

Power Systems

*NVMe U.2 drives for the 9009-41G,
9009-42G, or 9223-42S*

IBM

Note

Before using this information and the product it supports, read the information in [“Safety notices” on page v](#), [“Notices” on page 41](#), the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125-5823.

This edition applies to IBM® Power Systems servers that contain the POWER9™ processor and to all associated models.

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Safety notices

Safety notices may be printed throughout this guide:

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

World Trade safety information

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

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

German safety information

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

Laser safety information

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

Laser compliance

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



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

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard: If IBM supplied the power cord(s), connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product. Do not open or service any power supply assembly. Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.



- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. 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. 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.
- When performing a machine inspection: 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 attempt to switch power to the machine until all possible unsafe conditions are corrected. 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.
- 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 if provided, unless the earthquake option is to be installed.
- 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).



- Stability hazard:
 - The rack may tip over causing serious personal injury.
 - Before extending the rack to the installation position, read the installation instructions.
 - Do not put any load on the slide-rail mounted equipment mounted in the installation position.
 - Do not leave the slide-rail mounted equipment in the installation position.
- 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 1 of 2)

(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 or if the rack is not bolted to the floor. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.



- *(For fixed drawers.)* This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack. (R001 part 2 of 2)



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

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.

- Ensure that there are little-to-no empty U-levels between devices installed in the rack cabinet below the 32U 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 2083 mm (30 x 82 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 or in an earthquake environment bolt the rack to the floor.
 - 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)



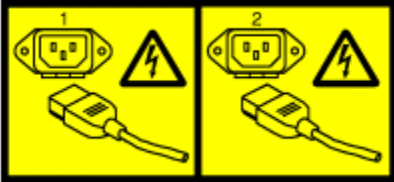
DANGER: Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack-mounted devices and do not use them to stabilize your body position (for example, when working from a ladder). Stability hazard:

- The rack may tip over causing serious personal injury.
- Before extending the rack to the installation position, read the installation instructions.

- Do not put any load on the slide-rail mounted equipment mounted in the installation position.
- Do not leave the slide-rail mounted equipment in the installation position.

(L002)

(L003)



or



or

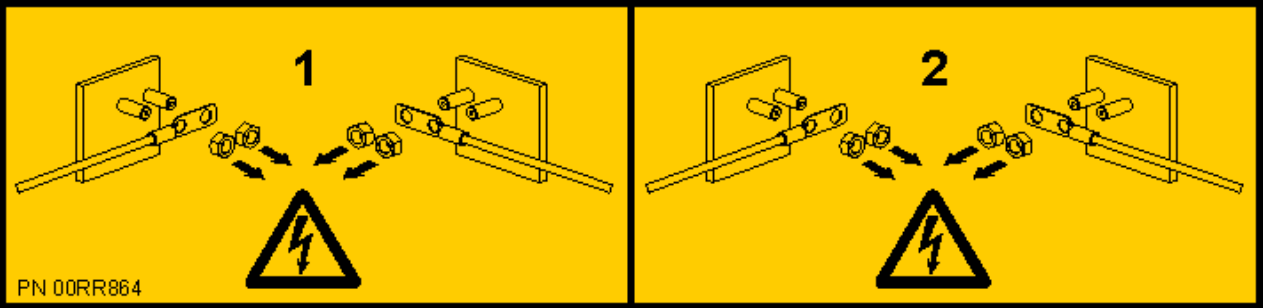



or



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 may not injure the eye, this procedure is potentially dangerous. Therefore, verifying the continuity of optical fibers by shining light into one end and looking at the other end is not recommended. To verify continuity of a fiber optic cable, use an optical light source and power meter. (C027)



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



CAUTION: Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following information:

- Laser radiation when open.
- Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam. (C030)

(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 degrees C (212 degrees 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 raise, lower or slide platform load shelf unless stabilizer (brake pedal jack) is fully engaged. Keep stabilizer brake engaged when not in use or motion.
- 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 platforms, tilt riser, angled unit install wedge or other such accessory options. Secure such platforms -- riser tilt, wedge, etc options to main lift shelf or forks in all four (4x or all other provisioned mounting) 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 [adjustable angling platform] option flat at all times except for final minor angle 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 (unless the specific allowance is provided for one following qualified procedures for working at elevations with this 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.
- This TOOL must be maintained correctly for IBM Service personnel to use it. IBM shall inspect condition and verify maintenance history before operation. Personnel reserve the right not to use TOOL if inadequate. (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.

NVMe U.2 drives for the 9009-41G, 9009-42G, or 9223-42S

Find information about installing, removing, and replacing NVMe U.2 drives in the IBM Power® System S914 (9009-41G), IBM Power System S924 (9009-42G), or IBM Power System H924S (9223-42S) server.

Installing an NVMe U.2 drive in the 9009-41G, 9009-42G, or 9223-42S system

Find information about installing an NVMe U.2 drive in the IBM Power System S914 (9009-41G), IBM Power System S924 (9009-42G), or IBM Power System H924S (9223-42S) server.

About this task

Note: Installing this feature is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you. You might be charged a fee by the service provider for this service.

If your system is managed by the Hardware Management Console (HMC), use the HMC to install the part in the system. For instructions, see [Installing a part by using the HMC \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/hmcinstall.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/hmcinstall.htm).

If you do not have an HMC, complete the steps in the following procedures to install an NVMe U.2 drive.

Preparing the 9009-41G, 9009-42G, or 9223-42S system to install an NVMe U.2 drive

To prepare the system to install an NVMe U.2 drive, complete the steps in this procedure.

Procedure

1. Ensure that the required software is installed to support the new feature. See the [Power Systems Prerequisites](#) website.
2. If applicable, open the rack door at the front of the system.
3. Review the NVMe U.2 drive slot locations. The NVMe U.2 slots are located in the front of the system.

Note: The NVMe U.2 drives are located in slots P2-C1, P2-C2, P2-C3, and P2-C4.

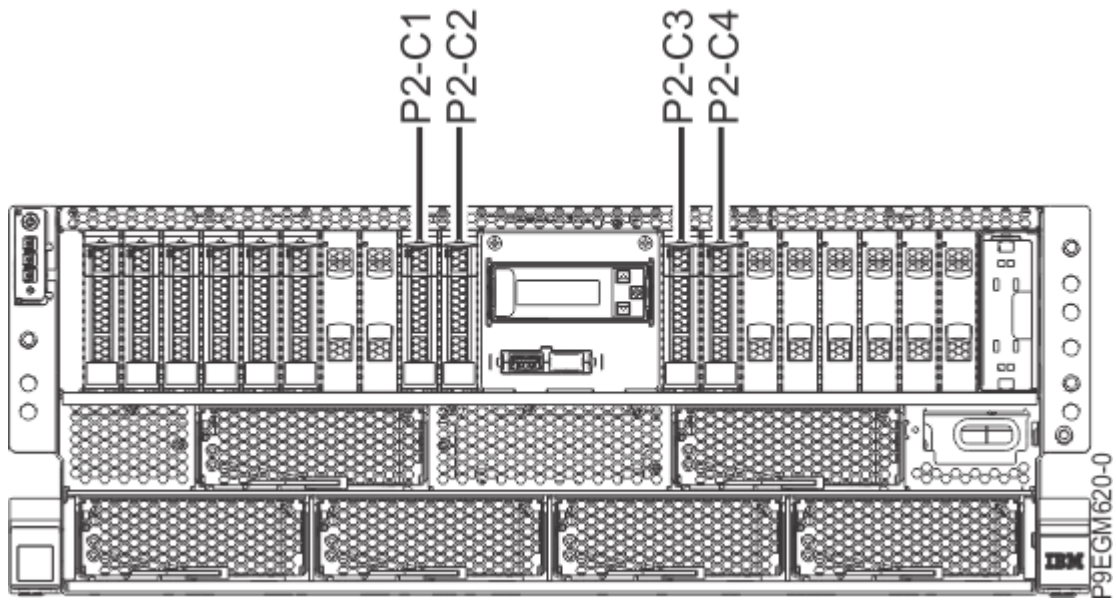


Figure 1. Location of the NVMe U.2 drives in the 9009-41G, 9009-42G, or 9223-42S system

4. Review the NVMe U.2 drive LED locations.

The NVMe U.2 drive has two LEDs that indicate the following status:

- A power/activity LED (green)
- An error and identify function LED (amber).

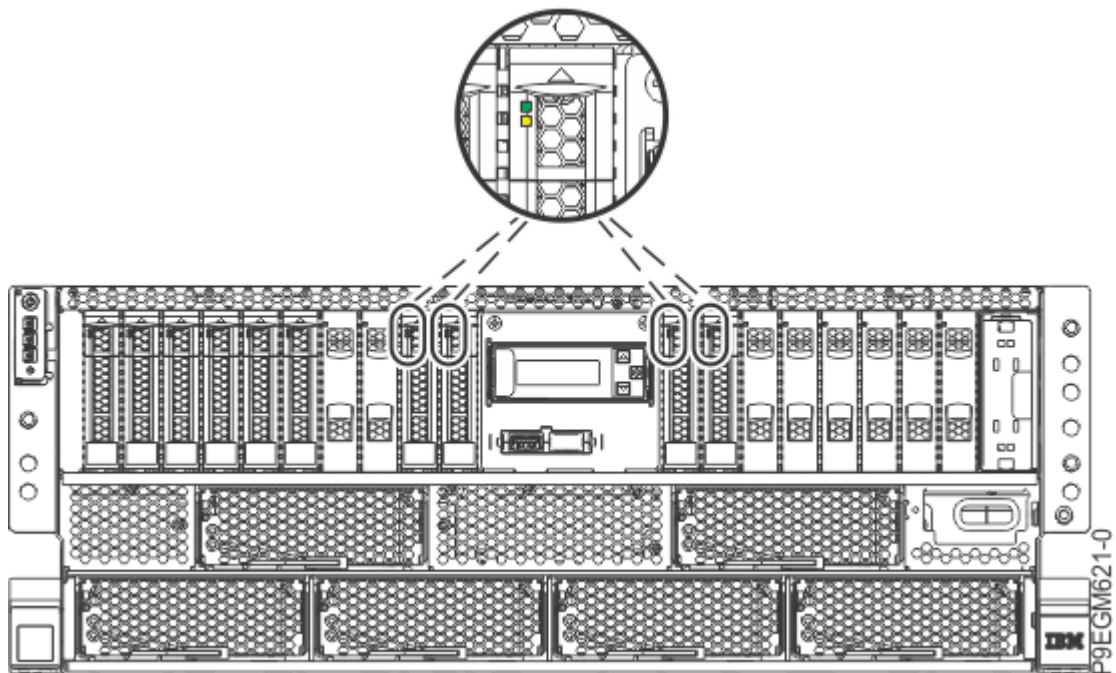


Figure 2. Locations of the NVMe U.2 drive LEDs in the 9009-41G, 9009-42G, or 9223-42S system

5. Review the plugging sequence for the NVMe U.2 drives.

- If you have a SAS RAID internal adapter in location P1-C49 and an NVMe U.2 pass-thru card in location P1-C50, install the NVMe U.2 drives in the following order: P2-C3, P2-C4.
- If you have an NVMe U.2 pass-thru card in location P1-C49, and location P1-C50 is empty, install the NVMe U.2 drives in the following order: P2-C1, P2-C2.
- If you have an NVMe U.2 pass-thru card in location P1-C49 and an NVMe U.2 pass-thru card in location P1-C50, install the NVMe U.2 drives in the following order: P2-C1, P2-C3, P2-C2, P2-C4.

6. Choose from the following options:

- If you want to install a PCIe adapter when the system power is turned off, continue with step “7” on [page 3](#).
- If the system power is turned on and if the AIX® operating system controls the slot, continue with step “9” on [page 7](#).
- If the system power is turned on and if the IBM i operating system controls the slot, continue with step “11” on [page 7](#).
- If the system power is turned on and if the Linux® operating system controls the slot, continue with step “12” on [page 8](#).

7. To prepare the system to install an NVMe U.2 drive when the system is powered off, complete the following steps:

- a) Activate the identify function. For instructions, see [Identifying a part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).
- b) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
 - Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
- c) Stop the system. For instructions, see [Stopping a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm).

8. If you powered the system off, complete the following steps:

- a) Label and disconnect the power cords from the system unit.
See [Figure 3 on page 4](#) or [Figure 4 on page 5](#).

Notes:

- This system might be equipped with two or more power supplies. If the removing and replacing procedures require the system power to be turned off, ensure that all the power sources to the system are disconnected.
- The power cord **(B)** is fastened to the system with hook-and-loop fastener **(A)**. If you are placing the system in a service position after you disconnect the power cords, ensure that you unstrap the fastener.

