram

7. Attach the host system location labels to the expansion drawer cable.

   Note: While you are completing these steps, refer to Figure 15 on page 19 as a reference.
   a. Locate the host system **(A)** that you are attaching to the EMX0 PCIe3 expansion drawer.
   b. Locate the host system serial number label sheet **(B)**.
   c. Match the host system serial number **(C)** to the serial number shown on the host system label sheet.
   d. Determine the location of the PCIe3 cable adapter on the host system where you will attach the first expansion drawer cable pair.
   e. Locate the labels on the host system label sheet **(B)** that correspond to the location of the PCIe3 cable adapter on the host system.
   f. Select one of the expansion drawer cables as the top cable **(D)** to attach to port T1.
   g. Attach the leftmost Cx-T1 label to the connector end of the cable **(E)**. See Figure 15 on page 19. Wrap the label with the blank end first so that the location information **(F)** is visible.
   h. Take the second label Cx-T1 from the host system label sheet **(B)** and place it on the opposite end of the cable that attaches to the EMX0 PCIe3 expansion drawer. Ensure that the label is placed more than 100 mm (4 in) from the end of the cable **(G)**. See Figure 15 on page 19.
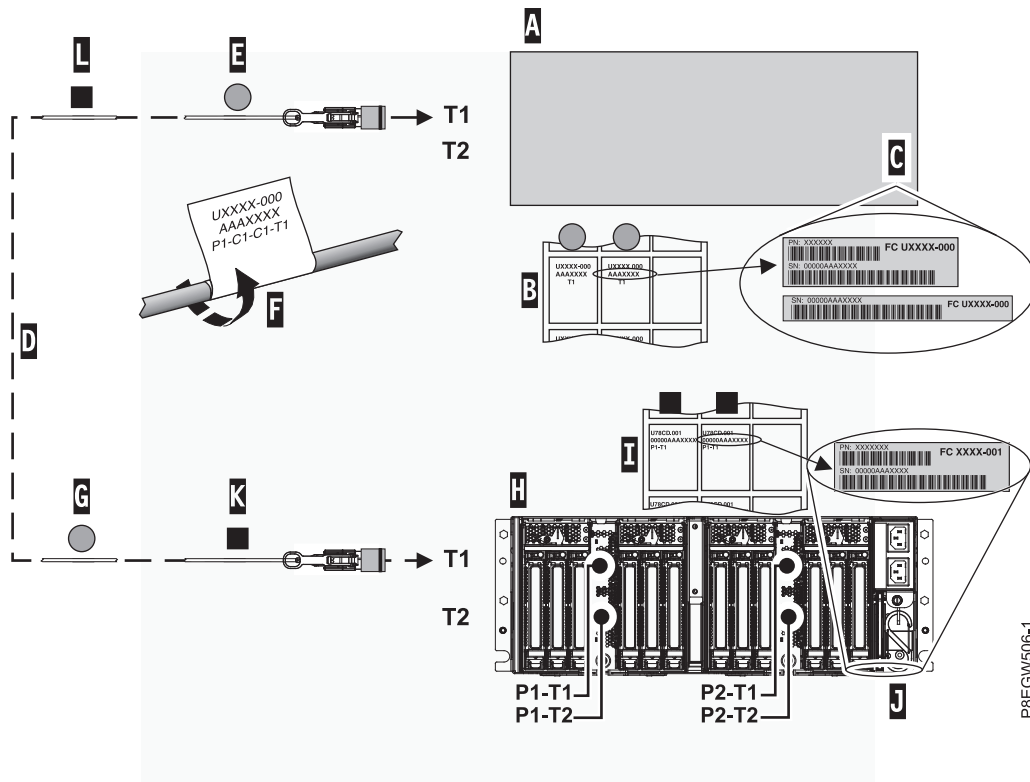
Figure 15. Labeling an expansion drawer cable

8. Attach the EMX0 PCIe3 expansion drawer location labels to the expansion drawer cable:

    Note: While you are completing these steps, refer to Figure 15 as a reference.
    a. Locate the EMX0 PCIe3 expansion drawer **(H)** that you are connecting to the host system.
    b. Locate the EMX0 PCIe3 expansion drawer serial number label sheet **(I)**.
    c. Match the EMX0 PCIe3 expansion drawer serial number **(J)** to the serial number shown on the EMX0 PCIe3 expansion drawer label sheet **(I)**.
    d. Determine the location of the I/O module on the EMX0 PCIe3 expansion drawer where you will attach the first cable pair.
    e. Locate the labels on the EMX0 PCIe3 expansion drawer label sheet that correspond to the I/O module location.
    f. Attach the leftmost Px-T1 label to the connector end of the cable **(K)**. See Figure 15. Wrap the label with the blank end first so that the location information **(F)** is visible.
    g. Take the second Px-T1 label from the expansion drawer label sheet and place it on the opposite end of the cable greater than 100 mm (4 in) from the end of the cable **(L)**. See Figure 15.
9. Place and route the labeled cable:

    Remember: Do not connect the cable now.
    a. Locate the connector end of the cable with the host system Cx-T1 label **(E)** and place it near the T1 port on the PCIe3 cable adapter.
    b. Route the cable and place the connector end **(K)** near the I/O module on the EMX0 PCIe3 expansion drawer.
10. Repeat steps 4 on page 18 - 9 for the other cable in the pair.
11. If you need to label and route more cable pairs, repeat steps 4 on page 18 - 10.
12. Continue with step 14 on page 20.

13. To place and route the expansion drawer cables, complete the following steps:

    Remember: Do not connect the cable now.

    a. Place the connector end of one of the expansion drawer cables near the T1 port on the PCIe3 cable adapter on the host system.

    b. Route the cable and place the opposite connector end near the I/O module on the EMX0 PCIe3 expansion drawer.

    c. Repeat this step for the other cable in the pair and for other cable pairs.

14. To connect the power cables for the EMX0 PCIe3 expansion drawer, complete the following steps:

    a. Connect the power cables into the power source.

       Important: Ensure that you plug the power cables into the power source before you connect them into the power supply of the EMX0 PCIe3 expansion drawer.

    b. Route the power cables through the s-carabiner so that the cables clear the PCIe3 6-slot fanout module or modules. See Figure 16.
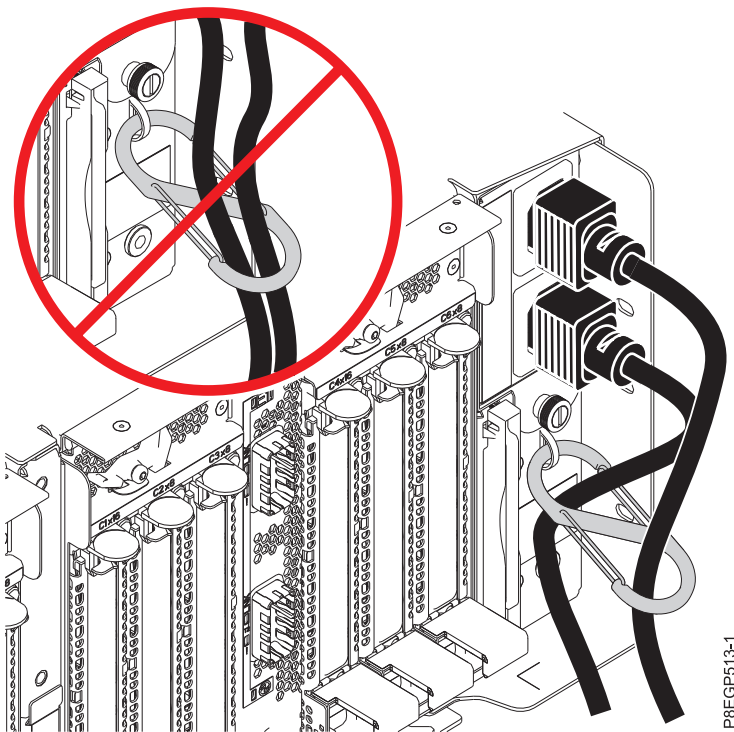
Figure 16. Routing the power cables through the s-carabiner and connecting them to the power supply

    c. Connect the other ends of the power cables into the power supplies on the EMX0 PCIe3 expansion drawer you are installing. See Figure 16.

