

Power Systems

*Adapters for the 9009-41A, 9009-41G,
9009-42A, 9009-42G, 9223-42H, 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 105](#), 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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Contents

- Safety notices.....V**

- Installing, removing, and replacing adapters..... 1**
 - Installing an adapter..... 1
 - Preparing the system..... 1
 - Installing an adapter..... 18
 - Preparing the system for operation..... 20
 - Removing and replacing an adapter..... 29
 - Preparing the system..... 29
 - Removing an adapter..... 48
 - Replacing an adapter..... 50
 - Preparing the system for operation..... 53
 - Permanently removing an adapter..... 62
 - Preparing the system..... 63
 - Permanently removing an adapter..... 74
 - Preparing the system for operation..... 78
 - Related procedures for installing and removing adapters..... 85
 - Avoiding electric shock..... 85
 - Handling static-sensitive devices..... 86
 - Updating the worldwide port name..... 87
 - Removing and replacing the tailstock on an adapter 87
 - Hot-plug manager access for AIX..... 92
 - Installing the AIX device driver software..... 95
 - Installing or replacing an adapter with the system power turned on in a Virtual I/O Server..... 96
 - Verifying that the hot-plug adapter tools are installed for the Linux operating system..... 99
 - Checking the amount of remaining life in NVMe devices..... 100

- Notices..... 105**
 - Accessibility features for IBM Power Systems servers..... 106
 - Privacy policy considerations 107
 - Trademarks..... 107
 - Electronic emission notices..... 107
 - Class A Notices..... 107
 - Class B Notices..... 111
 - Terms and conditions..... 113

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)



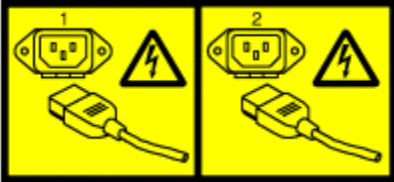
DANGER: Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack-mounted devices and do not use them to stabilize your body position (for example, when working from a ladder). Stability hazard:

- 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

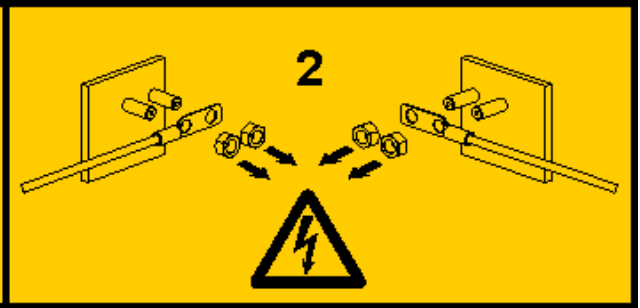
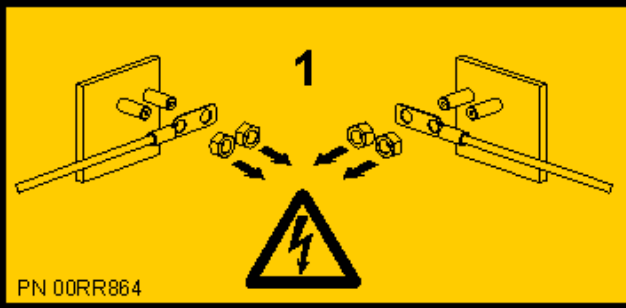


or



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.

Installing, removing, and replacing adapters

Find information about installing, removing, and replacing adapters for the IBM Power® System S914 (9009-41A and 9009-41G), IBM Power System S924 (9009-42A and 9009-42G), IBM Power System H924 (9223-42H), or IBM Power System H924S (9223-42S) server.

Installing an adapter in the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system

Find information about installing an adapter in the IBM Power System S914 (9009-41A and 9009-41G), IBM Power System S924 (9009-42A and 9009-42G), IBM Power System H924 (9223-42H), 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 complete the steps for installing an adapter in the system. For instructions, see [Installing a part by using the HMC](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/hmcinstall.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/hmcinstall.htm).

If your system is not managed by an HMC, complete the steps in the following procedures to install an adapter in the system.

Preparing the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system to install an adapter

To prepare the system to install an adapter, complete the steps in this procedure.

Before you begin

Note: If you are installing a PCIe3 cable adapter to attach your server to an EMX0 PCIe3 expansion drawer, you must ensure that you have the correct PCIe3 cable adapter and expansion drawer cable that works with the PCIe3 6-slot fanout module that you have in your EMX0 PCIe3 expansion drawer.

- If you have a CCIN **50CB** PCIe3 6-slot fanout module:
 - You must use one of the following PCIe3 cable adapters:
 - FC EJ08 (CCIN 2CE2)
 - FC EJ07 (CCIN 6B52)
 - FC EJ05 (CCIN 2B1C)
 - You must use one of the following expansion drawer cables: FC ECC6, FC ECC7, FC ECC8, FC ECC9, FC ECCR, FC ECCS, FC ECCX, FC ECCY, or FC ECCZ.
- If you have a CCIN **50CD** PCIe3 6-slot fanout module:
 - You must install one of the following PCIe3 cable adapters:
 - FC EJ19 (CCIN 6B53)
 - FC EJ1R (CCIN 58FF)
 - FC EJ20 (CCIN 2CF5)
 - You must use one of the following expansion drawer cables: FC ECCR, FC ECCS, FC ECCX, FC ECCY, or FC ECCZ.

Important: You need to work with the system administrator to prepare the adapter slot to receive the adapter. If this process exceeds the 10-minute service limitation with the system access cover removed, place the service access cover back on the system before working with the system administrator to maintain proper system cooling.

Procedure

1. If you are installing a PCIe3 cable adapter with the system power turned on, you must install the PCIe3 cable adapter by using the HMC. Otherwise, you must install the PCIe3 cable adapter with the system power turned off.
2. Ensure that the required software is installed to support the new feature. See the [Power Systems Prerequisites](#) website.

Important: If you are installing a PCIe3 cable adapter and want to connect an EMX0 PCIe3 expansion drawer via the HMC, you must have the HMC driver 9.1.921.0 or later installed.

3. Take appropriate precautions for avoiding electric shock and for handling static-sensitive devices. For more information, see [“Avoiding electric shock”](#) on page 85 and [“Handling static-sensitive devices”](#) on page 86.
4. If you are installing a PCIe3 cable adapter, ensure that the target slot is Unassigned in the I/O properties field for the managed server you are working on.
5. If applicable, open the rack door at the rear of the system.
6. Review the locations of the adapter slots and the light-emitting diode (LED) for the empty slot where you want to install the adapter. The adapters are viewed at the rear of the system.

[Figure 1](#) on page 3 and [Figure 2](#) on page 4 show the locations of the adapters in a system and the locations of the light-emitting diodes (LEDs) for the adapters.

The number of adapter slots that are available in the system depends on the number of system processors in the system. For the adapter placement information in this system, see [Adapter placement rules and slot priorities for the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S](#).

The adapter has two LEDs that indicate the status:

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

The status of the LEDs are as follows:

- **(B)** Indicates that the adapter is operating correctly. The green power LED (top LED) is lit solid and the amber fault LED (bottom LED) is off.
- **(C)** Indicates that the adapter is not operating correctly. The green power LED (top LED) is lit solid and the amber fault LED (bottom LED) is lit solid.
- **(D)** Indicates the faulty or failed adapter was selected by using the identify function. The green power LED (top LED) might or might not be lit and the amber fault LED (bottom LED) is flashing.

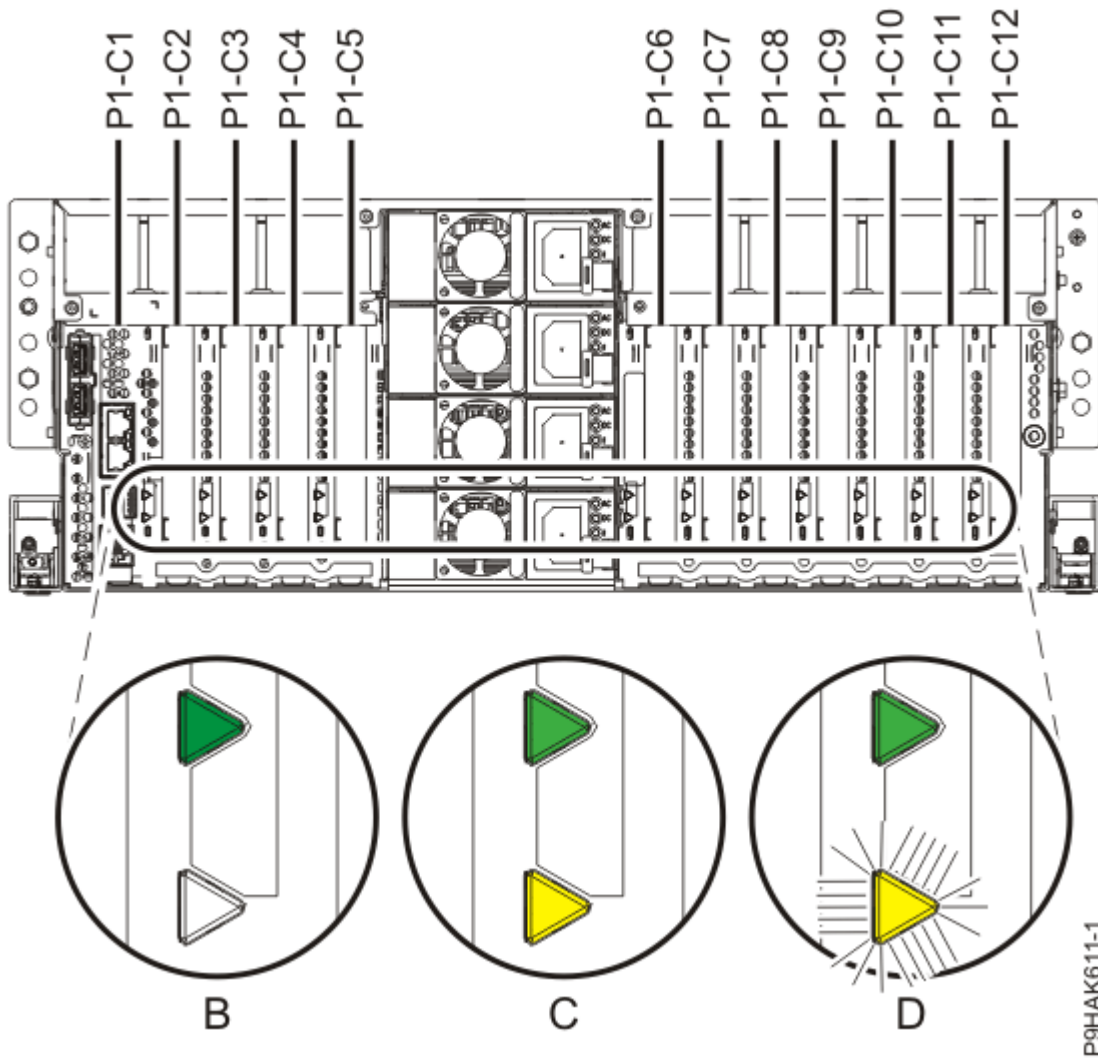


Figure 1. Adapter slot locations and locations of the LEDs in a rack-mounted 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, and 9223-42S system

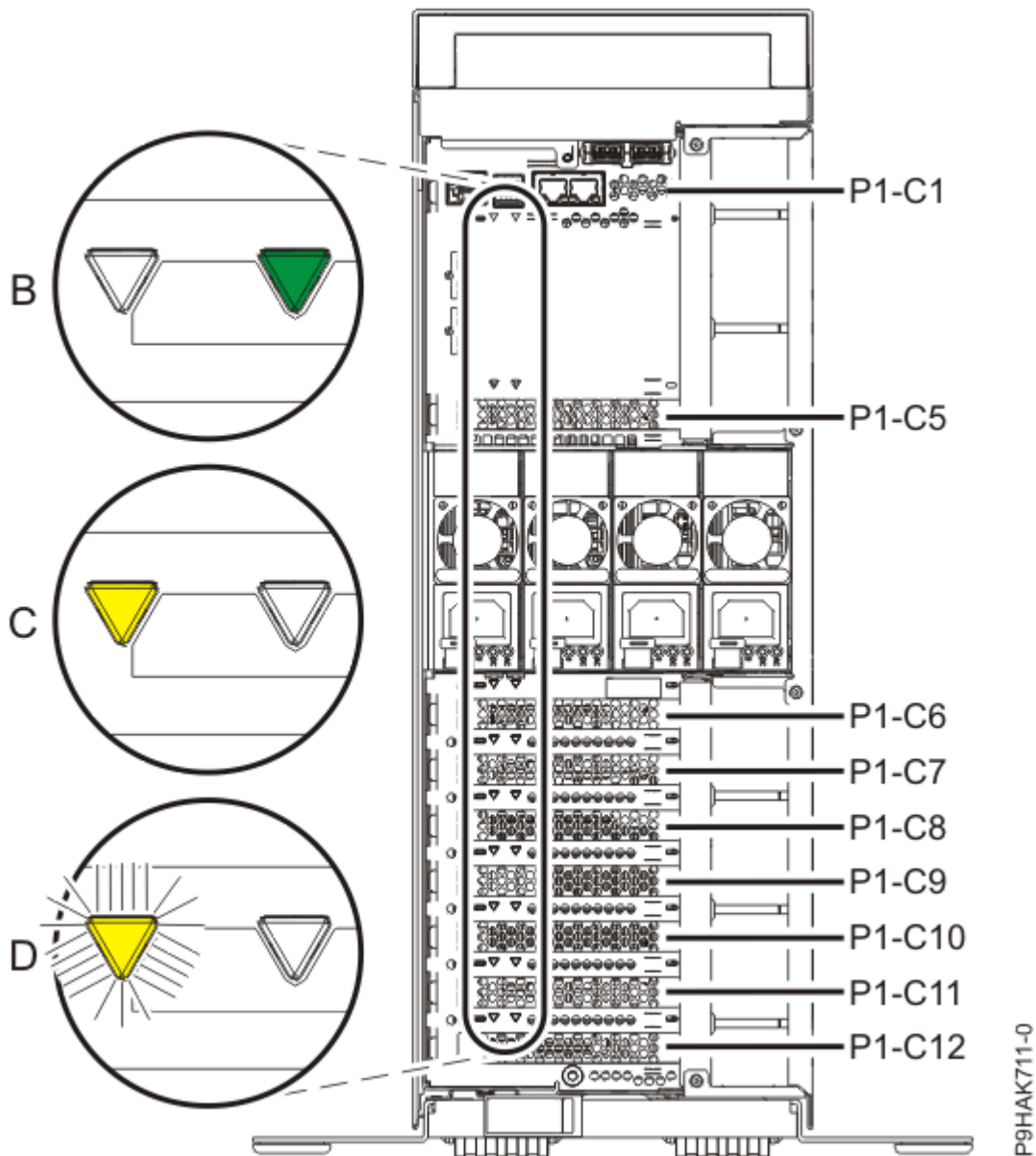


Figure 2. Adapter slot locations and locations of the LEDs in a stand-alone system.

7. Choose from the following options:

- If you want to install an adapter when the system power is turned off, continue with step “8” on page 4.
- If the system power is turned on and if the AIX® operating system controls the slot, continue with step “10” on page 9.
- If the system power is turned on and if the IBM i operating system controls the slot, continue with step “11” on page 10.
- If the system power is turned on and if the Linux® operating system controls the slot, continue with step “12” on page 12.

8. To prepare the system to install an adapter 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) If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:

- i) Release the mounting bracket from the cable management arm assembly by pressing the indentation (**A**) on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

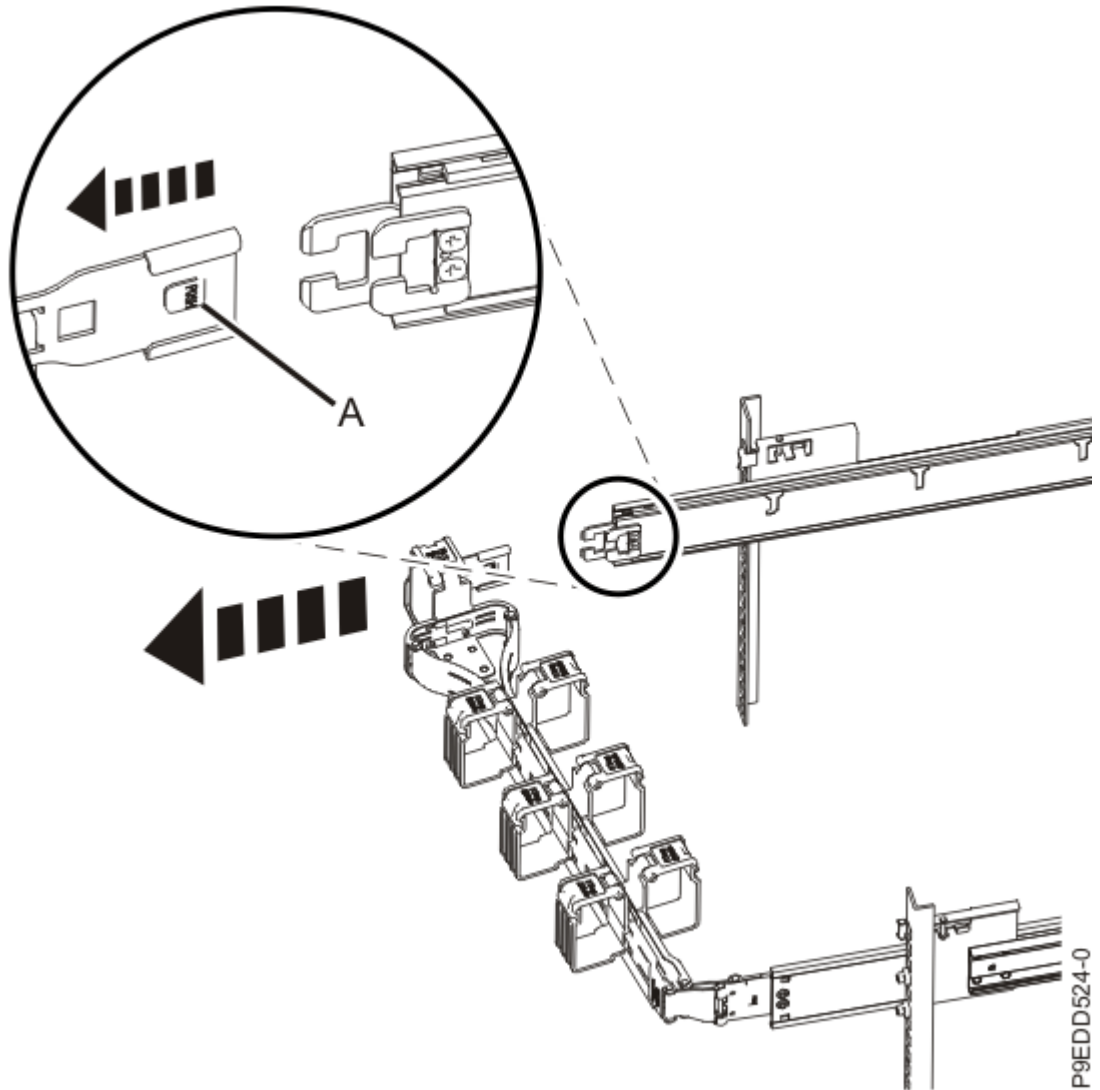


Figure 3. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- c) Physically verify that the slot you identified is where you want to install the adapter.
- 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 unoccupied slot that was selected by using the identify function.
- d) 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).
9. If you powered the system off, complete the following steps:
- a) Label and disconnect the power cords from the system unit.

See Figure 4 on page 6 or Figure 5 on page 7.

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.

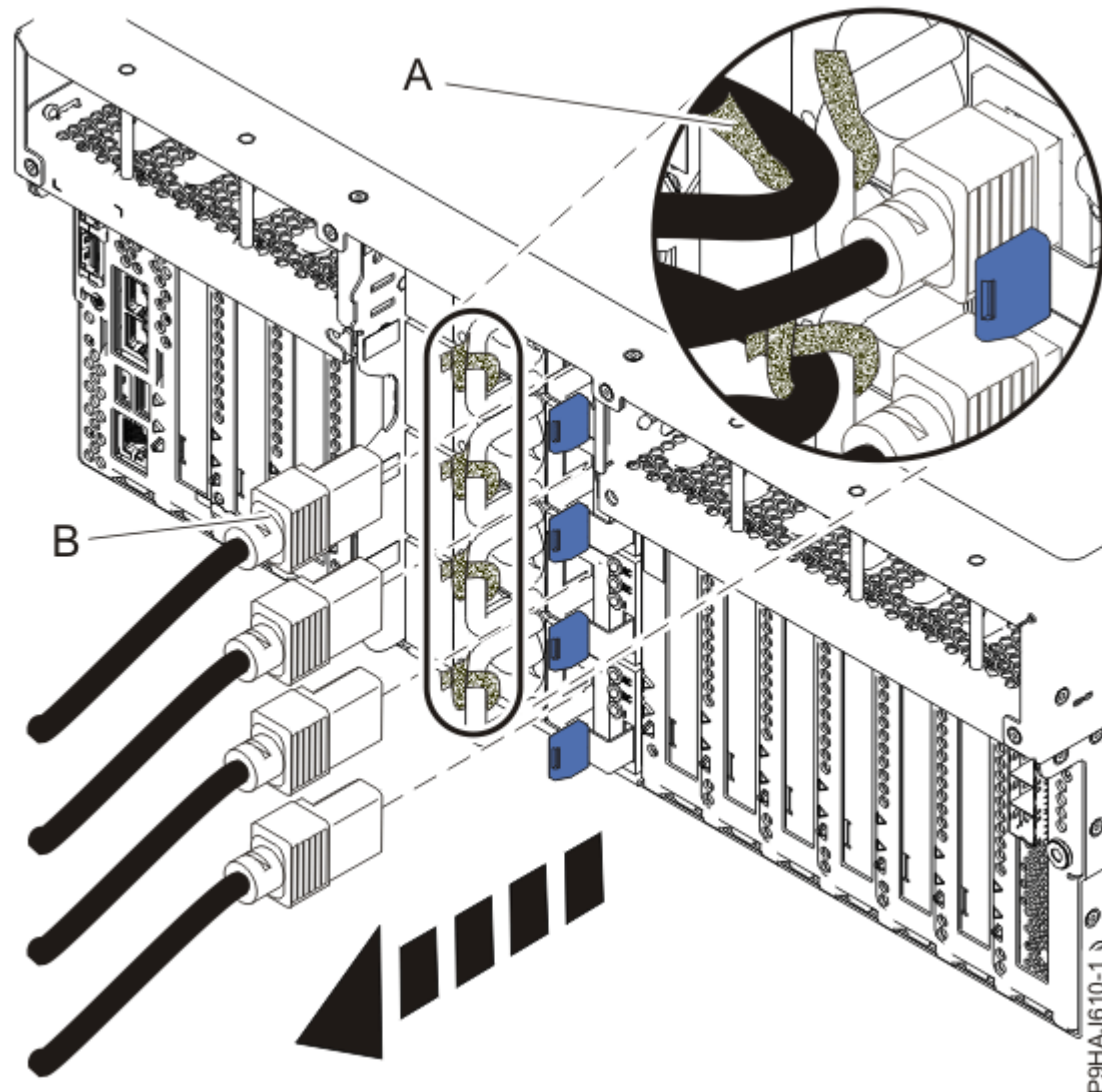


Figure 4. Removing the power cords from a rack-mounted server

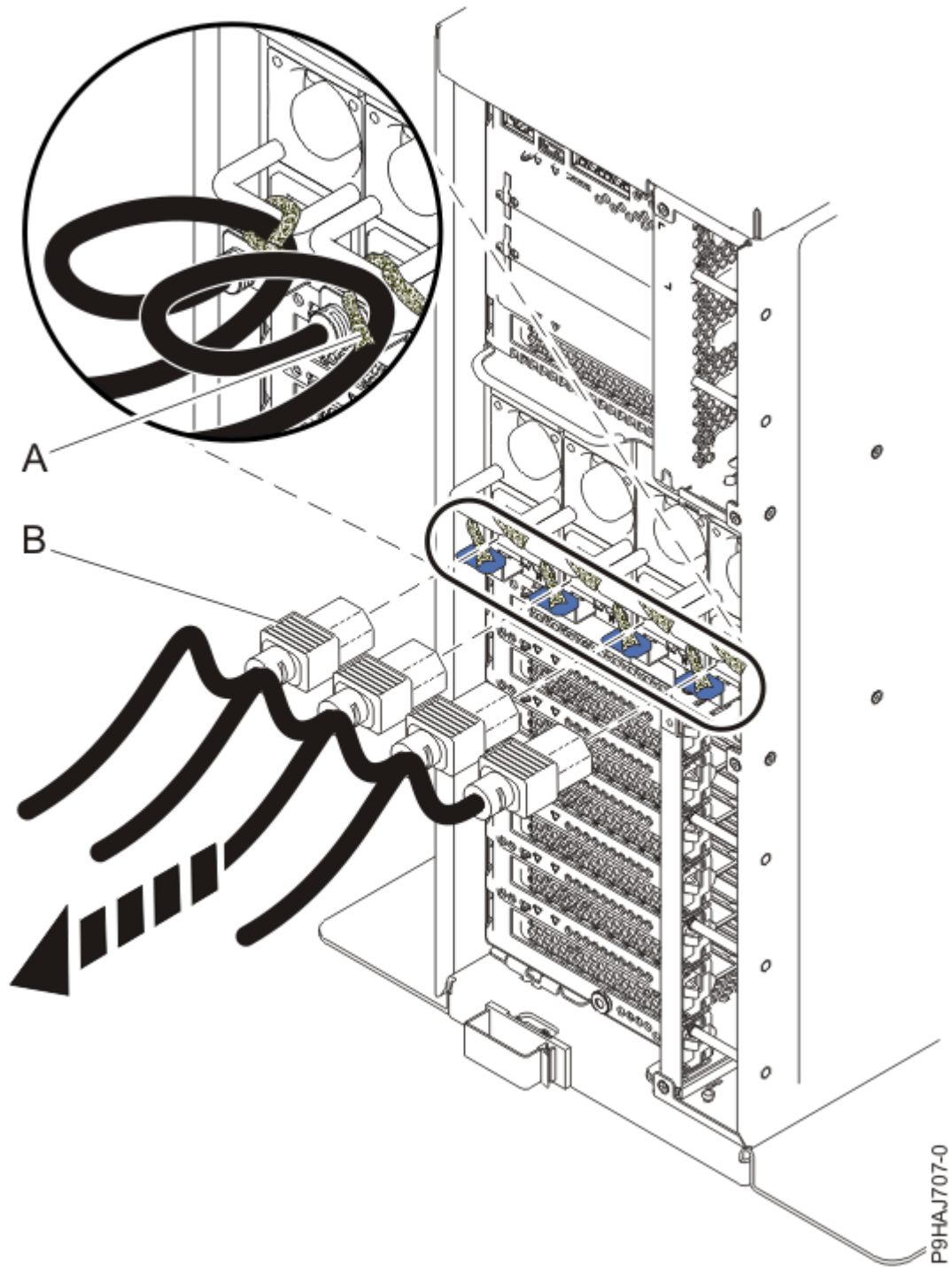
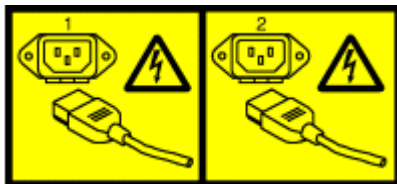


Figure 5. Removing the power cords from a stand-alone server

(L003)



OR



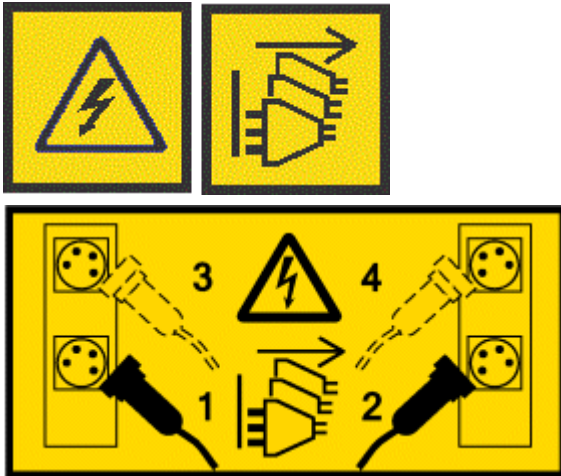
or

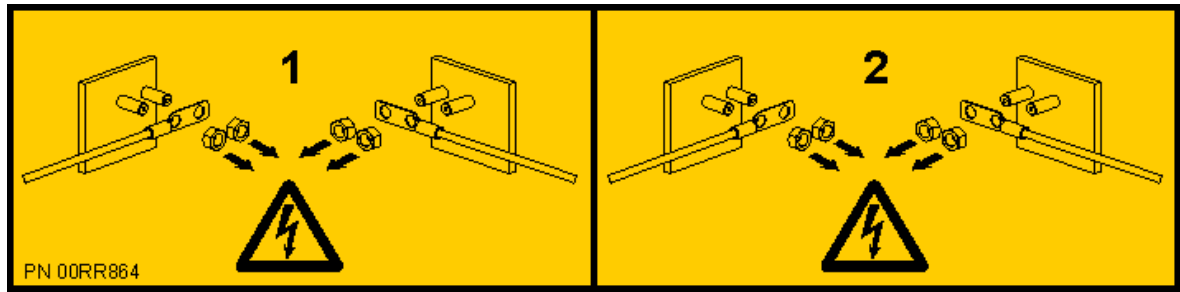


or



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)

- b) Continue with step “13” on page 13.
10. To prepare the system to install an adapter by using the AIX operating system, complete the following steps:
- Log in to the console as root user to access the Hot Plug Manager.
 - At the command line, type `smitty`.
 - Select **Devices > PCI Hot Plug Manager** and press Enter.
The **PCI Hot-Plug Manager** menu displays.