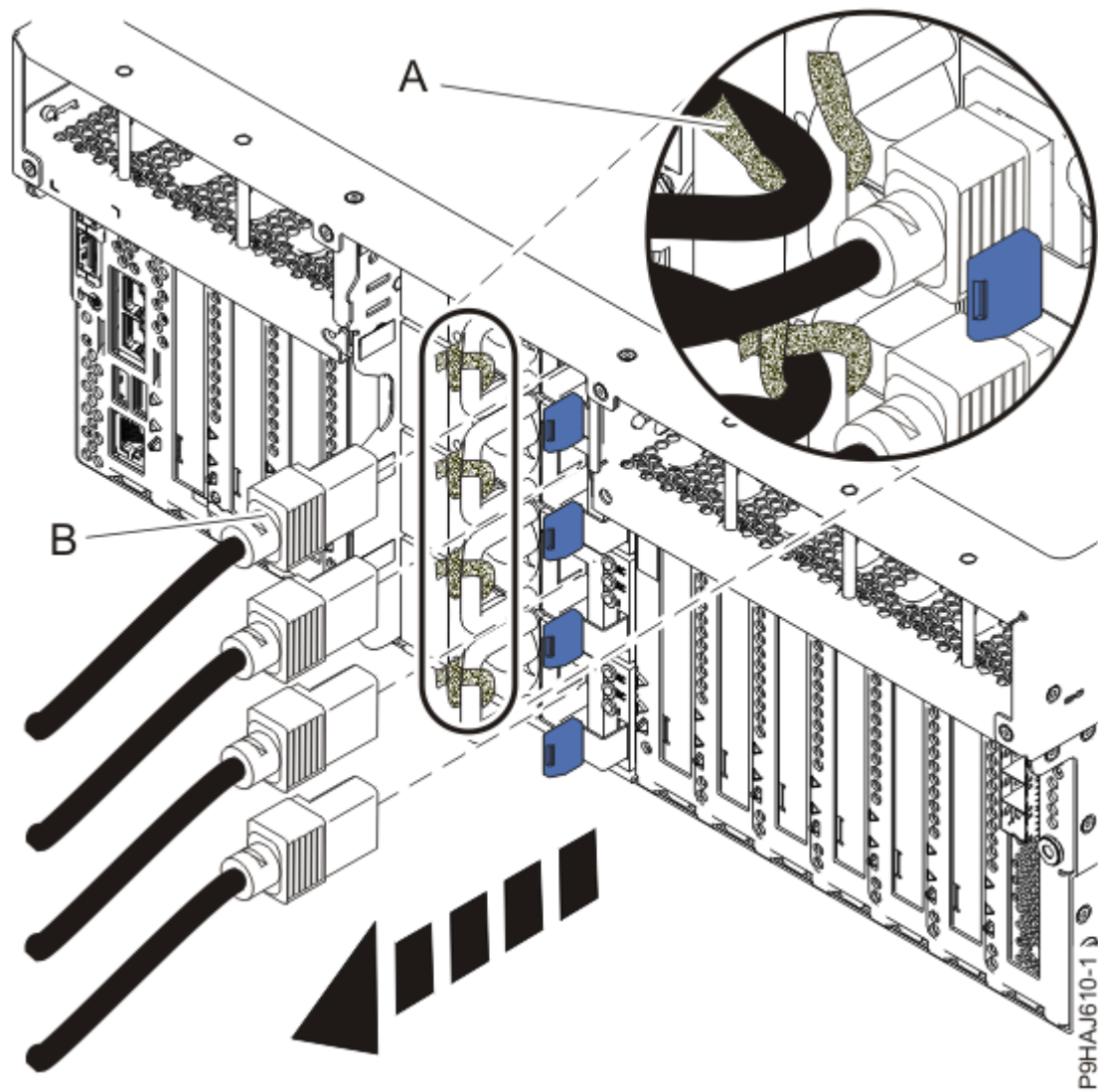


Figure 3. Removing the power cords from a rack-mounted server

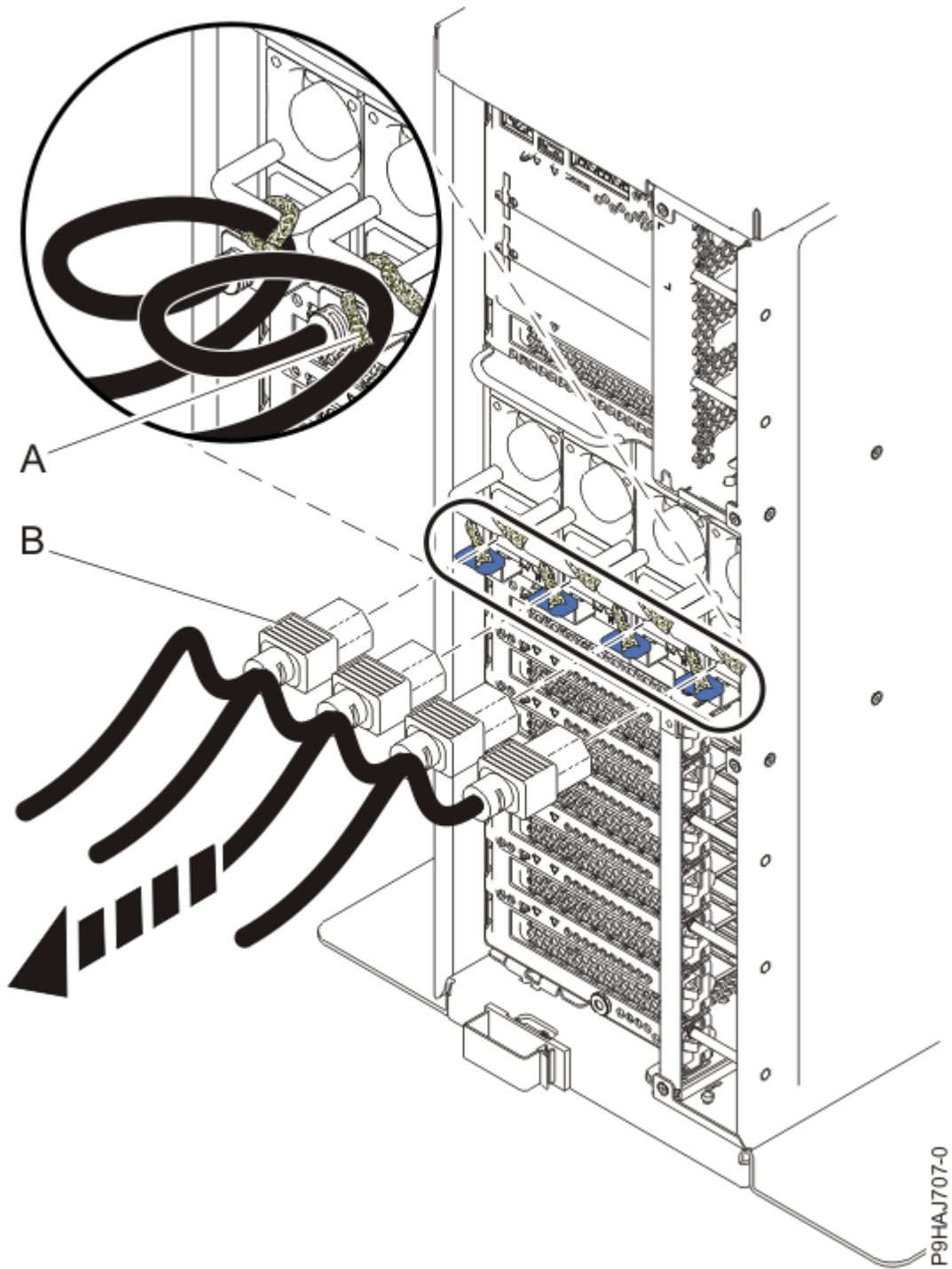
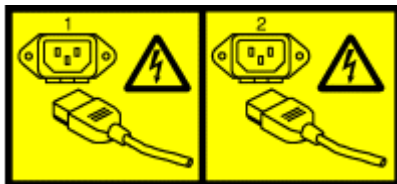


Figure 4. Removing the power cords from a stand-alone server

(L003)



OR



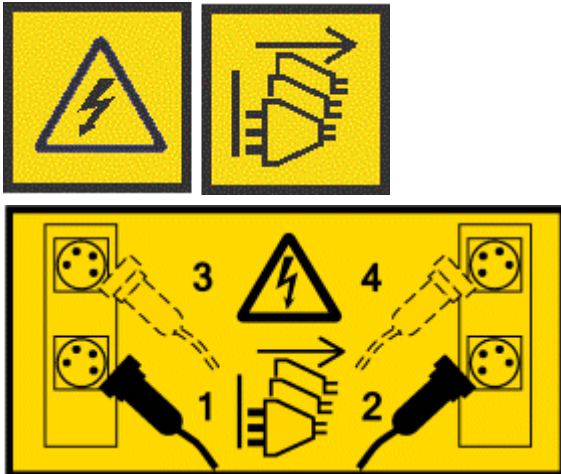
or

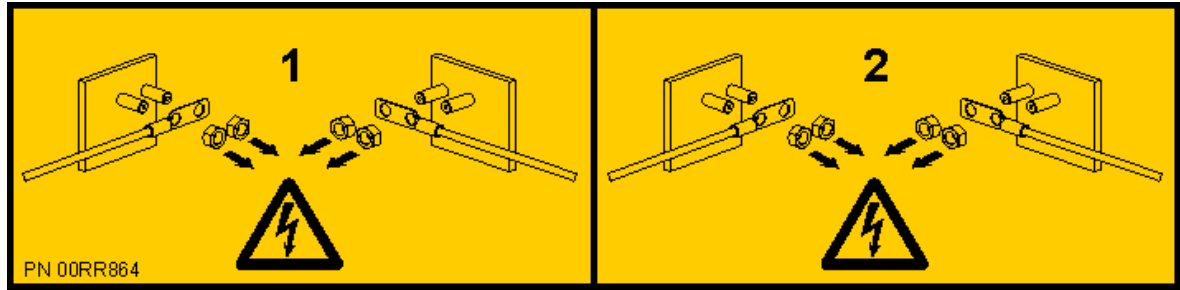


or



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)

9. To identify the available NVMe U.2 drive slots by using the AIX operating system, complete the following steps.

Note: The NVMe U.2 drives are based on PCI technology.

- a) Log in to the console as root user to access the Hot Plug Manager.
- b) At the command line, type `smitty`.
- c) Select **Devices > PCI Hot Plug Manager**.

For more information about the menu options in the **PCI Hot-Plug Manager** screen, see [PCIe Hot-Plug Manager menu](#).

- d) From the **PCI Hot-Plug Manager** menu, select **Add a PCI Hot-Plug Adapter > Add a PCI Hot-Plug Adapter**.
- e) Select the appropriate NVMe U.2 drive slot from the list that is displayed on the screen, and then press Enter.
The green LED remains on and the amber LED for the slot that is identified flashes.
- f) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
 - Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
- g) Press Enter on the console. The NVMe U.2 drive slot is placed in the **action** state and is ready to receive the drive. During the **action** state, the green LED turns off and the amber LED is flashing.

Important: Install or replace the drive when you are instructed to do so later in this procedure.

10. Continue with step “13” on page 8.

11. To prepare the system to install an NVMe U.2 drive by using the IBM i operating system, complete the following steps:

Note: The NVMe U.2 drives are based on PCIe technology.

- a) If necessary, start a System Service Tools (SST) session by typing `stsrst` on the command line of the Main Menu and then press Enter.
- b) Type your service tools user ID and service tools password on the **System Service Tools Sign On** display, and then press Enter.
- c) Select **Start a service tool > Hardware service manager > Packaging hardware resources (system, frames, cards)**.
- d) Type 9 (Hardware contained within package) in the **System Unit** field or **Expansion Unit** field of the unit where you are installing the PCIe adapter. Press Enter.
- e) Select the **Include empty positions** option.

- f) Select **Concurrent Maintenance** for the slot in which you want to install the adapter, and then press Enter.
 - g) Select the **Toggle LED blink off/on** option. A light-emitting diode (LED) flashes identifying the slot that you selected.
 - h) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
 - Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
 - i) Select the **Toggle LED blink off/on** option to stop the LED from flashing.
 - j) Continue with step [“13” on page 8](#).
12. To identify the available NVMe U.2 drive slots by using the Linux operating system, complete the following steps.

Note: The NVMe U.2 drives are based on PCI technology.

- a) Log in to the system console as the root user.
- b) Run the following command to list the available slots:

```
lsslot -c pci -a
```

The following screen is an example of the information that is displayed by this command:

```
# Slot          Description          Device(s)
U78D4.001.AAAXXX-P2-C1 PCI-X capable, 64 bit, 133MHz slot Empty
U78D4.001.AAAXXX-P2-C2 PCI-X capable, 64 bit, 133MHz slot Empty
U78D4.001.AAAXXX-P2-C3 PCI-X capable, 64 bit, 133MHz slot Empty
```

- c) Select the appropriate empty NVMe U.2 drive slot from the slots that are listed by the command.
 - d) Record the slot that you have selected.
 - e) To prepare the slot to accept an NVMe U.2 drive, complete the following steps:
 - i) Type the following command:


```
dmgr -c pci -a -s locationcode
```

Where `locationcode` is the location of the NVMe slot. For example, the location might be `U78D4.001.AAAXXX-P2-C1`.
 - ii) Press Enter. A fast-flashing amber LED at the front of the system near where the NVMe slot is located indicates that the slot is identified.
 - f) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
 - Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
13. Attach the electrostatic discharge (ESD) wrist strap.
- The ESD wrist strap must be connected to an unpainted metal surface until the service procedure is completed, and if applicable, until the service access cover is replaced.



Attention:

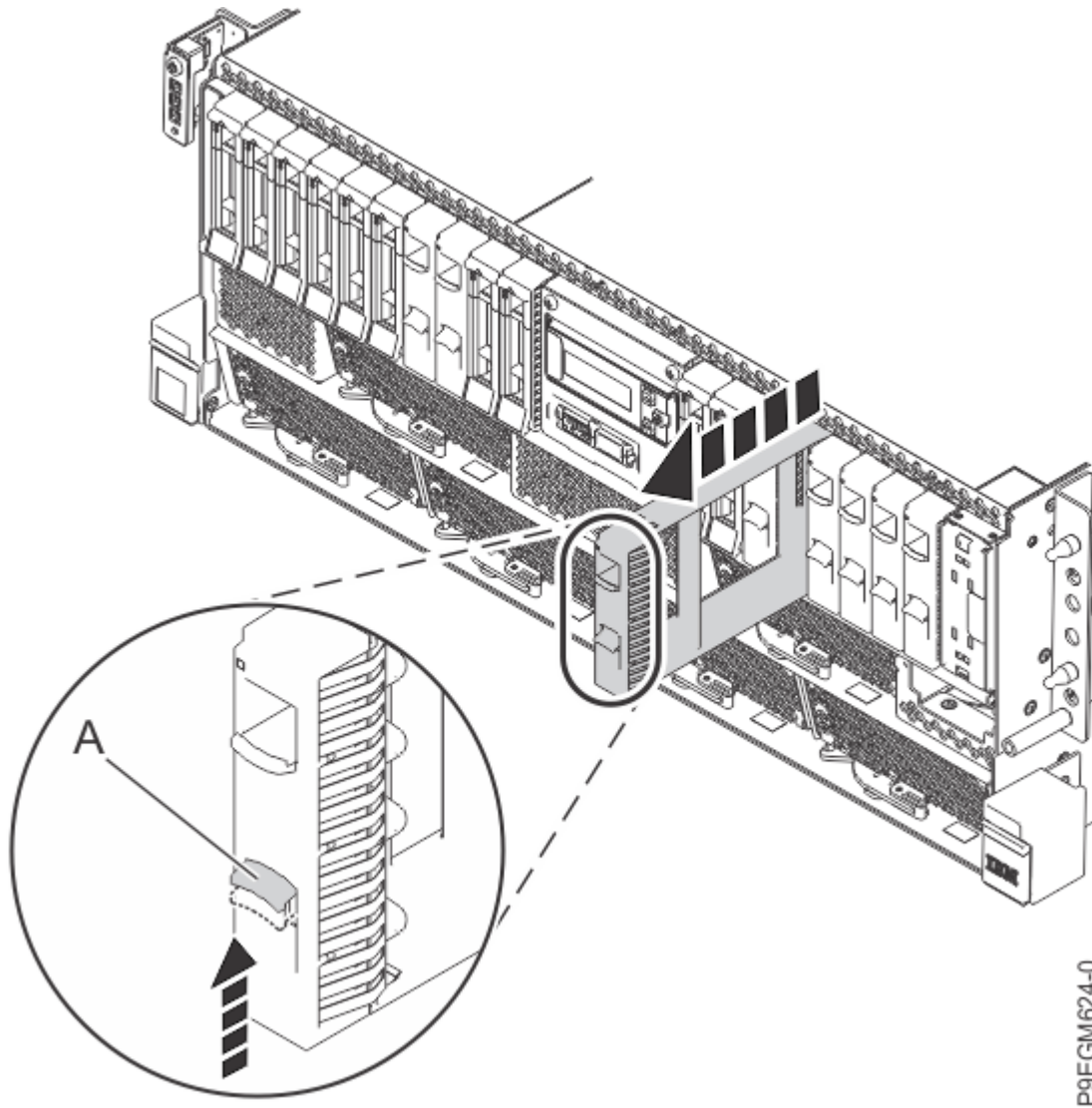
- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist 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. If at any point in this service process you move away from the system, it is important to again discharge yourself by touching an unpainted metal surface for at least 5 seconds before you continue with the service process.

Installing an NVMe U.2 drive in the 9009-41G, 9009-42G, or 9223-42S system

To install an NVMe U.2 drive in the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Remove the NVMe U.2 drive filler from the slot.
 - a) Press the NVMe drive filler handle release latch **(A)** in the direction that is shown.
 - b) Pull the NVMe drive filler out of the system.



P9EGM624-0

Figure 5. Removing an NVMe drive filler from the 9009-41G, 9009-42G, or 9223-42S system

3. Place the NVMe U.2 drive on an appropriate ESD surface.
4. Save the filler for a future use.
5. If necessary, remove the NVMe U.2 drive from the antistatic package.
6. To install or replace an NVMe U.2 drive, complete the following steps:
 - a) With the NVMe U.2 drive handle in the open position, slide the NVMe U.2 drive into the slot until it is fully seated.
 - b) Close the drive handle (**A**) to lock the drive in place.