15. To connect a pair of expansion drawer cables to the PCIe3 cable adapter on the host system and a PCIe3 6-slot fanout module on the EMX0 PCIe3 expansion drawer, and to activate the link, complete the following steps:

    a. If you are using an HMC Classic or HMC Enhanced interface, complete the following steps:

       1) Select **Serviceability** > **Hardware** > **MES Tasks**.

       2) Continue with step 15c on page 21.

    b. If you are using the HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface, complete the following steps:

       1) In the navigation area, click the **Resources** icon, and then click **All Systems**.

2) Click the system name for which you want to install the part.

3) In the navigation area, click **Serviceability**.

4) Continue with step 15c.

c. In the Serviceability window, click **Add FRU** (field replaceable unit).

d. Select **PCIe Connection** in the FRU type list.

e. Select the PCIe3 cable adapter from step 7d on page 18 that you want to connect first.

f. Start the procedure and follow the on-screen instructions.

   Note: If you arrived to this point by selecting **Serviceability** > **Hardware** > **MES Task** > **Add Enclosure**, a message is displayed that another service action is active on this system. Click **Proceed** even though the message indicates that doing so is not recommended.

16. Choose from the following options:
    - If you have another pair of cables to connect, repeat step 15 on page 20.
    - If you do not have another pair of cables to connect, continue with step 17.

17. If you have not already done so, route the cables for the PCIe adapters and expansion drawer cables into the cable management bracket or cable management arm and attach correctly by using the hook-and-loop fastener strips.

    Notes:
    - If you have a cable management bracket, ensure that it is in the highest possible position so the cables have plenty of clearance to move to the lowest position.
    - For more information about managing cables, see "Cable management" on page 29 and Power cord routing and retention.

18. If the system has a rear door, close or replace it.

19. Verify that the system or logical partition recognizes the drawer. For instructions, see Verifying the installed part (http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/pxhaj_hsmverify.htm).

20. If the system has logical partitions, you can now assign I/O slots in the expansion drawer that was added to logical partitions. For instructions, see Managing physical I/O devices and slots dynamically (http://www.ibm.com/support/knowledgecenter/POWER8/p8hat/p8hat_dlpariopp6.htm).

21. You have completed the steps to install an EMX0 PCIe3 expansion drawer. If you were directed here from another procedure, return to that procedure now.

Connecting an EMX0 PCIe3 expansion drawer to your system with the system power turned off

Learn how to connect an EMX0 PCIe3 expansion drawer to your system with the system power turned off.

Complete the following tasks to connect the EMX0 PCIe3 expansion drawer to your system with the system power turned off:

1. Routing and connecting the expansion drawer cables for an EMX0 PCIe3 expansion drawer with the system power turned off

2. Connecting power cables and powering on the system and the EMX0 PCIe3 expansion drawer

3. Completing the EMX0 PCIe3 expansion drawer installation

Routing and connecting the expansion drawer cables for an EMX0 PCIe3 expansion drawer with the system power turned off

Learn how to route and connect the expansion drawer cables with the system power turned off.

Remember: Before you can connect a system to an EMX0 PCIe3 expansion drawer, the system must have the required number of PCIe3 cable adapters installed and the EMX0 PCIe3 expansion drawer must have the wanted number of PCIe3 6-slot fanout modules installed.

- For instructions about installing a PCIe3 cable adapter, see PCIe adapters (http://www.ibm.com/support/knowledgecenter/POWER8/p8hak/pciadapters.htm).
- For instructions about installing a PCIe3 6-slot fanout module, see Installing the PCIe3 6-slot fanout module in the PCIe Gen3 I/O expansion drawer (http://www.ibm.com/support/knowledgecenter/POWER8/p8egv/p8egv_emx0_kickoff_install.htm).

Important: To avoid damage to the connectors on the expansion drawer cables, do not remove the protective covers until just before you need to plug the cable into the host system or the EMX0 PCIe3 expansion drawer.

To connect the EMX0 PCIe3 expansion drawer to a system, complete the following steps:

1. Determine the expansion drawer cable pair that can be used to connect the system to the EMX0 PCIe3 expansion drawer.

    Notes:
    - Each cable pair must be the same length. You can verify the cable lengths by viewing the length labels that are on the plug ends or near the pull tabs on each cable.
    - If your system and EMX0 PCIe3 expansion drawer are in the same rack and the system uses a cable management bracket, use the 2-meter cables.
    - If your system and EMX0 PCIe3 expansion drawer are in the same rack and the system uses a cable management arm, use the 3-meter cables.
    - If your system and EMX0 PCIe3 expansion drawer are in separate racks, use the 10-meter cables.
    - If you have a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system and the EMX0 PCIe3 expansion drawer is in a separate rack, you might need to use the 20-meter cables.

2. If the system is not already powered off, turn off the system. For instructions, see "Stopping a system or logical partition" on page 31.

3. If the system has a rear cover, remove or open it.

4. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.

5. Carefully remove the expansion drawer cable from the packaging. Do not remove the protective covers now.

6. Select from the following options:
    - If you are connecting the EMX0 PCIe3 expansion drawer to a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system, you will need to label the cables. Continue with step 7.
    - If you are not connecting the EMX0 PCIe3 expansion drawer to a 9080-MHE, 9080-MME, 9119-MHE, or 9119-MME system, continue with step 14 on page 24.

7. Locate the following items that you need later in the procedure:
    - Expansion drawer cable pairs
    - Host system label sheet
    - EMX0 PCIe3 expansion drawer label sheet
    - Optional: Labeling diagram

8. Attach the host system location labels to the expansion drawer cable.

    Note: While you are completing these steps, refer to Figure 17 on page 23 as a reference.
    a. Locate the host system **(A)** that you are attaching to the EMX0 PCIe3 expansion drawer.
    b. Locate the host system serial number label sheet **(B)**.
    c. Match the host system serial number **(C)** to the serial number shown on the host system label sheet.

d. Determine the location of the PCIe3 cable adapter on the host system where you will attach the first expansion drawer cable pair.

e. Locate the labels on the host system label sheet **(B)** that correspond to the location of the PCIe3 cable adapter on the host system.

f. Select one of the expansion drawer cables as the top cable **(D)** to attach to port T1.

g. Attach the leftmost Cx-T1 label to the connector end of the cable **(E)**. See Figure 17. Wrap the label with the blank end first so that the location information **(F)** is visible.

h. Take the second label Cx-T1 from the host system label sheet **(B)** and place it on the opposite end of the cable that attaches to the EMX0 PCIe3 expansion drawer. Ensure that the label is placed more than 100 mm (4 in) from the end of the cable **(G)**. See Figure 17.
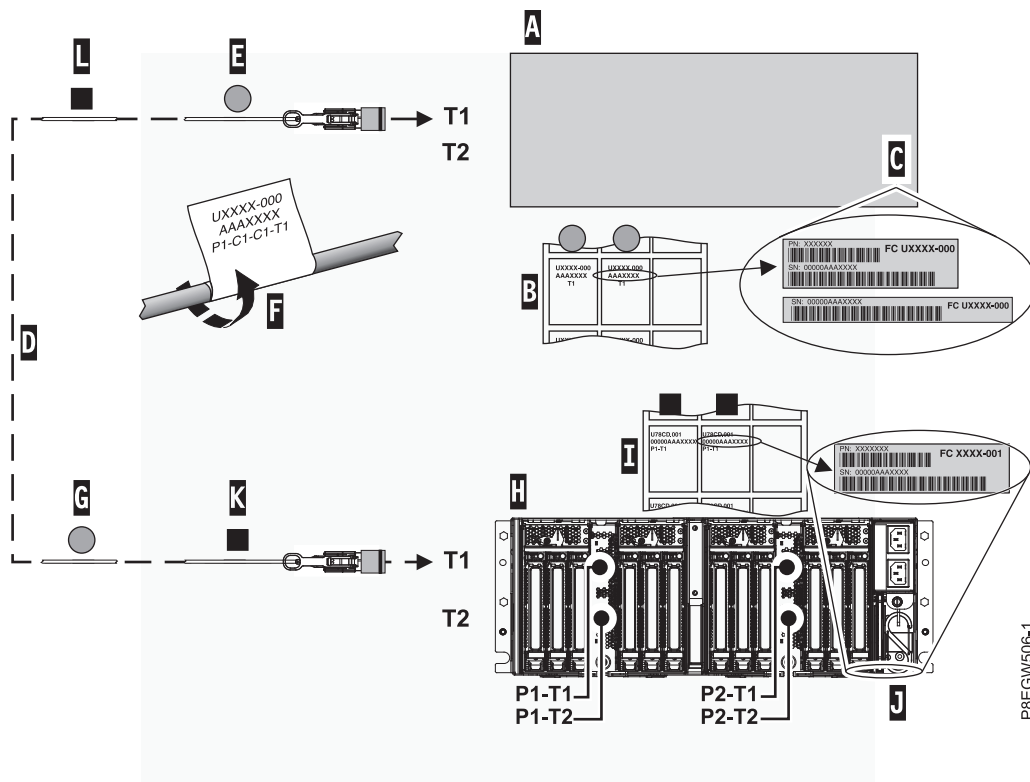