For more information about the menu options in the **PCI Hot-Plug Manager** screen, see [Hot-plug manager menu \(www.ibm.com/support/knowledgecenter/POWER9/p9hak/p9hak_hotplug_menu.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/p9hak_hotplug_menu.htm).
 - From the PCI Hot-Plug Manager menu, select **Add a PCI Hot-Plug Adapter**, and then press Enter.
 - Select the appropriate slot from the list that is displayed on the screen, and then press Enter.
 - If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:
 - Release the mounting bracket from the cable management arm assembly by pressing the indentation (**A**) on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

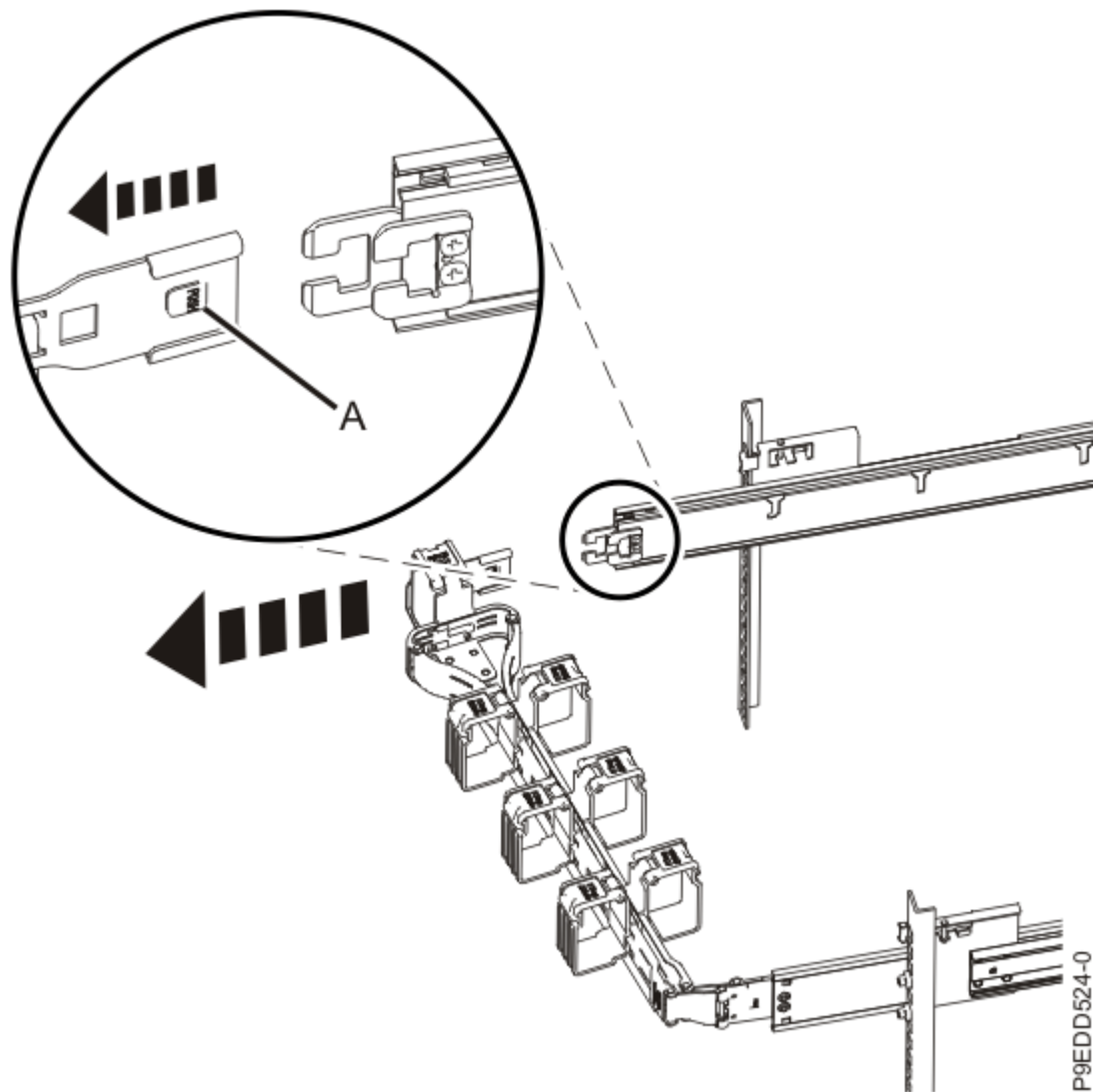


Figure 6. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- g) Physically verify that the slot you identified is where you want to install the adapter.
- 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 unoccupied slot that was selected by using the identify function.
- h) Continue with step “13” on page 13.
11. To prepare the system to install an adapter by using the IBM i operating system, complete the following steps:
- a) If necessary, start a System Service Tools (SST) session by typing `strsst` 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 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) If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:
 - i) Release the mounting bracket from the cable management arm assembly by pressing the indentation (**A**) on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