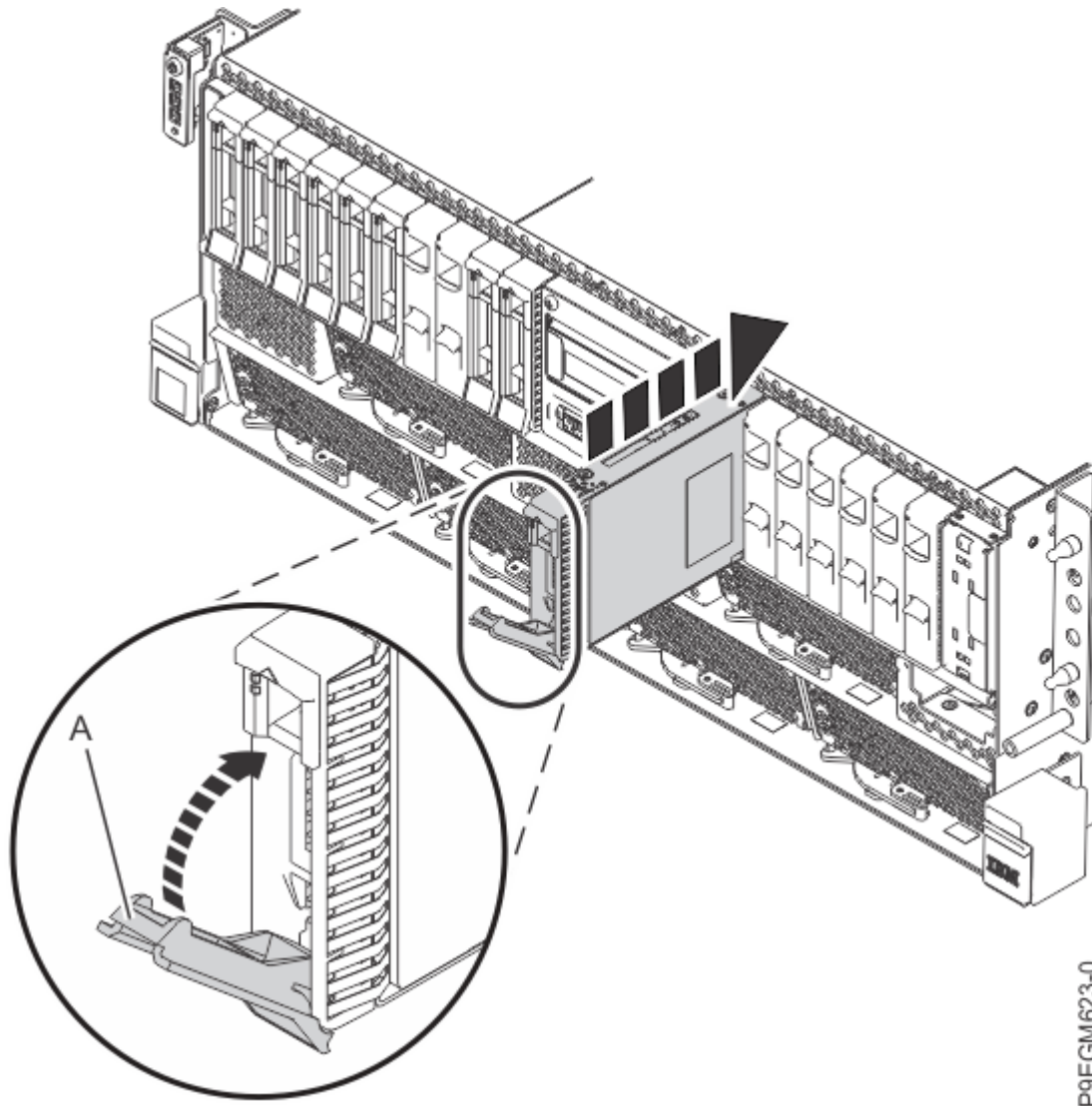


Figure 6. Installing or replacing an NVMe U.2 drive in the 9009-41G, 9009-42G, or 9223-42S system

Preparing the 9009-41G, 9009-42G, or 9223-42S system for operation after installing an NVMe U.2 drive

To prepare the system for operation after installing an NVMe U.2 drive, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Choose from the following options:
 - If the system power is turned off, continue with step “3” on page 11.
 - If you are using the AIX operating system, continue with step “5” on page 13.
 - If you are using the IBM i operating system, continue with step “8” on page 14.
 - If you are using the Linux operating system, continue with step “10” on page 14.
3. Using your labels, reconnect the power cords **(A)** to the system unit.

Fasten the power cords **(A)** to the system using the hook-and-loop fasteners **(B)** as shown in [Figure 7 on page 12](#) or [Figure 8 on page 13](#).

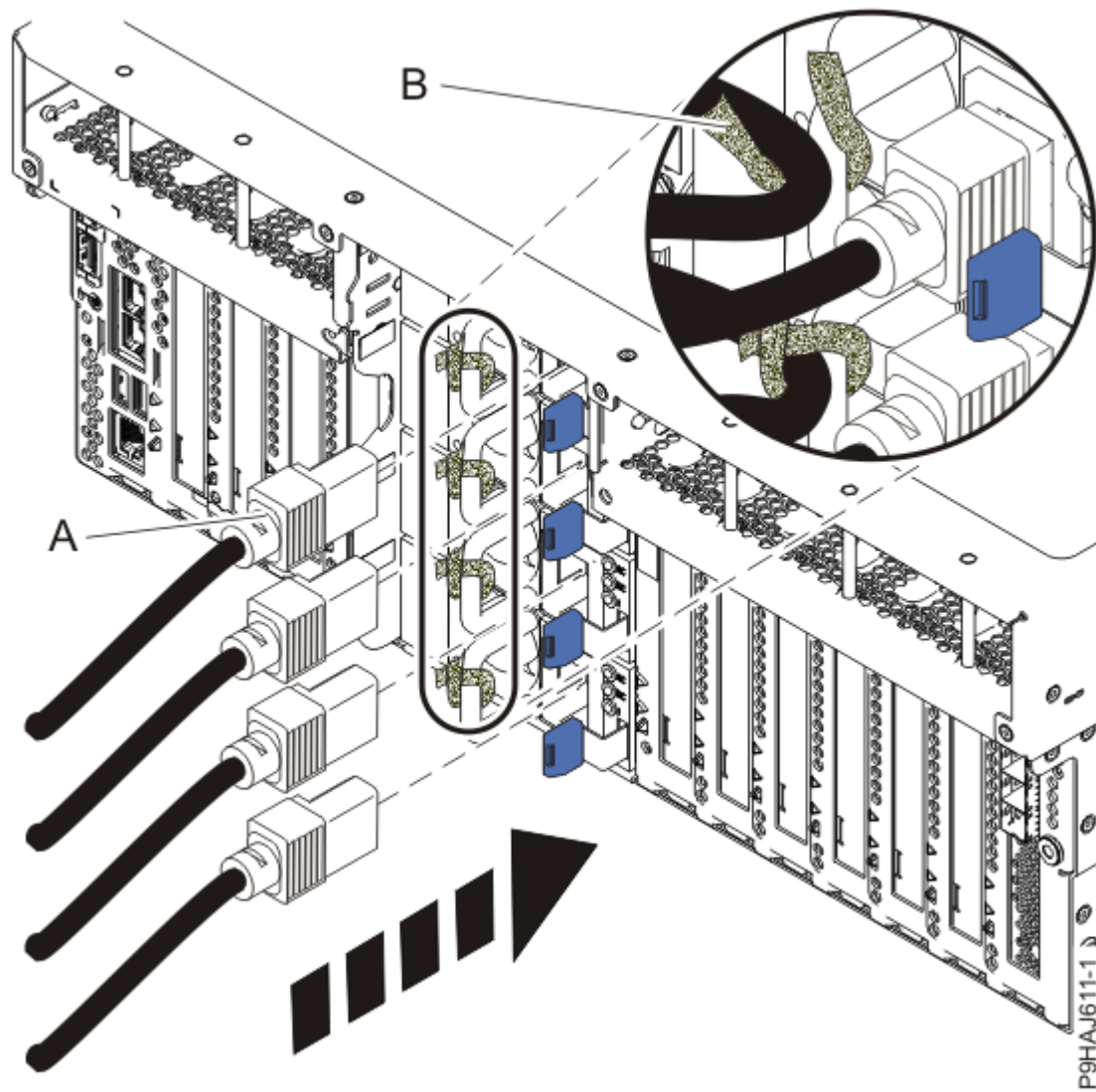


Figure 7. Connecting the power cords to a rack-mounted system

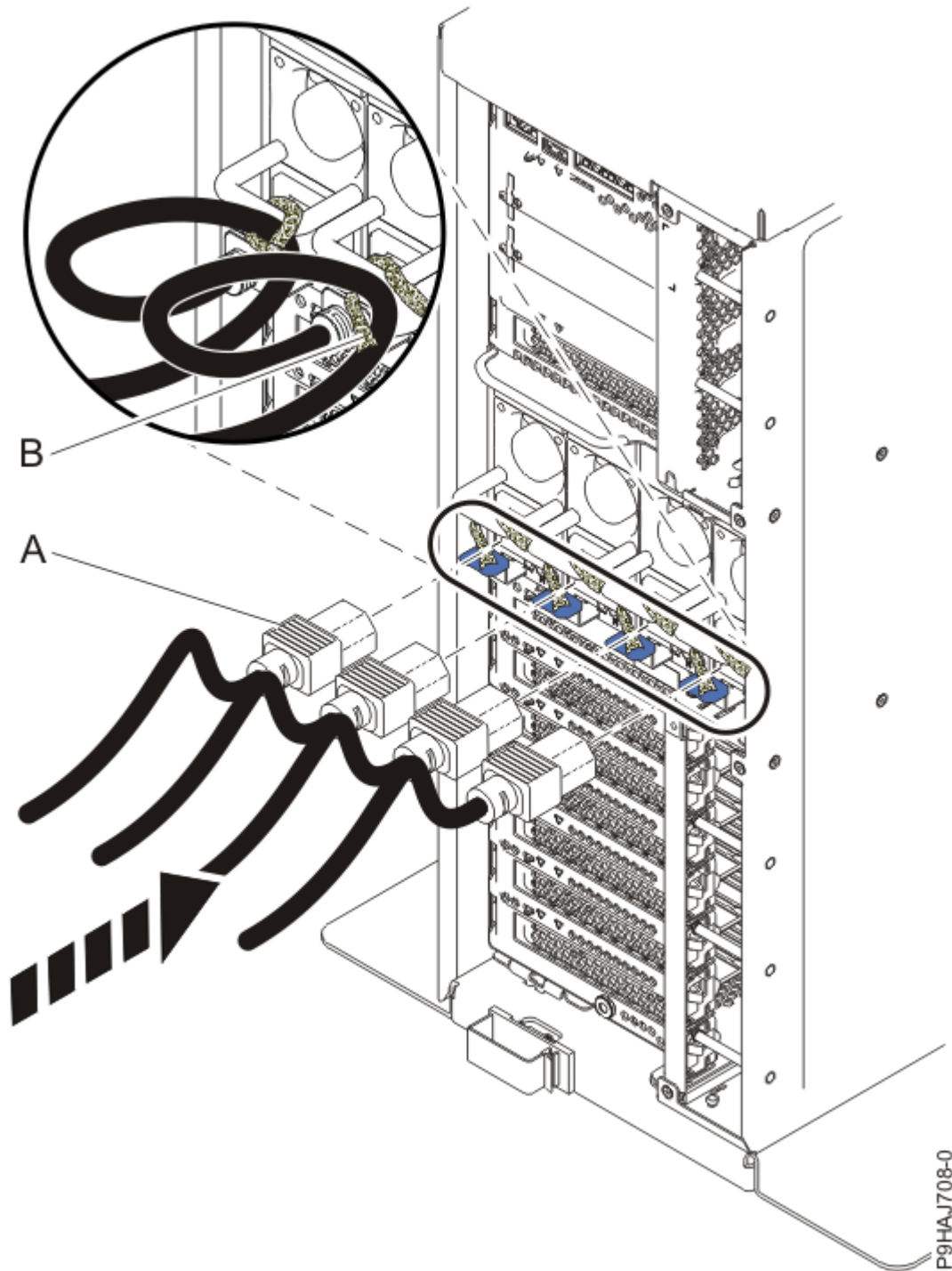


Figure 8. Connecting the power cords to a stand-alone system

4. If you installed an NVMe U.2 drive with the system power turned off, complete the following steps:
 - a) Start the system. For instructions, see [Starting a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm).
 - b) Continue with step “11” on page 14.
5. If you are using the AIX operating system, complete the following steps to configure the NVMe U.2 drive:
 - a) Press the F3 key to return to the Task Selection list.
 - b) Select **Log Repair Action**.
 - c) Select the resource that you replaced and select **Commit**.

- d) Press **F3** to return to **Task Selection List**.
 - e) Select **Hot Plug Task > PCI Hot Plug Manager > Configure a defined device**.
 - f) Select the device that is replaced from the list, and then press Enter. The device is now configured.
 - g) Press the **F10** key to exit the diagnostic program.
6. If you are using the AIX operating system, complete the following steps to verify the NVMe U.2 drive replacement:
 - a. If the diagnostic menu is not displayed, type the **diag** command.
 - b. Select **Advance Diagnostic Routines > Problem Determination**.
 - c. Select the name of the resource that is replaced from the menu. If the resource replaced is not shown, choose the resource that is associated with it.
 - d. Press Enter, and then press **Commit**.
 - e. Did the Problem Determination identify any problems?
 - **No:** Continue to the next step.
 - **Yes:** A problem is identified.
 - If you are a customer, record the error information, and then contact your service provider.
 - If you are an authorized service provider, return to map 210-5.
 - f. Press the **F10** key to exit the diagnostic program.
 7. Continue with step “11” on page 14.
 8. If you are using the IBM i operating system, return to the **Hardware Resource Concurrent Maintenance** display and select **Power on domain**.

The message `Power on complete` is shown.

9. Continue with step “11” on page 14.
10. If you are using the Linux operating system, complete the following steps:
 - a) In the Linux session on the console, press Enter after you install the NVMe U.2 drive to put the slot into the action state.
 - b) Enter the slot information with the **lsslot** command, as shown in the following example.

For example, if the slot in which you installed the NVMe U.2 drive was U78D4.001.AAAXXXX-P2-C1, enter the following command:

```
lsslot -c pci -s U78D4.001.AAAXXXX-P2-C1
```

The following screen is an example of the information that is displayed by this command:

```
# Slot          Description          Device(s)
U78D4.001.AAAXXXX-P2-C1 PCI-X capable, 64 bit, 133MHz slot 0001:40:01.0
```

11. Verify the installed part.
 - If you replaced the part because of a service action, verify the installed part. For instructions, see [Verifying a repair](http://www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm).
 - If you installed the part for any other reason, verify the installed part. For instructions, see [Verifying the installed part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm).
12. Turn off the identify LED. For instructions, see [Deactivating an identify LED](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm).

Removing and replacing an NVMe U.2 drive in the 9009-41G, 9009-42G, or 9223-42S system

Find information about removing and replacing an NVMe U.2 drive in the IBM Power System S914 (9009-41G), IBM Power System S924 (9009-42G), or IBM Power System H924S (9223-42S) server.

About this task

Note: Installing this feature is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you. You might be charged a fee by the service provider for this service.

If your system is managed by the Hardware Management Console (HMC), use the HMC to repair a part in the system. For instructions, see [Repairing a part by using the HMC \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm).

If you do not have an HMC, complete the steps in the following procedures to remove and replace an NVMe U.2 drive.

Preparing the 9009-41G, 9009-42G, or 9223-42S system to remove and replace an NVMe U.2 drive

To prepare the system to remove and replace an NVMe U.2 drive, complete the steps in this procedure.

Procedure

1. If applicable, open the rack door at the front of the system.
2. Review the NVMe U.2 drive slot locations. The NVMe U.2 slots are located in the front of the system.