Figure 17. Labeling an active optical cable

9. Attach the EMX0 PCIe3 expansion drawer location labels to the expansion drawer cable:

Note: While you are completing these steps, refer to Figure 17 as a reference.

a. Locate the EMX0 PCIe3 expansion drawer **(H)** that you are connecting to the host system.

b. Locate the EMX0 PCIe3 expansion drawer serial number label sheet **(I)**.

c. Match the EMX0 PCIe3 expansion drawer serial number **(J)** to the serial number shown on the EMX0 PCIe3 expansion drawer label sheet **(I)**.

d. Determine the location of the I/O module on the EMX0 PCIe3 expansion drawer where you will attach the first cable pair.

e. Locate the labels on the EMX0 PCIe3 expansion drawer label sheet that correspond to the I/O module location.

f. Attach the leftmost Px-T1 label to the connector end of the cable **(K)**. See Figure 17. Wrap the label with the blank end first so that the location information **(F)** is visible.

g. Take the second Px-T1 label from the expansion drawer label sheet and place it on the opposite end of the cable greater than 100 mm (4 in) from the end of the cable **(L)**. See Figure 17 on page 23.

10. Place and route the labeled cable:

   Remember: Do not connect the cable now.

   a. Locate the connector end of the cable with the host system Cx-T1 label **(E)** and place it near the T1 port on the PCIe3 cable adapter.

   b. Route the cable and place the connector end **(K)** near the I/O module on the EMX0 PCIe3 expansion drawer.

11. Repeat steps 8 on page 22 - 10 for the other cable in the pair.

12. If you need to label and route more cable pairs, repeat steps 8 on page 22 - 11.

13. Continue with step 15.

14. To place and route the expansion drawer cables, complete the following steps:

   Remember: Do not connect the cable now.

   a. Place the connector end of one of the expansion drawer cables near the T1 port on the PCIe3 cable adapter on the host system.

   b. Route the cable and place the opposite connector end near the I/O module on the EMX0 PCIe3 expansion drawer.

   c. Repeat this step for the other cable in the pair and for other cable pairs.

15. To connect the expansion drawer cables to the PCIe3 cable adapter ports on the host system and to a PCIe3 6-slot fanout module on the EMX0 PCIe3 expansion drawer, complete the following steps:

   a. Determine the first expansion drawer cable that you will connect. It is the cable that is located near connector **T1** on the PCIe3 cable adapter in the host system.

   b. Remove the protective cover from the connector on the expansion drawer cable. Hold the cable housing **(B)** on the short edges with the index finger and thumb on one hand. Then, grasping the cover on the long edge **(A)** with the index finger and thumb on the other hand, pull the protective cover off. See Figure 18.

   Note: Keep your fingers close to the closed end of the protective cover.
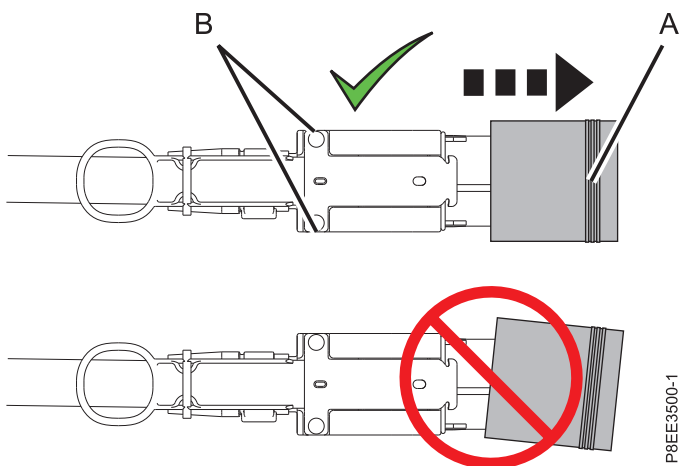

Figure 18. Removing the protective cover from the connector on the expansion drawer cable

   c. Connect the expansion drawer cable into the **T1** connector on the PCIe3 cable adapter in the host system.

d. Remove the protective cover and connect the cable that is located near connector **T2** on the PCIe3 cable adapter in the host system.

e. Remove the protective cover and connect the other end of the expansion drawer cable that is located near connector **T1** on the PCIe3 6-slot fanout module in the EMX0 PCIe3 expansion drawer.

f. Remove the protective cover and connect the other end of the cable that is located near connector **T2** on the PCIe3 6-slot fanout module in the EMX0 PCIe3 expansion drawer.
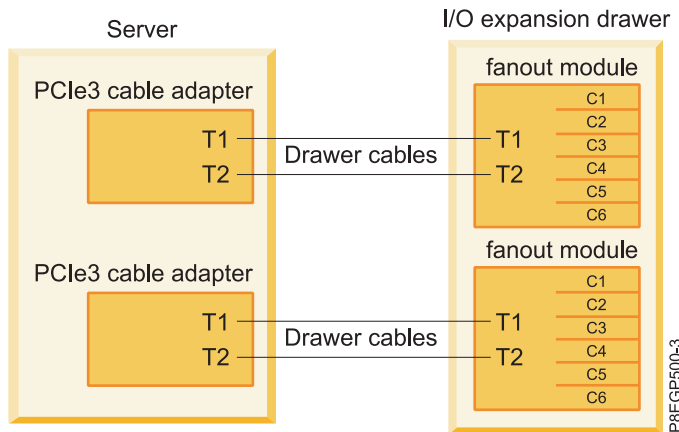

Figure 19. Connecting the expansion drawer cables

16. If you have not already done so, route the cables for the PCIe adapters and expansion drawer cables into the cable management bracket or cable management arm and attach correctly by using the hook-and-loop fastener strips.

    Notes:
    - If you have a cable management bracket, ensure that it is in the highest possible position so the cables have plenty of clearance to move to the lowest position.
    - For more information about managing cables, see "Cable management" on page 29 and Power cord routing and retention.

Connecting power cables and powering on the system and the EMX0 PCIe3 expansion drawer

Learn how to power on the system and the EMX0 PCIe3 expansion drawer.

To connect the power cables and power on the system and the EMX0 PCIe3 expansion drawer, complete the following steps:

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.

2. To connect the power cables for the EMX0 PCIe3 expansion drawer, complete the following steps:
   a. Connect the power cables into the power source.

      Important: Ensure that you plug the power cables into the power source before you connect them into the power supply of the EMX0 PCIe3 expansion drawer.

   b. Route the power cables through the s-carabiner so that the cables clear the PCIe3 6-slot fanout module or modules. See Figure 20 on page 26.
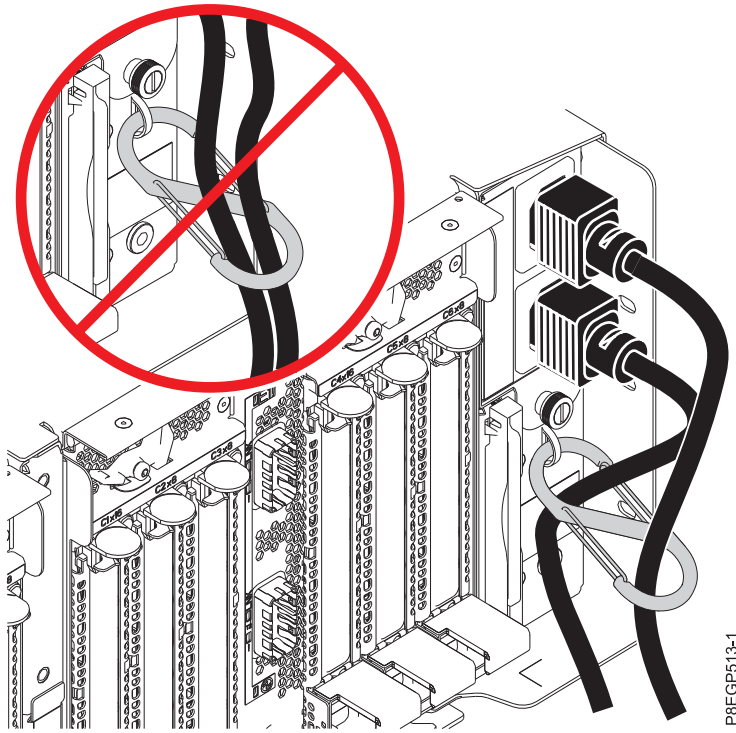
Figure 20. Routing the power cables through the s-carabiner and connecting them to the power supply

    c. Connect the other ends of the power cables into the power supplies on the EMX0 PCIe3 expansion drawer you are installing. See Figure 20.