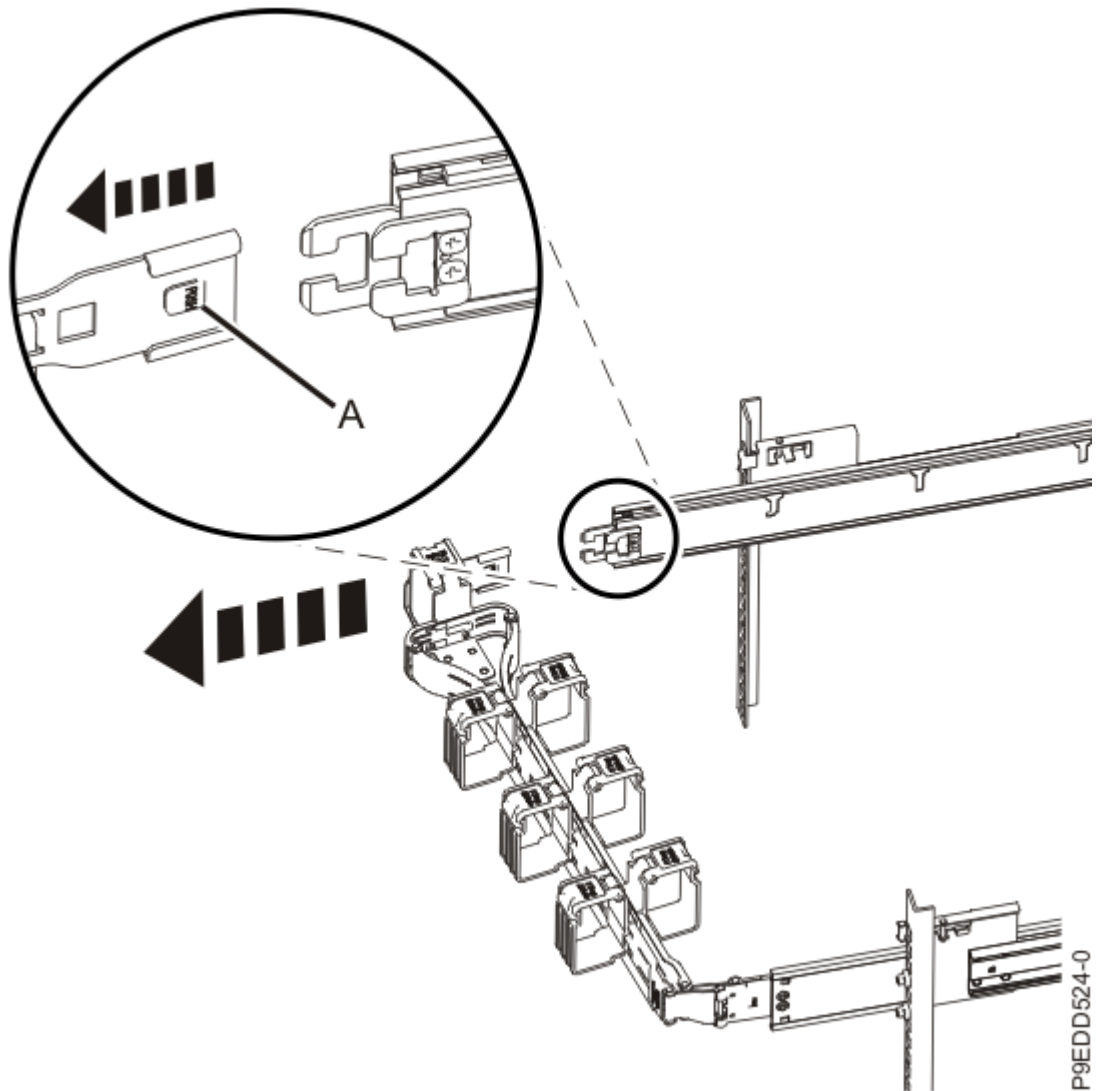


Figure 7. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- i) Physically verify that the slot you identified is where you want to install the adapter.
 - 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 unoccupied slot that was selected by using the identify function.
 - j) Select the **Toggle LED blink off/on** option to stop the LED from flashing.
 - k) Continue with step [“13” on page 13](#).
12. To prepare the system to install an adapter by using the Linux operating system, complete the following steps:
- 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)
U7879.001.DQD014E-P1-C1 PCI-X capable, 64 bit, 133MHz slot Empty
U7879.001.DQD014E-P1-C4 PCI-X capable, 64 bit, 133MHz slot Empty
U7879.001.DQD014E-P1-C5 PCI-X capable, 64 bit, 133MHz slot Empty
```

- c) Record the empty adapter slot where you want to install the adapter.
- d) Complete the following steps to prepare the slot to accept an adapter:
 - i) Type the following command:

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

Where *locationcode* is the location of the adapter slot. For example, the location might be U7879.001.DQD014E-P1-C3.

- ii) Press Enter. A fast-flashing amber LED at the rear of the system near the adapter indicates that the slot is identified.
 - iii) Physically verify that the slot you identified is where you want to install the adapter.

Notes:

- 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 the flashing amber LED, which identifies the slot that was selected by using the identify function.
- e) If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:
 - i) Release the mounting bracket from the cable management arm assembly by pressing the indentation **(A)** on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

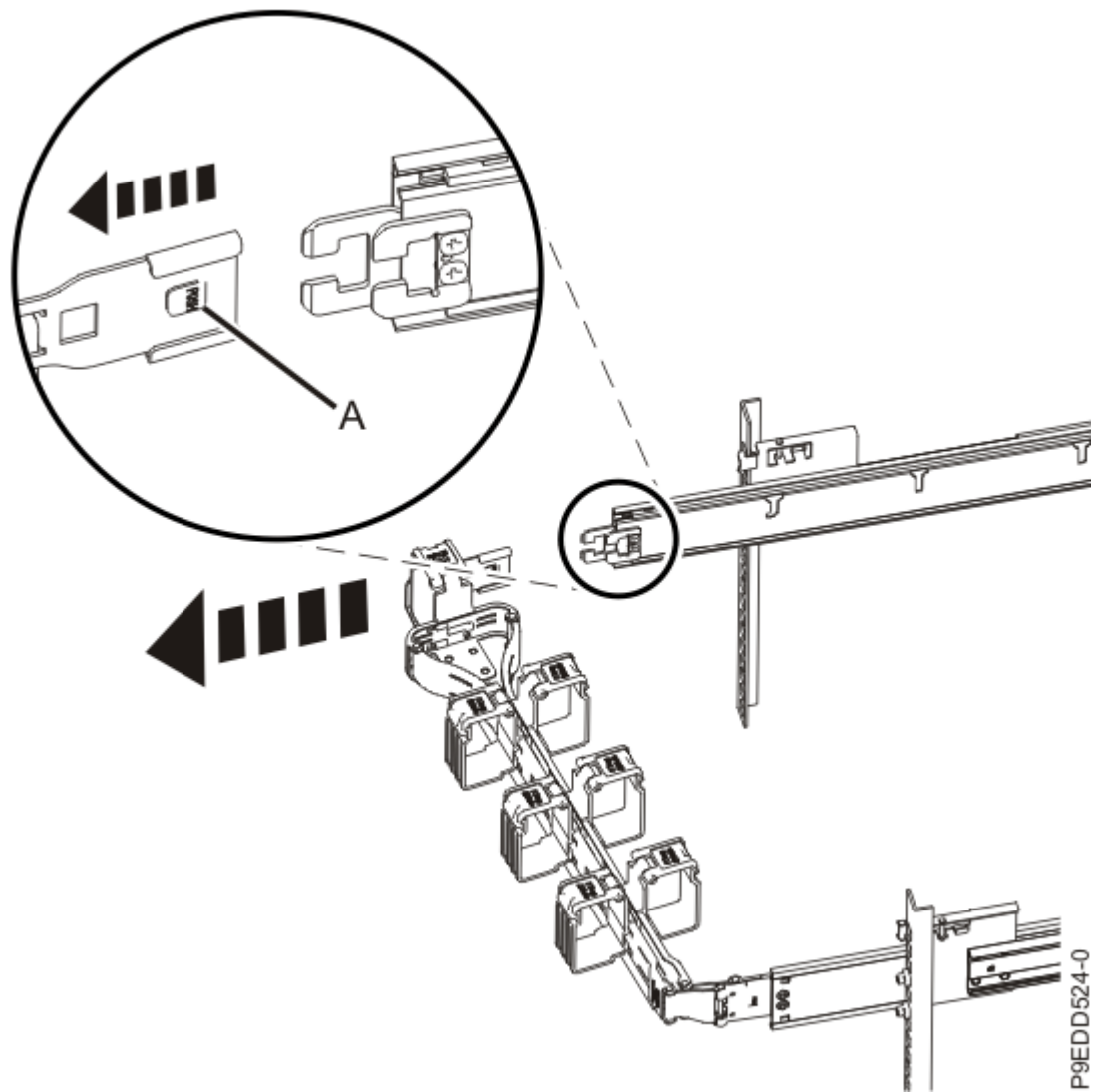


Figure 8. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- f) Physically verify that the slot you identified is where you want to install the adapter.
- 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 unoccupied slot that was selected by using the identify function.

13. If the cable management arm is open, close it by completing the following steps:

- a) Swing the cable management arm towards the server.
- b) Insert the inner cable management arm tab (**A**) into the outer mounting bracket (**B**) until it clicks into place as shown. The inner mounting bracket (**C**) is not used on the left side.

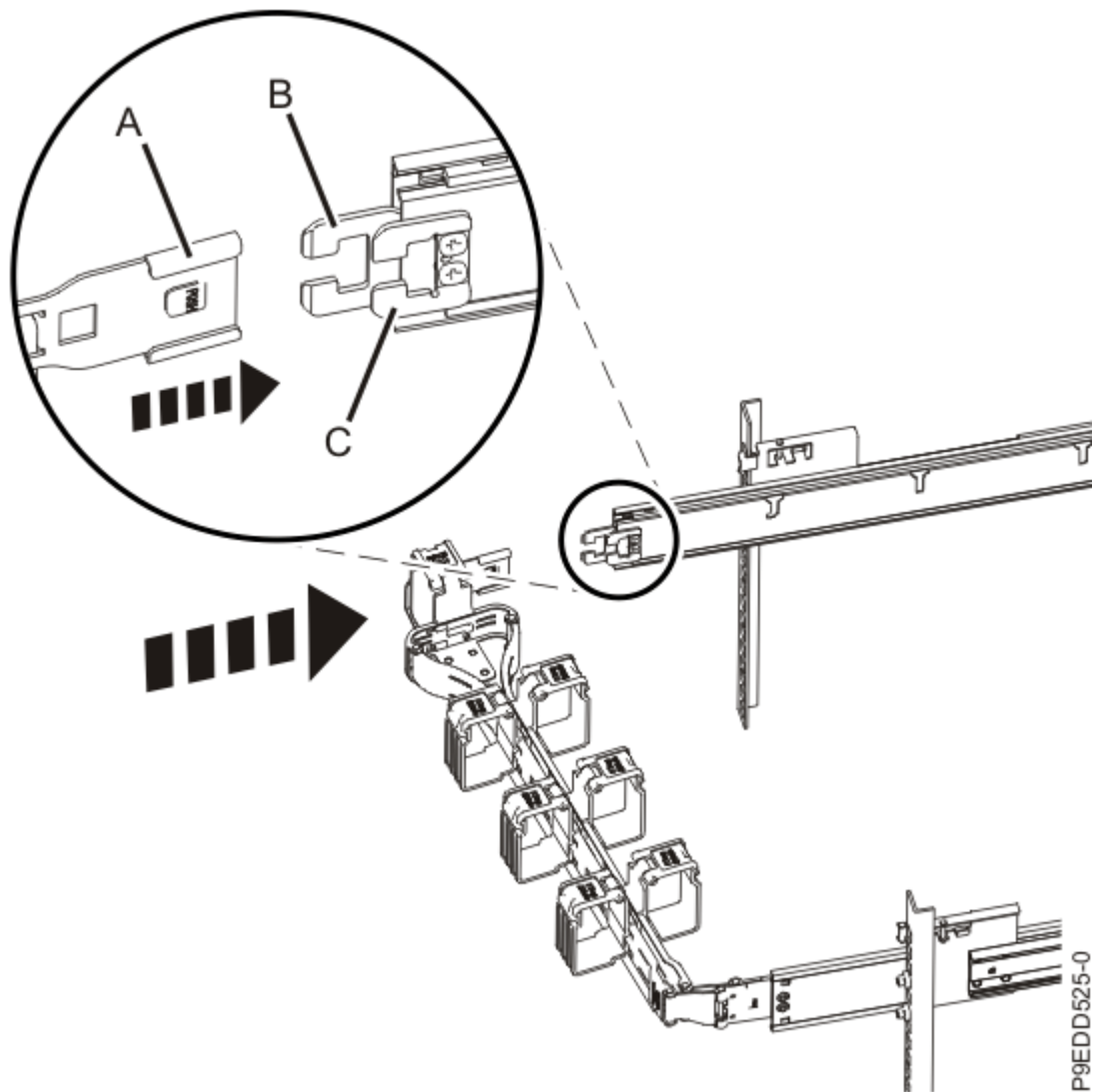


Figure 9. Closing the cable management arm

14. If applicable, open the rack front door.
15. For a rack-mounted system, open the side latches **(A)** and pull the latches to slide the system unit fully into the service position until the slides click and hold the system unit securely. Ensure that the screws inside the latches are not secured to the rack.

See the following figure.

Remove the hook-and-loop fasteners that secure the cable management arms. Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the system do not catch or bind as you pull the system unit into the service position.

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.

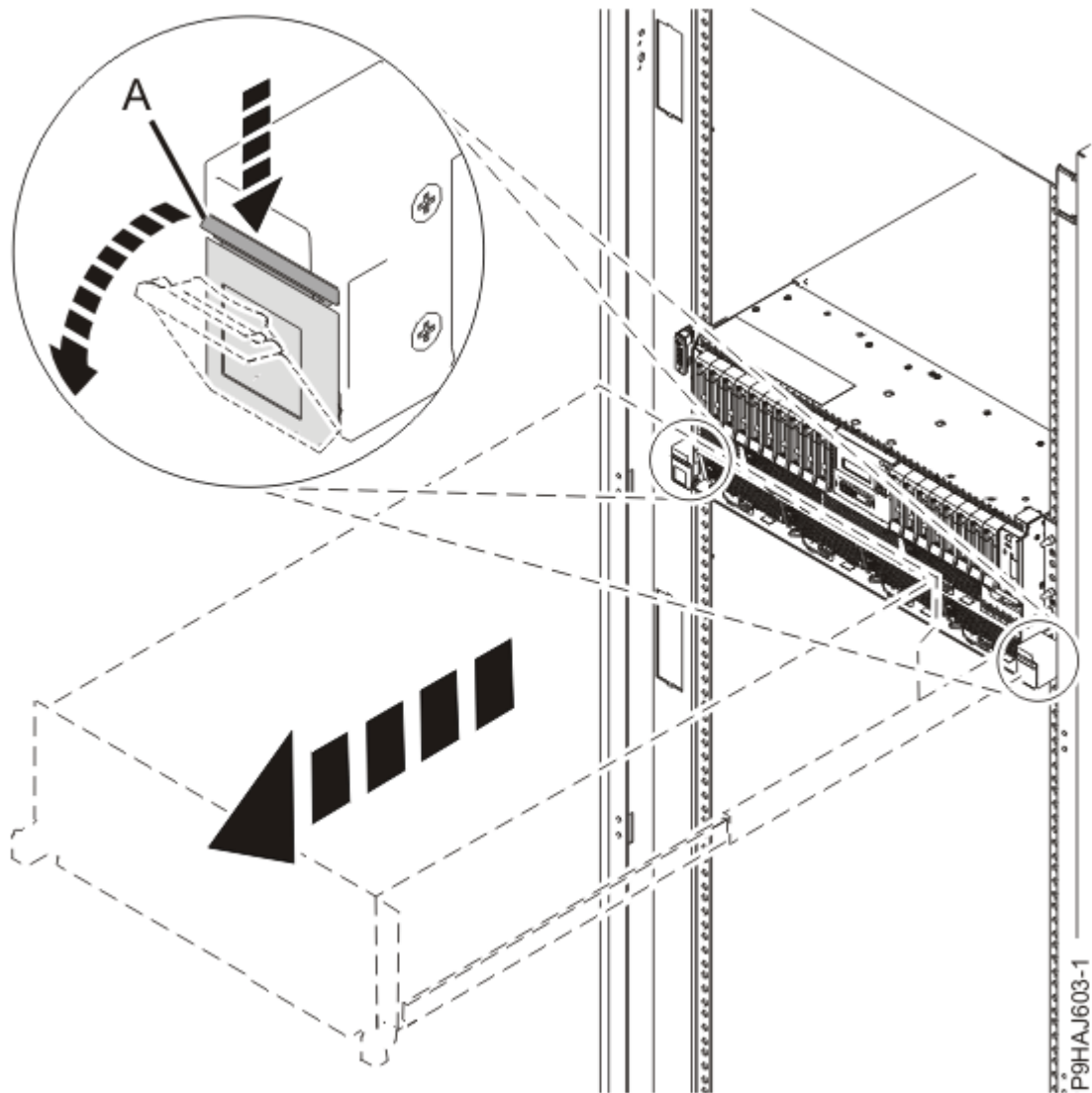


Figure 10. Releasing the side latches

16. 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.

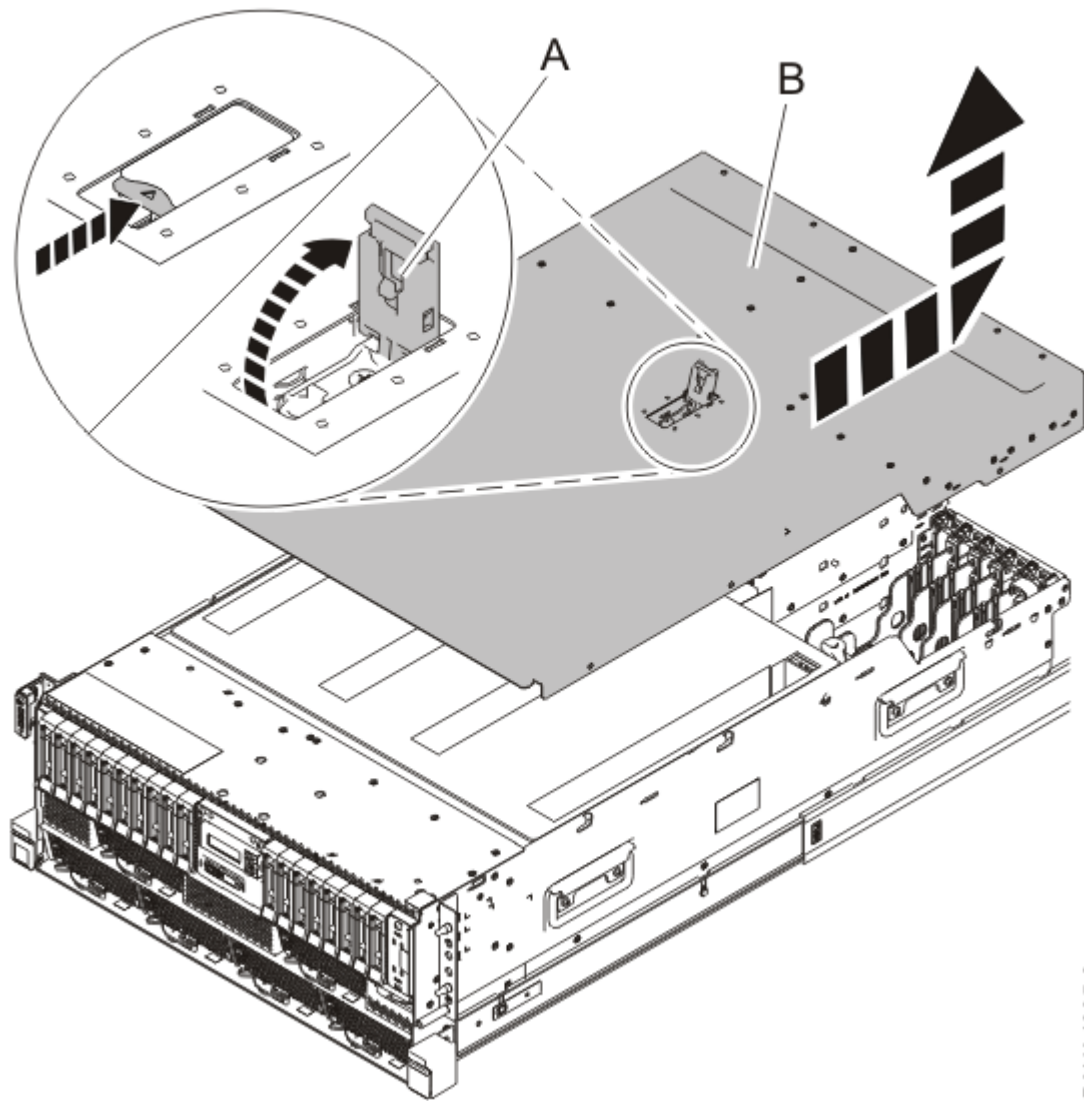
17. Remove the service access cover.

For a rack-mounted system, complete the following steps. Refer to [Figure 11 on page 17](#).



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.

- a. Release the service cover latch by pushing the release latch **(A)** in the direction shown.
- b. Slide the cover **(B)** off the system unit. When the front of the service access cover clears the upper frame ledge, lift the cover up and off the system unit.



P9HAJ605-2

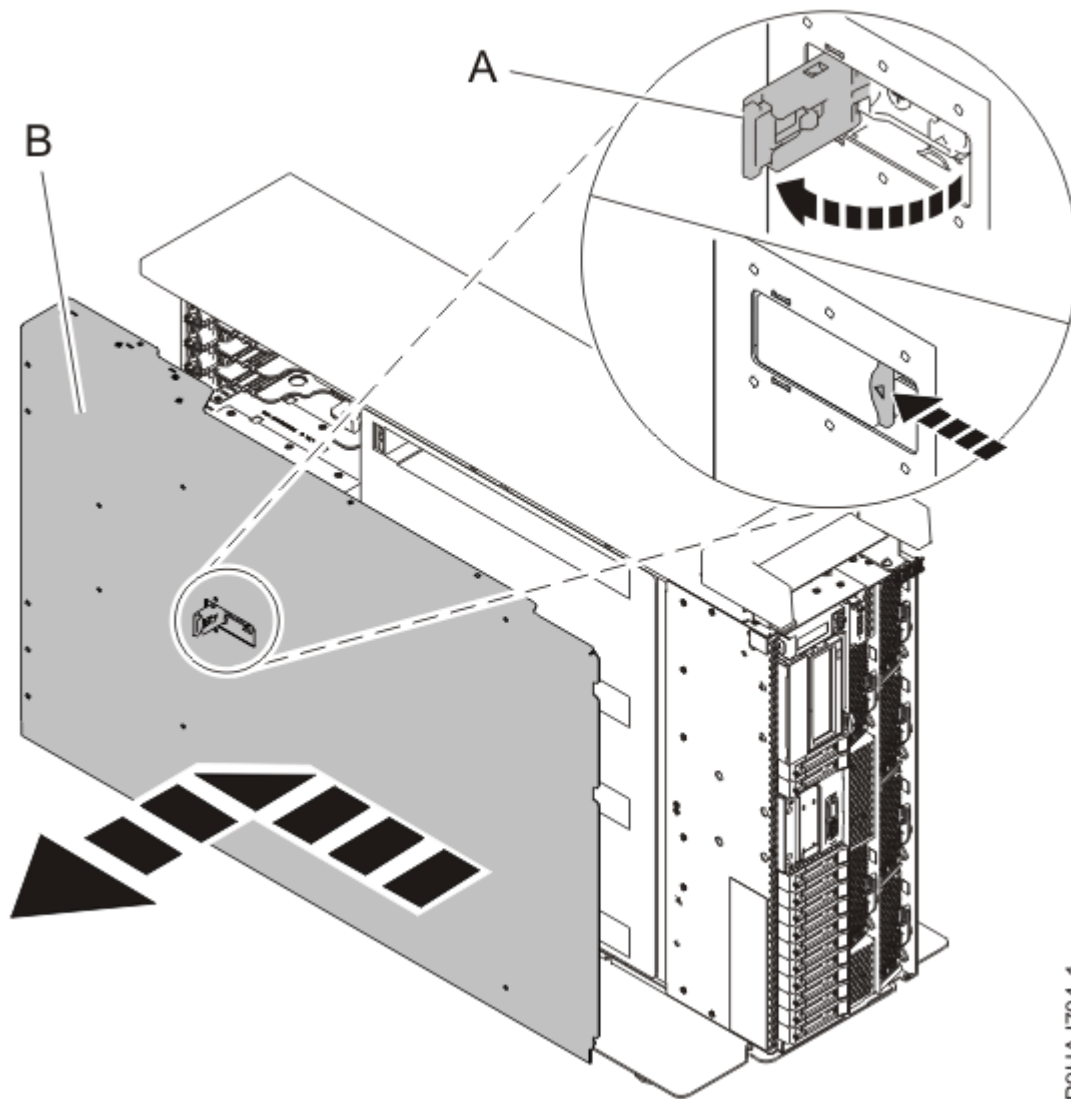
Figure 11. Removing the service access cover from a rack-mounted system

For a stand-alone system, complete the following steps. Refer to [Figure 12 on page 18](#).



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.

- a. Release the latch by pushing the release latch **(A)** in the direction shown.
- b. Slide the cover **(B)** off the system unit. When the front of the service access cover has cleared the upper frame ledge, lift the cover up and off the system unit.



P9HAJ704-1

Figure 12. Removing the service access cover

Installing an adapter in the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system

To install an adapter 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. Ensure that the target slot is empty.
3. If necessary, remove the adapter from the antistatic package.

Attention: Avoid touching the components and gold connectors on the adapter.

4. Place the adapter, component-side up, on a flat, antistatic surface.



Attention: A pin on the tailstock of the adapter resembles a removable screw. Do not remove this pin. It is required for correct alignment and seating.

5. If the adapter latch (**B**) at the target slot on the system is not already in the open position, pull the latch into the open position by rotating the latch outwards from its clip on the back of the system.

See [Figure 13 on page 19](#) and [Figure 14 on page 20](#) for the location of the adapter latch.

(L007)



CAUTION: A hot surface nearby. (L007)

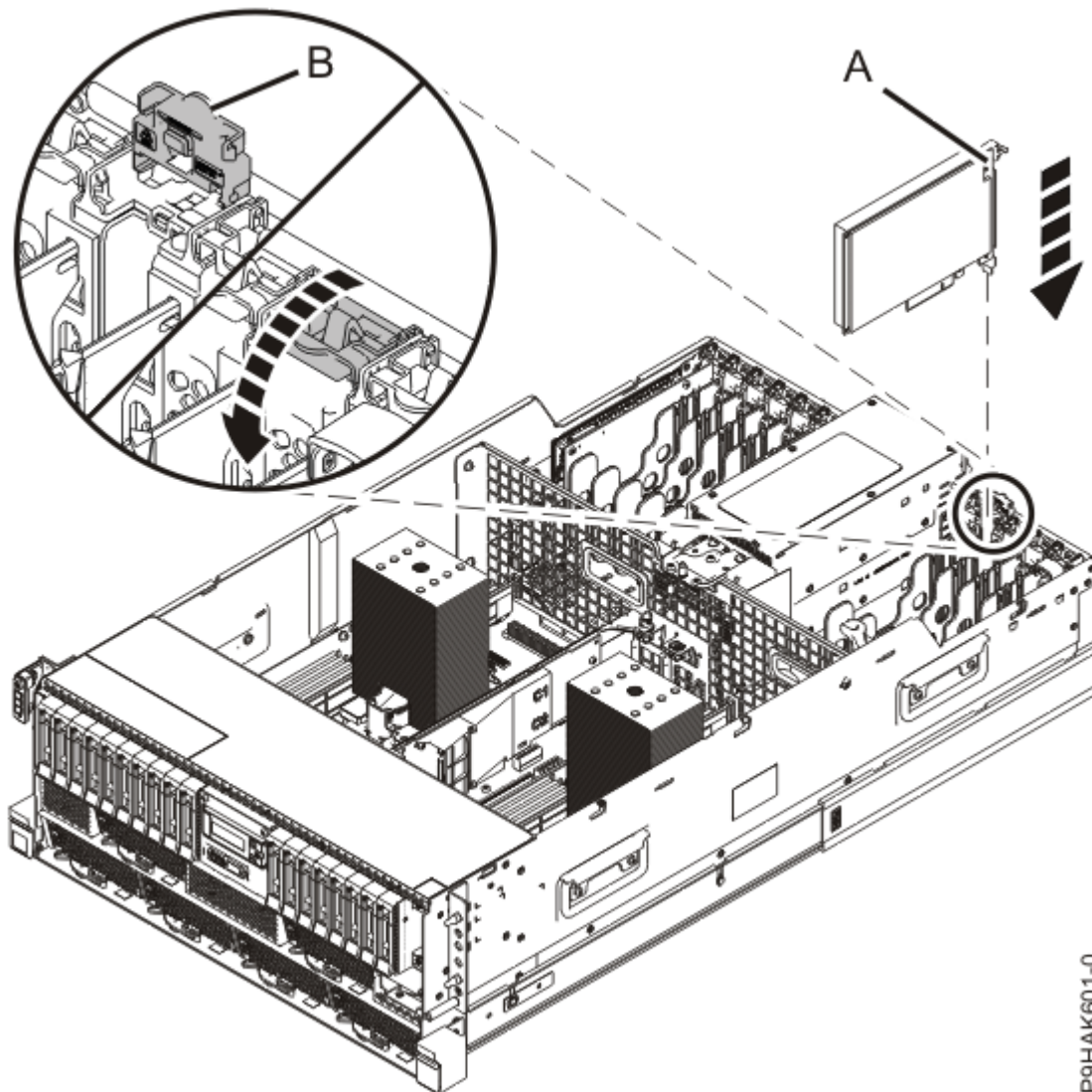


Attention: The system supports full-height tailstock brackets only. If your adapter shipped with a low-profile tailstock, you might need to change it. For instructions on removing and replacing the tailstock, see [Removing and replacing the tailstock](#).

6. Press the adapter firmly into its connector ensuring that it is seated.

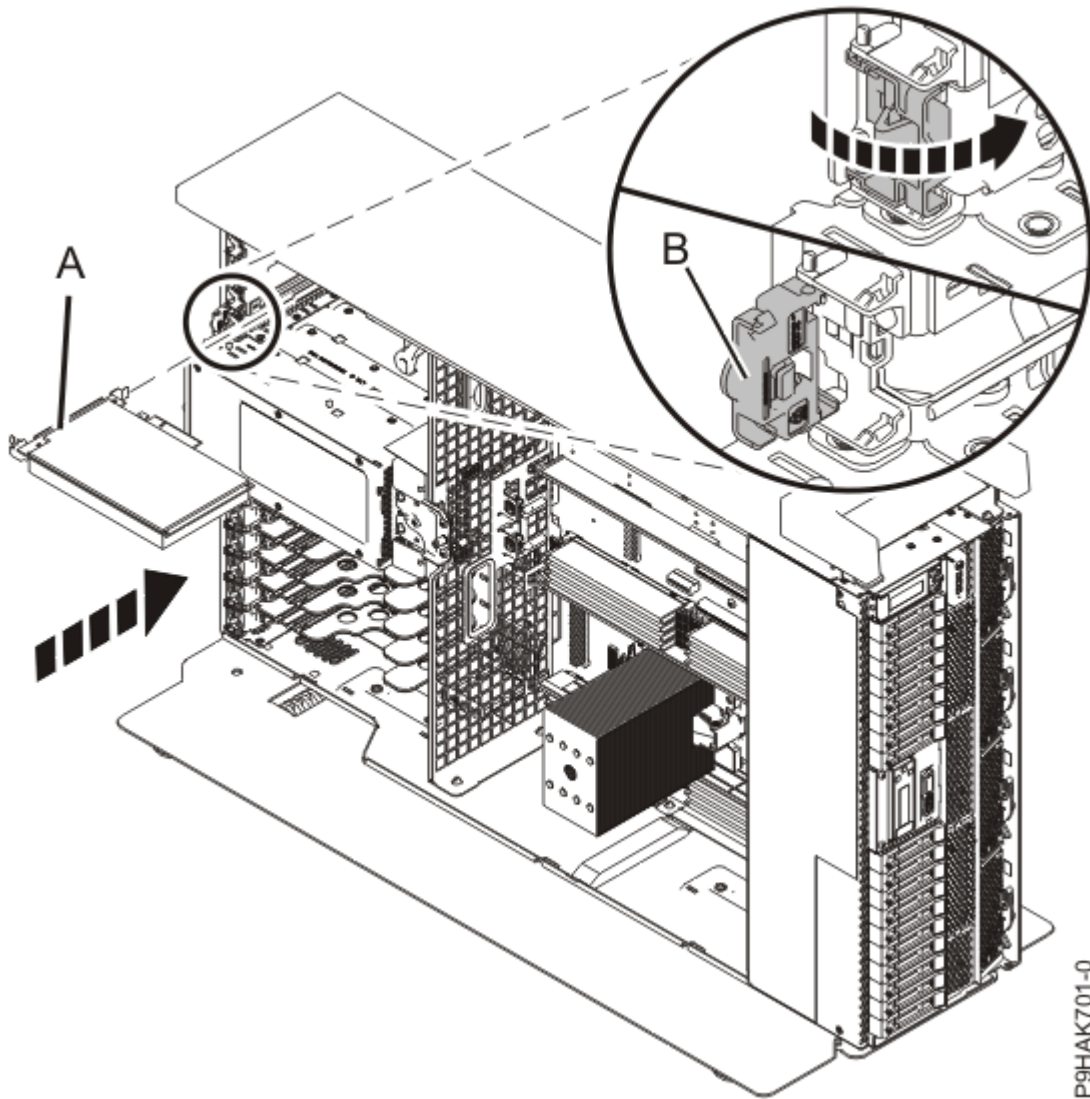
See [Figure 13](#) on page 19 and [Figure 14](#) on page 20.

7. To lock the adapter in its slot, rotate the adapter latch (**B**) in the direction that is shown.



P9HAK601-0

Figure 13. Installing or replacing an adapter in a 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S rack-mounted system



P9HAK701-0

Figure 14. Installing or replacing an adapter in the 9009-41A stand-alone system.

Preparing the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system for operation after installing an adapter