Note: The NVMe U.2 drives are located in slots P2-C1, P2-C2, P2-C3, and P2-C4.

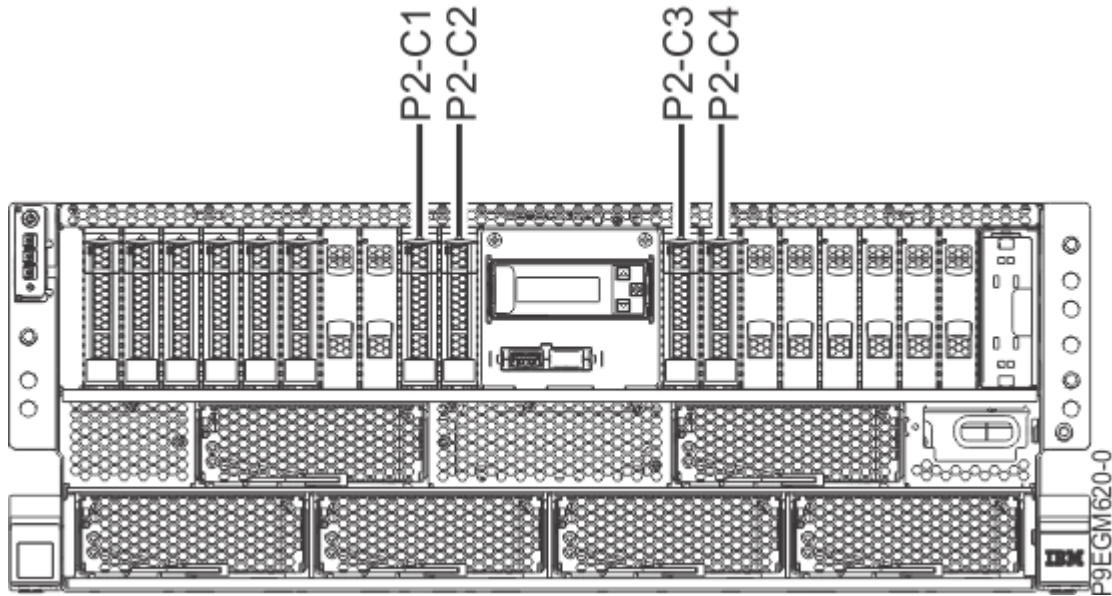


Figure 9. Location of the NVMe U.2 drives in the 9009-41G, 9009-42G, or 9223-42S system

3. Review the NVMe U.2 drive LED locations.

The NVMe U.2 drive has two LEDs that indicate the following status:

- A power/activity LED (green)
- An error and identify function LED (amber).

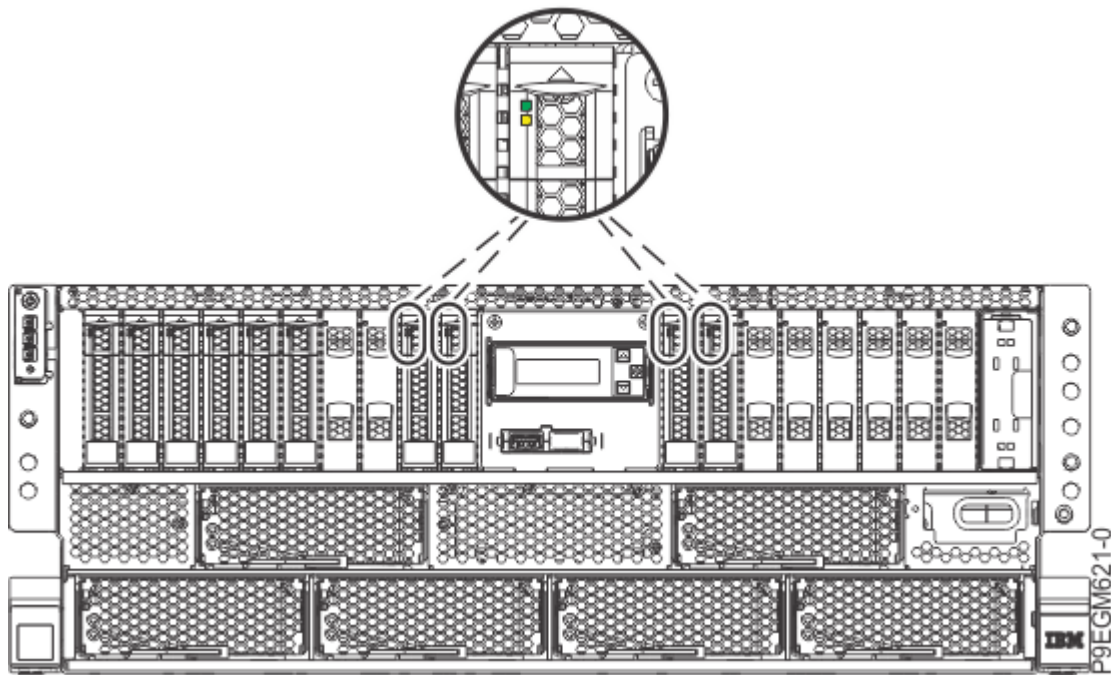


Figure 10. Locations of the NVMe U.2 drive LEDs in the 9009-41G, 9009-42G, or 9223-42S system

4. Choose from the following options:

- If you want to install an NVMe U.2 drive when the system power is turned off, continue with step [“5” on page 16](#).
- If the system power is turned on and if the AIX operating system controls the slot, continue with step [“7” on page 20](#).
- If the system power is turned on and if the IBM i operating system controls the slot, continue with step [“8” on page 21](#).
- If the system power is turned on and if the Linux operating system controls the slot, continue with step [“9” on page 22](#).

5. To prepare the system to install or replace an NVMe U.2 drive when the system is powered off, complete the following steps:

- a) Activate the identify function. For instructions, see [Identifying a part \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).
- b) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
 - Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
- c) Stop the system. For instructions, see [Stopping a system \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm).

6. If you powered the system off, complete the following steps:

- a) If applicable, open the rack door at the rear of the system.
- b) Label and disconnect the power cords from the system unit.
See [Figure 11 on page 17](#) or [Figure 12 on page 18](#).

Notes:

- This system might be equipped with two or more power supplies. If the removing and replacing procedures require the system power to be turned off, ensure that all the power sources to the system are disconnected.

- The power cord **(B)** is fastened to the system with hook-and-loop fastener **(A)**. If you are placing the system in a service position after you disconnect the power cords, ensure that you unstrap the fastener.

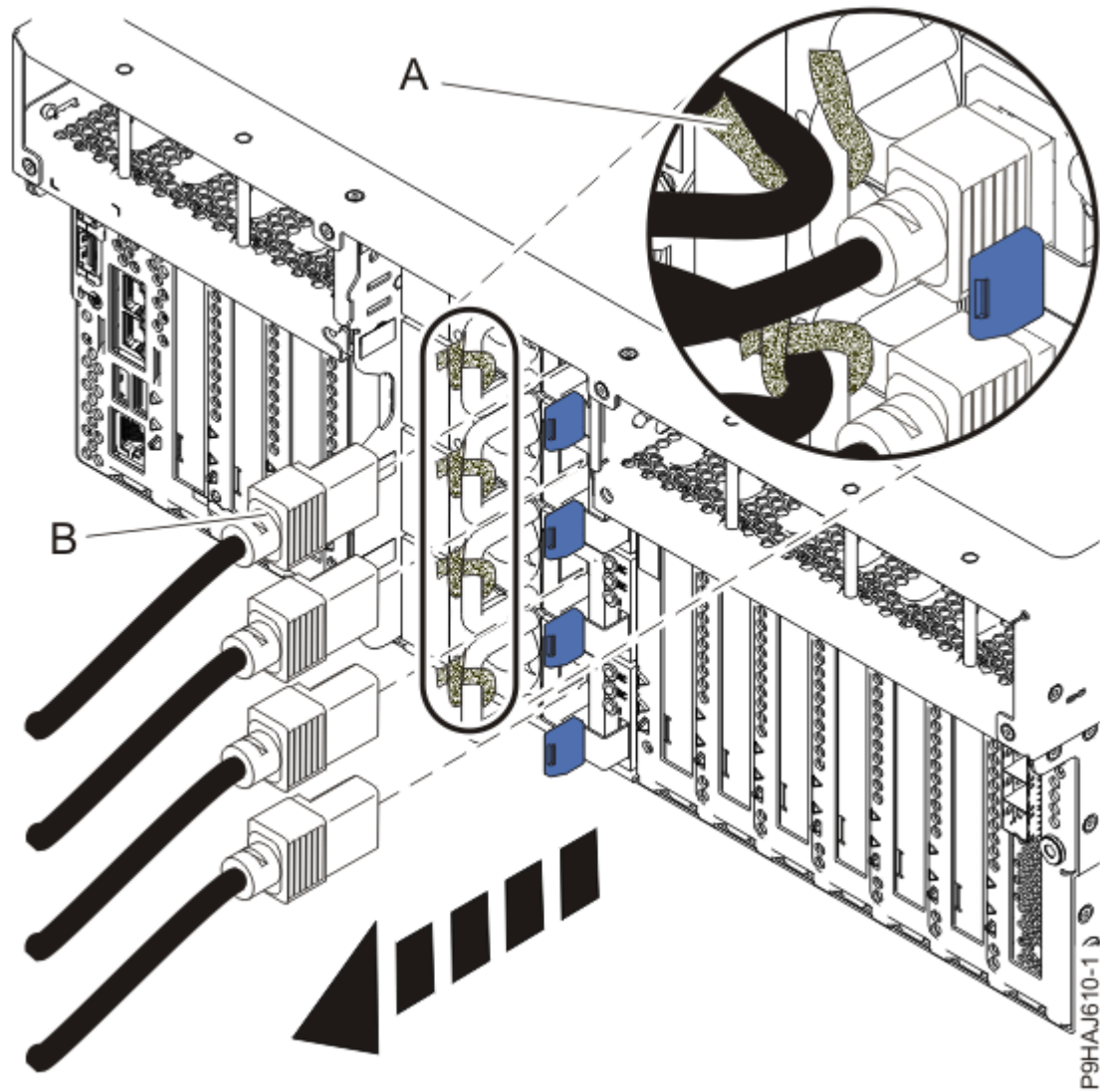


Figure 11. Removing the power cords from a rack-mounted server

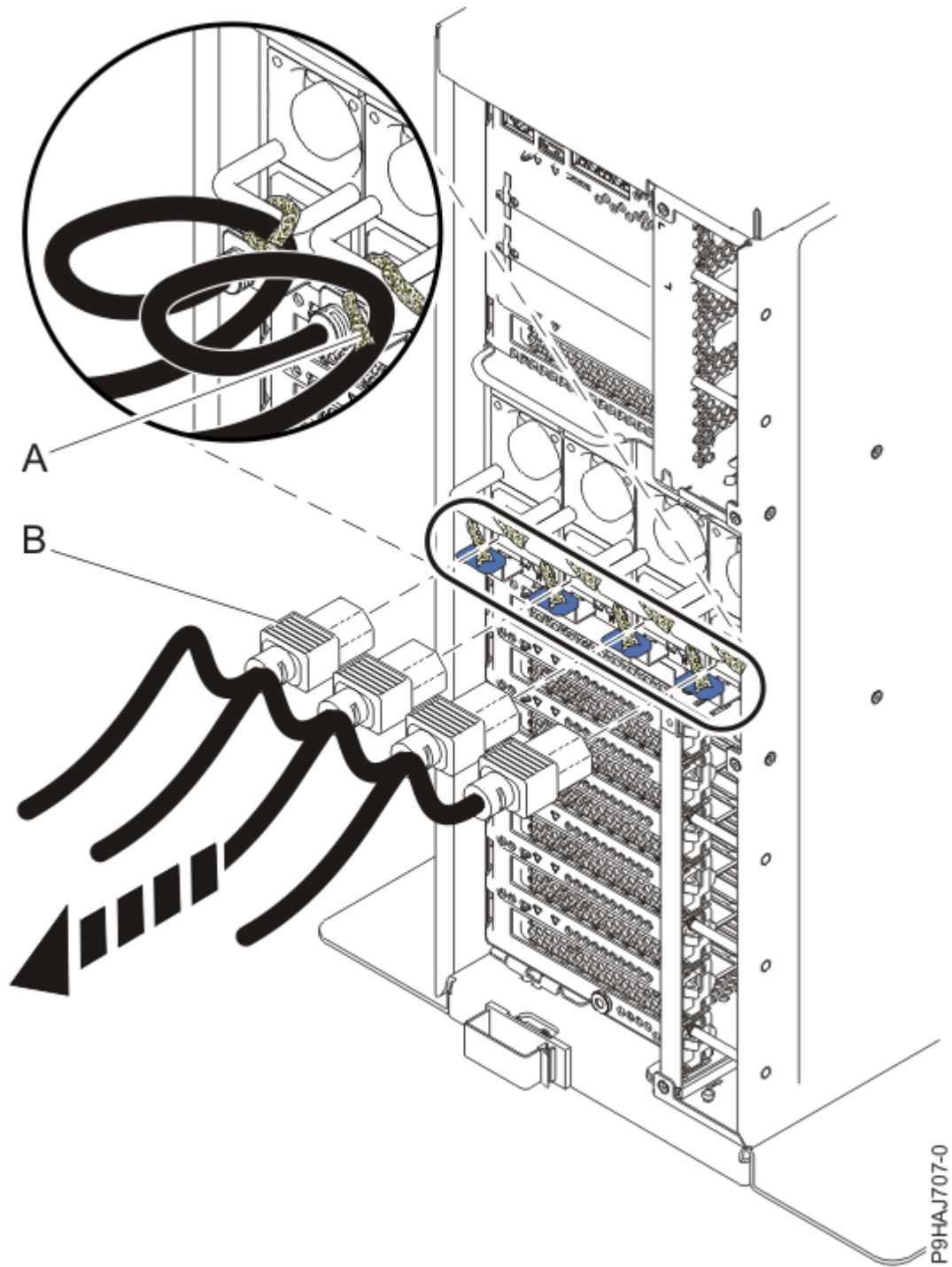
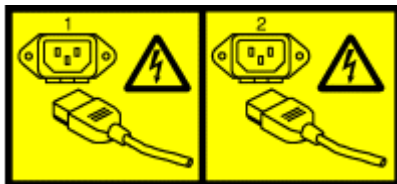


Figure 12. Removing the power cords from a stand-alone server

(L003)



OR



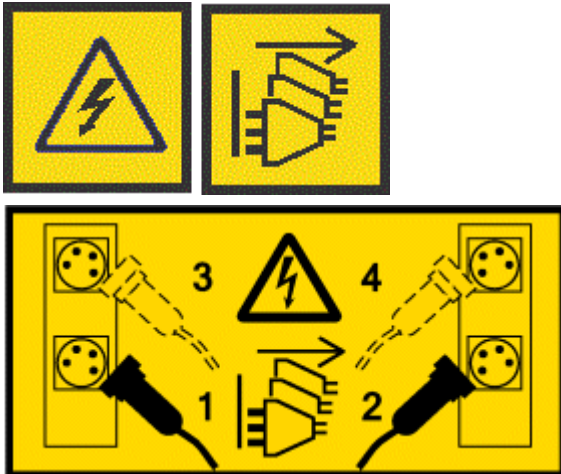
or

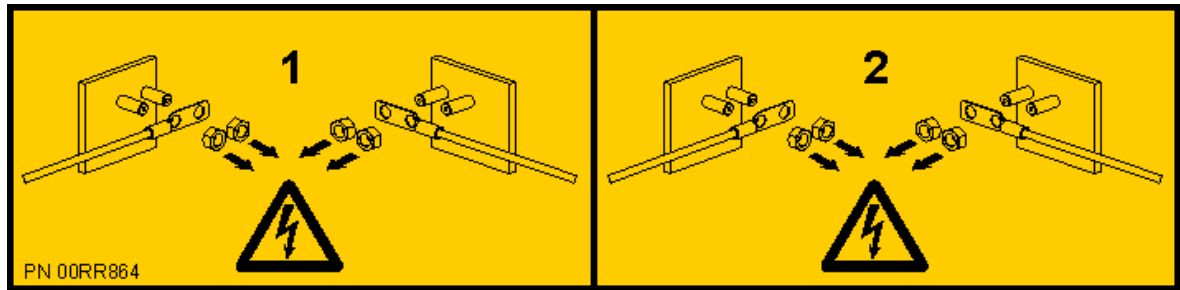


or



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)

- c) Continue with step [“10”](#) on page 22.
7. To prepare to remove an NVMe U.2 drive by using the AIX operating system, complete the following steps:
- a) Take the NVMe U.2 drive offline before you remove and replace an NVMe U.2 drive when the system power is turned on.
Before you take an NVMe U.2 drive offline, the devices that are attached to the adapter must be taken offline as well. This action must be done by a system administrator. Taking the NVMe U.2 drive offline prevents a service representative or user from causing an unexpected outage for other users of the system.
 - b) Before you hot-plug an NVMe U.2 drive for storage devices, ensure that the file systems on those devices are unmounted.
 - c) Ensure that any processes or applications that might use the drive are stopped.
 - d) To identify the failed NVMe U.2 drive, complete the following steps on the AIX console:

Note: The NVMe U.2 drives are based on PCI technology.