3. Record the current date and time. You will need it when you power on the system when you are checking for serviceable events.

4. To power on the system to firmware standby state and check for serviceable events, select one of the following options:

- If your system is managed by an HMC, choose from the following options:
  - If you are using an HMC Classic or HMC Enhanced interface, continue with step 5.
  - If you are using an HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface, continue with step 6 on page 27.
- If your system is managed by an Advanced System Management Interface (ASMI), access the ASMI by using an authority level of administrator or authorized service provider, and then continue with step 7 on page 27.

5. If you are using an HMC Classic or HMC Enhanced interface, complete the following steps:

    a. In the HMC navigation area, expand **Systems Management** and click **Servers**.

    b. Select the check box next to the name of the system to enable the tasks for that system.

    c. To enable the system to power on to the firmware standby state, complete the following steps:

        1) From the **Tasks** menu, click **Properties**.

        2) Click the **Power-On Parameters** tab.

        3) Record the current setting for the **Partition start policy** field so that you can restore the setting later in this procedure.

        4) Set the **Partition start policy** field to **User-Initiated**. Click **OK**.

    d. From the **Tasks** menu, click **Operations** > **Power on**. Click **OK**.

    e. In the content area, observe the system that you are working with until the value in the Status column changes to Standby.

    f. To reset the **Partition start policy** field to its original value, complete the following steps:

1) From the **Tasks** menu, click **Properties**.

2) Click the **Power-On Parameters** tab.

3) Set the **Partition start policy** field to the value that you recorded earlier.

4) Click **OK**.

g. To check for and handle new serviceable events that were generated during this procedure, complete the following steps:

1) In the navigation area, select **Service Management**.

2) Select **Manage Servicable Events**.

3) Specify event criteria that includes events that were generated during the procedure. In particular, specify the managed system that the EMX0 PCIe3 expansion drawer was added to, and specify a date and time range that includes the date and time that were recorded previously.

4) Perform problem analysis on any open serviceable events.

5) Continue with step 8 on page 28.

6. If you are using an HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface, complete the following steps:

a. In the navigation area, click the **Resources** icon , and then select **All Systems**.

b. In the content pane, select the name of the system to view the actions for that system.

c. To enable the system to power on to the firmware standby state, complete the following steps:

1) In the navigation area, select **Properties** > **Other properties**.

2) Select the **Power-On Parameters** tab.

3) Record the current setting for the **Partition start policy** field so that you can restore the setting later in this procedure.

4) Set the **Partition start policy** field to **User-Initiated**. Click **OK**.

d. In the navigation area, select **System Actions** > **Operations** > **Power on** and click **OK**.

e. In the content area, observe the system that you are working with until the value in the Status column changes to Standby.

f. To reset the **Partition start policy** field to its original value, complete the following steps:

1) In the navigation area, select **Properties** > **Other properties**.

2) Select the **Power-On Parameters** tab.

3) Set the **Partition start policy** field to the value that you recorded earlier.

g. To check for and handle new serviceable events that were generated during this procedure, complete the following steps:

1) In the navigation area, click the **Serviceability** icon, and then select **Serviceable Events Manager**.

2) Specify event criteria that includes events that were generated during the procedure. In particular, specify the managed system that the EMX0 PCIe3 expansion drawer was added to, and specify a date and time range that includes the date and time that were recorded previously.

3) Perform problem analysis on any open serviceable events that are identified in the previous step.

4) Continue with step 8 on page 28.

7. If you are using an ASMI, complete the following steps:

a. In the ASMI navigation area, expand **Power/Restart Control**.

b. Click **Power On/Off System**.

c. Record the current setting for the **Server firmware start policy** field so that you can restore the setting later in this procedure.

d. Set the **Server firmware start policy** field to **Standby (User-Initiated)**.

e. Click **Power On/Off System**.

f. Periodically, click **Power On/Off System** again to refresh the information on the display until the value of the **Current system firmware state** field changes to Standby.

g. To reset the **Server firmware start policy** field to its original value, complete the following steps:

   1) In the ASMI navigation area, expand **Power/Restart Control**.

   2) Click **Power On/Off System**..

   3) Set the Server firmware start policy field to the value that you recorded in step 7c.

   4) To check for and handle new serviceable events that were generated during this procedure, complete the following steps:

      a) In the ASMI navigation area, expand **System Service Aids**.

      b) Click **Error/Event Logs**.

      c) In the Serviceable/Customer attention events table, look for events that were generated during this procedure. The value in the **Time** column must be after the date and time that were recorded previously.

      d) Perform problem analysis on any open serviceable events that are identified in the previous step.

8. Power on the system to running state by choosing one of the following options:

   • Power on one or more logical partitions. For instructions, see "Starting the system or logical partition" on page 34.

      Notes:

      – If you start a partition while the system is in the standby state, the system changes from the standby state into the operating or running state.

      – This option is only available if you have an HMC.

   • Power off the system and then power it back on. For instructions, see "Stopping a system or logical partition" on page 31 and "Starting the system or logical partition" on page 34.

Completing the EMX0 PCIe3 expansion drawer installation

Learn how to complete the installation process.

To complete the installation process, complete the following steps:

1. If the system has a rear door, close or replace it.

2. Verify that the system or logical partition recognizes the drawer. For instructions, see Verifying the installed part (http://www.ibm.com/support/knowledgecenter/POWER8/p8haj/pxhaj_hsmverify.htm).

3. If the system has logical partitions, you can now assign I/O slots in the expansion drawer that was added to logical partitions. For instructions, see Managing physical I/O devices and slots dynamically (http://www.ibm.com/support/knowledgecenter/POWER8/p8hat/p8hat_dlpariopp6.htm).

4. You have completed the steps to install an EMX0 PCIe3 expansion drawer. If you were directed here from another procedure, return to that procedure now.

Reference information

Use the information in this section as needed to complete installation and configuration tasks.