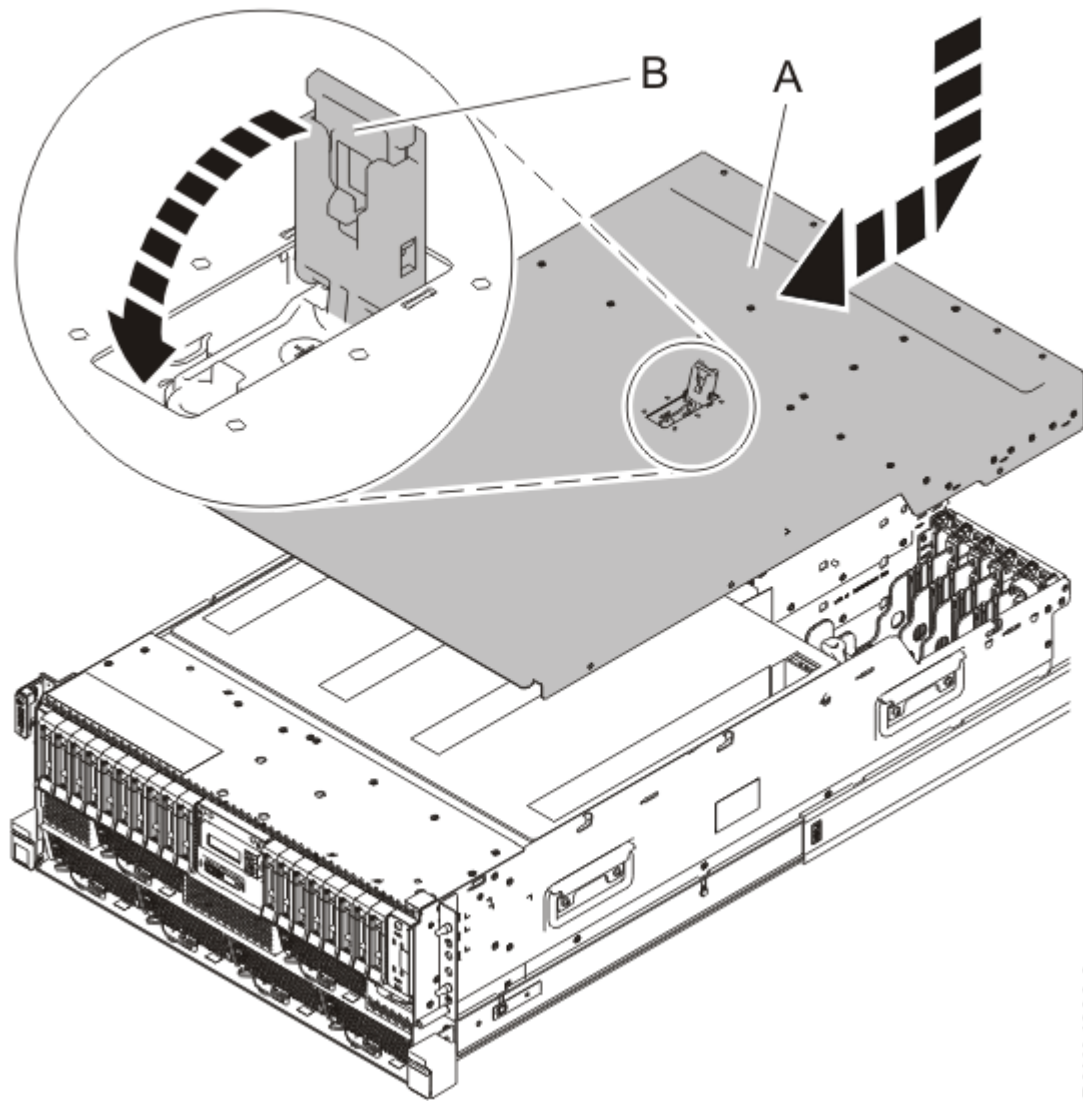
To prepare the system for operation after installing an adapter, complete the steps in this procedure.

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. Replace the service access cover.

For a rack-mounted system, complete the following steps. Refer to [Figure 15 on page 21](#).

- a. Slide the cover **(A)** onto the system unit.
- b. Close the release latch **(B)** by pushing it in the direction shown.

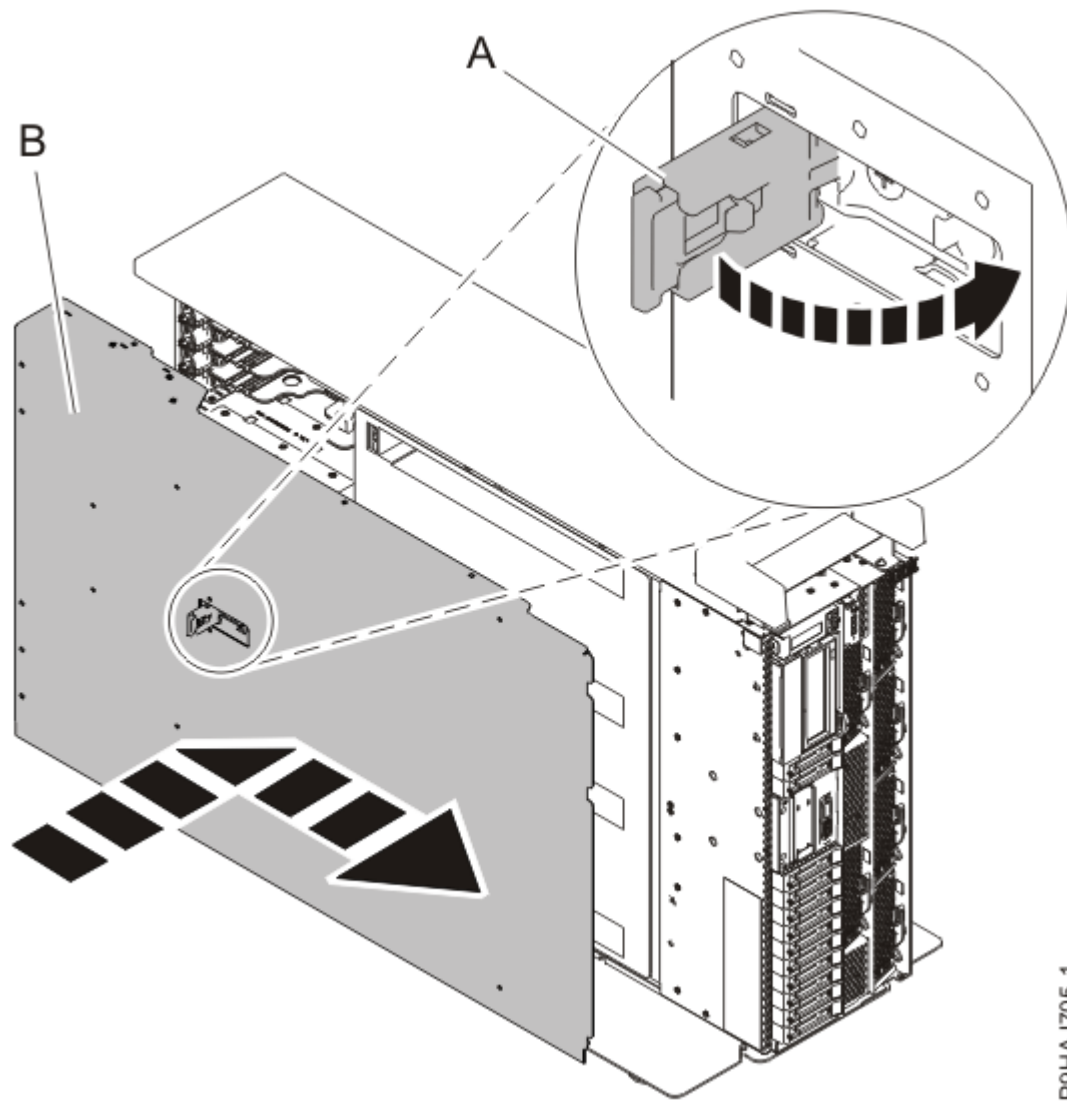


P9HAJ606-2

Figure 15. Installing the service access cover

For a stand-alone system, complete the following steps. Refer to [Figure 16 on page 22](#).

- a. Slide the cover **(B)** on to the system unit as shown.
- b. Close the latch release **(A)** by pushing it in the direction shown.



P9HAJ705-1

Figure 16. Installing the service access cover

3. For a rack-mounted system, unlock the blue rail safety latches (**A**) as shown in [Figure 17 on page 23](#) by pushing them inward.

Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the unit do not catch or bind as you push the unit into the operating position.

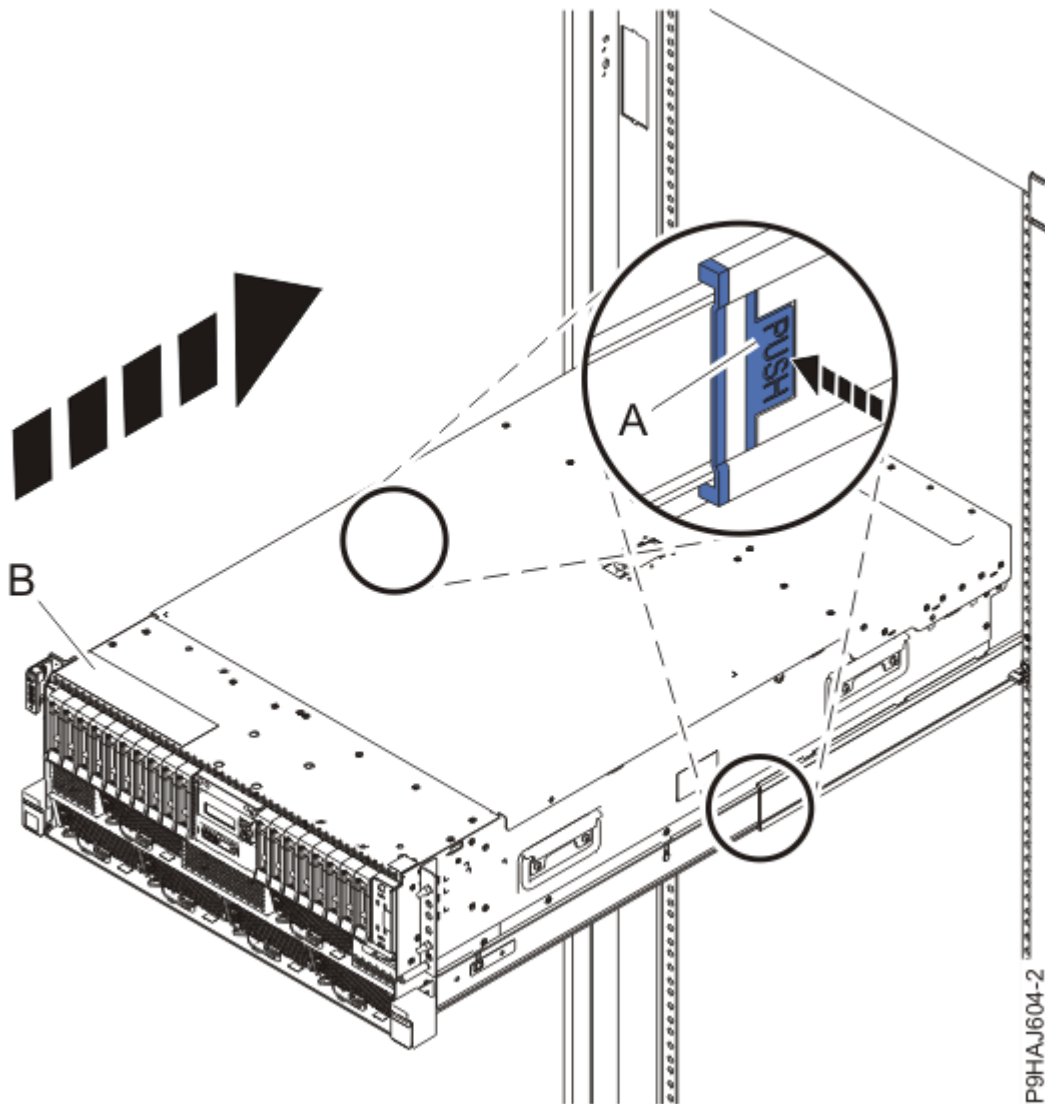


Figure 17. Placing the system into the operating position

4. For a rack-mounted system, push the system unit (**B**) as shown in the previous figure back into the rack until both release latches lock the system into position.

Secure the cable management arm with hook-and-loop fasteners around the back side of the cable management arm, but not around the cables.

5. If you installed a PCIe3 cable adapter, and want to connect an EMX0 PCIe3 expansion drawer to your system, continue with [Connecting an EMX0 PCIe Gen3 I/O expansion drawer to your system](#).

Note: If you have a 9040-MR9 or 9080-M9S system, you can connect and activate the expansion drawer cable when the system power is turned on. Otherwise, you must connect the cable with the system power turned off. The cable is activated when you start the system.

6. If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:

Note: If you are removing or replacing the system backplane, you must open the cable management arm.

- a) Release the mounting bracket from the cable management arm assembly by pressing the indentation (**A**) on the inner cable management arm tab.

The cable management arm releases from the outer mounting bracket in the direction shown.

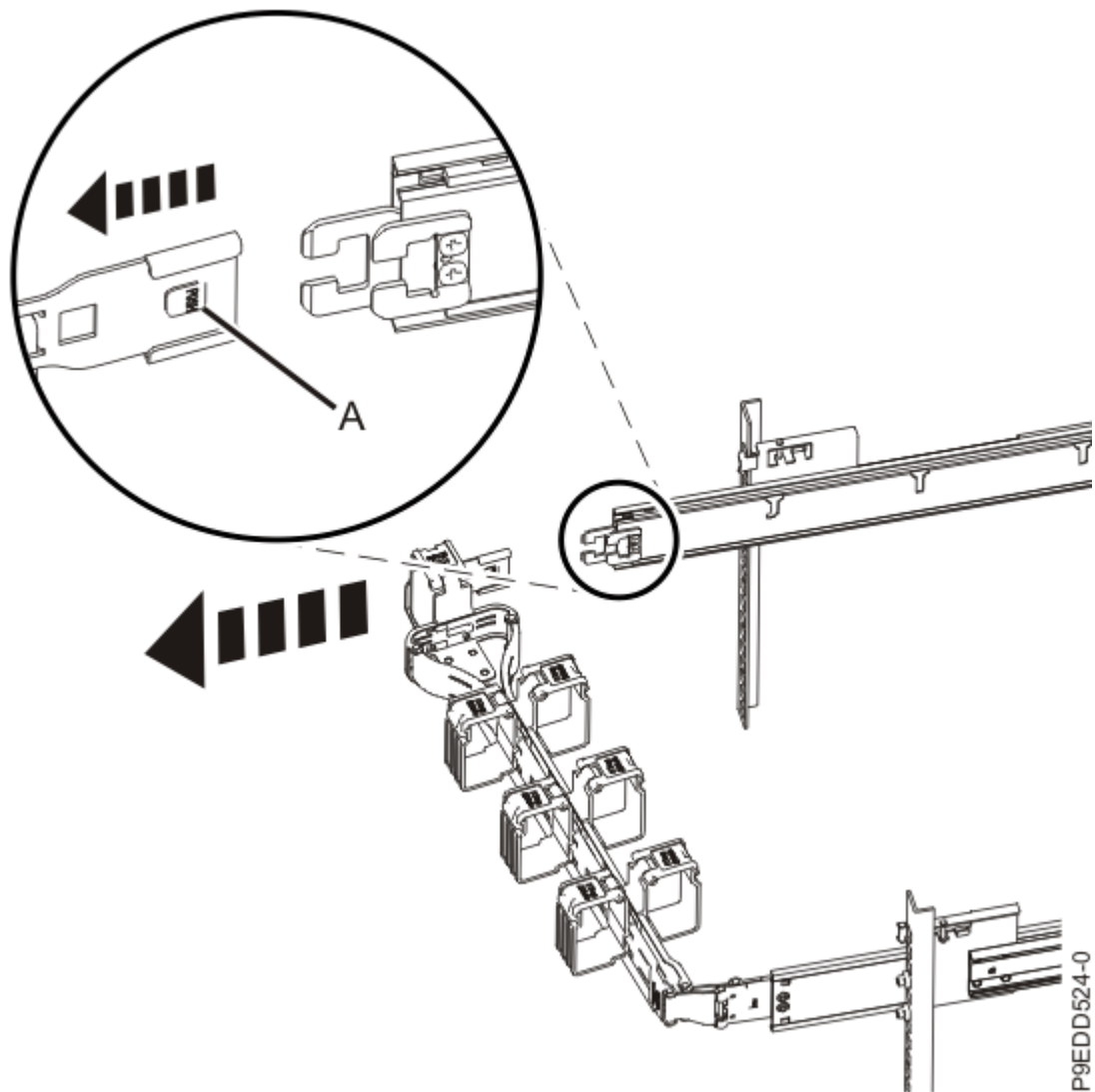


Figure 18. Releasing the cable management arm

- b) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

7. Connect any cables or transceivers to the adapter.
8. If you are servicing a rack-mounted system, route the cables through the cable-management arm.
9. 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 19](#) on page 25 or [Figure 20](#) on page 26.

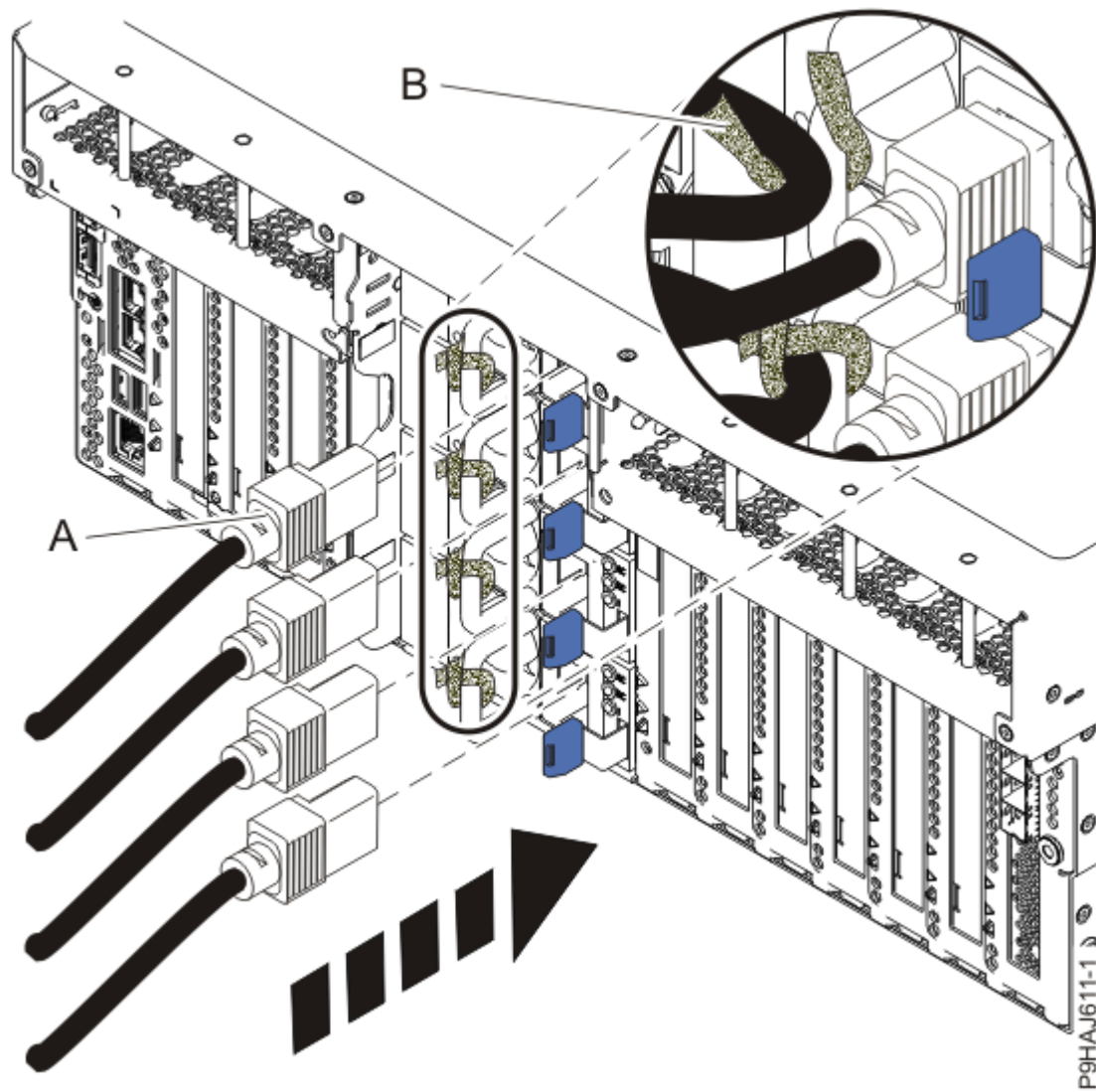


Figure 19. Connecting the power cords to a rack-mounted system

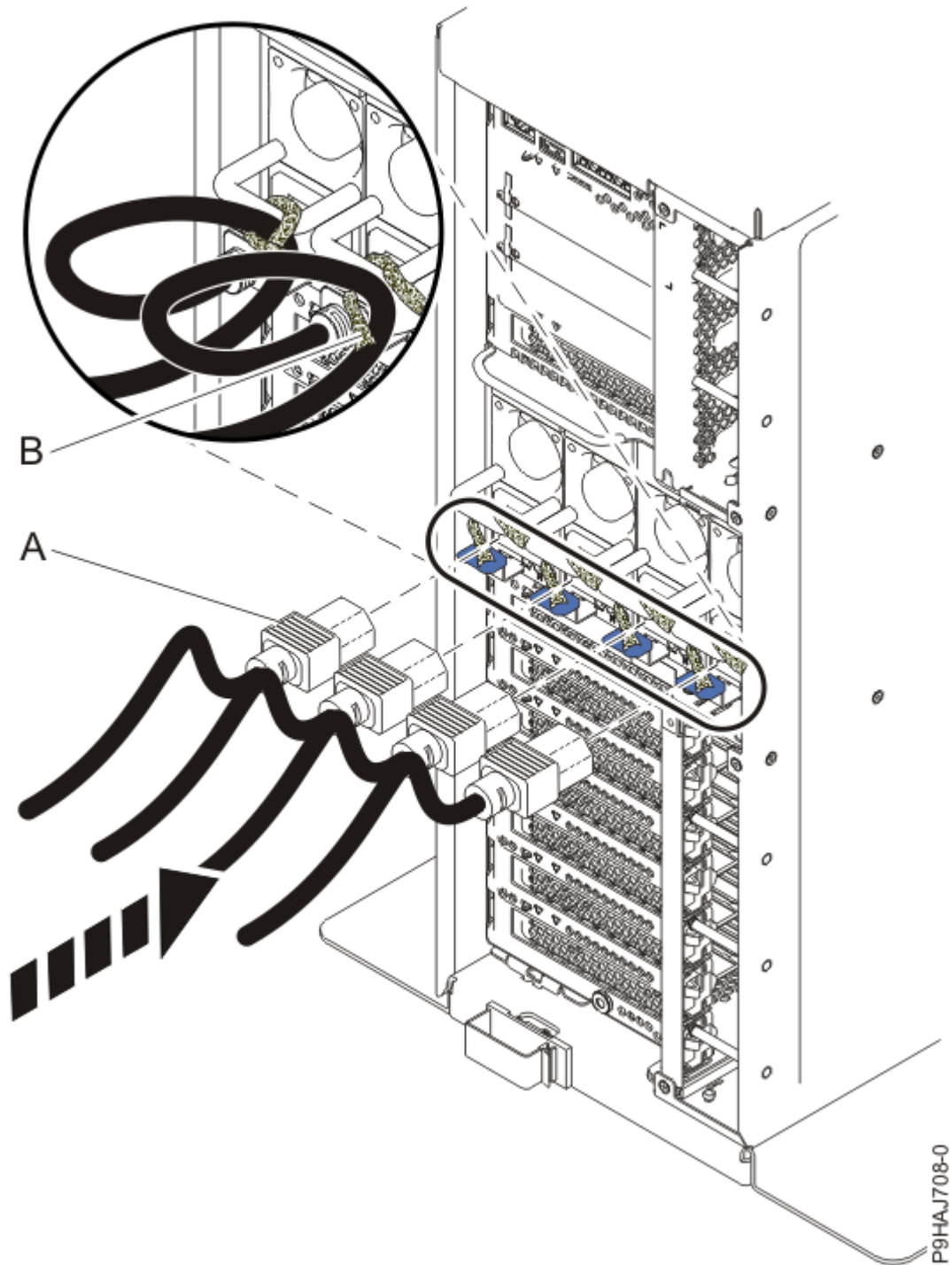


Figure 20. Connecting the power cords to a stand-alone system

10. If the cable management arm is open, close it by completing the following steps:
 - a) Swing the cable management arm towards the server.
 - b) Insert the inner cable management arm tab **(A)** into the outer mounting bracket **(B)** until it clicks into place as shown. The inner mounting bracket **(C)** is not used on the left side.

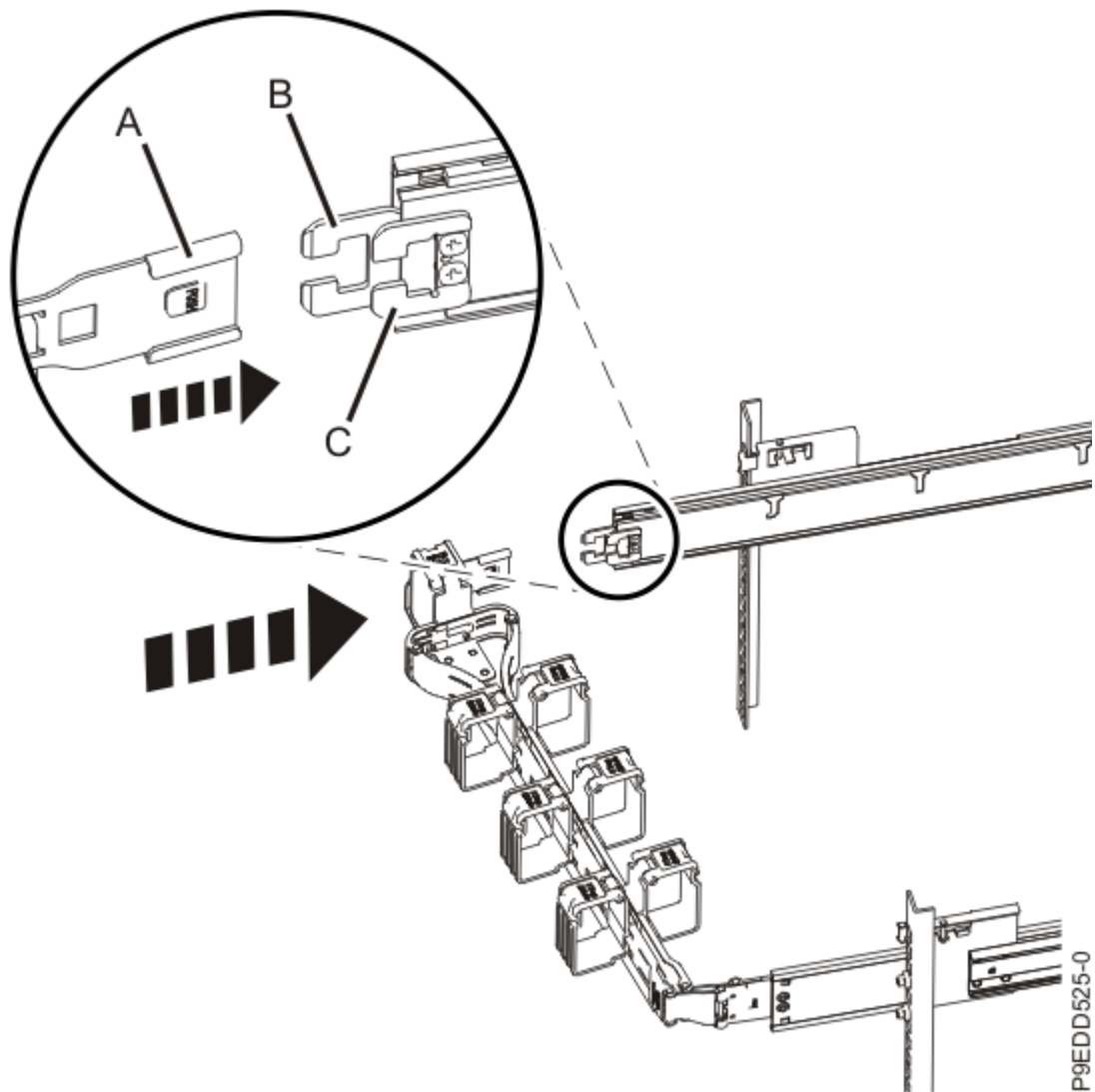


Figure 21. Closing the cable management arm

11. Close the rack door at the rear of the system.
12. Choose from the following options:
 - If you completed this procedure with the system power turned off, continue with step “13” on page [27](#).
 - If you are using the AIX operating system, continue with step “14” on page [27](#).
 - If you are using the IBM i operating system, continue with step “15” on page [28](#).
 - If you are using the Linux operating system, continue with step “19” on page [28](#).
13. If the system power is 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 “20” on page [28](#).
14. If you are using the AIX operating system, you must configure the adapter by completing the following steps:
 - a) Install the AIX device drivers for the installed adapter.
For instructions, see [Installing the AIX device driver software](#).
 - b) On the console, enter `cfgmgr` to configure the adapter.
 - c) Continue with step “20” on page [28](#).

15. 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.

16. Did you install a PCIe3 x8 non-volatile memory SSD NVMe adapter?

- **Yes:** Continue with step “17” on page 28.
- **No:** Continue with step “20” on page 28.

17. If you installed a PCIe3 x8 non-volatile memory SSD NVMe adapter and the logical partition that controls the adapter is running the IBM i operating system, complete the following steps to prepare the NVMe adapter for operation:

- Start the IBM i System Service Tools (STRSST), and specify the user name and password.
- On the System Service Tools (SST) display, select **Work with disk units > Work with disk configuration > Work with NVM Devices > Delete existing NVM Namespaces**.
- Select the NVMe device that you installed.
- 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:
 - Select **4=Delete Namespace** for each of the listed namespaces.
 - Press F10 to confirm the deletion of the namespaces.
 - Press F12 to return to the SST main menu.
- On the System Service Tools (SST) display, select **Work with disk units > Work with disk configuration > Work with NVM Devices > Create NVM Namespaces**.
- Select the NVMe device that you installed.
- On the **Create NVM Namespaces** display, select the quantity and capacity of the namespaces (disk units) that you want to create on the newly installed NVMe device.
- Press F10 to confirm the creation of the namespaces.
- Press F12 to return to the SST main menu.

18. Continue with step “20” on page 28.

19. If you are using the Linux operating system, complete the following steps:

- In the Linux session on the console, press Enter after you install or replace the adapter to put the slot into the action state.
- Enter the slot information with the **lsslot** command, as shown in the following example.

For example, if the slot in which you installed the adapter was U7879.001.DQD014E-P1-C3.