 - i) Log in as root user.
 - ii) At the command line, type `diag` and then press Enter.
 - iii) From the **Function Selection menu**, select **Task Selection > Hot Plug Task > PCI Hot Plug Manager > Unconfigure a Device**.
 - iv) Press **F4** (or **Esc +4**) to display the **Device Names** menu.
 - v) Select the NVMe U.2 drive that you’re removing in the **Device Names** menu.
 - vi) Choose from the following options:
 - If you are replacing the NVMe U.2 drive, use the Tab key to answer Yes to **Keep Definition**.
 - If you are permanently removing the NVMe U.2 drive, use the Tab key to answer No to **Keep Definition**.

Then, use the Tab key again to answer Yes to **Unconfigure Child Devices**, and then press Enter. Press Enter to confirm the operation. The OK message next to the **Command** field confirms a successful unconfiguration.
 - vii) Press **F3** (or **Esc +3**) twice to return to the **Hot Plug Manager** menu.
 - viii) Select **replace/remove PCI Hot Plug adapter** and then select the slot that contains the NVMe U.2 drive to be removed from the system and press Enter.
 - ix) Select **remove** and press Enter. The green light remains on and the amber LED for the slot that is identified flashes.
 - e) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.

- Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
- f) Press Enter on the console. The NVMe U.2 drive slot is placed in the **action** state and is ready to remove from the system. During the **action** state, the green LED turns off and the amber LED is flashing.
- Important:** Remove the drive when you're instructed to do so later in this procedure.
- g) Continue with step ["10" on page 22](#).
8. To prepare to remove an NVMe U.2 drive by using the IBM i operating system, complete the following steps:
- Note:** The NVMe U.2 drives are based on PCIe technology.
- a) To ensure that all of the namespaces in the NVMe device that are mirror protected disk units are suspended from mirrored protection, complete the following steps:
- i) Start the IBM i System Service Tools (STRSST), and specify the user name and password.
 - ii) On the System Service Tools (SST) display, select **Work with Disk Units > Work with disk configuration > Work with NVM Devices > Display NVM namespaces**.
 - iii) Locate the NVMe device that you are replacing by examining the Serial Number and Resource Name.
 - iv) Write down the ASP, Unit, and Resource Name of the disk units in the NVMe from the previous step. Ignore any disk units which have an asterisk (*) in the ASP and Unit fields; those disk units are not configured and do not belong to an ASP.
 - v) Press F3 to return to the **Work with Disk Units** menu.
 - vi) Select **Work with disk unit recovery > Suspend mirrored protection > Suspend mirrored protection**. All of the disk units that can be suspended from mirrored protection are shown.
 - vii) Type 1=Suspend in the option field for each disk unit in the list that you wrote down in step ["8.a.iv" on page 21](#).
- Note:** If any of the disk units in the list from step ["8.a.iv" on page 21](#) are not shown on the Suspend Mirrored Protection display, contact your next level of support. Do not remove an NVMe U.2 drive that is in use because it can cause an unexpected outage.
- b) To identify the location of the failed NVMe U.2 drive by using the IBM i operating system, complete the following steps:
- Note:** The NVMe U.2 drives are based on PCIe technology.
- i) Type `strsst` on the command line of the Main Menu and then press Enter.
 - ii) Type your service tools user ID and service tools password press Enter.
 - iii) Select **Hardware Service Manager > Packaging hardware resources (system, frames, cards)**.
 - iv) Type 9 (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the drive. Press Enter.
 - v) If you are installing a new NVMe U.2 drive, select the option to **Include empty positions**.
 - vi) Select **Concurrent Maintenance** on the drive position where you want to remove the drive, and then press Enter.
 - vii) Select the option to **Toggle LED blink off/on**. A light-emitting diode (LED) flashes identifying the slot that you selected. Physically verify that this slot is the correct slot where you want to remove the drive.
- c) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
- Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.

- Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
- d) To deactivate the Identify LED, complete the following steps:
- i) Select **Toggle LED blink off/on**.
 - ii) Select **Power off domain**. Wait for the **Hardware Resource Concurrent Maintenance** display to appear with this message: Power off complete.
- e) Continue with step “10” on page 22.
9. To prepare to remove an NVMe U.2 drive by using the Linux operating system, complete the following steps:
- a) Ensure that the system or logical partition is at the correct level of the operating system before you hot-plug an NVMe U.2 drive.
 - b) Verify that the Linux, hot-plug tools are installed.
For instructions, see [Verifying that the hot-plug tools are installed for Linux](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_linuxhotplugverify.htm) (http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_linuxhotplugverify.htm).
 - c) Ensure that you have the POWER® Linux Service Aids installed on your system.
These service aids enable system serviceability, as well to improve system management. If you are using a Linux distribution with Linux kernel version 2.6 or later, you can install the Service Aids that give you access to more capabilities, which can help you diagnose problems on your system. This software is available at the [Service and productivity tools for Linux on POWER website](http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html) (<http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html>).
 - d) Take the NVMe U.2 drive offline before you remove and replace an NVMe U.2 drive when the system power is turned on.
Before you take an NVMe U.2 drive offline, the devices that are attached to the adapter must be taken offline as well. This action must be done by a system administrator. Taking the NVMe U.2 drive offline prevents a service representative or user from causing an unexpected outage for other users of the system.
 - e) Before you hot-plug an NVMe U.2 drive for storage devices, ensure that the file systems on those devices are unmounted.
 - f) Activate the identify function. For instructions, see [Identifying a part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).
 - g) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
 - Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
 - h) To prepare the slot to remove an NVMe U.2 drive by using the Linux operating system, complete the following steps:
 - i) Type the following command:


```
drmgr -c pci -r -s locationcode
```

 Where `locationcode` is the location of the slot. For example, the location might be `U78D4.001.AAAXXX-P2-C1`.
 - ii) Follow the instructions on the display to complete the task.
10. Attach the electrostatic discharge (ESD) wrist strap.
- The ESD wrist strap must be connected to an unpainted metal surface until the service procedure is completed, and if applicable, until the service access cover is replaced.



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. If at any point in this service process you move away from the system, it is important to again discharge yourself by touching an unpainted metal surface for at least 5 seconds before you continue with the service process.

Removing an NVMe U.2 drive from the 9009-41G, 9009-42G, or 9223-42S system

To remove an NVMe U.2 drive from the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. To remove an NVMe U.2 drive from the system, complete the following steps:
 - a) Press the release latch **(A)** in the direction that is shown to release the drive handle **(B)**.

(L007)



CAUTION: A hot surface nearby. (L007)

- b) Support the bottom of the NVMe U.2 drive as you slide the drive out of the system, holding the drive by its sides.

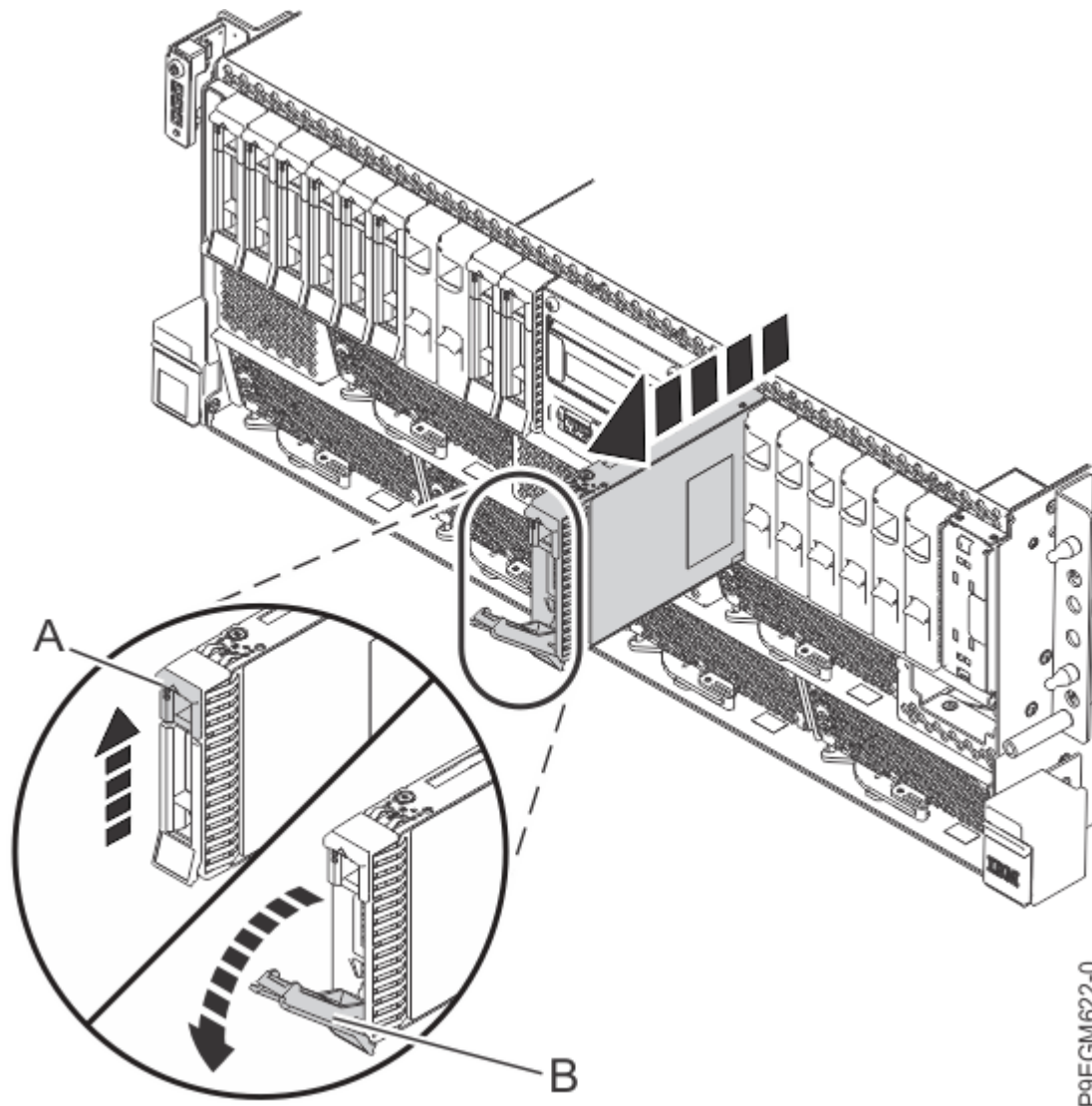


Figure 13. Removing an NVMe U.2 drive from the 9009-41G, 9009-42G, or 9223-42S system

3. Place the NVMe U.2 drive on an appropriate ESD surface.
4. If you are using the AIX operating system, after you remove the NVMe U.2 drive, return to the console and press Enter. Both the green and amber LED are turned off.
A message that the remove operation is complete is shown.

Replacing an NVMe U.2 drive in the 9009-41G, 9009-42G, or 9223-42S system

To replace an NVMe U.2 drive in the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Choose from the following options:
 - If you are using the AIX operating system to replace the NVMe U.2 drive when the system is powered on, continue with step “3” on page 25.
 - If you are using the IBM i operating system, continue with step “6” on page 25.

- If you are using the Linux operating system to replace the NVMe U.2 drive when the system is powered on, continue with step [“5” on page 25](#).
3. To prepare the slot to accept an NVMe U.2 drive by using the AIX operating system, complete the following steps on the console:

Note: The NVMe U.2 drives are based on PCI technology.

 - a) Select **Add a PCI Hot Plug adapter** from the **Hot Plug Manager** menu.
 - b) Select the slot from where you removed the NVMe drive and press Enter.
The green LED remains on and the amber LED flashes.
 - c) Press Enter again to put the slot into the **action** state so that the slot is ready to receive the drive.
During the **action** state, the green LED turns off and the amber LED is flashing.
 4. Continue with step [“6” on page 25](#).
 5. To prepare the slot to accept an NVMe U.2 drive by using the Linux operating system, complete the following steps:
 - a. Type the following command:

```
dimgr -c pci -a -s locationcode
```

Where *locationcode* is the location of the PCIe slot. For example, the location might be U78D4.001.AAAXXXX-P2-C1.
 - b. Press Enter. A fast-flashing amber LED at the rear of the system near the adapter indicates that the slot is identified.
 - c. Press Enter again. The NVMe U.2 drive slot is placed in the action state and is ready to receive the drive. During the action state, the green LED turns off and the amber LED is flashing.

Note: Install or replace the drive when you are instructed to do so later in this procedure.
 6. If necessary, remove the NVMe U.2 drive from the antistatic package.
 7. To install or replace an NVMe U.2 drive, complete the following steps:
 - a) With the NVMe U.2 drive handle in the open position, slide the NVMe U.2 drive into the slot until it is fully seated.
 - b) Close the drive handle **(A)** to lock the drive in place.