Cable management

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 cable routing on the bottom and top of the rack, and between drawers.
- Shorter drawers should not be placed between longer drawers in the rack (for example, placing 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. Power cables
  2. 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.
- Install and route the communications cables, starting with smallest diameter first and then progressing to the largest diameter.
- Use the innermost cable-management bridge lances for power cables.
- Use the middle cable-management bridge lances for communications cables.
- The outermost row of cable-management bridge lances are available for use when routing cables.
- Use the cable raceways on the sides of the rack to manage excess power cables.
- There are four cable-management bridge lances on the top of the rack. Use these bridge lances 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 provided with the system to maintain concurrent maintenance routing.
- Maintain a minimum bend diameter of 101.6 mm (4 in.) for communications (SAS, IB, and PCIe) cables.
- Maintain a minimum bend diameter of 50.8 mm (2 in.) for power cables.
- Use the shortest-length cable available for each point-to-point connection.
- If cables have to 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.
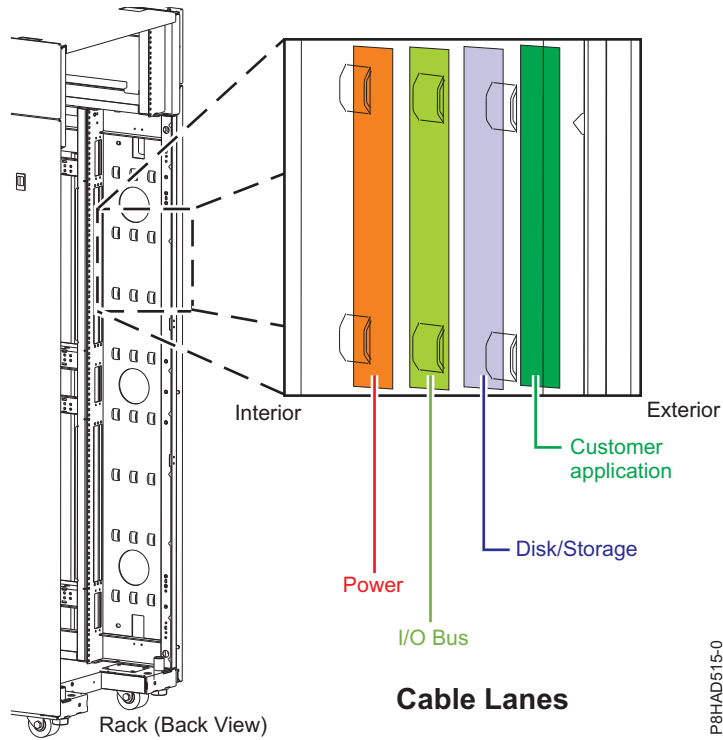- Use hook-and-loop fasteners where necessary.
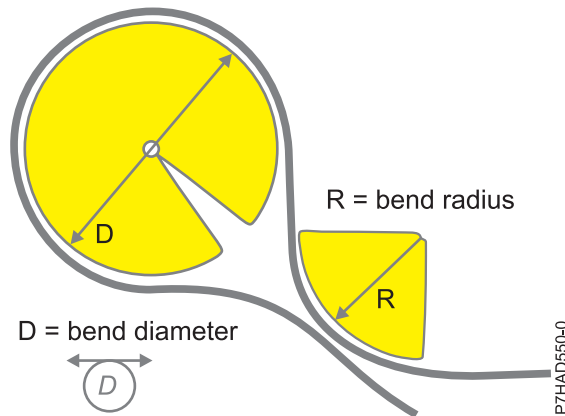
29

Figure 21. Cable management bridge lances

Figure 22. Cable bend radius

Power cord routing and retention

Proper power cord routing and retention ensures that your system remains connected to a power supply.

The primary purpose of power cord retention is to prevent unexpected power loss to your system that could potentially cause system operations to stop functioning.

Different types of power cord retention are available. Some of the most commonly used types of retention include:

- Cable management arms
- Rings

- Clamps
- Plastic straps
- Hook-and-loop fasteners

Power cord retainers are typically found at the rear of the unit and on the chassis or pedestal near the alternating current (AC) power cord input.

Systems that are rack mounted and are on rails should use the provided cable management arm.

Systems that are rack mounted, but are not on rails should use the provided rings, clamps, or straps.
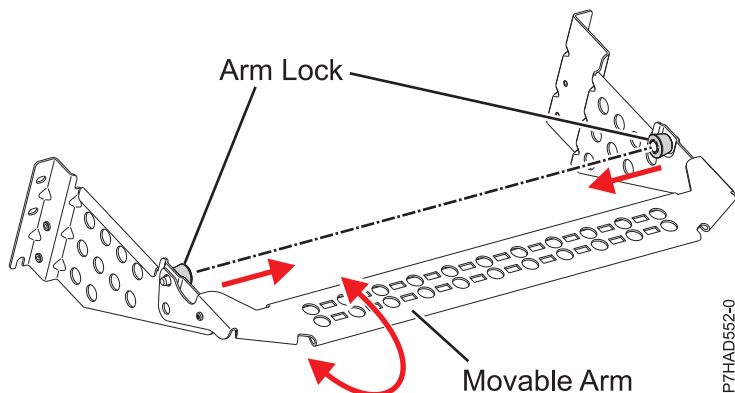

Figure 23. Cable management bracket

Stopping a system or logical partition

Learn how to stop a system or logical partition as a part of a system upgrade or service action.

Attention: Using either the power-on button on the control panel or entering commands at the Hardware Management Console (HMC) to stop the system can cause unpredictable results in the data files. Also, the next time you start the system, it might take longer if all applications are not ended before stopping the system.

To stop the system or logical partition, select the appropriate procedure.

Stopping a system that is not managed by an HMC

You might need to stop the system to complete another task. If your system is not managed by the Hardware Management Console (HMC), use these instructions to stop the system by using the power button or the Advanced System Management Interface (ASMI).

Before you stop the system, follow these steps:
1. Ensure that all jobs are completed and end all applications.
2. If a Virtual I/O Server (VIOS) logical partition is running, ensure that all clients are shut down or that the clients have access to their devices by using an alternative method.

Stopping a system by using the control panel

You might need to stop the system to complete another task. If your system is not managed by the Hardware Management Console (HMC), use these instructions to stop the system by using the power button.

The following procedure describes how to stop a system that is not managed by the HMC.

1. Log in to the host partition as a user with the authority to run the **shutdown** or **pwrdwnsys** (Power Down System) command.
2. At the command line, enter one of the following commands:
   - If your system is running the AIX® operating system, type **shutdown**.
   - If your system is running the Linux operating system, type **shutdown -h now**.
   - If your system is running the IBM i operating system, type PWRDWNSYS. If your system is partitioned, use the **PWRDWNSYS** command to power down each of the secondary partitions. Then, use the **PWRDWNSYS** command to power down the primary partition.

   The command stops the operating system. The system power turns off, the power-on light begins to slowly flash, and the system goes into a standby state.
3. Record the IPL type and the IPL mode from the control panel display to help you return the system to this state when the installation or replacement procedure is completed.
4. Set the power switches of any devices that are connected to the system to off.

Stopping a system by using the ASMI

You might need to stop the system to complete another task. If your system is not managed by the Hardware Management Console (HMC), use these instructions to stop the system by using the Advanced System Management Interface (ASMI).

To stop a system by using the ASMI, complete the following steps:

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, click **Power/Restart Control** > **Power On/Off System**. The power state of the system is displayed.
3. Specify the settings as required and click **Save setting and power off**.

Stopping a system by using the HMC

You can use the Hardware Management Console (HMC) to stop the system or logical partition.

By default, the managed system is set to power off automatically when you shut down the last running logical partition on the managed system. If you set the managed system properties on the HMC so that the managed system does not power off automatically, you must use this procedure to power off your managed system.

Attention: Ensure that you shut down the running logical partitions on the managed system before you power off the managed system. Powering off the managed system without shutting down the logical partitions first causes the logical partitions to shut down abnormally and can cause data loss. If you use a Virtual I/O Server (VIOS) logical partition, ensure that all clients are shut down or that the clients have access to their devices by using an alternative method.

To power off a managed system, you must be a member of one of the following roles:
- Super administrator
- Service representative
- Operator
- Product engineer

Note: If you are a product engineer, verify that the customer has shut down all active partitions and has powered off the managed system. Continue with the procedure only after the status of the server changes to **Power Off**.

Stopping a system by using the HMC Classic or HMC Enhanced interface

Learn how to stop a system by using the HMC Classic or HMC Enhanced interface.

To stop the system or logical partition by using the HMC Classic or HMC Enhanced interface, complete the following steps:

1. In the navigation area, click **Systems Management** > **Servers**.
2. In the content pane, select the managed system.
3. In the Tasks area, click **Operations** > **Power Off**.
4. Select the appropriate power-off mode and click **OK**.

Related information:

➦ Shutting down and restarting logical partitions

Stopping a system by using the HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface

Learn how to stop a system by using the HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface.

To stop the system or logical partition by using the HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface, complete the following steps:

1. You must deactivate all the active logical partitions before powering off the system. To deactivate logical partitions for a specific system, complete the following steps:

   a. In the navigation area, click the **Resources** icon , and then click **All Systems**.
   b. Click the system name for which you want to deactivate partitions.
   c. Select the logical partitions that you want to deactivate.
   d. In the content pane, click **Actions** > **Deactivate**.
   e. Click **OK**.

2. To power off the system, complete the following steps:

   a. In the navigation area, click the **Resources** icon , and then click **All Systems**.
   b. Select the system that you want to power off.
   c. In the content pane, click **Actions** > **View All Actions** > **Power Off**.
   d. Click **OK**.

Stopping an IBM PowerKVM system

You can use the Intelligent Platform Management Interface (IPMI) to stop an IBM PowerKVM system.