```
Enter lsslot -c pci -s U7879.001.DQD014E-P1-C3
```

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

```
# Slot                Description                Device(s)
U7879.001.DQD014E-P1-C3 PCI-X capable, 64 bit, 133MHz slot 0001:40:01.0
```

20. 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).

21. 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 adapter in the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system

Find information about removing and replacing an adapter in the IBM Power System S914 (9009-41A and 9009-41G), IBM Power System S924 (9009-42A and 9009-42G), IBM Power System H924 (9223-42H), or IBM Power System H924S (9223-42S) server.

About this task

Note: Removing or replacing 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 your system is not managed by an HMC, complete the steps in the following procedures to remove and replace an adapter in the system.

Preparing the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system to remove and replace an adapter

To prepare the system to remove and replace an adapter in the system, complete the steps in this procedure.

Before you begin

Note: If you are replacing a PCIe3 cable adapter that you use to attach your server to an EMX0 PCIe3 expansion drawer, you must ensure that you have the correct PCIe3 cable adapter and expansion drawer cable to work with the PCIe3 6-slot fanout module that you have in your EMX0 PCIe3 expansion drawer.

- If you have a CCIN **50CB** PCIe3 6-slot fanout module:
 - You must use one of the following PCIe3 cable adapters:
 - FC EJ08 (CCIN 2CE2)
 - FC EJ07 (CCIN 6B52)
 - FC EJ05 (CCIN 2B1C)
 - You must use one of the following expansion drawer cables: FC ECC6, FC ECC7, FC ECC8, FC ECC9, FC ECCR, FC ECCS, FC ECCX, FC ECCY, or FC ECCZ.
- If you have a CCIN **50CD** PCIe3 6-slot fanout module:
 - You must install one of the following PCIe3 cable adapters:
 - FC EJ19 (CCIN 6B53)
 - FC EJ1R (CCIN 58FF)
 - FC EJ20 (CCIN 2CF5)
 - You must use one of the following expansion drawer cables: FC ECCR, FC ECCS, FC ECCX, FC ECCY, or FC ECCZ.

About this task

Procedure

1. Take appropriate precautions for avoiding electric shock and for handling static-sensitive devices. For more information, see [“Avoiding electric shock” on page 85](#) and [“Handling static-sensitive devices” on page 86](#).
2. If applicable, open the rack door at the rear of the system.
3. Review the locations of the adapter slots and the service indicators for the adapter that you want to service. The adapters are viewed at the rear of the system.

[Figure 22 on page 31](#) and [Figure 23 on page 32](#) show the locations of the adapter in a system and the locations of the light-emitting diodes (LEDs) for the adapter.

The adapter has two LEDs that indicate the status:

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

The status of the LEDs are as follows:

- **(B)** Indicates that the adapter is operating correctly. The green power LED (top LED) is lit solid and the amber fault LED (bottom LED) is off.
- **(C)** Indicates that the adapter is not operating correctly. The green power LED (top LED) is lit solid and the amber fault LED (bottom LED) is lit solid.
- **(D)** Indicates the faulty or failed adapter was selected by using the identify function. The green power LED (top LED) might or might not be lit and the amber fault LED (bottom LED) is flashing.



Attention: If the adapter is operating correctly, then the Activity LED is ON (green) and the Error amber LED is OFF, as shown in (B). Do not attempt to remove a working adapter.

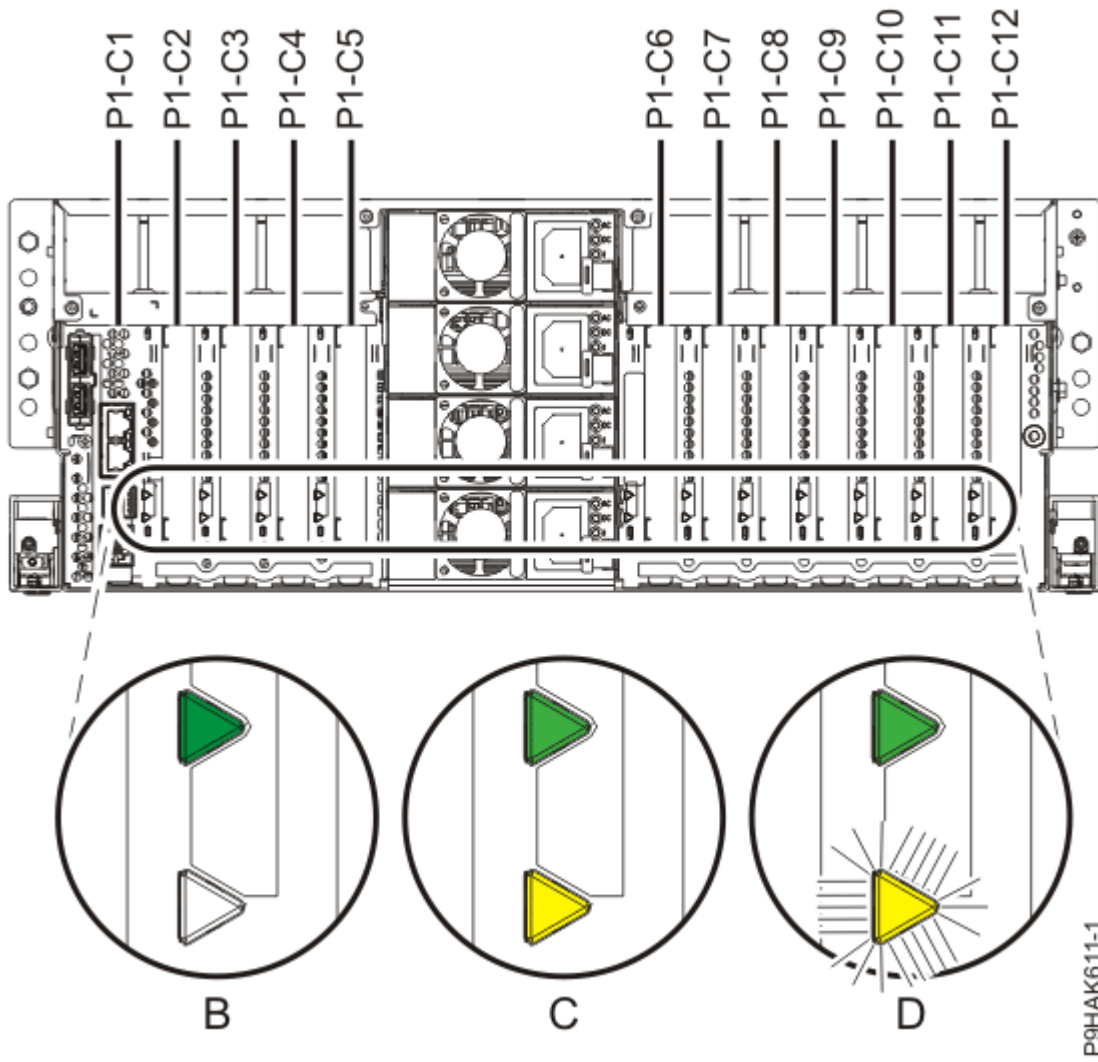


Figure 22. Adapter slot locations and locations of the LEDs in a rack-mounted 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, and 9223-42S system

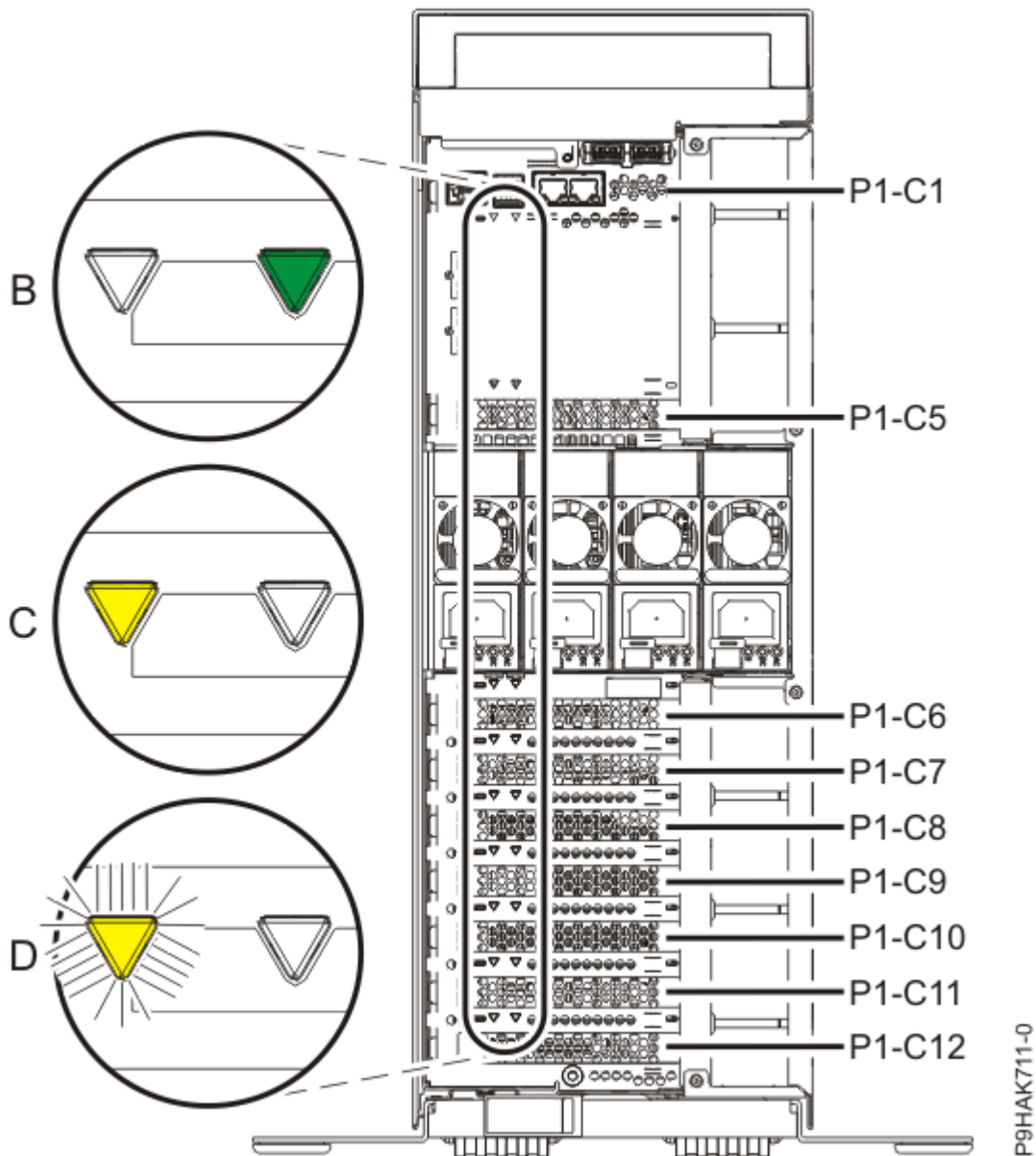


Figure 23. Adapter slot locations and locations of the LEDs in a stand-alone system.

4. Choose from the following options:

- If you want to remove an adapter when the system power is turned off, continue with step “5” on page 32.
- If the system power is turned on and if the AIX operating system controls the slot, continue with step “7” on page 37.
- If the system power is turned on and if the IBM i operating system controls the slot, continue with step “8” on page 38.
- If the system power is turned on and if the Linux operating system controls the slot, continue with step “9” on page 40.

5. To prepare the system to remove an adapter when the system is powered off, complete the following steps:

- a) Use the service indicator light-emitting diodes (LEDs) to help identify the part. 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) If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:

- i) Release the mounting bracket from the cable management arm assembly by pressing the indentation (**A**) on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

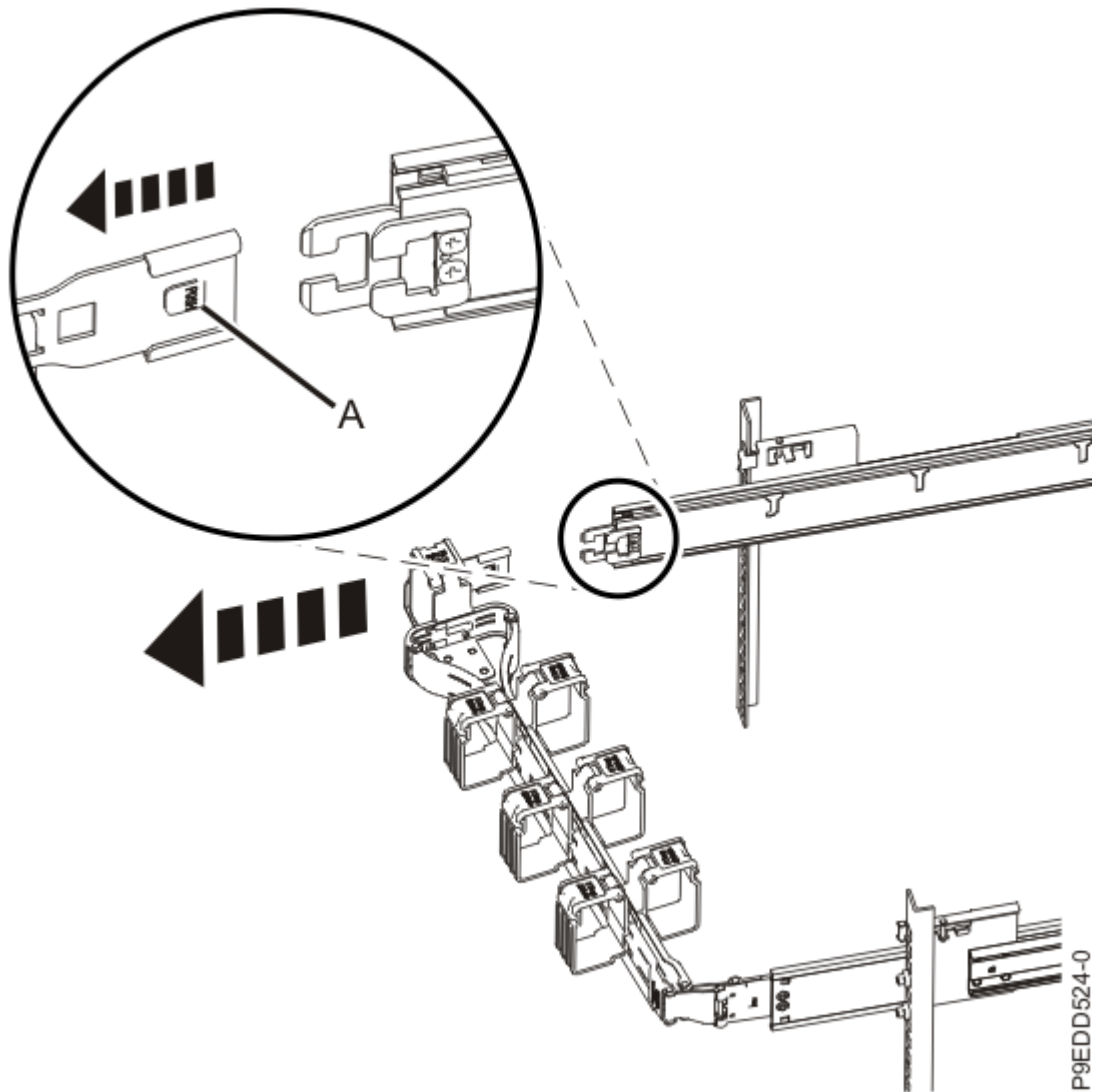


Figure 24. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- c) Physically verify that the slot you identified is where you want to remove the adapter.
- 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) If you have not yet recorded the adapter slot details, record the slot number and location of each adapter that is being removed.

Note: Adapter slots are numbered on the rear of the system.

- e) 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).
6. If you powered the system off, complete the following steps:
- a) Label and disconnect the power cords from the system unit.
See [Figure 25 on page 34](#) or [Figure 26 on page 35](#).

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.

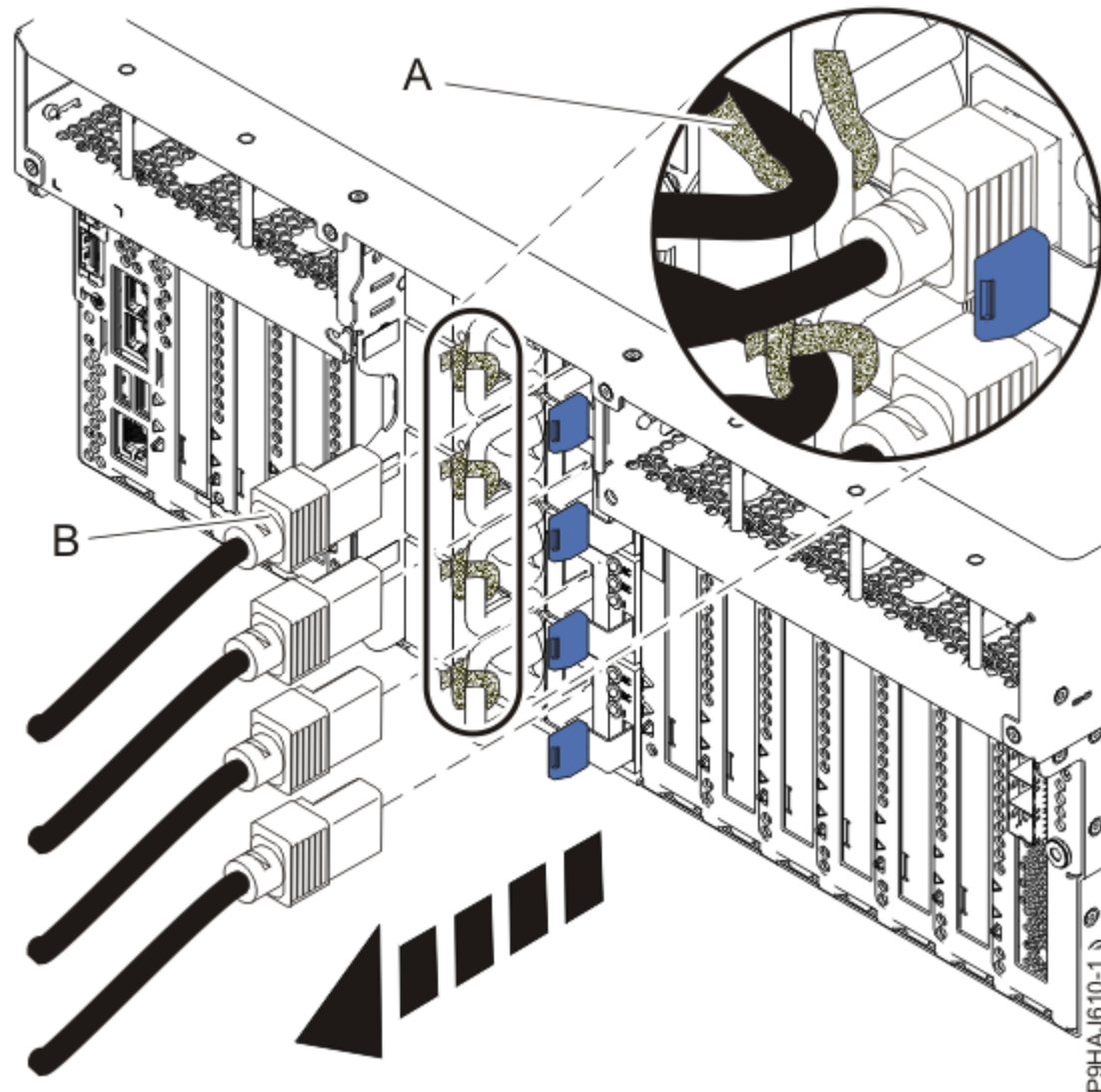


Figure 25. Removing the power cords from a rack-mounted server

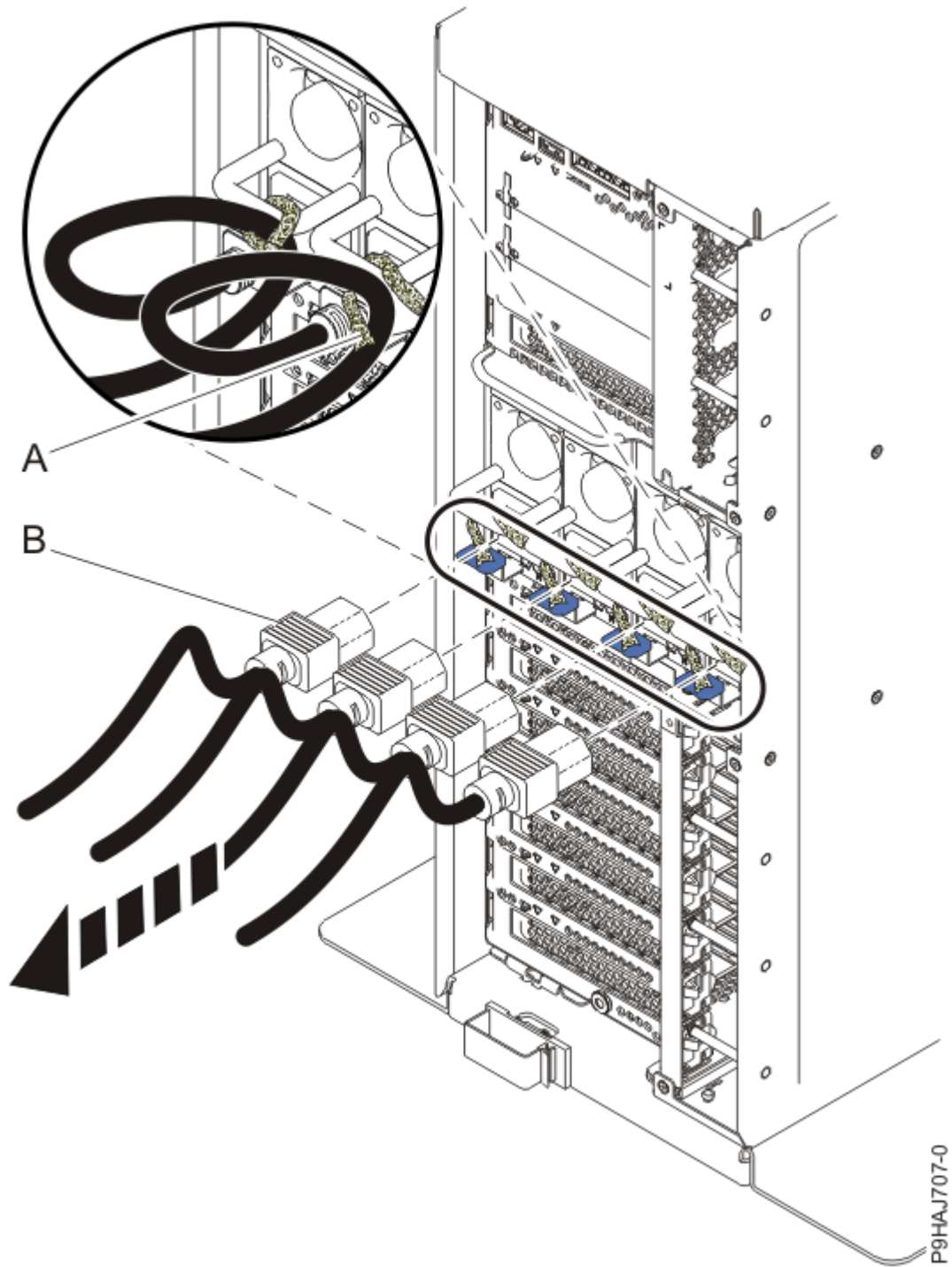
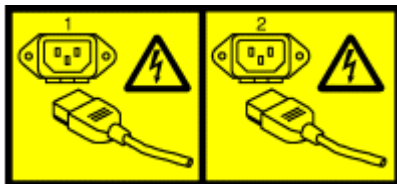


Figure 26. Removing the power cords from a stand-alone server

(L003)



OR



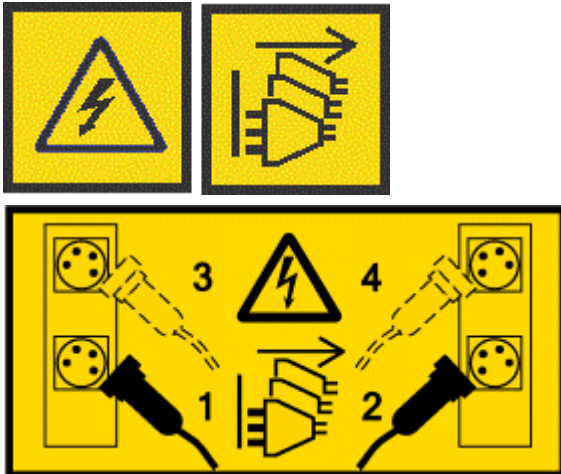
or

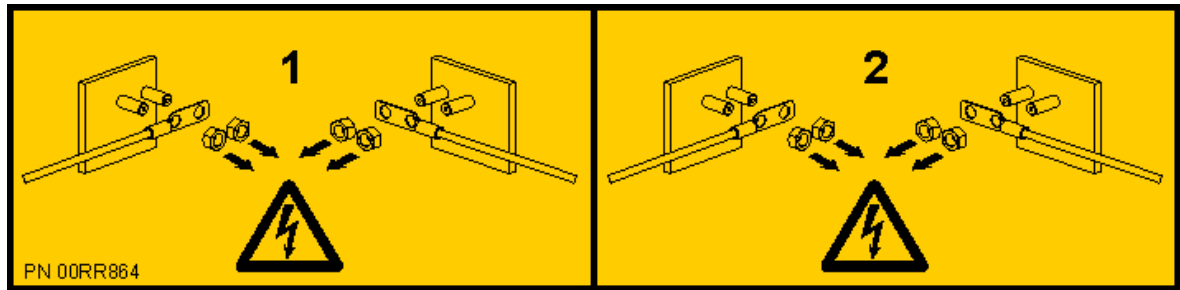


or



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)

- b) Continue with step “10” on page 43.
7. To prepare to remove an adapter by using the AIX operating system, complete the following steps:
- a) You must take the adapter offline before you remove and replace an adapter when the system power is turned on (hot-plugging). Before you take an adapter 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 adapter offline prevents a service representative or user from causing an unexpected outage for other users of the system.
 - b) Before hot-plugging adapters or storage devices, ensure that the file systems on those devices are unmounted.
 - c) Ensure that any processes or applications that might use the adapter are stopped.
 - d) To identify the failed adapter, complete the steps in this procedure on the console:
 - 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 adapter that you are removing in the **Device Names** menu.
 - vi) Use the Tab key to answer No to **Keep Definition**. 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 adapter to be removed from the system.
 - ix) Select **remove**. The amber LED for the adapter flashes for the slot that is identified.
 - x) Physically verify that the slot you identified is where you want to remove the adapter.
- Notes:**
- 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 the flashing amber LED, which identifies the slot that was selected by using the identify function.
- xi) Press Enter. The adapter is placed in the **action** state and is ready to be removed from the system.
- e) If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:

- i) Release the mounting bracket from the cable management arm assembly by pressing the indentation **(A)** on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

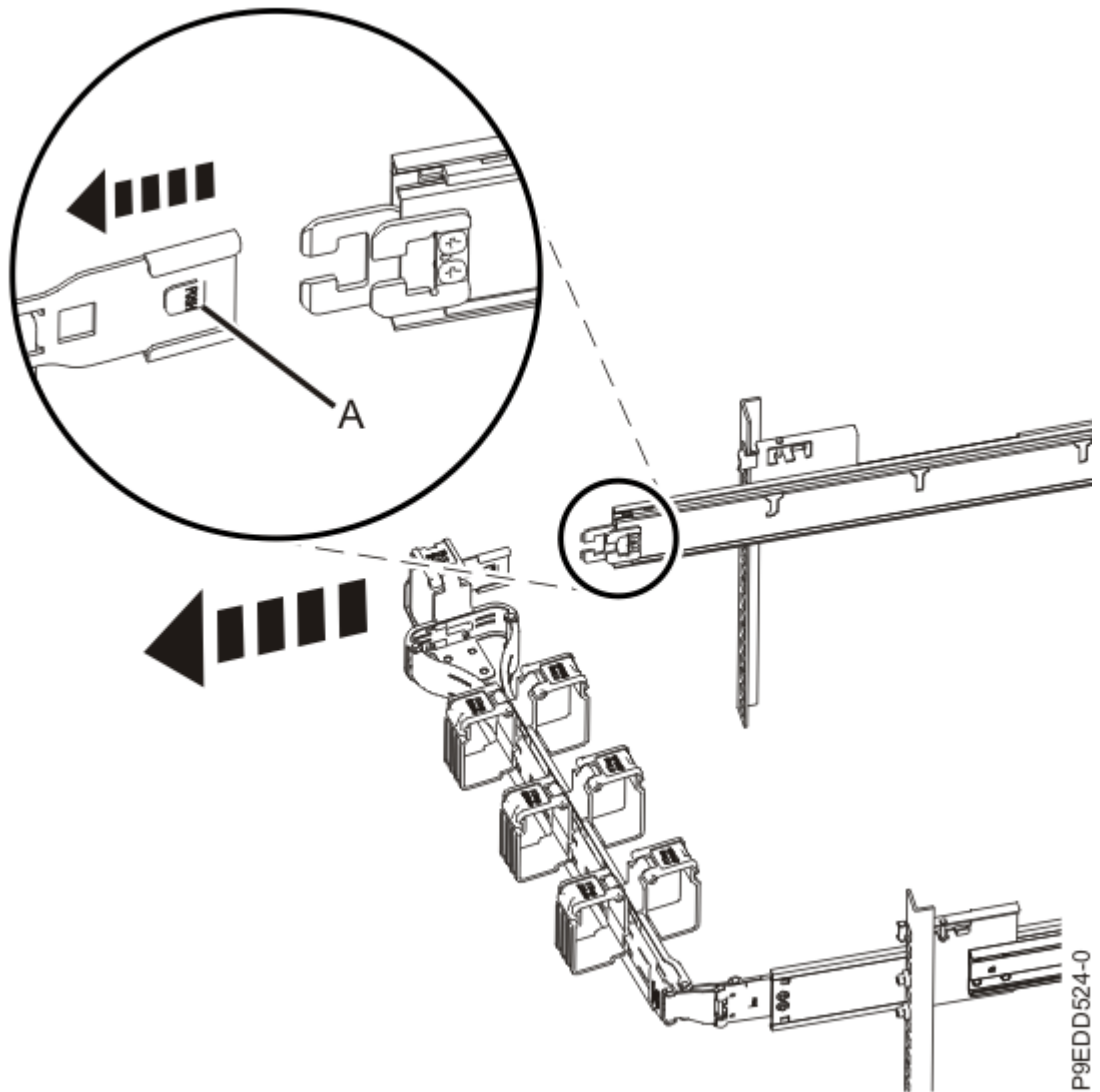


Figure 27. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- f) Physically verify that the slot you identified is where you want to remove the adapter.
- 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) Continue with step “10” on page 43.

8. To prepare to remove an adapter by using the IBM i operating system, complete the following steps:

- a) You must take the adapter offline before you remove and replace an adapter when the system power is turned on (hot-plugging). Before you take an adapter 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 adapter offline prevents a service representative or user from causing an unexpected outage for other users of the system.

- b) Is the adapter you want to replace a PCIe3 x8 non-volatile memory SSD NVMe adapter?
- **Yes:** Continue with the next step.
 - **No:** Continue with step “8.d” on page 39.
- c) If you are replacing a PCIe3 x8 non-volatile memory SSD NVMe adapter and the logical partition that controls the adapter is running the IBM i operating system, complete the following steps to ensure that all of the namespaces in the NVMe device which are mirror protected disk units are suspended from mirrored protection.
- 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.c.iv” on page 39.
- Note:** If any of the disk units in the list from step “8.c.iv” on page 39 are not shown on the Suspend Mirrored Protection display, contact your next level of support. Do not remove an NVMe device that is in use because it can cause an unexpected outage.
- d) Before hot-plugging adapters or storage devices, ensure that the file systems on those devices are unmounted.
- e) Ensure that any processes or applications that might use the adapter are stopped.
- f) To identify the location of the failed adapter by using the IBM i operating system, complete the following steps:
- 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 card. Press Enter.
 - v) If you are installing a new adapter, select the option to **Include empty positions**.
 - vi) Select **Concurrent Maintenance** on the card position where you want to remove the card, 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 adapter.
- g) If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:
- i) Release the mounting bracket from the cable management arm assembly by pressing the indentation (**A**) on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

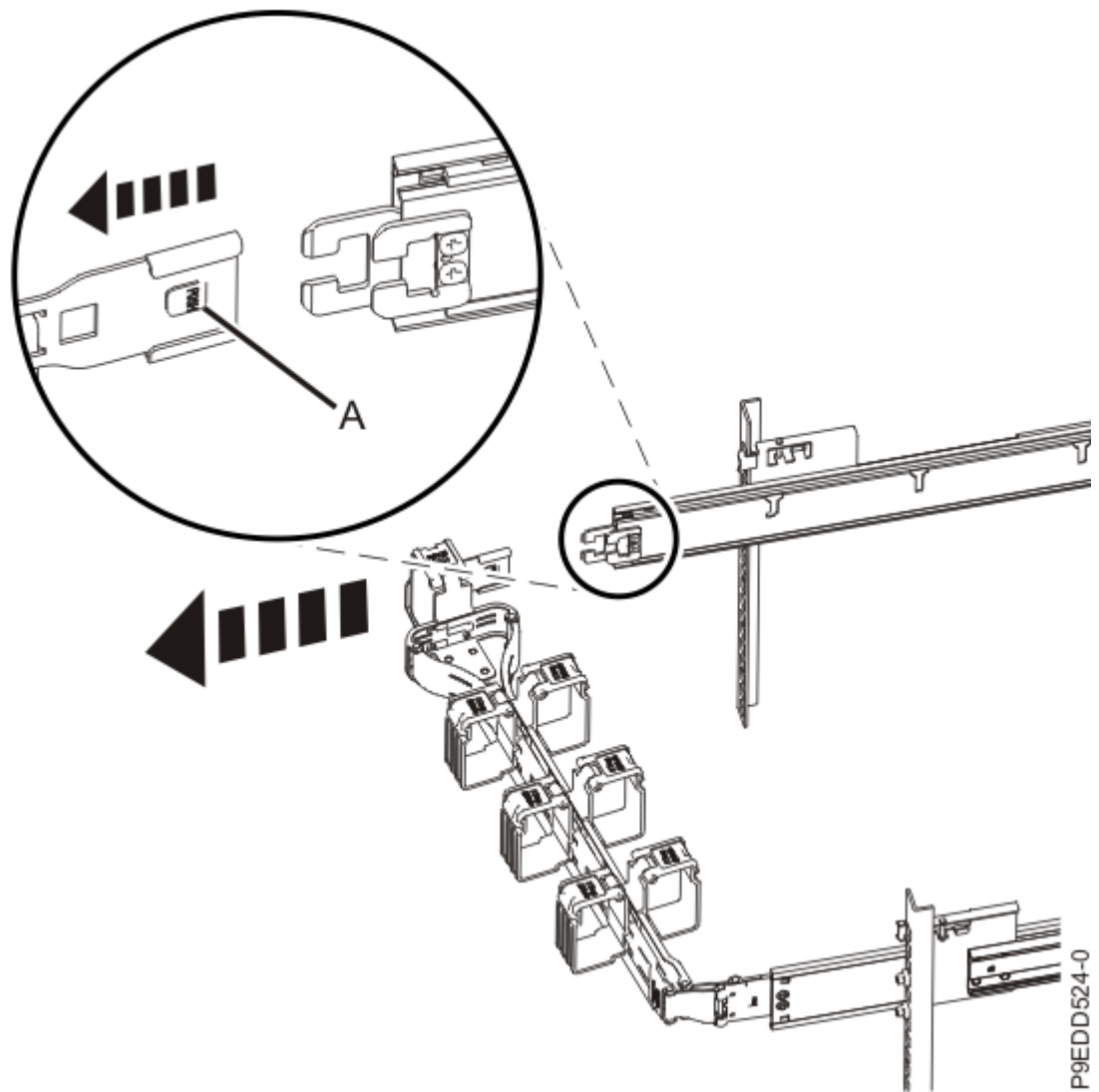


Figure 28. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- h) Physically verify that the slot you identified is where you want to remove the adapter.
- 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) 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.
- j) Continue with step “10” on page 43.
9. To prepare to remove an adapter by using the Linux operating system, complete the following steps:

- a) Before you hot-plug an adapter, ensure that the server or partition is at the correct level of the Linux operating system.
- b) Verify that the Linux, hot-plug adapter tools are installed.
For instructions, see [Verifying that the hot-plug adapter tools are installed for Linux](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_linuxhotplugverify.htm) (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 on POWER distribution with Linux kernel version 2.6 or later, you can install the Service Aids that gives 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](http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html) website (<http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html>).
- d) You must take the adapter offline before you remove and replace an adapter when the system power is turned on (hot-plugging). Before you take an adapter 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 adapter offline prevents a service representative or user from causing an unexpected outage for other users of the system.
- e) Before hot-plugging adapters or storage devices, ensure that the file systems on those devices are unmounted.
- f) Ensure that any processes or applications that might use the adapter are stopped.
- g) Use the service indicator light-emitting diodes (LEDs) to help identify the part. 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).
- h) If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:
 - i) Release the mounting bracket from the cable management arm assembly by pressing the indentation **(A)** on the inner cable management arm tab. The cable management arm releases from the outer mounting bracket in the direction shown.

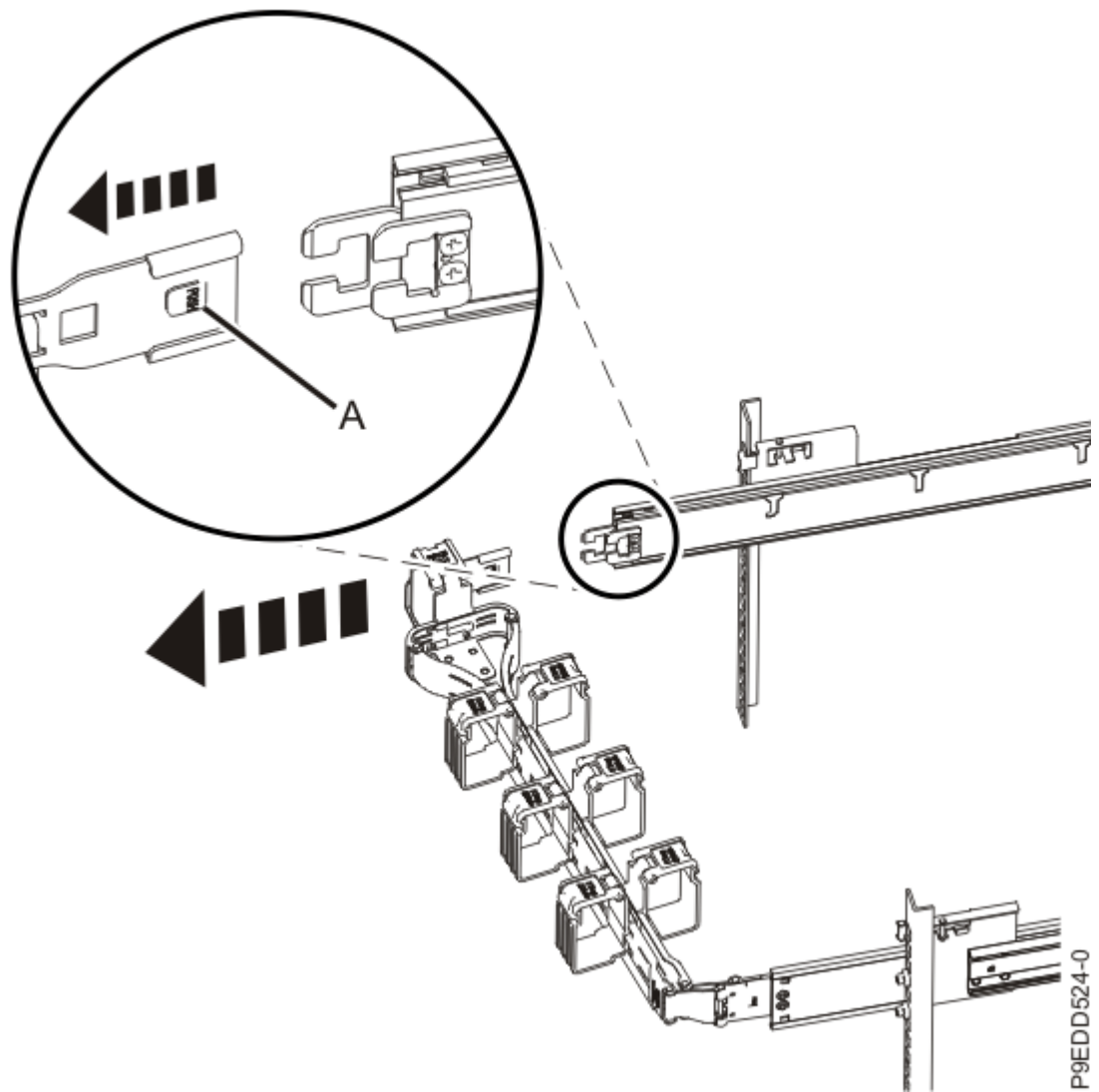


Figure 29. Releasing the mounting bracket

- ii) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

- i) Physically verify that the slot you identified is where you want to install the adapter.
- 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 unoccupied slot that was selected by using the identify function.
- j) Use the Linux operating system **dmgr** command to prepare the adapter to be removed when the system power is turned on.
- i) Type the following command:

```
dmgr -c pci -r -s locationcode
```


Where *locationcode* is replaced with the location you identified earlier. For example, U7879.001.DQD014E-P1-C3.

The following screen is displayed.