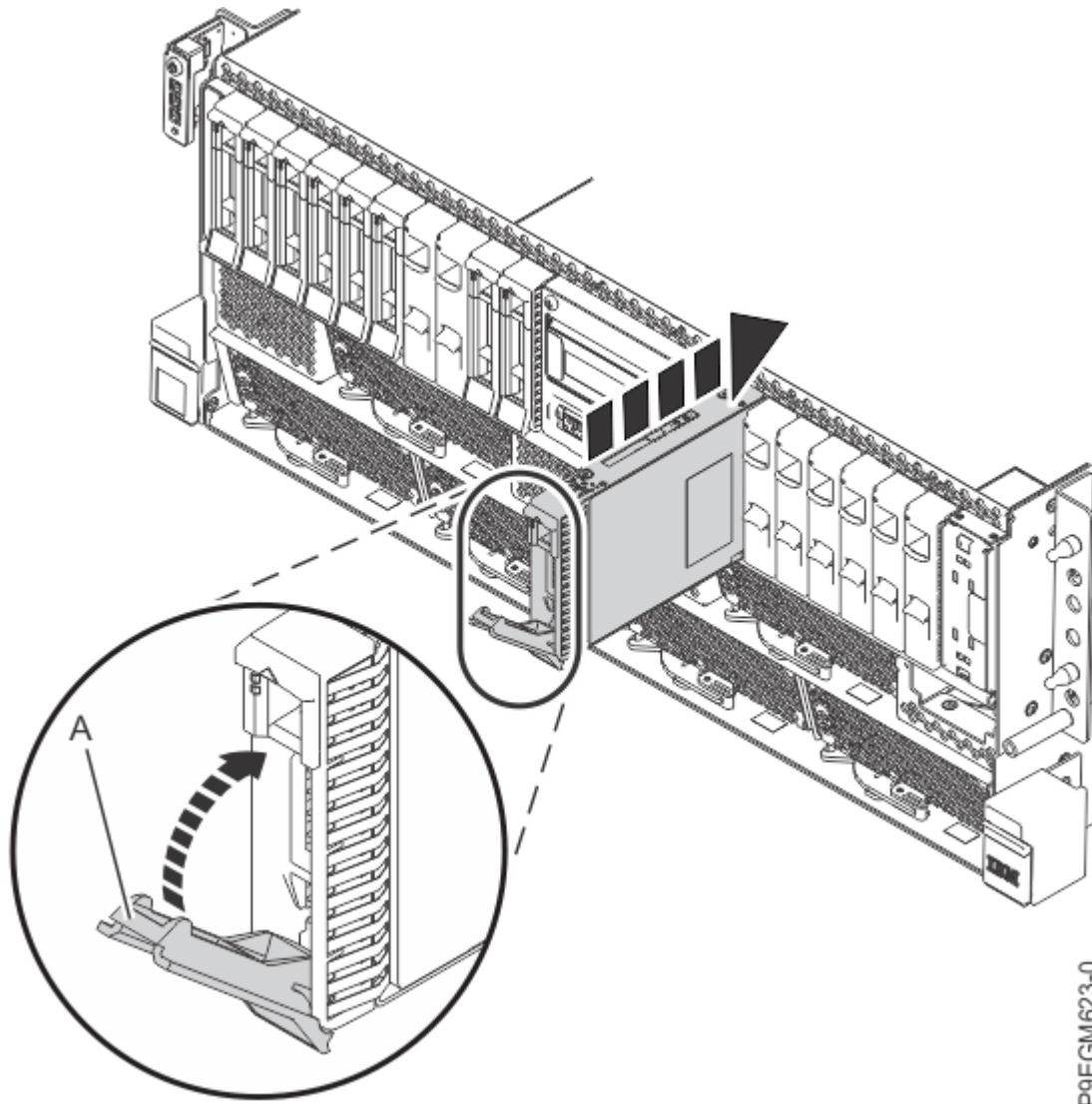


Figure 14. Installing or replacing an NVMe U.2 drive in the 9009-41G, 9009-42G, or 9223-42S system

Preparing the 9009-41G, 9009-42G, or 9223-42S system for operation after removing and replacing an NVMe U.2 drive

To prepare the system for operation after removing and replacing an NVMe U.2 drive, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Choose from the following options:
 - If the system power is turned off, continue with step “3” on page 26.
 - If you are using the AIX operating system, continue with step “5” on page 28.
 - If you are using the IBM i operating system, continue with step “8” on page 29.
 - If you are using the Linux operating system, continue with step “11” on page 29.
3. Using your labels, reconnect the power cords **(A)** to the system unit.

Fasten the power cords **(A)** to the system using the hook-and-loop fasteners **(B)** as shown in [Figure 15](#) on page 27 or [Figure 16](#) on page 28.

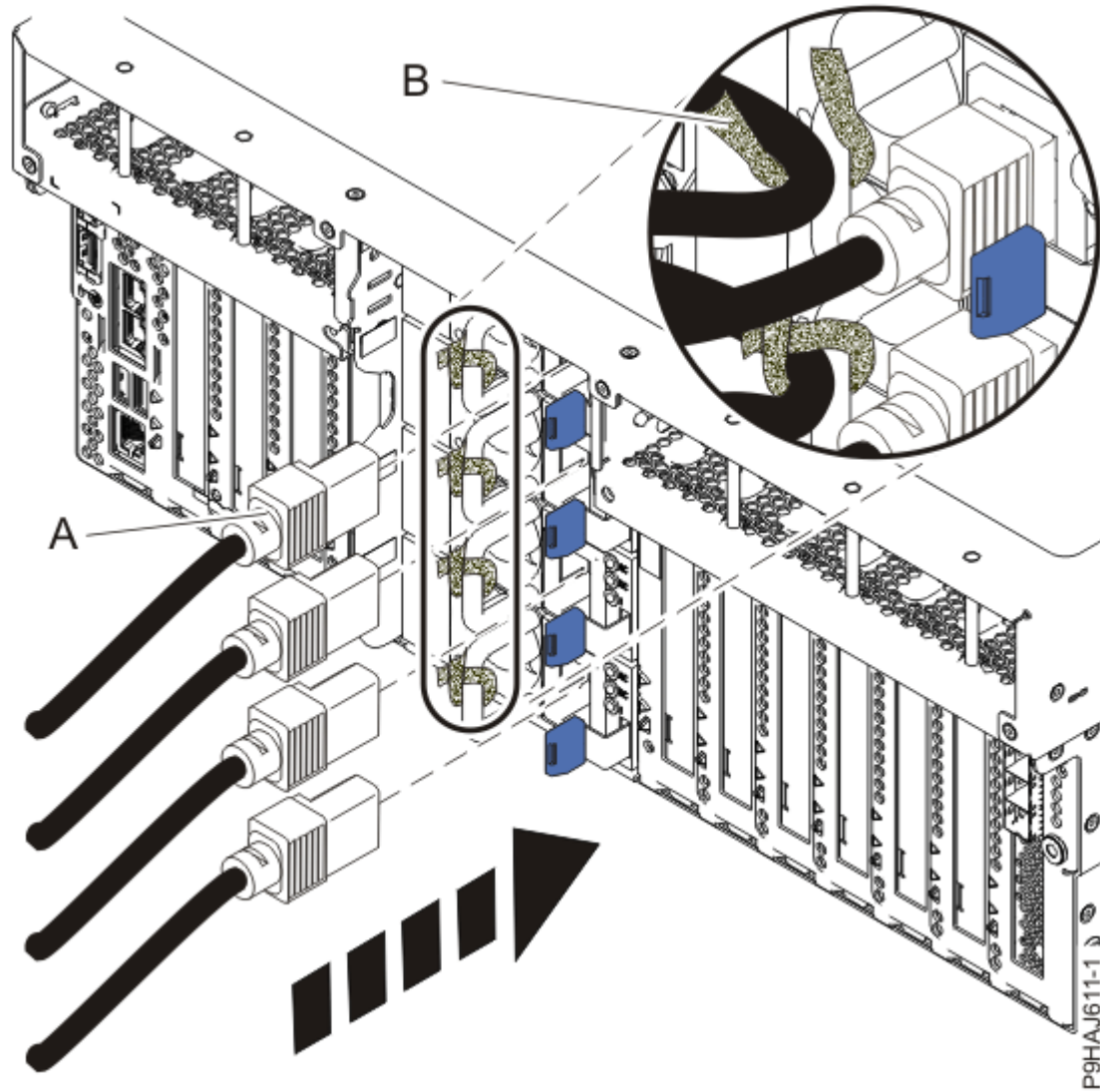


Figure 15. Connecting the power cords to a rack-mounted system

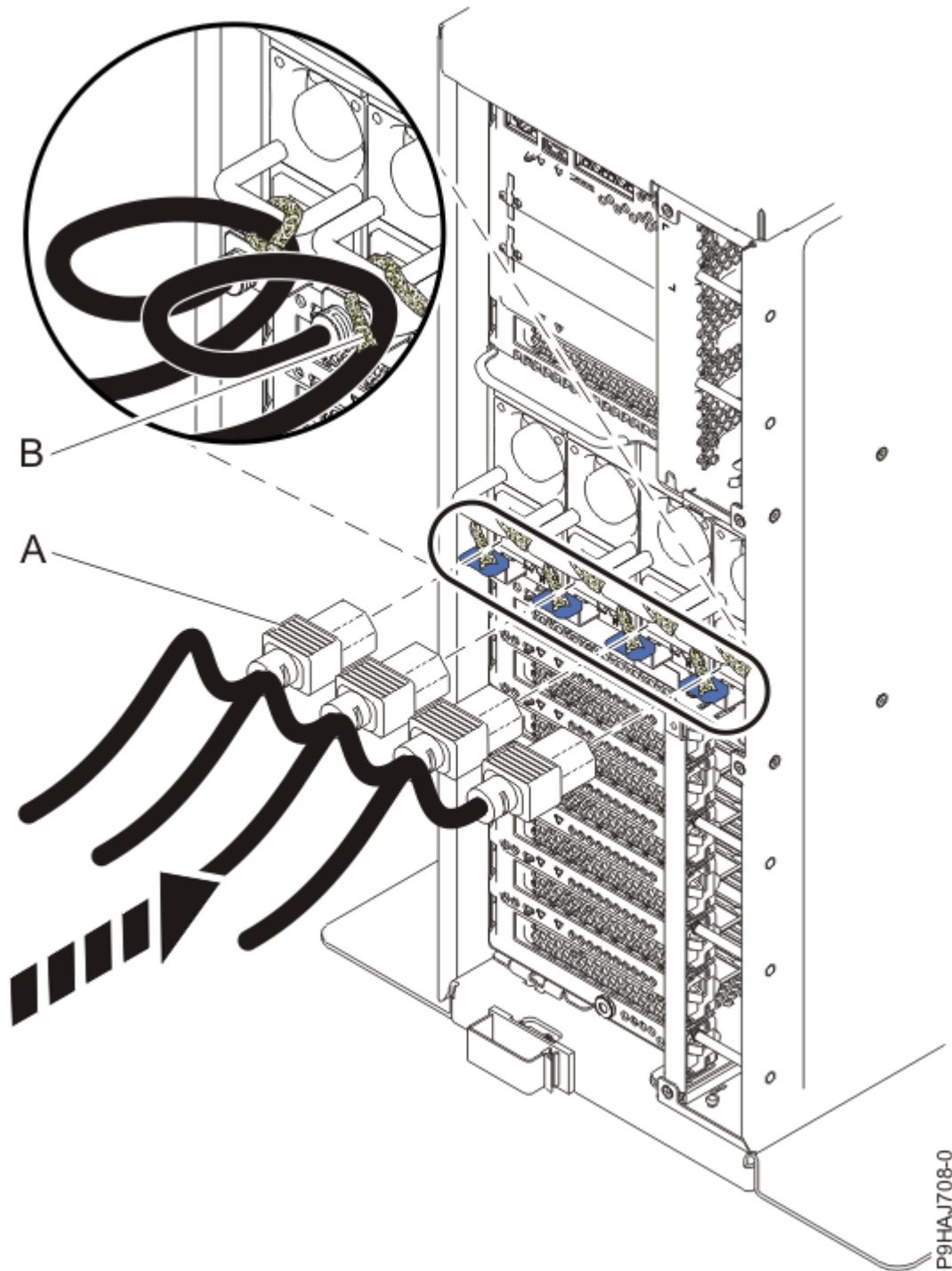


Figure 16. Connecting the power cords to a stand-alone system

4. If you installed an NVMe U.2 drive with the system power turned off, complete the following steps:
 - a) Start the system. For instructions, see [Starting a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm).
 - b) Continue with step “12” on page 30.
5. If you are using the AIX operating system, complete the following steps to configure the NVMe U.2 drive:
 - a) Press the F3 key to return to the Task Selection list.
 - b) Select **Log Repair Action**.
 - c) Select the resource that you replaced and select **Commit**.

- d) Press **F3** to return to **Task Selection List**.
 - e) Select **Hot Plug Task > PCI Hot Plug Manager > Configure a defined device**.
 - f) Select the device that is replaced from the list, and then press Enter. The device is now configured.
 - g) Press the **F10** key to exit the diagnostic program.
6. If you are using the AIX operating system, complete the following steps to verify the NVMe U.2 drive replacement:
- a. If the diagnostic menu is not displayed, type the **diag** command.
 - b. Select **Advance Diagnostic Routines > Problem Determination**.
 - c. Select the name of the resource that is replaced from the menu. If the resource replaced is not shown, choose the resource that is associated with it.
 - d. Press Enter, and then press **Commit**.
 - e. Did the Problem Determination identify any problems?
 - **No:** Continue to the next step.
 - **Yes:** A problem is identified.
 - If you are a customer, record the error information, and then contact your service provider.
 - If you are an authorized service provider, return to map 210-5.
 - f. Press the **F10** key to exit the diagnostic program.
7. Continue with step “12” on page 30.
8. If you are using the IBM i operating system, return to the **Hardware Resource Concurrent Maintenance** display and select **Power on domain**.
- The message Power on complete is shown.
9. Complete the following steps to prepare the NVMe U.2 drive for operation by using the IBM i operating system:
- a) Start the IBM i System Service Tools (STRSST), and specify the user name and password.
 - b) On the System Service Tools (SST) display, select **Work with disk units > Work with disk configuration > Work with NVM Devices > Delete existing NVM Namespaces**.
 - c) Select the device that you installed.
 - d) Choose from the following options:
 - If no namespaces are listed, press F12 to return to the SST main menu and continue with the next step.
 - If there are namespaces listed, complete the following steps:
 - i) Select **4=Delete Namespace** for each of the listed namespaces.
 - ii) Press F10 to confirm the deletion of the namespaces.
 - iii) Press F12 to return to the SST main menu.
 - e) On the System Service Tools (SST) display, select **Work with disk units > Work with disk configuration > Work with NVM Devices > Create NVMe namespaces to pair with Active mirror protected NVMe units**.
 - f) Select the device that you installed.
 - g) If there are no namespaces listed, contact your service provider.
 - h) Select option 1 to create a namespace for each disk unit listed. The units listed are the mirror protected units which have a status of Active and whose mirror pair has a Suspended status.
 - i) Press F10 to confirm your selections. The service function will create matching namespaces and resume mirrored protection on those newly created namespaces.
10. Continue with step “12” on page 30.
11. If you are using the Linux operating system, complete the following steps:

- a) In the Linux session on the console, press Enter after you install the NVMe U.2 drive to put the slot into the action state.
- b) Enter the slot information with the **lsslot** command, as shown in the following example.

For example, if the slot in which you installed the NVMe U.2 drive was U78D4.001.AAAXXXX-P2-C1, enter the following command:

```
lsslot -c pci -s U78D4.001.AAAXXXX-P2-C1
```

The following screen is an example of the information that is displayed by this command:

```
# Slot                Description                Device(s)
U78D4.001.AAAXXXX-P2-C1 PCI-X capable, 64 bit, 133MHz slot 0001:40:01.0
```

12. Verify the installed part.

- If you replaced the part because of a service action, verify the installed part. For instructions, see [Verifying a repair](http://www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm).
- If you installed the part for any other reason, verify the installed part. For instructions, see [Verifying the installed part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm).

13. Turn off the identify LED. For instructions, see [Deactivating an identify LED](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm).

Permanently removing an NVMe U.2 drive from the 9009-41G, 9009-42G, or 9223-42S system

Find information about permanently removing an NVMe U.2 drive from the IBM Power System S914 (9009-41G), IBM Power System S924 (9009-42G), or IBM Power System H924S (9223-42S) server.

About this task

Note: Installing this feature is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you. You might be charged a fee by the service provider for this service.

If your system is managed by the Hardware Management Console (HMC), use the HMC to repair a part in the system. For instructions, see [Repairing a part by using the HMC](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm).

If you do not have an HMC, complete the steps in the following procedures to permanently remove an NVMe U.2 drive.

Preparing the 9009-41G, 9009-42G, or 9223-42S system to permanently remove an NVMe U.2 drive

To prepare the system to permanently remove an NVMe U.2 drive, complete the steps in this procedure.