To stop an IBM PowerKVM system, complete the following steps:

1. Log in to the host as a root user or with sudo authority.
2. To power off each of the guests, complete the following steps.
   a. To obtain a list of all guests, type `virsh list`.
   b. For each guest in the list, type `virsh shutdown` *domain name* or type `virsh shutdown` *domain ID*.

      Note:
      Type `virsh list` to verify whether all the guests are powered off. If any guest is not powered off, type `virsh destroy` *domain name* or type `virsh destroy` *domain ID* to power off the guest.
3. Run the `ipmitool -I lanplus -H` *FSP IP* `-P` *ipmipassword* `chassis power off` command from a remote system.

Starting the system or logical partition

Learn how to start a system or logical partition after performing a service action or system upgrade.

Starting a system that is not managed by an HMC

You can use the power button or the Advanced System Management Interface (ASMI) to start a system that is not managed by a Hardware Management Console (HMC).

Starting a system by using the control panel

You can use the power button on the control panel to start a system that is not managed by a Hardware Management Console (HMC).

To start a system by using the control panel, complete the following steps:

1. Open the front rack door, if necessary.
2. Before you press the power button on the control panel, ensure that power is connected to the system unit as follows:
   - All system power cables are connected to a power source.
   - The power LED, as shown in the following figure, is slowly flashing.
   - The top of the display, as shown in the following figure, shows `01 V=F`.
3. Press the power button **(A)**, as shown in the following figure, on the control panel.
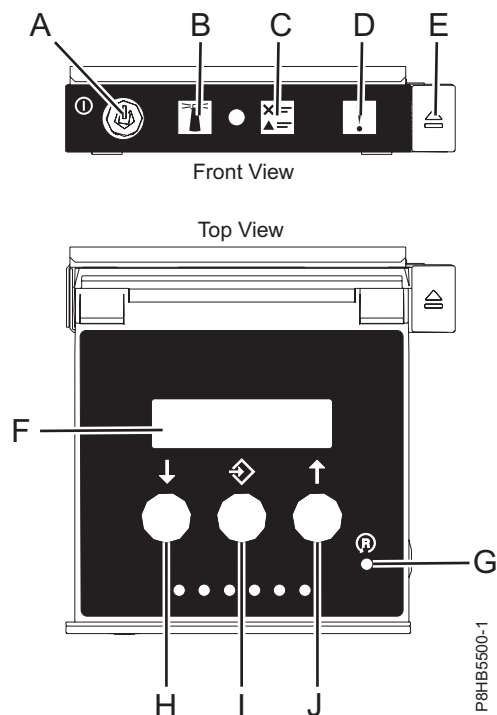

Figure 24. Control panel

- **A**: Power-on button
  - A constant light indicates full system power to the unit.
  - A flashing light indicates standby power to the unit.
  - There is approximately a 30-second transition period from the time the power-on button is pressed to when the power LED goes from flashing to solid. During the transition period, the LED might flash faster.

- **B**: Enclosure identify light
  - A constant light indicates the identify state, which is used to identify a part.
  - No light indicates that the system is operating normally.
- **C**: System information light
  - No light indicates that the system is operating normally.
  - Light on indicates that the system requires attention.
- **D**: Enclosure fault roll-up light
  - A constant light indicates a fault in the enclosure.
  - No light indicates that the system is operating normally.
- **E**: Eject button
- **F**: Function/Data display
- **G**: Pinhole reset button
- **H**: Decrement button
- **I**: Enter button
- **J**: Increment button
4. Observe the following aspects after pressing the power button:
   - The power-on light begins to flash faster.
   - The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
   - Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops flashing and remains on, indicating that the system power is on.

Tip: If pressing the power button does not start the system, then contact your next level of support or your service provider.

Starting a system by using the ASMI

You can use the Advanced System Management Interface (ASMI) to start a system that is not managed by a Hardware Management Console (HMC).

To start a system by using the ASMI, complete the following steps:
1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, click **Power/Restart Control** > **Power On/Off System**. The power state of the system is displayed.
3. Specify the settings as required and click **Save setting and power on**.

Starting a system or logical partition by using the HMC

You can use the Hardware Management Console (HMC) to start the system or logical partition after the required cables are installed and the power cables are connected to a power source.

Starting a system or logical partition by using the HMC Classic or HMC Enhanced interface

Learn how to start a system or logical partition by using the HMC Classic or HMC Enhanced interface.

To start the system by using the HMC Classic or HMC Enhanced interface, complete the following steps:
1. Verify that the logical partition start policy is set to **User-Initiated** by completing the following steps:
   a. In the navigation area, expand **Systems Management** > **Servers**.
   b. In the content pane, select the managed system.
   c. In the Tasks area, click **Properties**.

d. Click the **Power-On Parameters** tab. Ensure that the **Partition start policy** field is set to **User-Initiated**.
2. Power on the managed system by completing the following steps:
   a. In the navigation area, expand **Systems Management** > **Servers**.
   b. In the content pane, select the managed system.
   c. Click **Operations > Power on**.
   d. Select the power-on option and click **OK**.

Starting a system or logical partition by using the HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface

Learn how to start a system or logical partition by using the HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface.

To start a system or logical partition by using the HMC Enhanced + Tech Preview (Pre-GA) or HMC Enhanced+ interface, complete the following steps:

1. To power on the managed system, complete the following steps:

   a. In the navigation area, click the **Resources** icon , and then click **All Systems**.
   b. Select the system that you want to power on.
   c. In the content pane, click **Actions** > **View All Actions** > **Power On**.
   d. Click **OK**.

2. To activate a logical partition, complete the following steps:

   a. In the navigation area, click the **Resources** icon , and then click **All Partitions**.
   b. Click the logical partition name that you want to activate.
   c. In the navigation area, click **Partition Actions** > **Operations** > **Activate**.
   d. Click **OK**.

3. To activate a logical partition for a specific system, complete the following steps:

   a. In the navigation area, click the **Resources** icon , and then click **All Systems**.
   b. Click the system name in which you want to activate the logical partition.
   c. Select logical partitions that you want to activate.
   d. In the content pane, click **Actions** > **Activate**.
   e. Click **OK**.

4. To verify that the logical partition start policy is set to **User-Initiated**, complete the following steps:

   a. In the navigation area, click the **Resources** icon , and then click **All Systems**.
   b. Click the system name to view details.
   c. In the navigation area, click **Properties** > **Other Properties**.
   d. Click the **Power-On Parameters** tab. Ensure that the **Partition start policy** field is set to **User-Initiated**.

Starting an IBM PowerKVM system

You can use the Intelligent Platform Management Interface (IPMI) to start an IBM PowerKVM system.

To start an IBM PowerKVM system, run the `ipmitool -I lanplus -H` *FSP IP* `-P` *ipmipassword* `chassis power on` command from a remote system.

Connector locations

Learn about connector locations for enclosures and expansion units and servers.

Connector locations for the EMX0 PCIe3 expansion drawer

Learn about connector locations for the EMX0 PCIe3 expansion drawer.
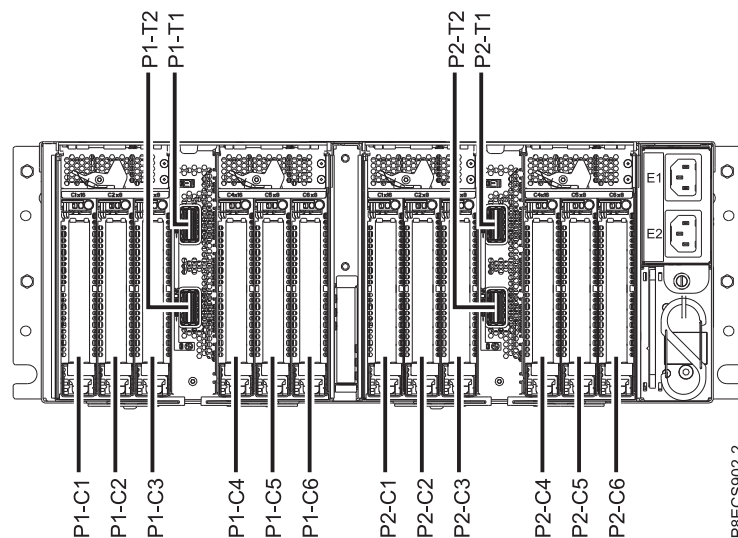
Figure 25. EMX0 PCIe3 expansion drawer showing the PCIe3 6-slot fanout module

For more information about the EMX0 PCIe3 expansion drawer locations, see PCIe Gen3 I/O expansion drawer locations (http://www.ibm.com/support/knowledgecenter/POWER8/p8ecs/ p8ecs_emx0_loccodes.htm).