```
The visual indicator for the specified PCI slot has been set to the
identify state. Press Enter to continue or enter x to exit.
```

ii) Physically verify that the slot you identified is where you want to remove the adapter.

Notes:

- 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 the flashing amber LED, which identifies the slot that was selected by using the identify function.

iii) Press Enter. The slot is ready to have an adapter removed. Continue to follow these instructions until you are told to remove the adapter.

10. Label and disconnect all of the cables or transceivers that are attached to the adapter you plan to remove.

Use a hook-and-loop fastener to hold the cables in place.

11. If the cable management arm is open, close it by completing the following steps:

- a) Swing the cable management arm towards the server.
- b) Insert the inner cable management arm tab **(A)** into the outer mounting bracket **(B)** until it clicks into place as shown. The inner mounting bracket **(C)** is not used on the left side.

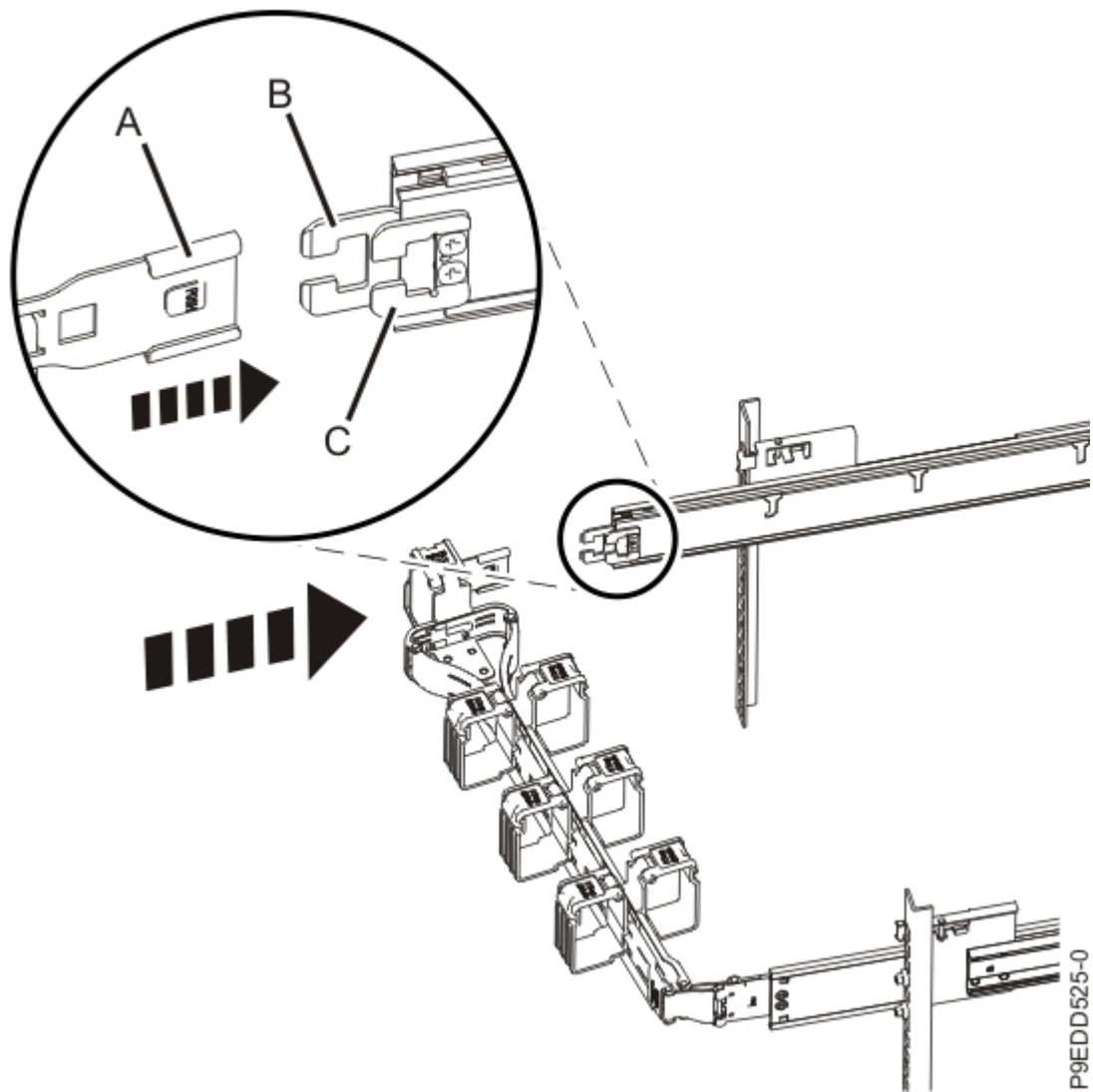


Figure 30. Closing the cable management arm

12. If applicable, open the rack front door.
13. For a rack-mounted system, open the side latches **(A)** and pull the latches to slide the system unit fully into the service position until the slides click and hold the system unit securely. Ensure that the screws inside the latches are not secured to the rack.

See the following figure.

Remove the hook-and-loop fasteners that secure the cable management arms. Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the system do not catch or bind as you pull the system unit into the service position.

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.

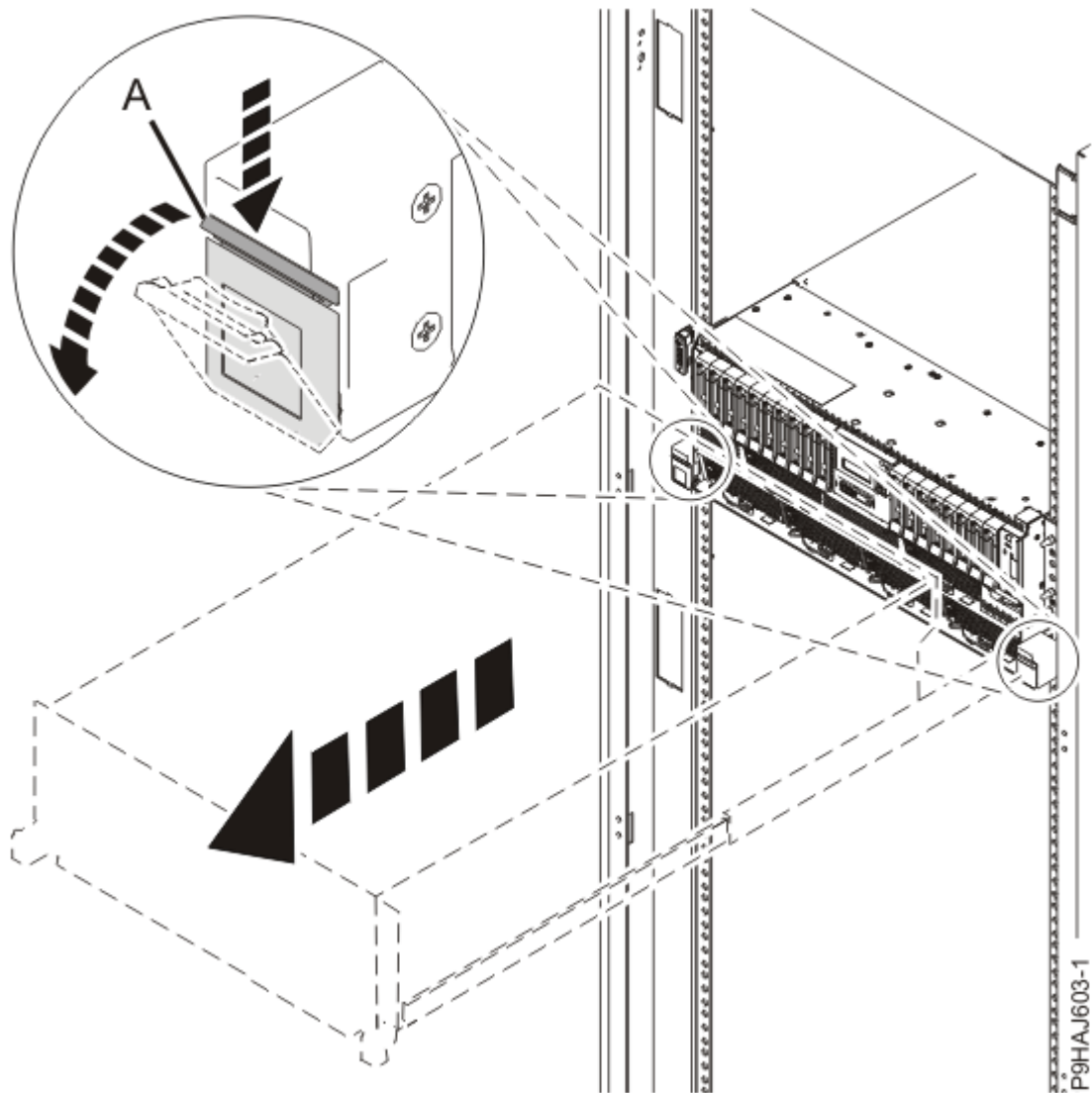


Figure 31. Releasing the side latches

14. 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.

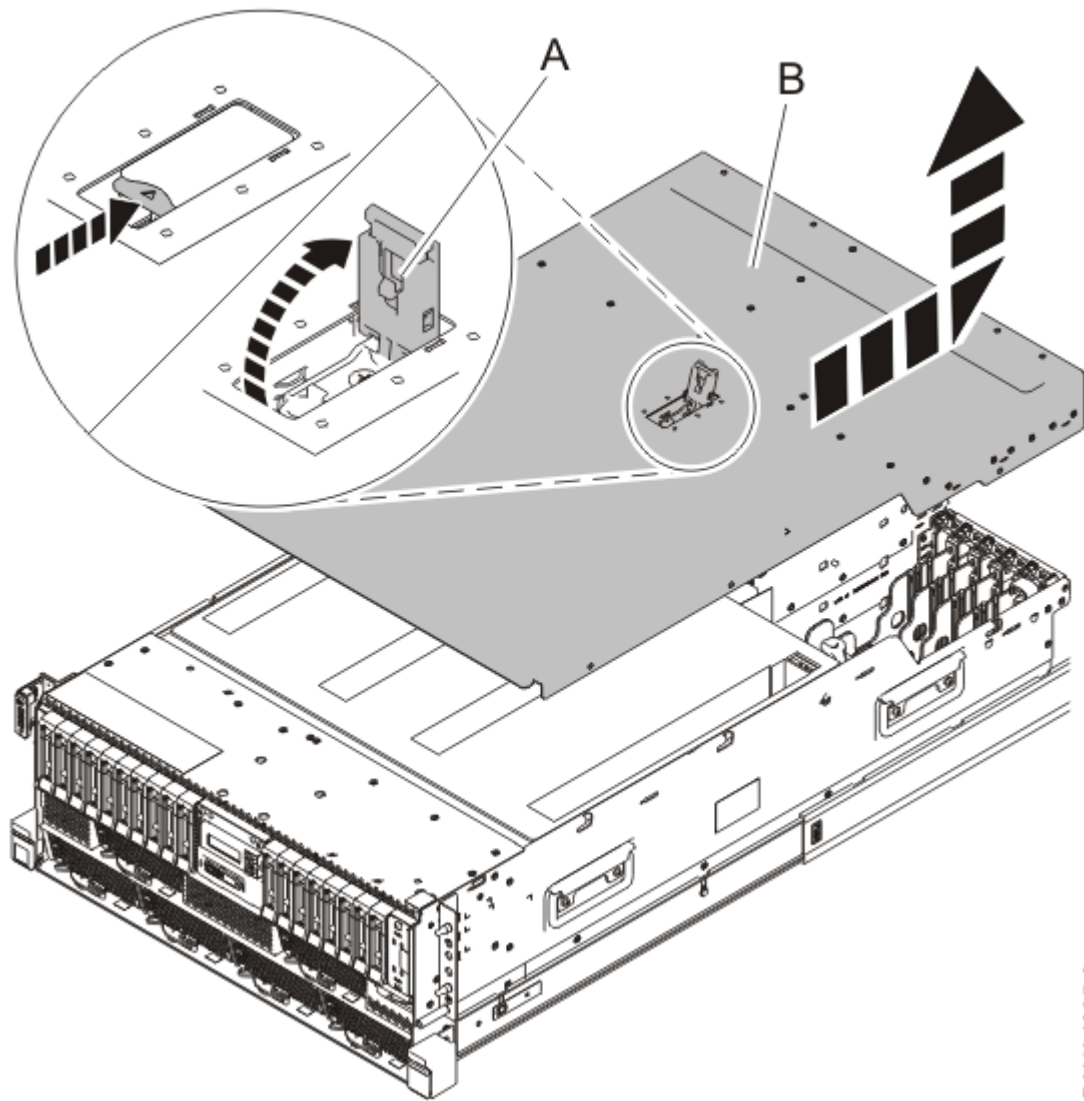
15. Remove the service access cover.

For a rack-mounted system, complete the following steps. Refer to [Figure 32 on page 47](#).



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.

- a. Release the service cover latch by pushing the release latch **(A)** in the direction shown.
- b. Slide the cover **(B)** off the system unit. When the front of the service access cover clears the upper frame ledge, lift the cover up and off the system unit.



P9HAJ605-2

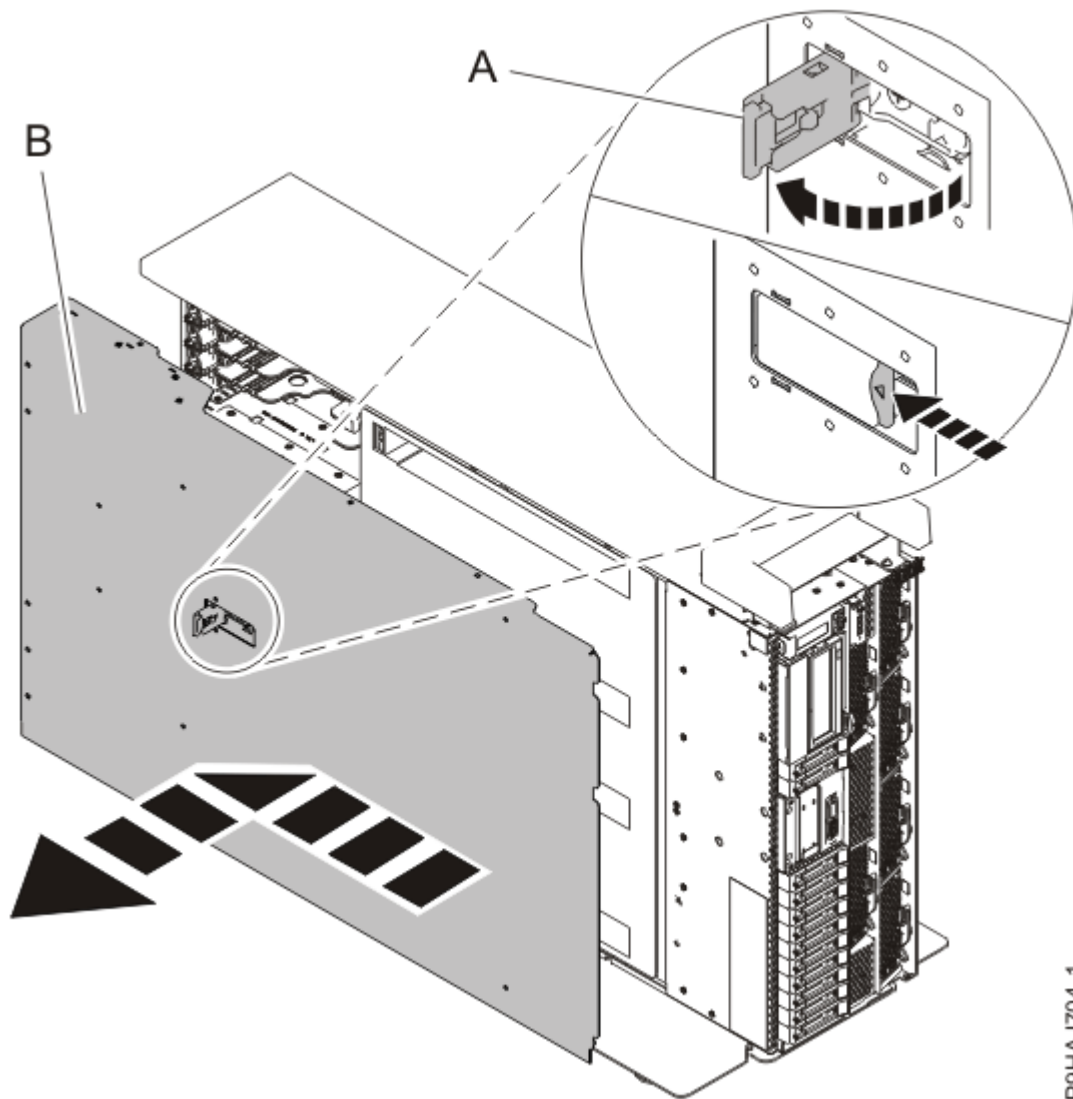
Figure 32. Removing the service access cover from a rack-mounted system

For a stand-alone system, complete the following steps. Refer to [Figure 33](#) on page 48.



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.

- a. Release the latch by pushing the release latch **(A)** in the direction shown.
- b. Slide the cover **(B)** off the system unit. When the front of the service access cover has cleared the upper frame ledge, lift the cover up and off the system unit.



P9HAJ704-1

Figure 33. Removing the service access cover

Removing an adapter from the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system


To remove an adapter 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 adapter, complete the following steps:
 - a) Set the adapter latch **(A)** in the target slot to the open position by rotating the latch **(A)** in the direction that is shown in the following figure.

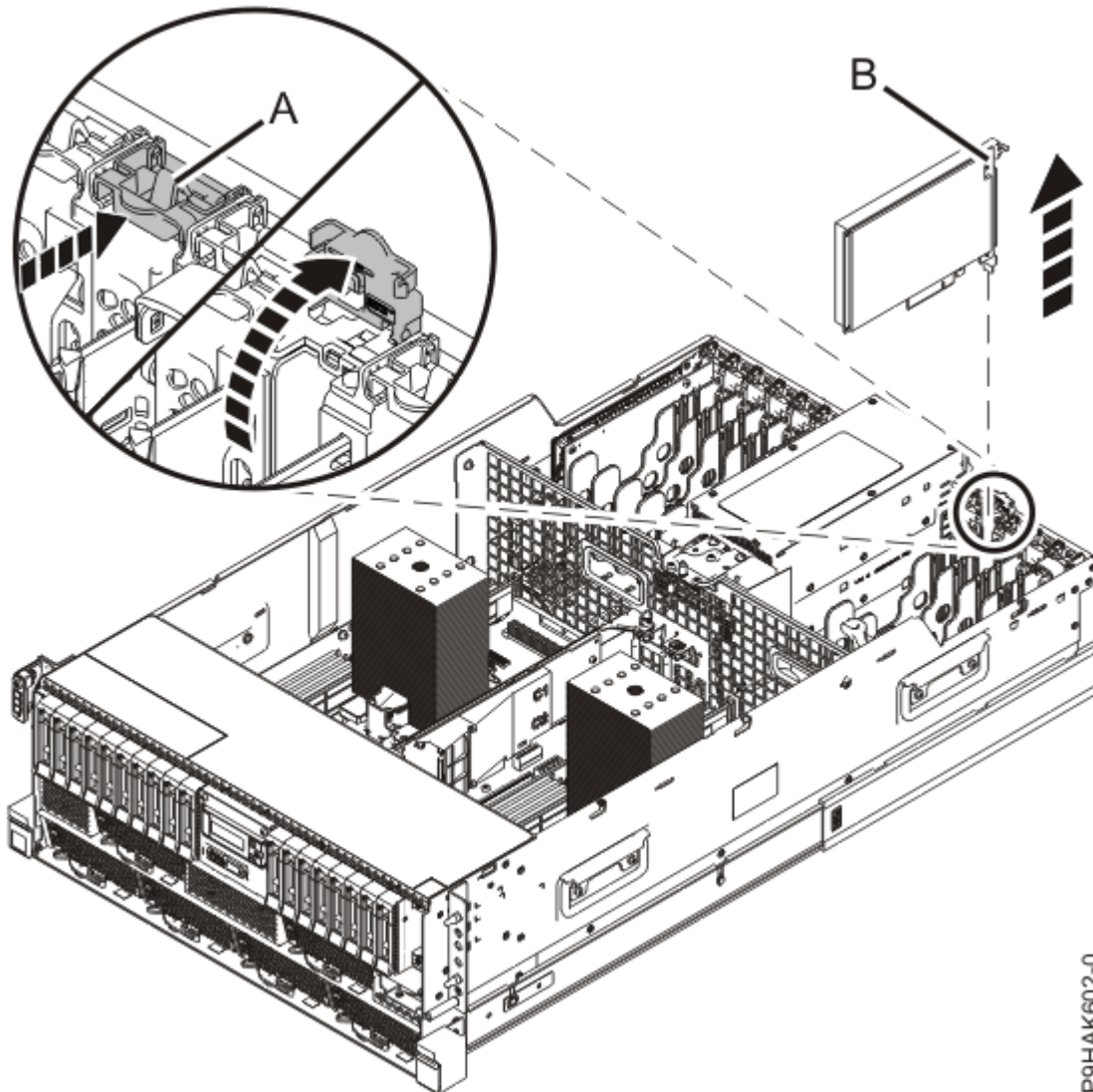
(L007)



 **CAUTION:** A hot surface nearby. (L007)

b) Carefully grasp the adapter **(B)** by its top edge or tailstock, and remove the adapter from the slot as shown in the following figure.

 **Attention:** A pin on the tailstock of the adapter resembles a removable screw. Do not remove this pin. It is required for correct alignment and seating.



P9HAK602-0

Figure 34. Removing an adapter from a 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S rack-mounted system

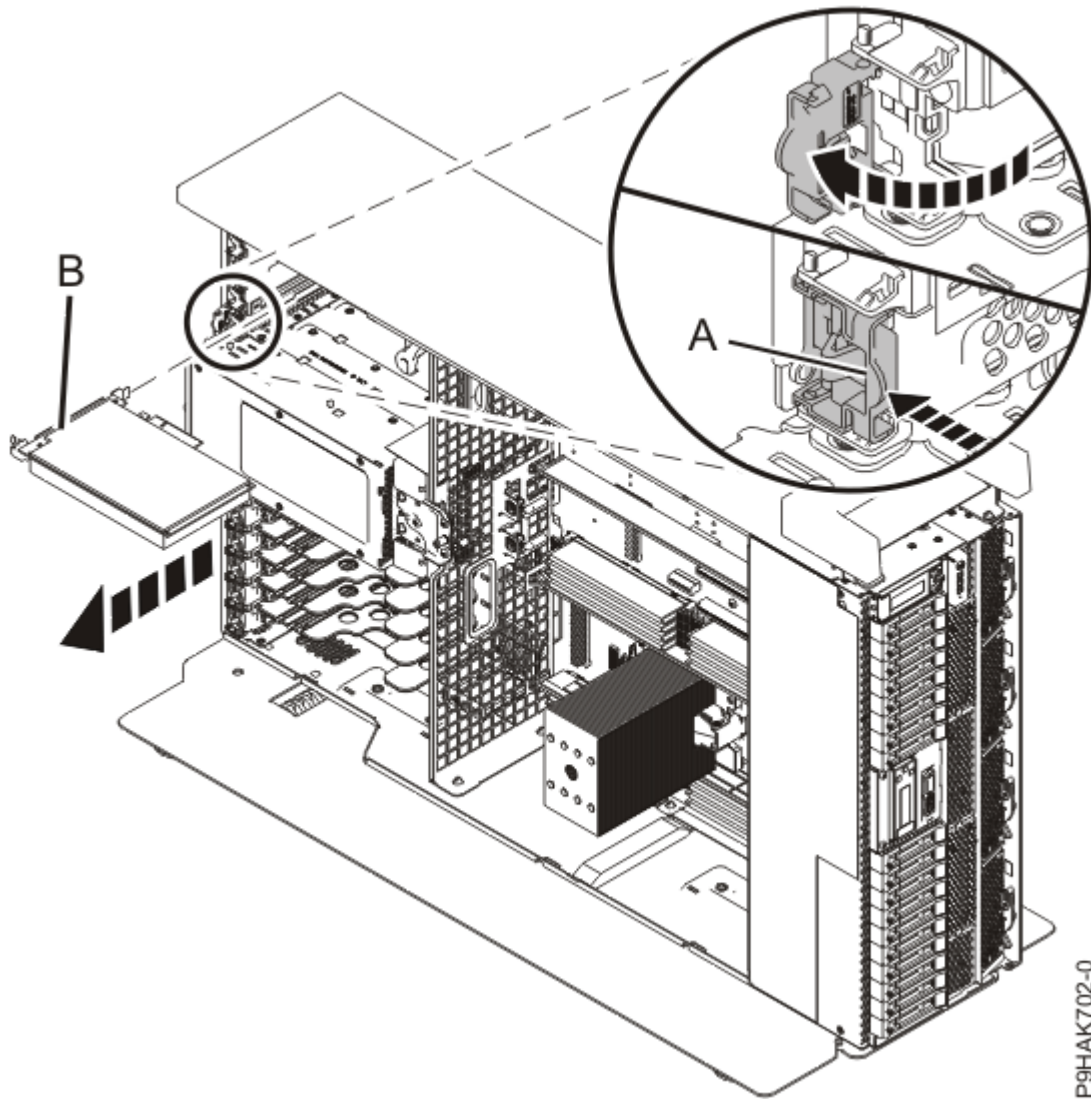


Figure 35. Removing an adapter from the 9009-41A stand-alone system

3. Place the removed adapter on an approved ESD surface.

Replacing an adapter in the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system

To replace an adapter 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. Ensure that the target slot is empty.
3. If necessary, remove the adapter from the antistatic package.

Attention: Avoid touching the components and gold connectors on the adapter.

4. Place the adapter, component-side up, on a flat, antistatic surface.



Attention: A pin on the tailstock of the adapter resembles a removable screw. Do not remove this pin. It is required for correct alignment and seating.

5. Choose from the followings options:

- If the system power is turned off, continue with step “11” on page 51.
- If the system power is turned on and you are using the IBM i operating system, continue with step “11” on page 51.
- If you are using the AIX or Linux operation system, read the following note:

Important: You need to work with the system administrator to prepare the adapter slot to receive the adapter. If this process exceeds the 10-minute service limitation with the system access cover removed, place the service access cover back on the system before working with the system administrator to maintain proper system cooling.

Then, choose from the following options:

- If the system power is turned on and you are using the AIX operating system, continue with step “6” on page 51.
 - If the system power is turned on and you are using the Linux operating system, continue with step “8” on page 51.
6. If you are using the AIX operating system, use the **diag** command on the console to prepare the slot to accept an adapter.
 - a) Select **Add a PCI Hot Plug adapter** from the **Hot Plug Manager** menu.
 - b) Select the slot from where you removed the adapter.
 - c) Press Enter again to put the slot into the action state.
A fast-flashing amber LED at the rear of the system near the adapter indicates that the slot is identified and is ready to receive the adapter.
 7. Continue with step “9” on page 51.
 8. If you are using the Linux operating system, use the `dimgr` command on the console to prepare the slot to accept an adapter.

For example, to install the adapter in slot U7879.001.DQD014E-P1-C3, type:

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

In this example, you would replace *locationcode* with U7879.001.DQD014E-P1-C3.

Follow the instructions on the display to complete the task.

9. Ensure that you have on the ESD strap.
10. If necessary, remove the service access cover.
11. To replace an adapter, complete the following steps:
 - a) If the adapter latch (**B**) at the target slot on the system is not already in the open position, pull the latch into the open position by rotating the latch outwards from its clip on the back of the system.

(L007)



CAUTION: A hot surface nearby. (L007)



Attention: The system supports full-height tailstock brackets only. If your adapter shipped with a low-profile tailstock, you might need to change it.

- b) Press the adapter firmly into its connector ensuring that it is seated.
- c) To lock the adapter in its slot, rotate the adapter latch (**B**) in the direction that is shown.

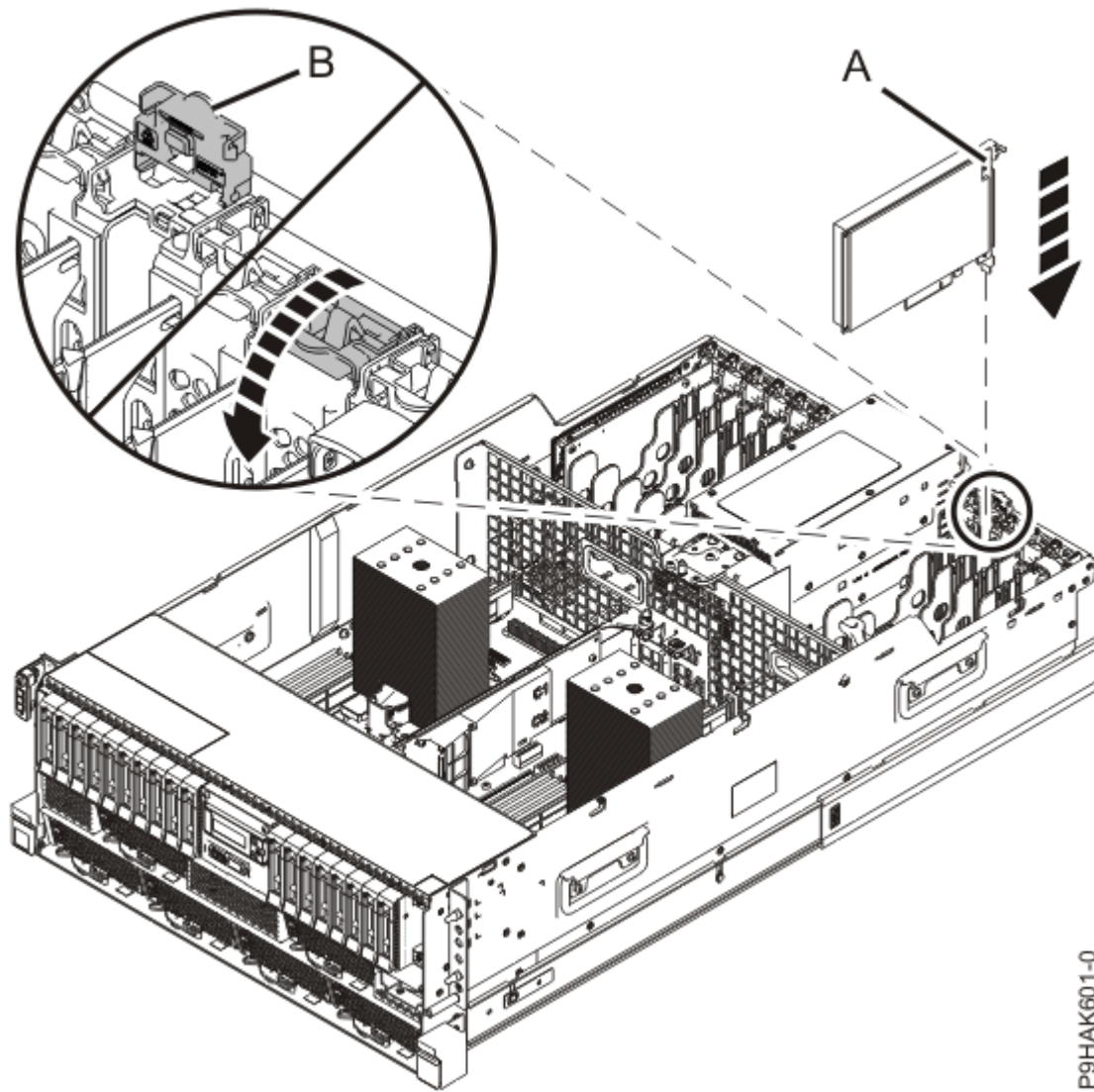