Procedure

1. Activate the identify function. For instructions, see [Identifying a part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).
2. Physically verify that the slot you identified is where you want to permanently remove the NVMe U.2 drive.
3. To prepare the system to permanently remove an NVMe U.2 drive when the system is powered off, complete the following steps:
 - a) Activate the identify function. For instructions, see [Identifying a part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).

- b) Physically verify that the slot you identified is where you want to install or replace the NVMe U.2 drive.
 - Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
 - Look for a flashing amber LED, which identifies the slot that was selected by using the identify function.
 - c) Stop the system. For instructions, see [Stopping a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm).
4. If you powered the system off, complete the following steps:
- a) If applicable, open the rack door at the rear of the system.
 - b) Label and disconnect the power cords from the system unit.
See [Figure 17 on page 32](#) or [Figure 18 on page 33](#).

Notes:

- This system might be equipped with two or more power supplies. If the removing and replacing procedures require the system power to be turned off, ensure that all the power sources to the system are disconnected.
- The power cord **(B)** is fastened to the system with hook-and-loop fastener **(A)**. If you are placing the system in a service position after you disconnect the power cords, ensure that you unstrap the fastener.

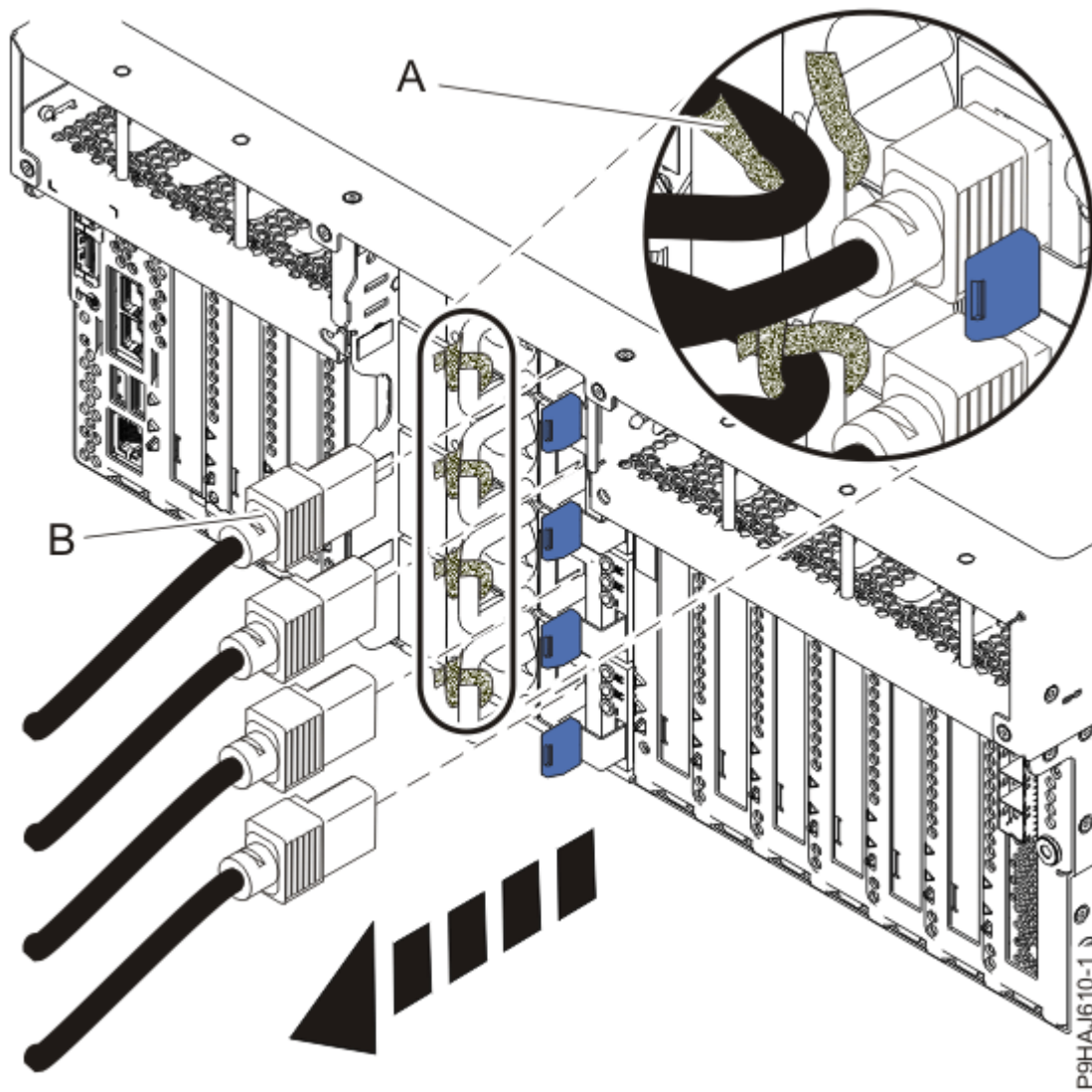


Figure 17. Removing the power cords from a rack-mounted server

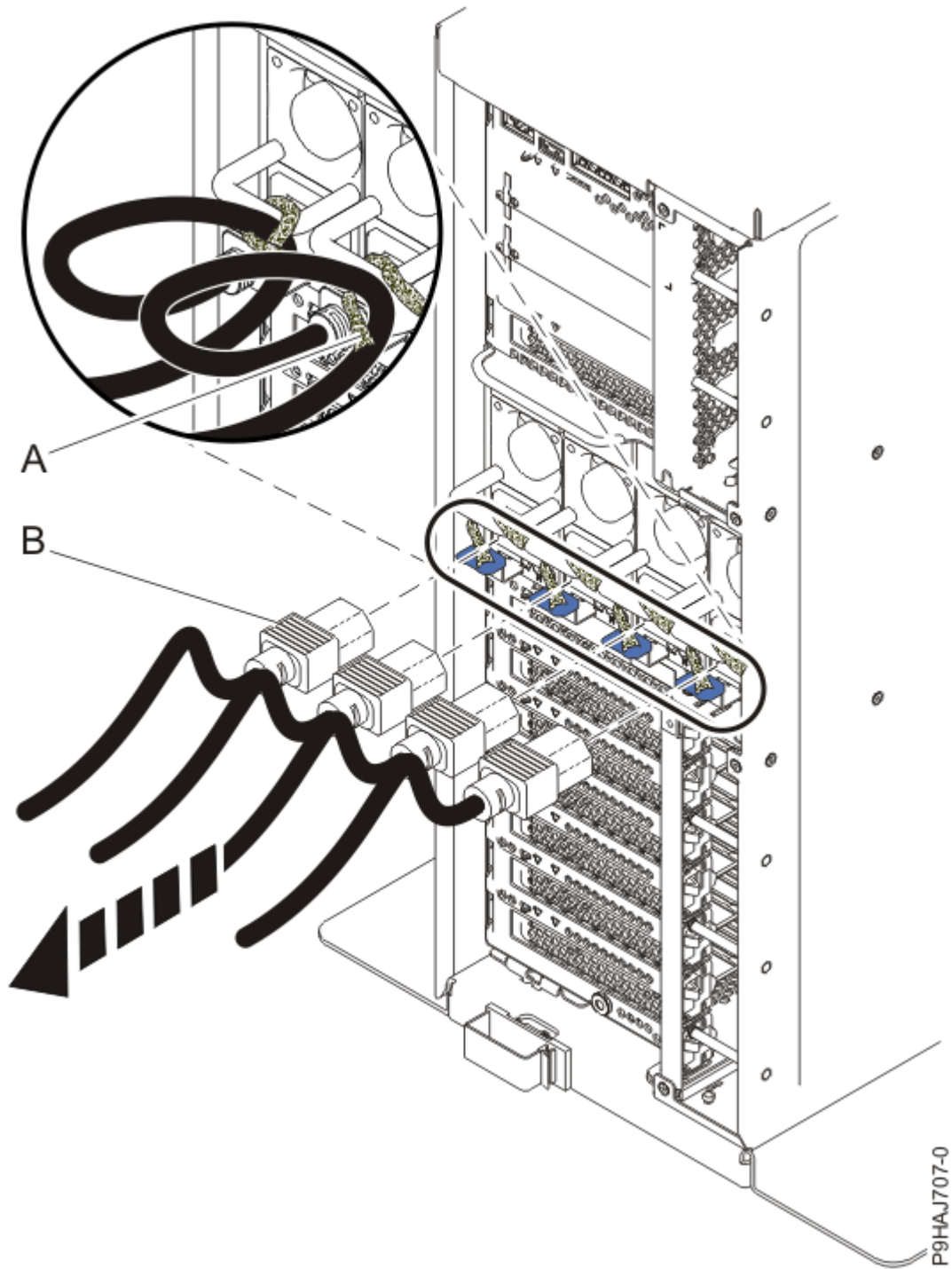
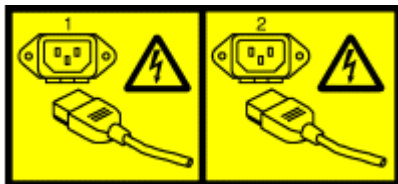


Figure 18. Removing the power cords from a stand-alone server

(L003)



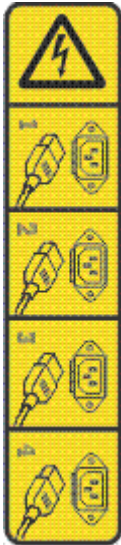
or



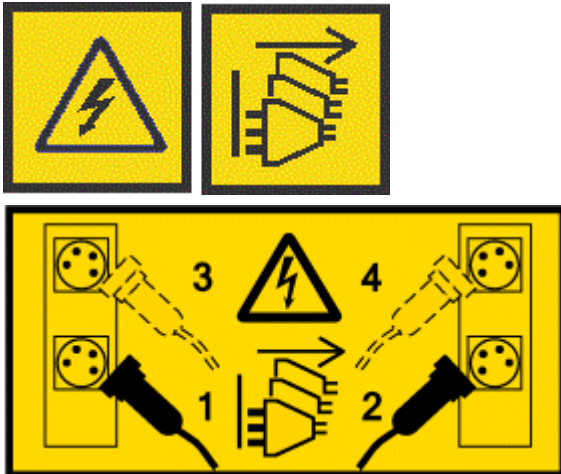
or

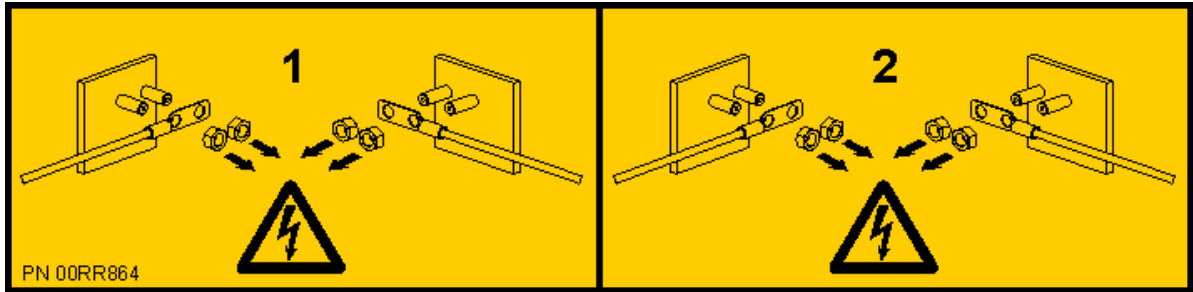


or



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)

5. Attach the electrostatic discharge (ESD) wrist strap.

The ESD wrist strap must be connected to an unpainted metal surface until the service procedure is completed, and if applicable, until the service access cover is replaced.



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. If at any point in this service process you move away from the system, it is important to again discharge yourself by touching an unpainted metal surface for at least 5 seconds before you continue with the service process.

Permanently removing an NVMe U.2 drive from the 9009-41G, 9009-42G, or 9223-42S system

To permanently remove an NVMe U.2 drive from the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. To remove an NVMe U.2 drive from the system, complete the following steps:
 - a) Press the release latch **(A)** in the direction that is shown to release the drive handle **(B)**.

(L007)



CAUTION: A hot surface nearby. (L007)

- b) Support the bottom of the NVMe U.2 drive as you slide the drive out of the system, holding the drive by its sides.

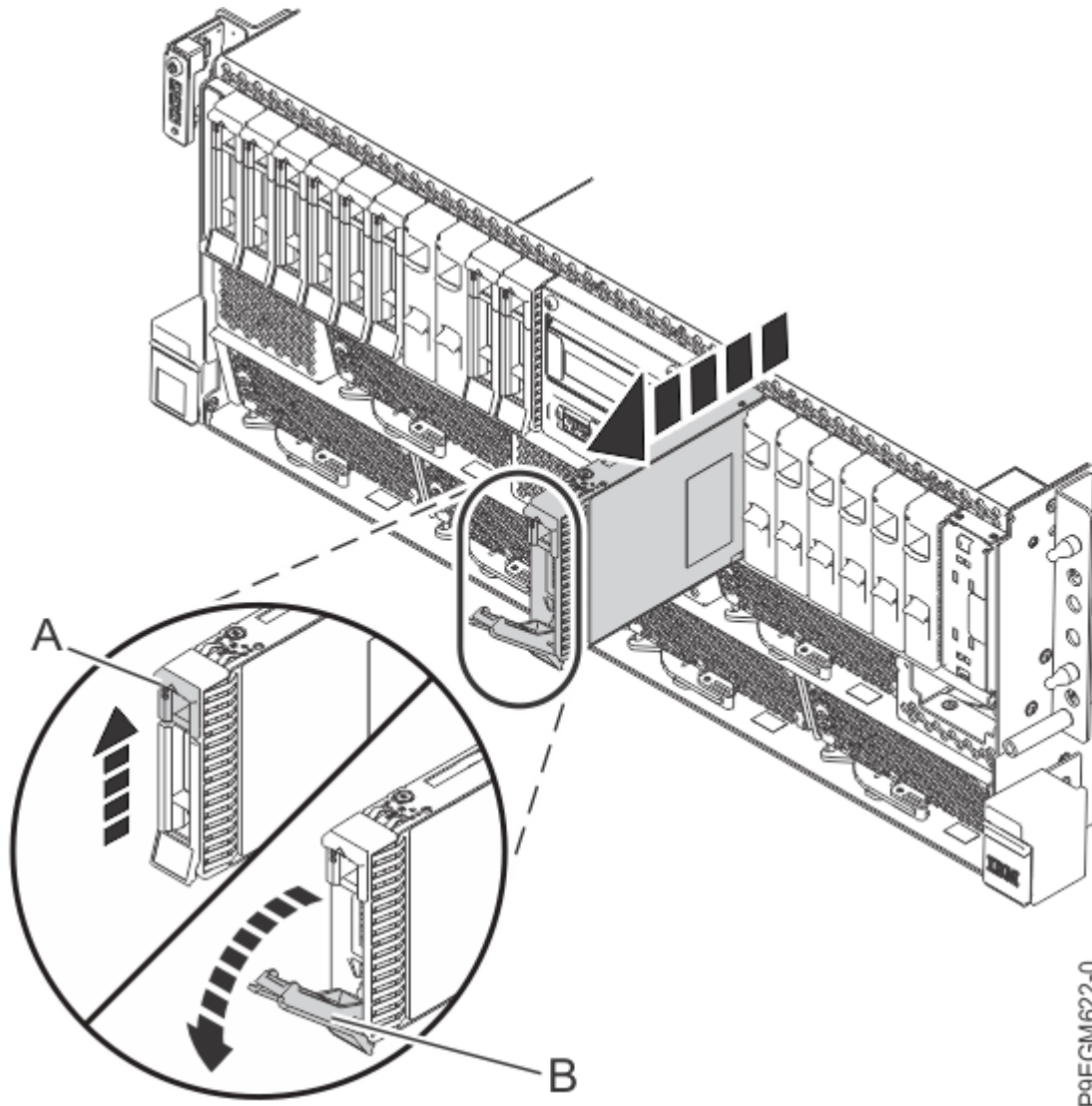


Figure 19. Removing an NVMe U.2 drive from the 9009-41G, 9009-42G, or 9223-42S system

3. Place the NVMe U.2 drive on an appropriate ESD surface.
4. To ensure proper airflow, you must install a NVMe drive filler.
 - a) With the NVMe drive filler handle **(A)** in the open position, slide the filler into the slot until it is fully seated.
 - b) Close the filler handle until the handle locks in place.