Connector locations for POWER8 servers

Learn about connector locations for POWER8® servers.

Connector locations for the 5148-22L, 8247-21L, 8247-22L, 8284-21A, and 8284-22A systems

Learn about connector locations for the 5148-22L, 8247-21L, 8247-22L, 8284-21A, and 8284-22A systems.

The expanded function 5148-22L, 8247-21L, 8247-22L, 8284-21A, and 8284-22A servers provide cable connector locations via a SAS port for disk drive enclosures.
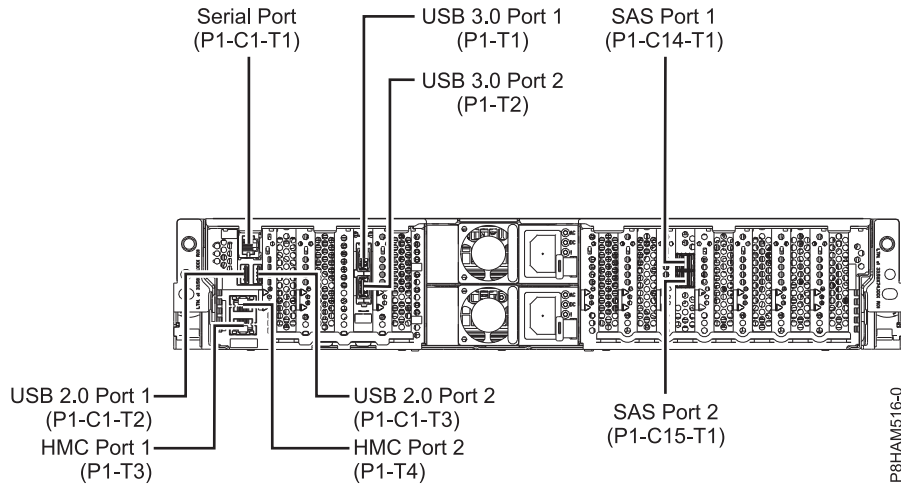
Figure 26. Connector locations for the expanded function 5148-22L, 8247-21L, 8247-22L, 8284-21A, and 8284-22A systems

Connector locations for the 8286-41A system

Learn about connector locations for the 8286-41A rack-mounted and stand-alone models.

The 8286-41A server provides cable connector locations via a SAS port for disk drive enclosures.
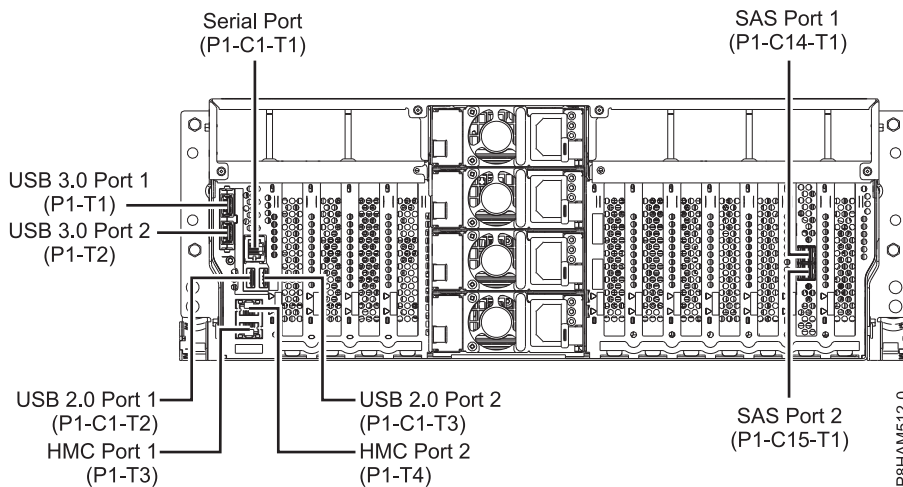
Figure 27. Connector locations for the rack-mounted 8286-41A (expanded function) system
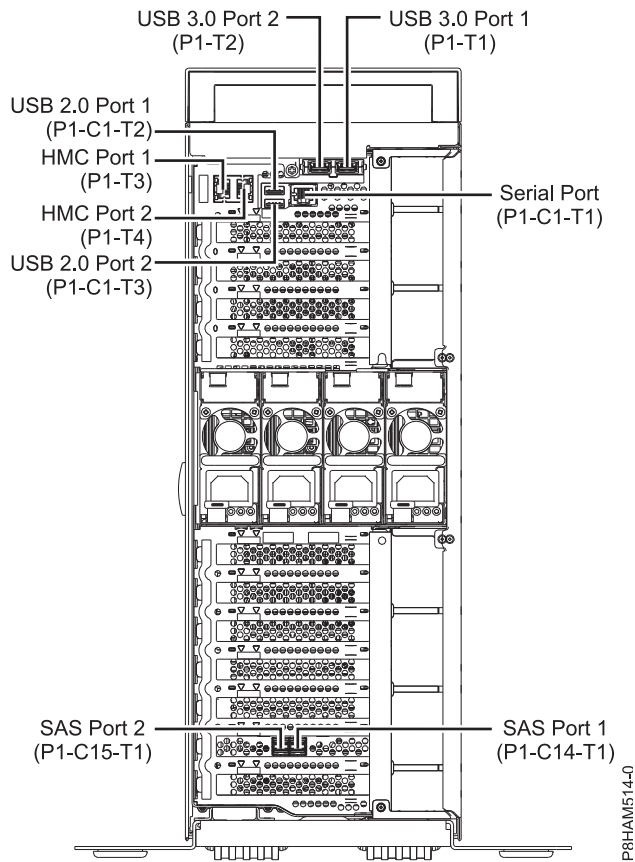
Figure 28. Connector locations for the stand-alone 8286-41A (expanded function) system

Connector locations for the 8247-42L and 8286-42A systems

Learn about connector locations for the 8247-42L and 8286-42A rack-mounted models.

The 8247-42L and 8286-42A (expanded function) servers provide cable connector locations via a SAS port for disk drive enclosures.
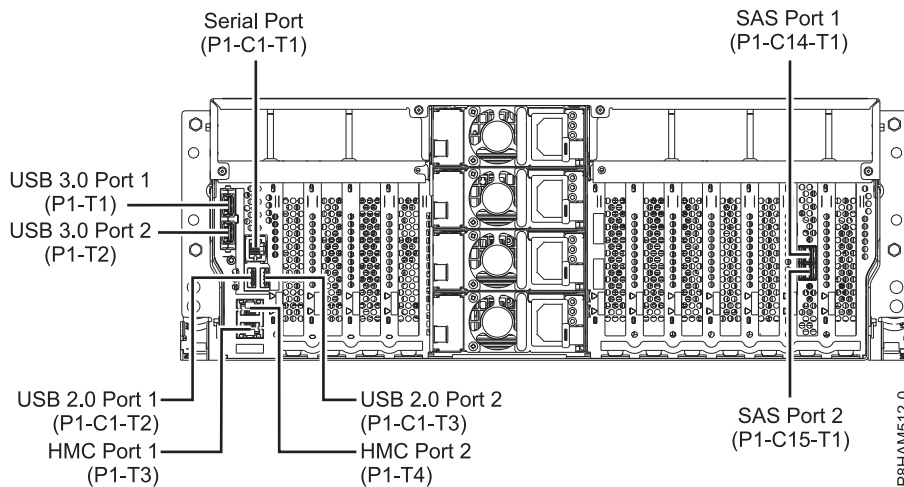
Figure 29. Connector locations for the 8247-42L and 8286-42A (expanded function) systems

Connector locations for the 8408-44E and 8408-E8E systems

Learn about connector locations for the 8408-44E and 8408-E8E systems.