Figure 36. Installing or replacing an adapter in a 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S rack-mounted system

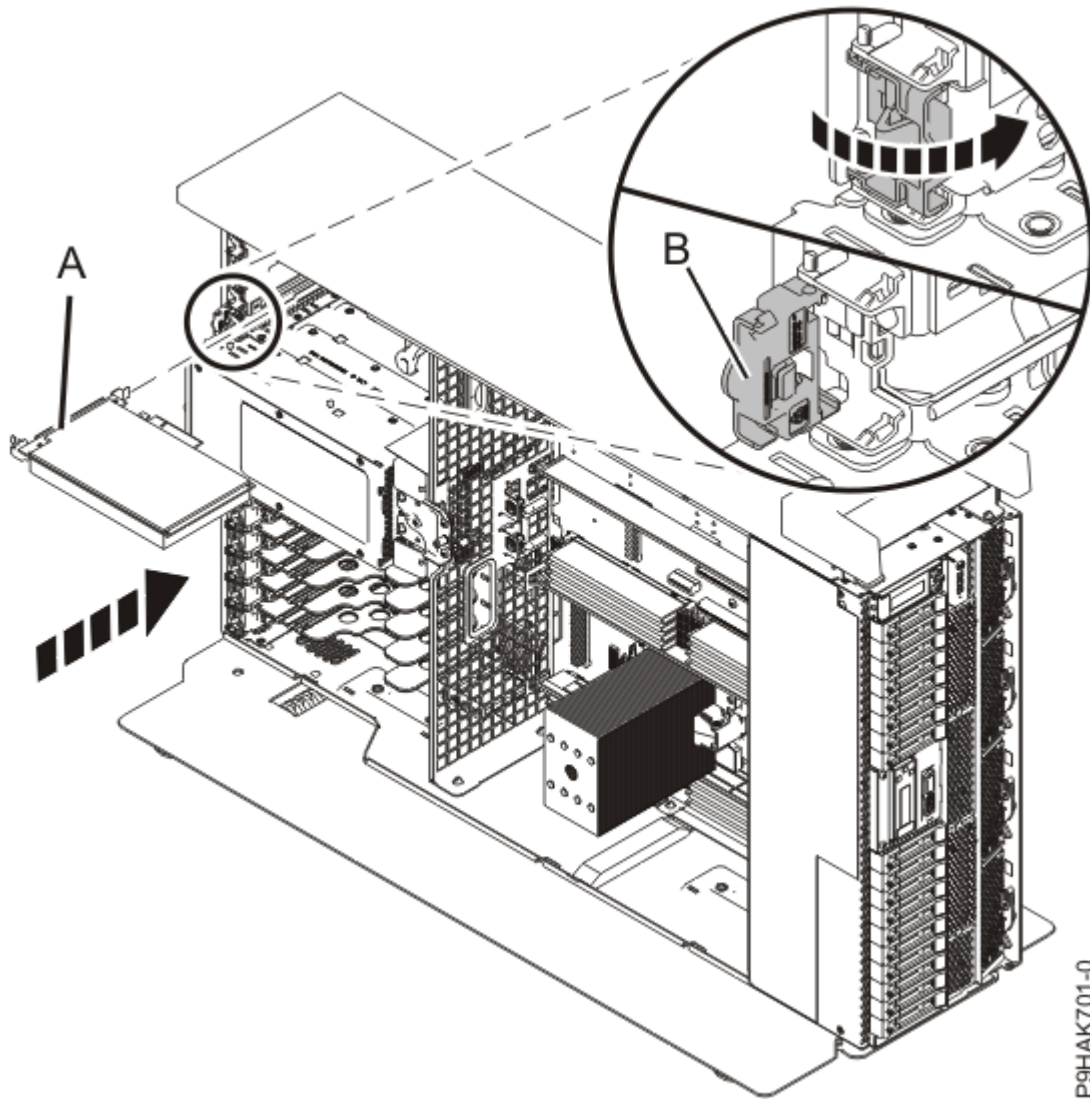


Figure 37. Installing or replacing an adapter in the 9009-41A stand-alone system.

Preparing the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system for operation after removing and replacing an adapter

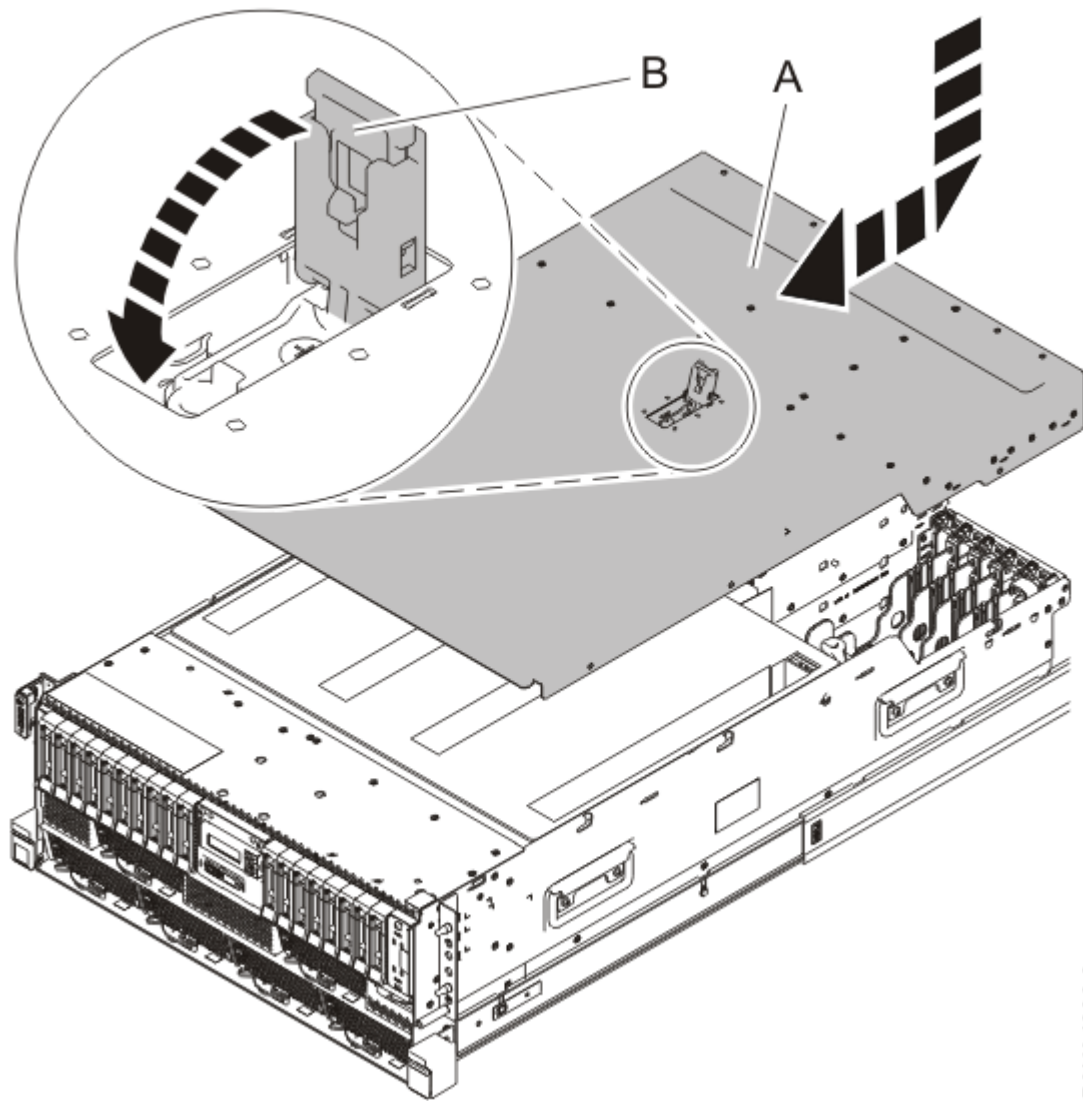
To prepare the system for operation after removing and replacing an adapter, complete the steps in this procedure.

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. Replace the service access cover.

For a rack-mounted system, complete the following steps. Refer to [Figure 38 on page 54](#).

- a. Slide the cover **(A)** onto the system unit.
- b. Close the release latch **(B)** by pushing it in the direction shown.

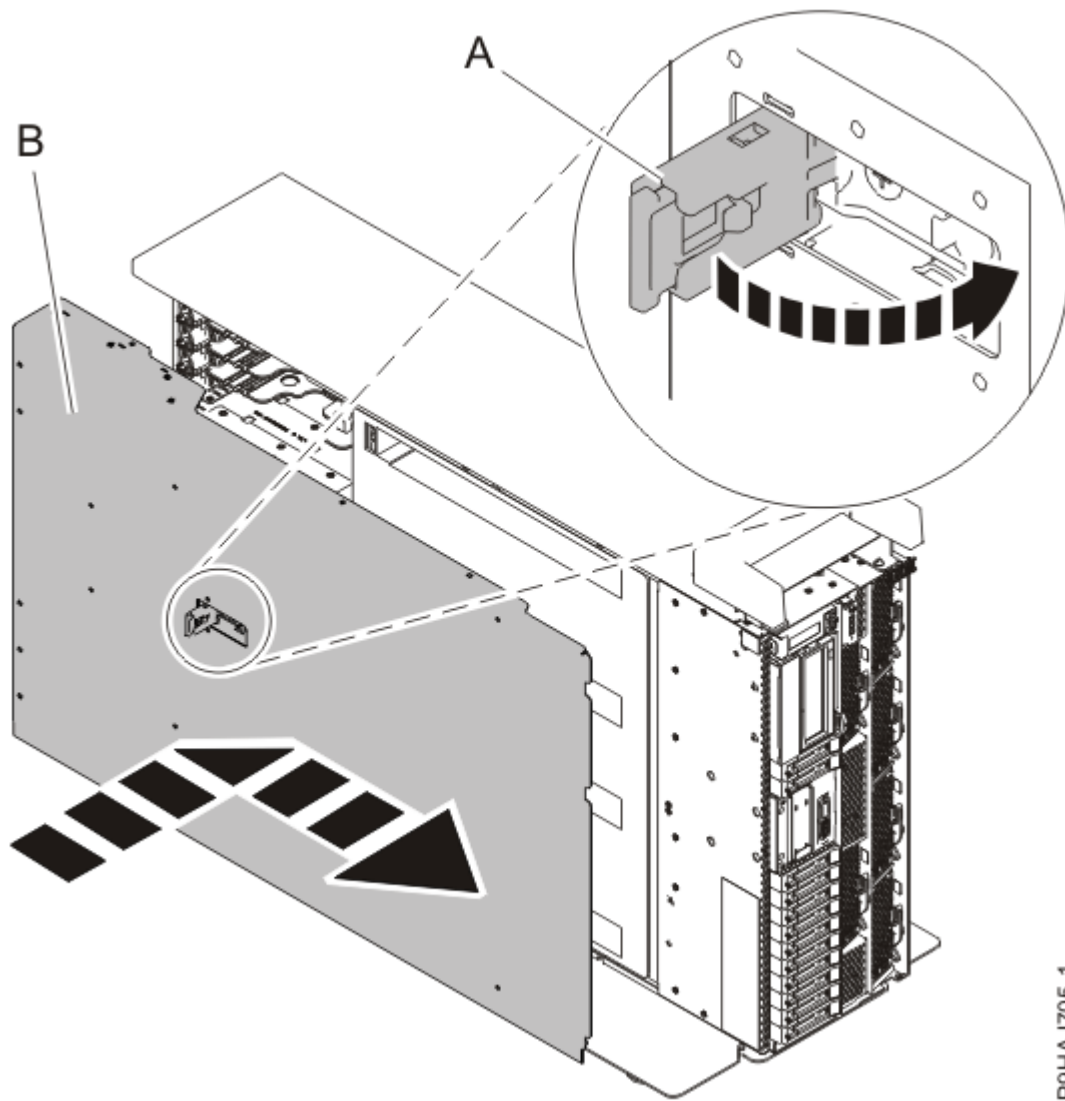


P9HAJ606-2

Figure 38. Installing the service access cover

For a stand-alone system, complete the following steps. Refer to [Figure 39 on page 55](#).

- a. Slide the cover **(B)** on to the system unit as shown.
- b. Close the latch release **(A)** by pushing it in the direction shown.



P9HAJ705-1

Figure 39. Installing the service access cover

3. For a rack-mounted system, unlock the blue rail safety latches (**A**) as shown in [Figure 40 on page 56](#) by pushing them inward.

Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the unit do not catch or bind as you push the unit into the operating position.

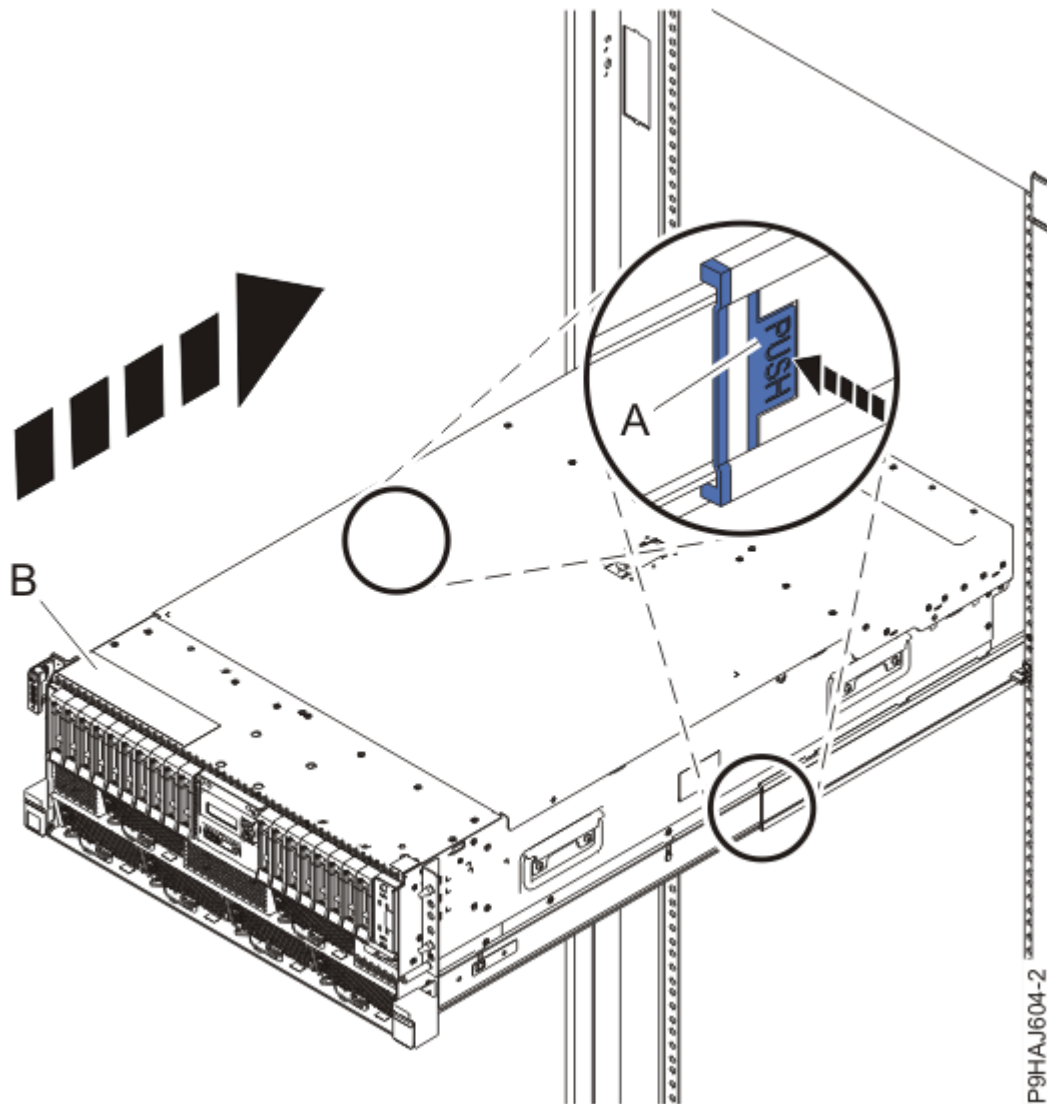


Figure 40. Placing the system into the operating position

4. For a rack-mounted system, push the system unit (**B**) as shown in the previous figure back into the rack until both release latches lock the system into position.

Secure the cable management arm with hook-and-loop fasteners around the back side of the cable management arm, but not around the cables.

5. If applicable, open the rack door at the rear of the system.
6. If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:

Note: If you are removing or replacing the system backplane, you must open the cable management arm.

- a) Release the mounting bracket from the cable management arm assembly by pressing the indentation (**A**) on the inner cable management arm tab.

The cable management arm releases from the outer mounting bracket in the direction shown.

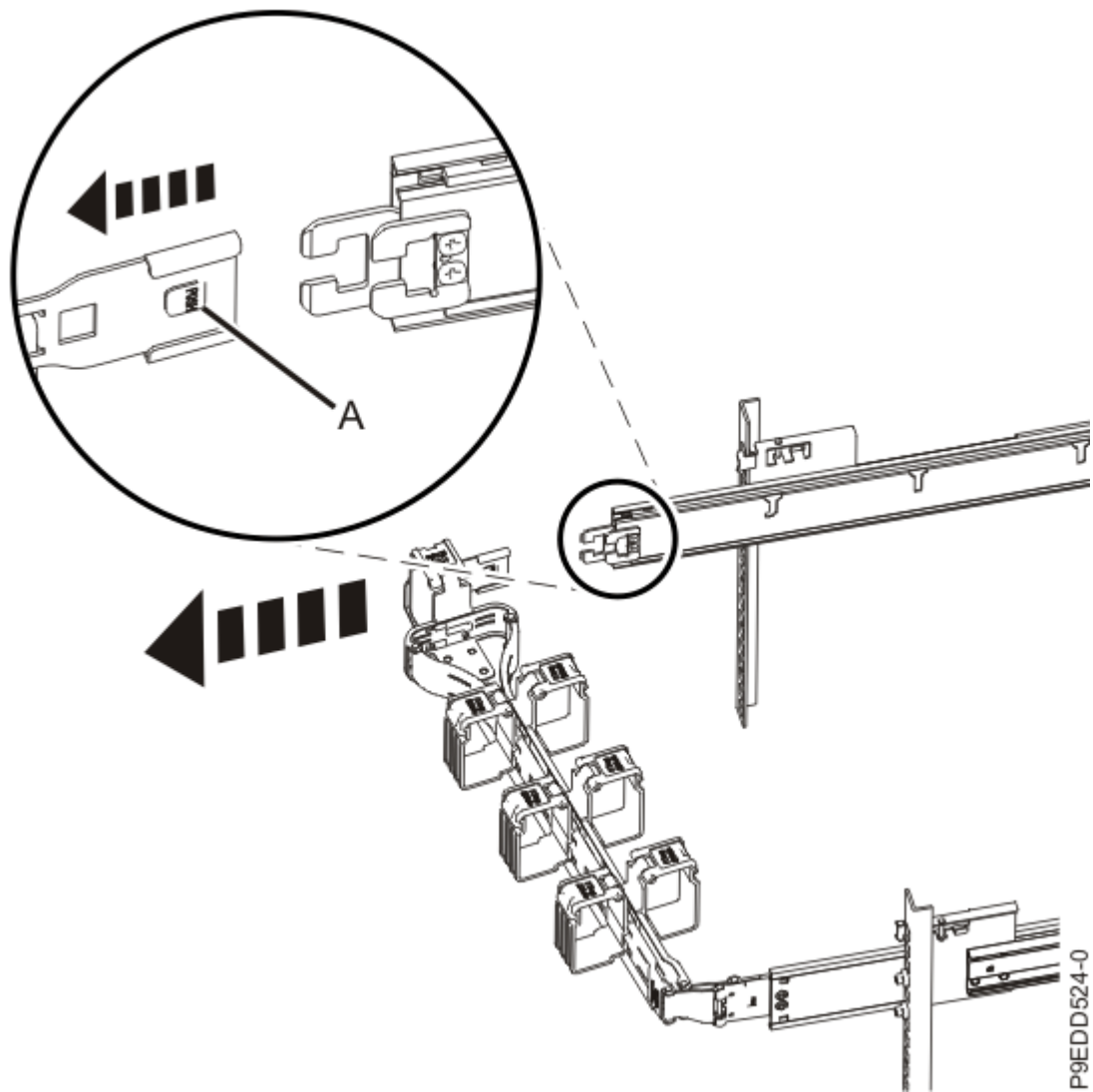


Figure 41. Releasing the cable management arm

- b) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

7. If removed, connect the cables or transceivers to the adapter.
8. If you are servicing a rack-mounted system, route the cables through the cable-management arm.
9. 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 42](#) on page 58 or [Figure 43](#) on page 59.

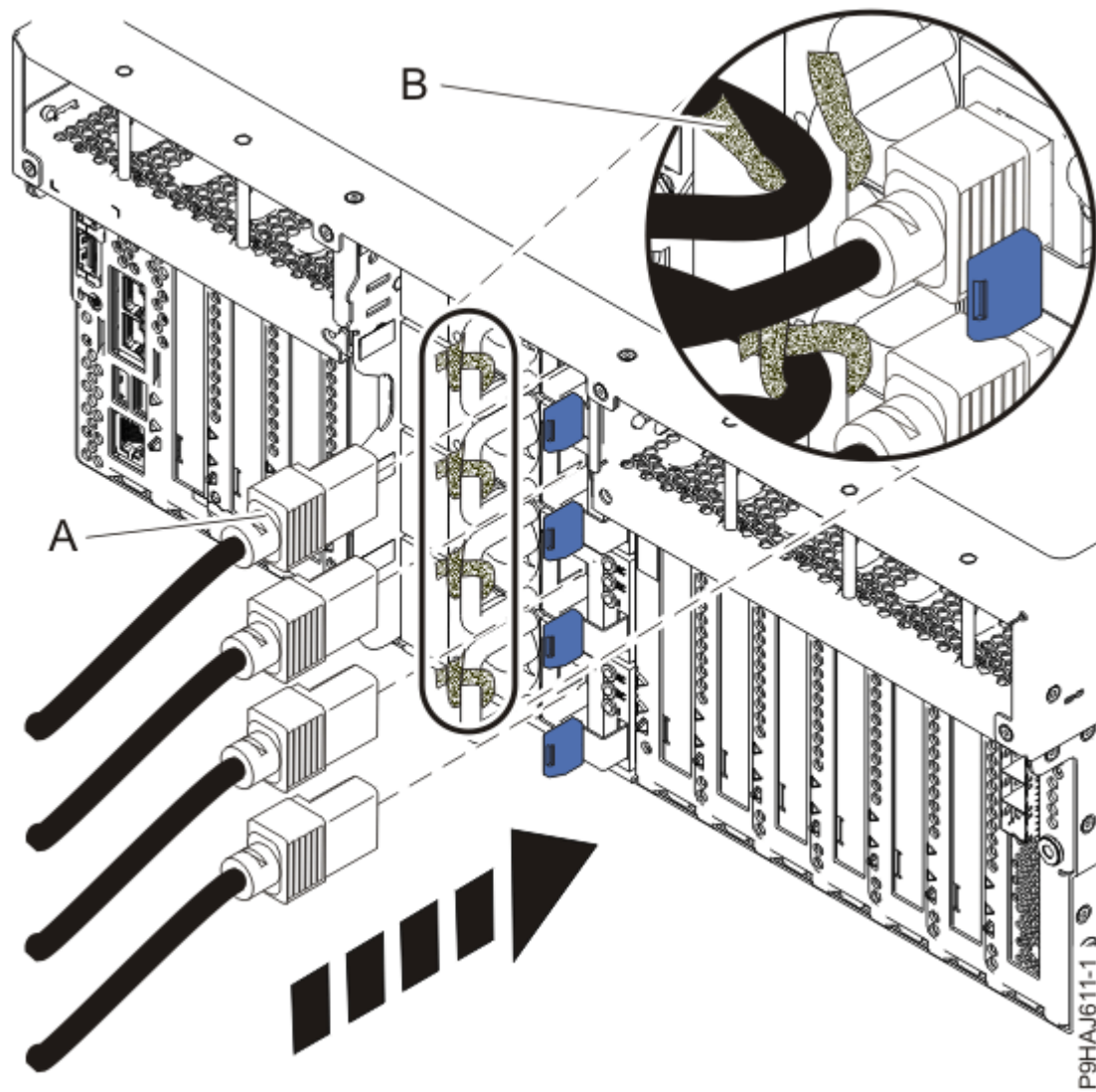


Figure 42. Connecting the power cords to a rack-mounted system

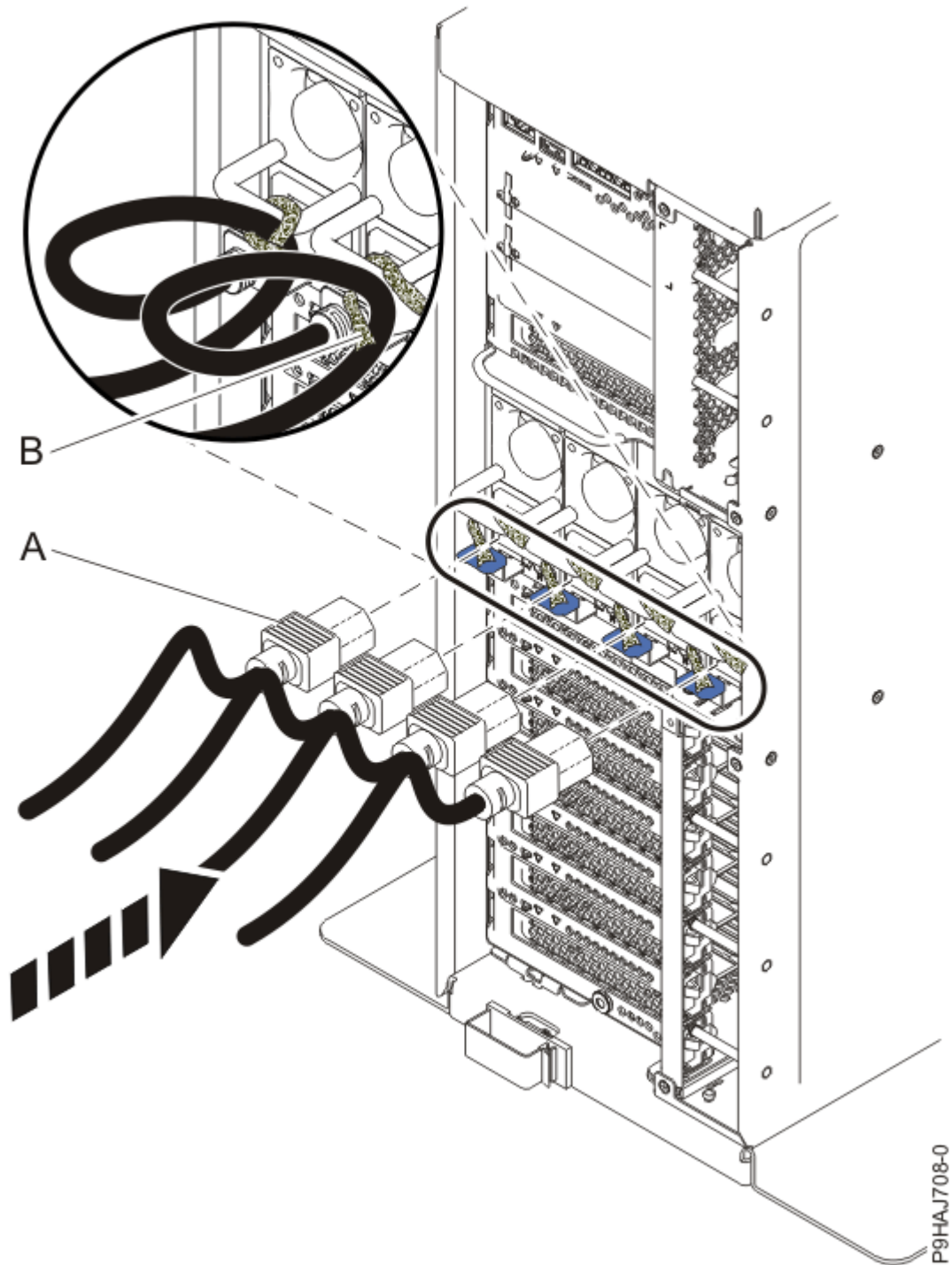


Figure 43. Connecting the power cords to a stand-alone system

10. If the cable management arm is open, close it by completing the following steps:
 - a) Swing the cable management arm towards the server.
 - b) Insert the inner cable management arm tab **(A)** into the outer mounting bracket **(B)** until it clicks into place as shown. The inner mounting bracket **(C)** is not used on the left side.

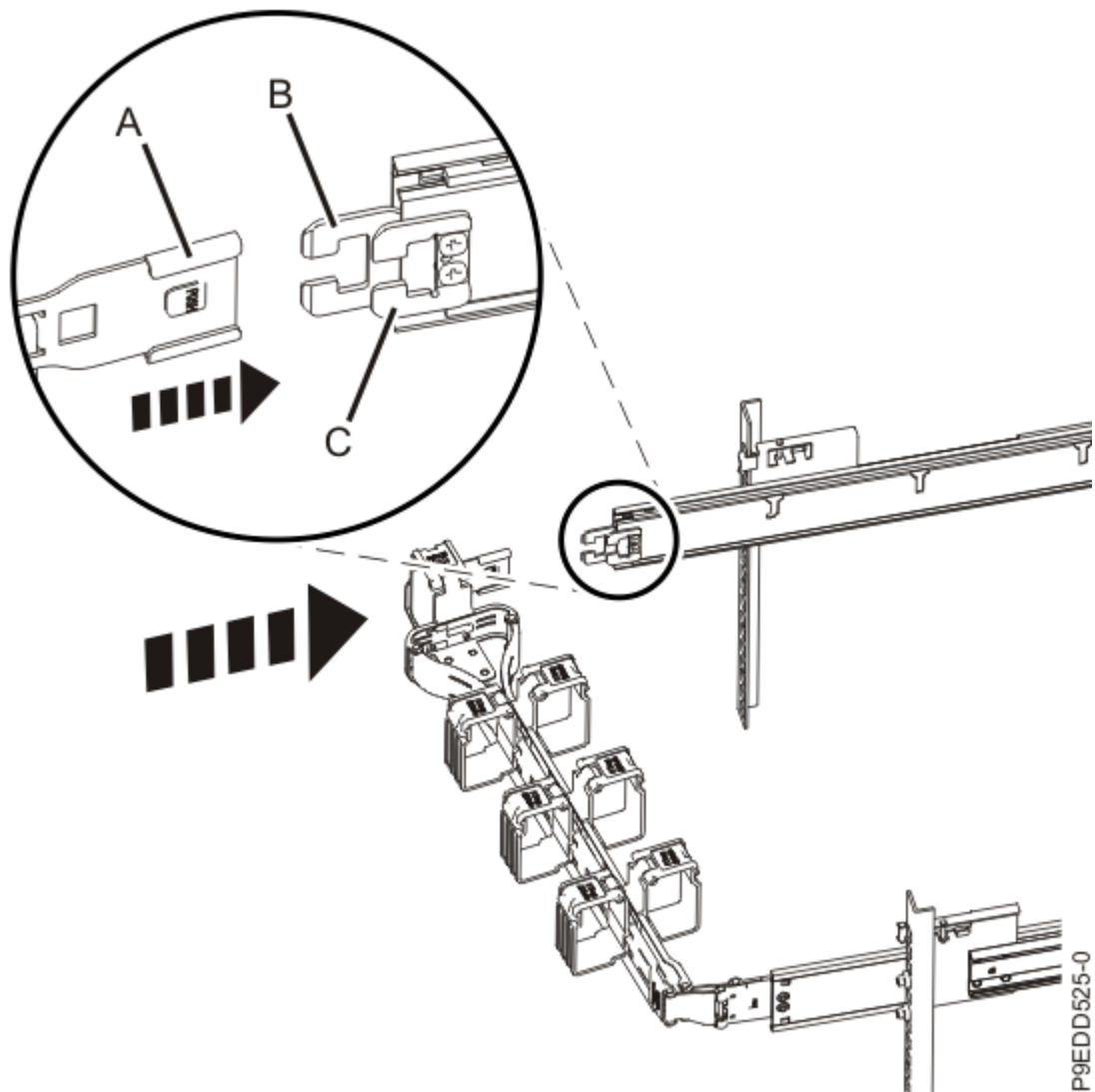


Figure 44. Closing the cable management arm

11. Close the rack door at the rear of the system.
12. Choose from the following options:
 - If you completed the procedure with the system power turned off, continue with step “13” on page 60.
 - If you are using the AIX operating system, continue with step “14” on page 60.
 - If you are using the IBM i operating system, continue with step “16” on page 61.
 - If you are using the Linux operating system, continue with step “20” on page 62.
13. To prepare the system for operation when the system is powered 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 “21” on page 62.
14. If you are using the AIX operating system, complete the following steps to configure the adapter:
 - a) Press the F3 key to return to the Task Selection list.
 - b) Select **Log Repair Action**.
 - c) Select the resource that was replaced and select **Commit**.
 - d) Press the **F3** key to return to **Task Selection List**.
 - e) Select **Hot Plug Task > PCI Hot Plug Manager > Configure a defined device**.

- f) Select the device that you replaced from the list, and then press Enter. The device is now configured.
- g) Press the F10 key to exit the diagnostic program.
15. If you are using the AIX operating system, complete the following steps to verify the adapter replacement:
- If the diagnostic menu is not displayed, type the `diag` command.
 - Select **Advance Diagnostic Routines > Problem Determination**.
 - Select the name of the resource that was replaced from the menu. If the resource replaced is not shown, choose the resource that is associated with it.
 - Press Enter, and then press **Commit (F7 or Esc+7)**.
 - 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.
 - Press the **F10** key to exit the diagnostic program.
 - Continue with step [“21” on page 62](#).
16. 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.
17. Did you replace a PCIe3 x8 non-volatile memory SSD NVMe adapter?
- **Yes:** Continue with step [“18” on page 61](#).
 - **No:** Continue with step [“21” on page 62](#).
18. If you replaced a PCIe3 x8 non-volatile memory SSD NVMe adapter and the logical partition that controls the adapter is running the IBM i operating system, complete the following steps to prepare the NVMe adapter for operation:
- Start the IBM i System Service Tools (STRSST), and specify the user name and password.
 - On the System Service Tools (SST) display, select **Work with disk units > Work with disk configuration > Work with NVM Devices > Delete existing NVM Namespaces**.
 - Select the device that you replaced.
 - 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:
 - Select **4=Delete Namespace** for each of the listed namespaces.
 - Press F10 to confirm the deletion of the namespaces.
 - Press F12 to return to the SST main menu.
 - On the System Service Tools (SST) display, select **Work with disk units > Work with disk configuration > Work with NVM Devices > Create NVM Namespaces to pair with Active mirror protected NVM units**.
 - Select the NVMe device that you replaced.
 - On the **Create NVM Namespaces - Show the Units Suspended from Mirror Protection** display, press F7 to select all of the suspended disk units.
 - Press F10 to confirm the creation of the listed namespaces that will be paired with the suspended disk units.

Note: The operation will create new namespaces on the selected NVMe device, pair the new namespaces with the suspended NVMe disk units, and start to resume mirror protection on the newly created disk units.

i) Press F12 to return to the SST main menu.

19. Continue with step “21” on page 62.

20. 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 or replace the adapter 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 adapter was U7879.001.DQD014E-P1-C3.

Enter **lsslot -c pci -s U7879.001.DQD014E-P1-C3**

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