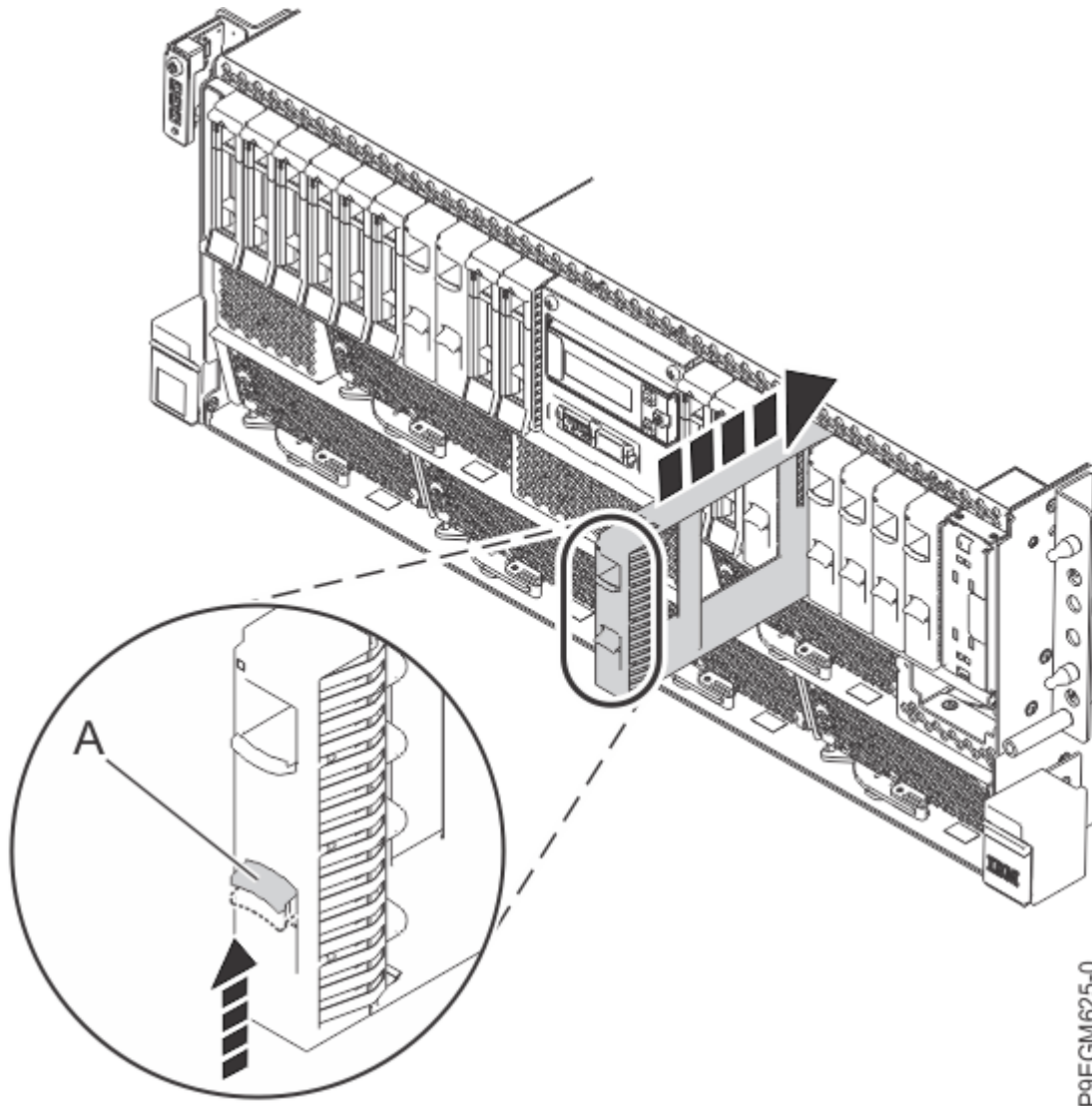


Figure 20. Installing an NVMe drive filler in the 9009-41G, 9009-42G, or 9223-42S system

Preparing the 9009-41G, 9009-42G, or 9223-42S system for operation after permanently removing an NVMe U.2 drive

To prepare the system for operation after permanently removing an NVMe U.2 drive, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Using your labels, reconnect the power cords **(A)** to the system unit.

Fasten the power cords **(A)** to the system using the hook-and-loop fasteners **(B)** as shown in [Figure 21](#) on page 38 or [Figure 22](#) on page 39.

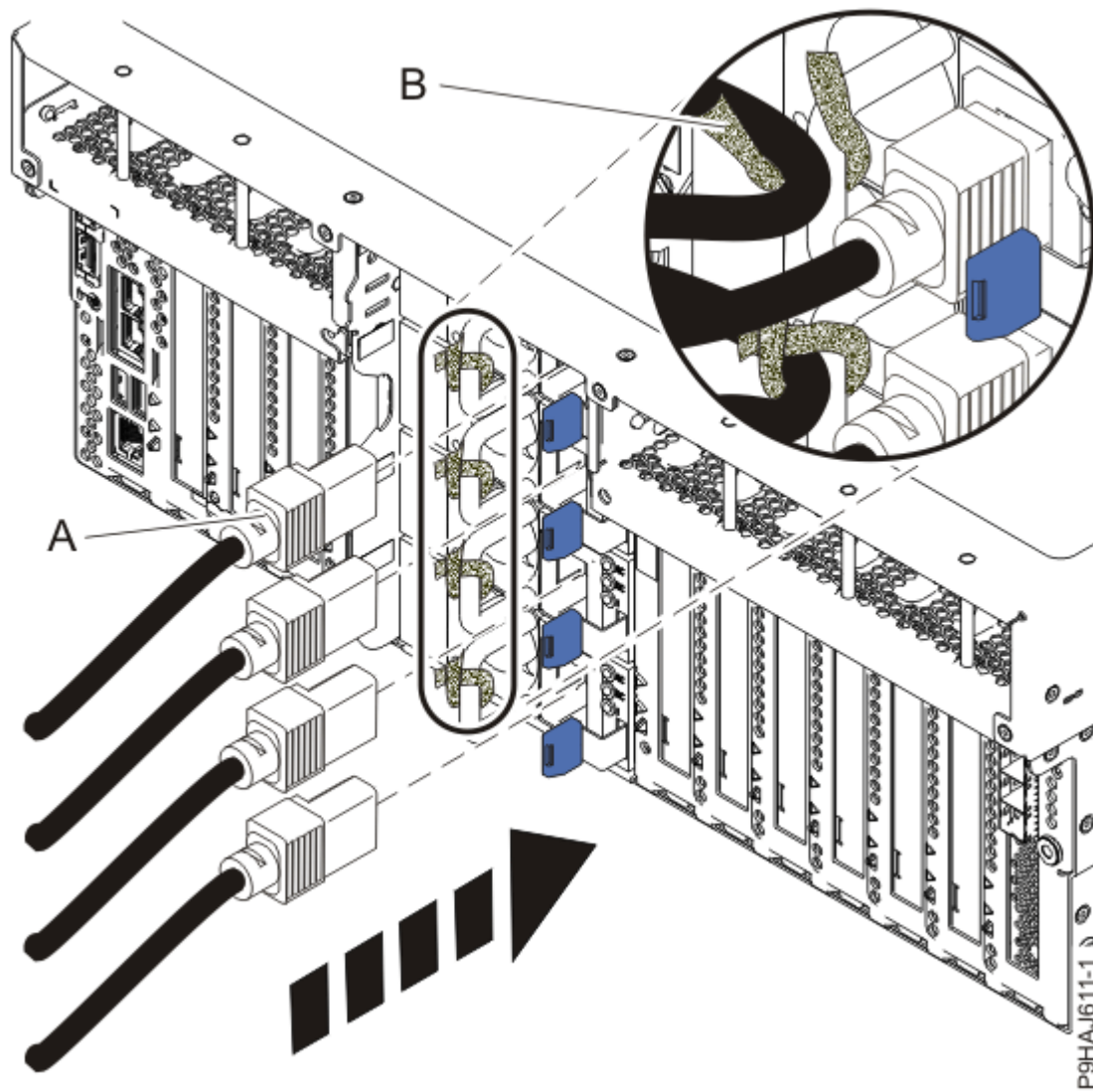


Figure 21. Connecting the power cords to a rack-mounted system

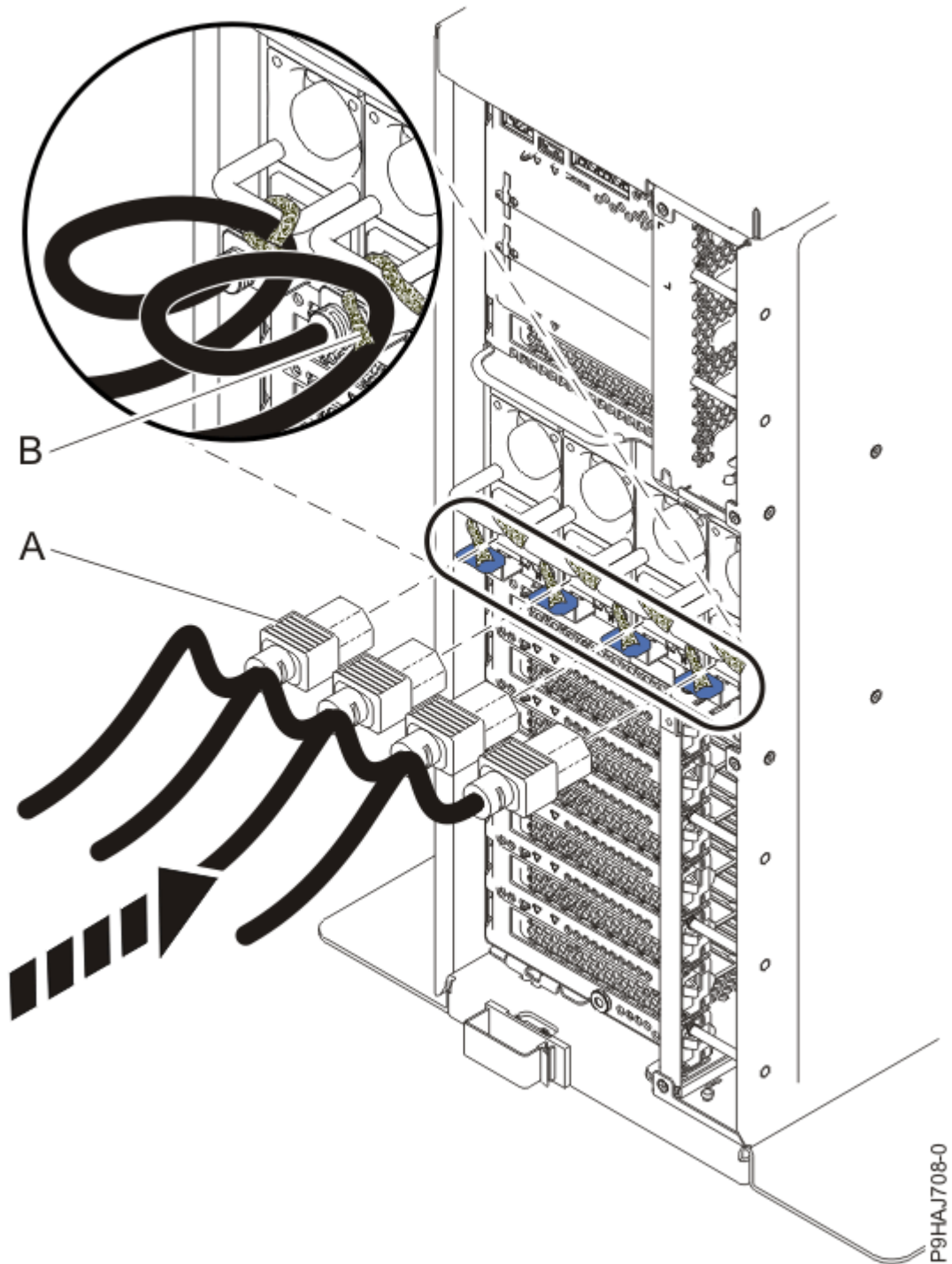


Figure 22. Connecting the power cords to a stand-alone system

3. Start the system. For instructions, see [Starting a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm).
4. Turn off the identify LED. For instructions, see [Deactivating an identify LED](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm).

Related procedures for installing, removing, and replacing NVMe devices

About this task

Find procedures that are related to installing, removing, and replacing NVMe devices.

Checking the amount of remaining life in NVMe devices

Learn how to use operating system commands to find the amount of remaining life in an NVMe device.

The AIX, IBM i, and Linux operating systems have commands that you can use to determine the amount of life that is remaining in an NVMe device.

For more information, see the following procedures:

- [Running the AIX command to check the amount of remaining life in NVMe devices](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_aix.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_aix.htm)
- [Running the IBM i command to check the amount of remaining life in NVMe devices](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_ibmi.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_ibmi.htm)
- [Running the Linux command to check the amount of remaining life in NVMe devices](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_linux.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_linux.htm)

Related information

[“Removing an operational NVMe device from an IBM i logical partition” on page 40](#)

Learn how to remove an operational NVMe device from an IBM i logical partition.

Removing an operational NVMe device from an IBM i logical partition

Learn how to remove an operational NVMe device from an IBM i logical partition.

The IBM i operating system provides commands that you can use to remove an operational NVMe device.

For details, see [Removing an operational NVMe device from a partition](#) in the IBM i Knowledge Center.

Note: To navigate to the page in the IBM i 7.4 Knowledge Center, select **Systems management > Disk management > Disk management checklist > Removing an operational NVMe device from a partition**.

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Tel: 914-499-1900

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IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 (0) 800 225 5426
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This statement applies to 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

Japan Voluntary Control Council for Interference (VCCI) Notice

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

Korea Notice

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

People's Republic of China Notice

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。

Russia Notice

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

Taiwan Notice

警告使用者：

此為甲類資訊技術設備，
於居住環境中使用時，可
能會造成射頻擾動，在此
種情況下，使用者會被要
求採取某些適當的對策。

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

United States Federal Communications Commission (FCC) Notice

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. Proper cables and connectors are available from IBM-authorized dealers. 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.

Responsible Party:
International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Contact for FCC compliance information only: fccinfo@us.ibm.com

Class B Notices

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

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

Canada Notice

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

European Community and Morocco Notice

This product is in conformity with the protection requirements of Directive 2014/30/EU of the European Parliament and of the Council on the harmonization 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.

German Notice

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-Mitgliedsstaaten und 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 55032 Klasse B

Japan Electronics and Information Technology Industries Association (JEITA) Notice

(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 applies to 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 applies to 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 applies to 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

Japan Voluntary Control Council for Interference (VCCI) Notice

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

Taiwan Notice

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

United States Federal Communications Commission (FCC) Notice

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 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.

Responsible Party:

International Business Machines Corporation
New Orchard Road
Armonk, New York 10504
Contact for FCC compliance information only: fccinfo@us.ibm.com

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