The 8408-44E and 8408-E8E systems provide cable connector locations via a SAS port (P1-C5-T3) for disk drive enclosures and cable ports (P1-C5-T1 and P1-C5-T2) for the EMX0 PCIe3 expansion drawer.
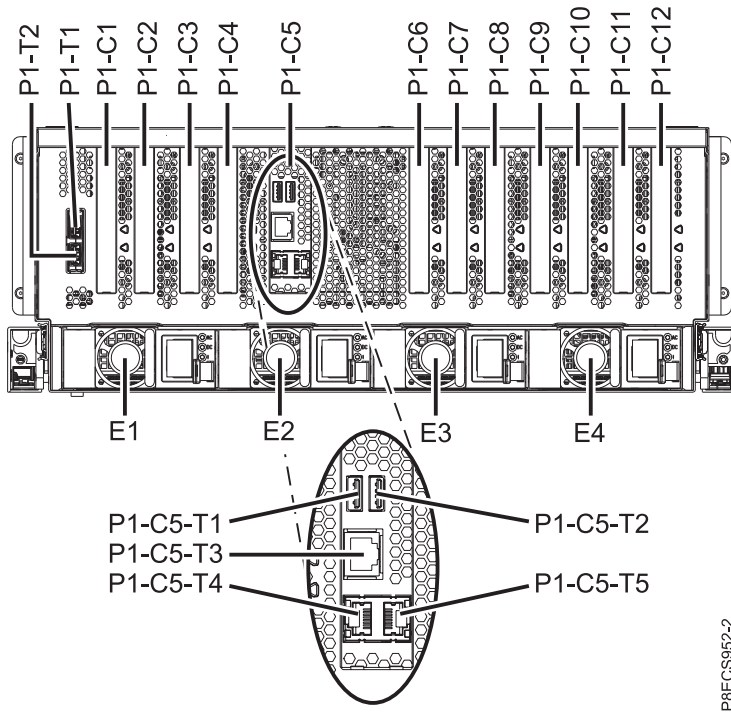
Figure 30. Connector locations for the 8408-44E and 8408-E8E systems

Connector locations for the 9080-MHE, 9080-MME, 9119-MHE, and 9119-MME systems

Learn about connector locations for the 9080-MHE, 9080-MME, 9119-MHE, and 9119-MME systems.

The 9080-MHE, 9080-MME, 9119-MHE, and 9119-MME servers provide cable connector locations for the EMX0 PCIe Gen3 I/O expansion drawer.
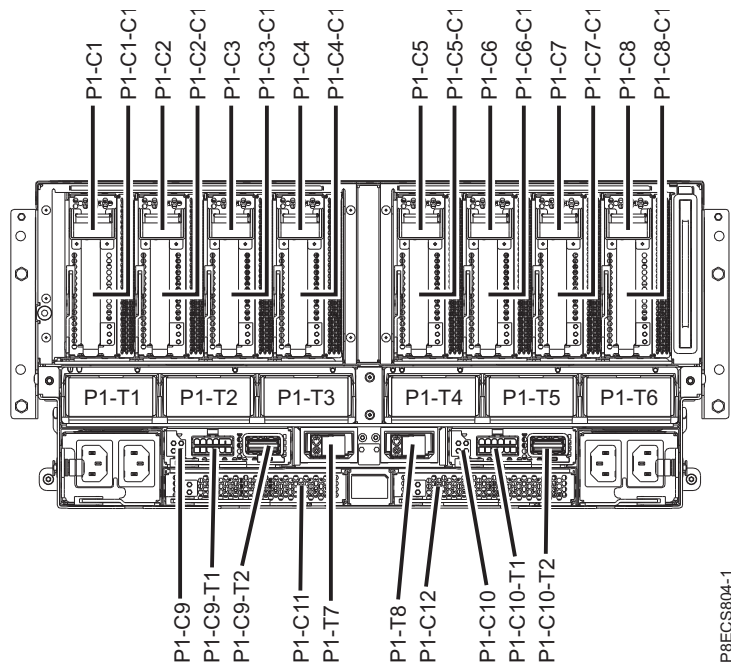
Figure 31. Connector locations for the 9080-MHE, 9080-MME, 9119-MHE, and 9119-MME systems

Notices

This information was developed for products and services offered in the US.

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

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

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
US

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

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

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you provide in any way it believes appropriate without incurring any obligation to you.

The performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on specific configurations and operating conditions.

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

Statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

43

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

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

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

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

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

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

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

Homologation statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

Accessibility features for IBM Power Systems servers

Accessibility features assist users who have a disability, such as restricted mobility or limited vision, to use information technology content successfully.

Overview

The IBM Power Systems servers include the following major accessibility features:
- Keyboard-only operation
- Operations that use a screen reader

The IBM Power Systems servers use the latest W3C Standard, WAI-ARIA 1.0 (www.w3.org/TR/wai-aria/), to ensure compliance with US Section 508 (www.access-board.gov/guidelines-and-standards/ communications-and-it/about-the-section-508-standards/section-508-standards) and Web Content Accessibility Guidelines (WCAG) 2.0 (www.w3.org/TR/WCAG20/). To take advantage of accessibility features, use the latest release of your screen reader and the latest web browser that is supported by the IBM Power Systems servers.

The IBM Power Systems servers online product documentation in IBM Knowledge Center is enabled for accessibility. The accessibility features of IBM Knowledge Center are described in the Accessibility section of the IBM Knowledge Center help (www.ibm.com/support/knowledgecenter/doc/ kc_help.html#accessibility).

Keyboard navigation

This product uses standard navigation keys.

Interface information

The IBM Power Systems servers user interfaces do not have content that flashes 2 - 55 times per second.

The IBM Power Systems servers web user interface relies on cascading style sheets to render content properly and to provide a usable experience. The application provides an equivalent way for low-vision users to use system display settings, including high-contrast mode. You can control font size by using the device or web browser settings.

The IBM Power Systems servers web user interface includes WAI-ARIA navigational landmarks that you can use to quickly navigate to functional areas in the application.

Vendor software

The IBM Power Systems servers include certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for accessibility information about its products.

Related accessibility information

In addition to standard IBM help desk and support websites, IBM has a TTY telephone service for use by deaf or hard of hearing customers to access sales and support services:

TTY service
800-IBM-3383 (800-426-3383)
(within North America)

For more information about the commitment that IBM has to accessibility, see IBM Accessibility (www.ibm.com/able).

Privacy policy considerations

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user, or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

This Software Offering does not use cookies or other technologies to collect personally identifiable information.

If the configurations deployed for this Software Offering provide you as the customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at http://www.ibm.com/privacy and IBM's Online Privacy Statement at http://www.ibm.com/privacy/details the section entitled "Cookies, Web Beacons and Other Technologies" and the "IBM Software Products and Software-as-a-Service Privacy Statement" at http://www.ibm.com/software/info/product-privacy.

Trademarks

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

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

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

CAN ICES-3 (A)/NMB-3(A)

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU 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.

European Community contact:
IBM Deutschland GmbH
Technical Regulations, Abteilung M456
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 800 225 5426
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

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

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

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

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

Electromagnetic Interference (EMI) Statement - Korea

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

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 2014/30/EU zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaatenund hält die Grenzwerte der EN 55022 / EN 55032 Klasse A ein.

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

EN 55022 / EN 55032 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2014/30/EU in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC Richtlinie 2014/30/EU) 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 Relations Europe, Abteilung M456
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 (0) 800 225 5426
email: HalloIBM@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 / EN 55032 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

CAN ICES-3 (B)/NMB-3(B)

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU 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.

European Community contact:
IBM Deutschland GmbH
Technical Regulations, Abteilung M456
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 800 225 5426
email: halloibm@de.ibm.com

VCCI Statement - Japan

この装置は，クラスB情報技術装置です。この装置は，家庭環境で使用
することを目的としていますが，この装置がラジオやテレビジョン受信機に
近接して使用されると，受信障害を引き起こすことがあります。
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.

（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

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

Germany Compliance Statement

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

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2014/30/EU zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaatenund hält die Grenzwerte der EN 55022/ EN 55032 Klasse B ein.

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

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 2014/30/EU in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC Richtlinie 2014/30/EU) für Geräte der Klasse B

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 Relations Europe, Abteilung M456
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 (0) 800 225 5426
email: HalloIBM@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022/ EN 55032 Klasse B.

Terms and conditions

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

Applicability: These terms and conditions are in addition to any terms of use for the IBM website.

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

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

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

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

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

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

IBM ®

Part Number: 01LK530

Printed in USA

GI11-9914-04

(1P) P/N: 01LK530