```
# Slot                Description                Device(s)
U7879.001.DQD014E-P1-C3 PCI-X capable, 64 bit, 133MHz slot 0001:40:01.0
```

21. 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).

22. 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).

23. If you replaced a Fibre Channel adapter, the customer might need to update the Fibre Channel SAS path to the external storage subsystems with the new WWPN number or numbers.

Permanently removing an adapter from the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system

Find information about permanently removing an adapter from the IBM Power System S914 (9009-41A and 9009-41G), IBM Power System S924 (9009-42A and 9009-42G), IBM Power System H924 (9223-42H), or IBM Power System H924S (9223-42S) server.

About this task

Note: Removing or replacing 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 your system is not managed by an HMC, complete the steps in the following procedures to permanently remove an adapter from the system.

Preparing the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system to permanently remove a PCIe adapter

To prepare the system to permanently remove an adapter from the system, complete the steps in this procedure.

Before you begin

Procedure

1. Take appropriate precautions for avoiding electric shock and for handling static-sensitive devices. For more information, see [“Avoiding electric shock” on page 85](#) and [“Handling static-sensitive devices” on page 86](#).
2. Review the locations of the adapter slots and the service indicators for the adapter that you want to service. The adapters are viewed at the rear of the system.

Figure 45 on page 64 and Figure 46 on page 65 show the locations of the adapter in a system and the locations of the light-emitting diodes (LEDs) for the adapter.

The adapter has two LEDs that indicate the status:

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

The status of the LEDs are as follows:

- **(B)** Indicates that the adapter is operating correctly. The green power LED (top LED) is lit solid and the amber fault LED (bottom LED) is off.
- **(C)** Indicates that the adapter is not operating correctly. The green power LED (top LED) is lit solid and the amber fault LED (bottom LED) is lit solid.
- **(D)** Indicates the faulty or failed adapter was selected by using the identify function. The green power LED (top LED) might or might not be lit and the amber fault LED (bottom LED) is flashing.



Attention: If the adapter is operating correctly, then the Activity LED is ON (green) and the Error amber LED is OFF, as shown in (B). Do not attempt to remove a working adapter.

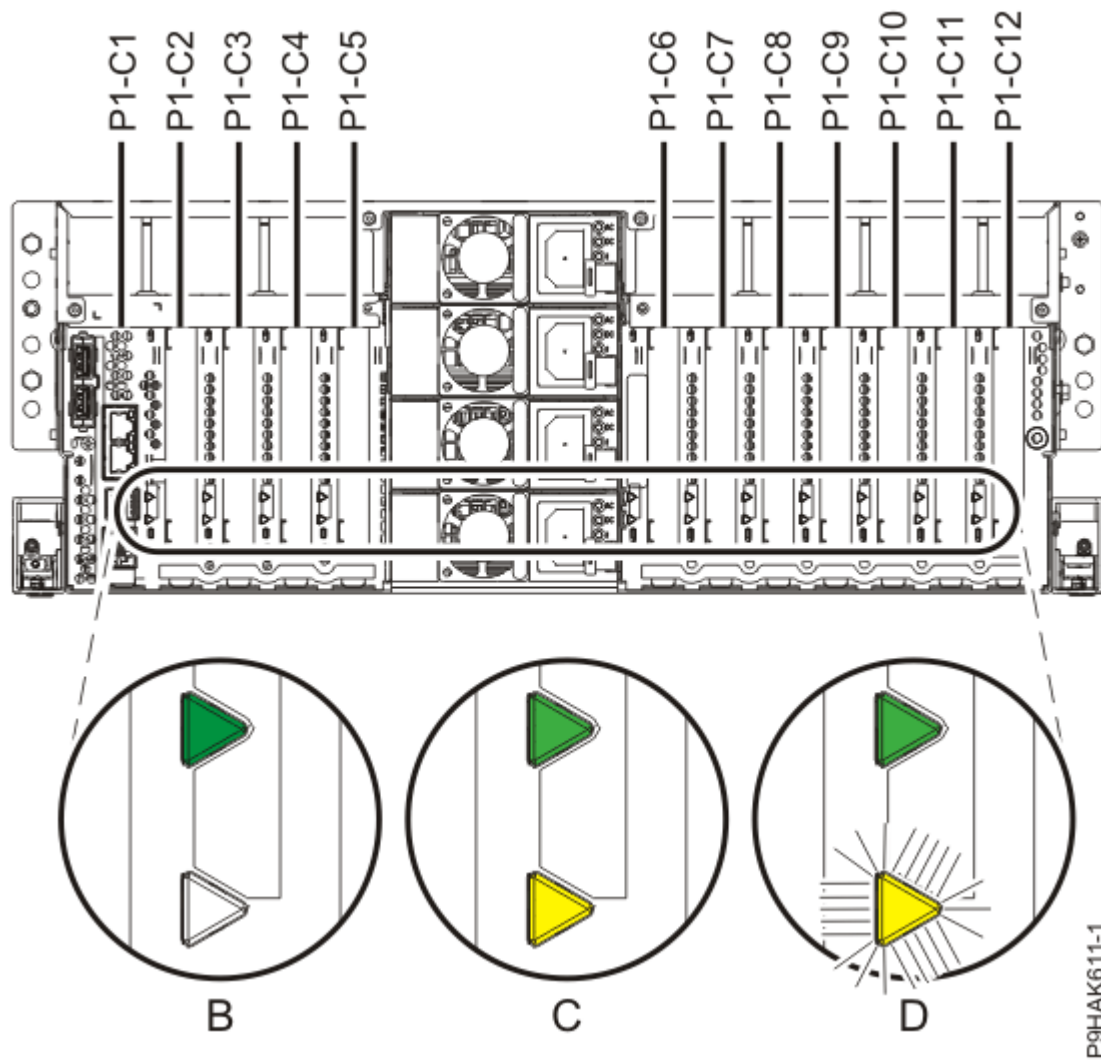


Figure 45. Adapter slot locations and locations of the LEDs in a rack-mounted 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, and 9223-42S system

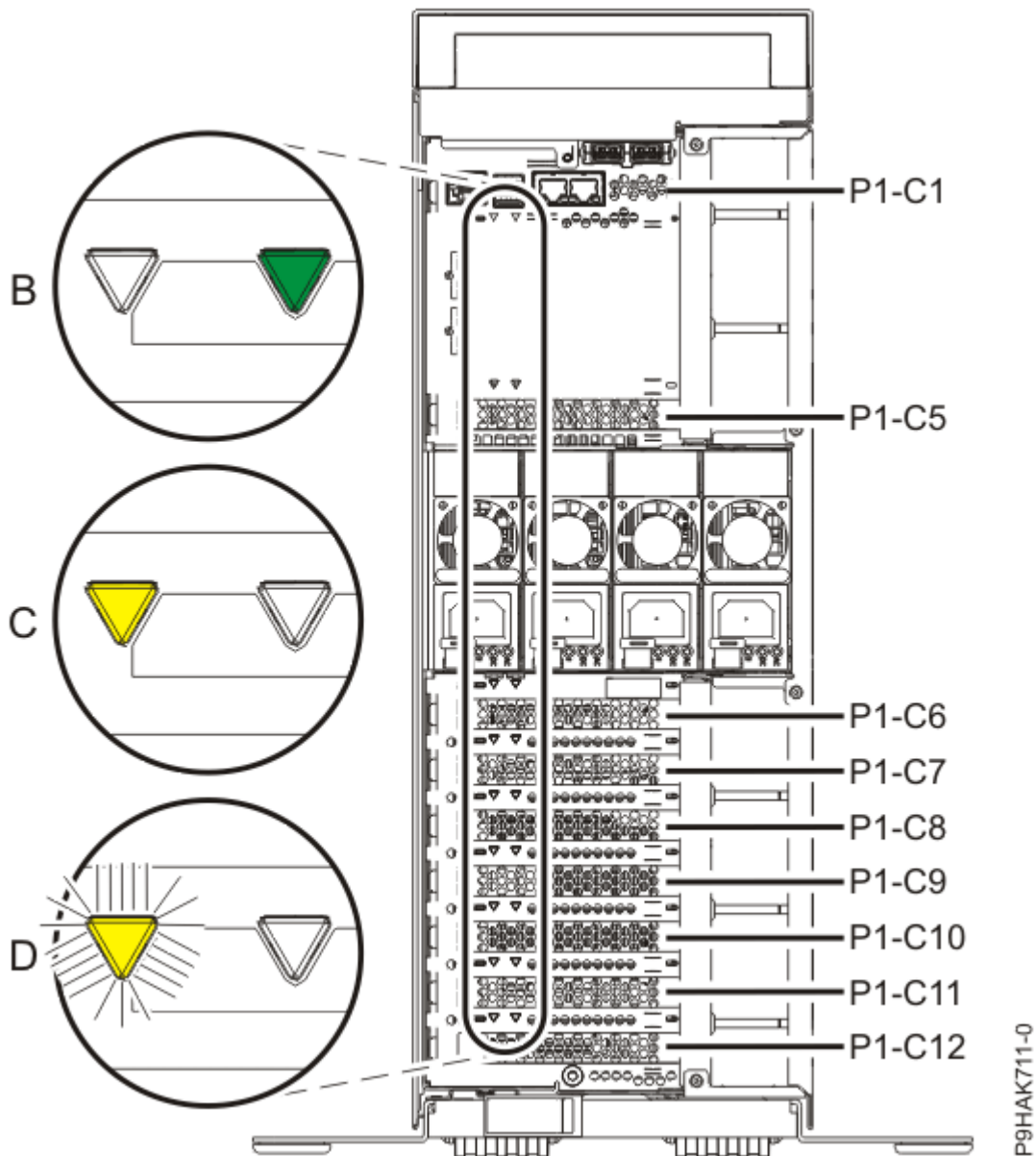


Figure 46. Adapter slot locations and locations of the LEDs in a stand-alone system.

3. Use the service indicator light-emitting diodes (LEDs) to help identify the part. 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).
4. If applicable, open the rack door at the rear of the system.
5. If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:

Note: If you are removing or replacing the system backplane, you must open the cable management arm.

- a) Release the mounting bracket from the cable management arm assembly by pressing the indentation **(A)** on the inner cable management arm tab.

The cable management arm releases from the outer mounting bracket in the direction shown.

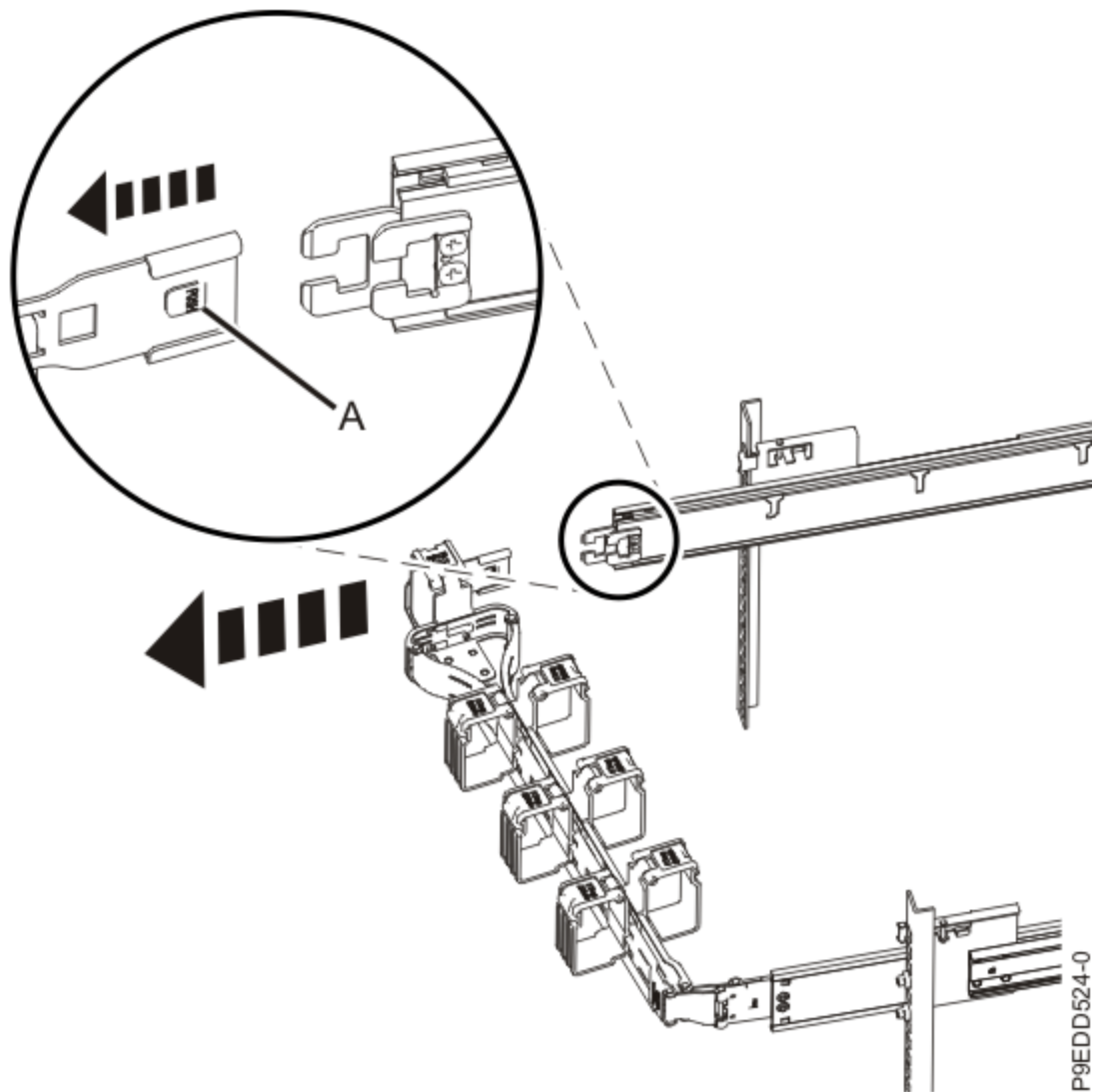


Figure 47. Releasing the cable management arm

b) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

6. Physically verify that the slot you identified is where you want to remove the adapter.
 - 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.

7. If you have not yet recorded the adapter slot details, record the slot number and location of each adapter that is being removed.

Note: Adapter slots are numbered on the rear of the system.

8. 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).

9. Label and disconnect all of the cables or transceivers that are attached to the adapter you plan to remove.

Use a hook-and-loop fastener to hold the cables in place.

10. Label and disconnect the power cords from the system unit.

See [Figure 48 on page 67](#) or [Figure 49 on page 68](#).

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.

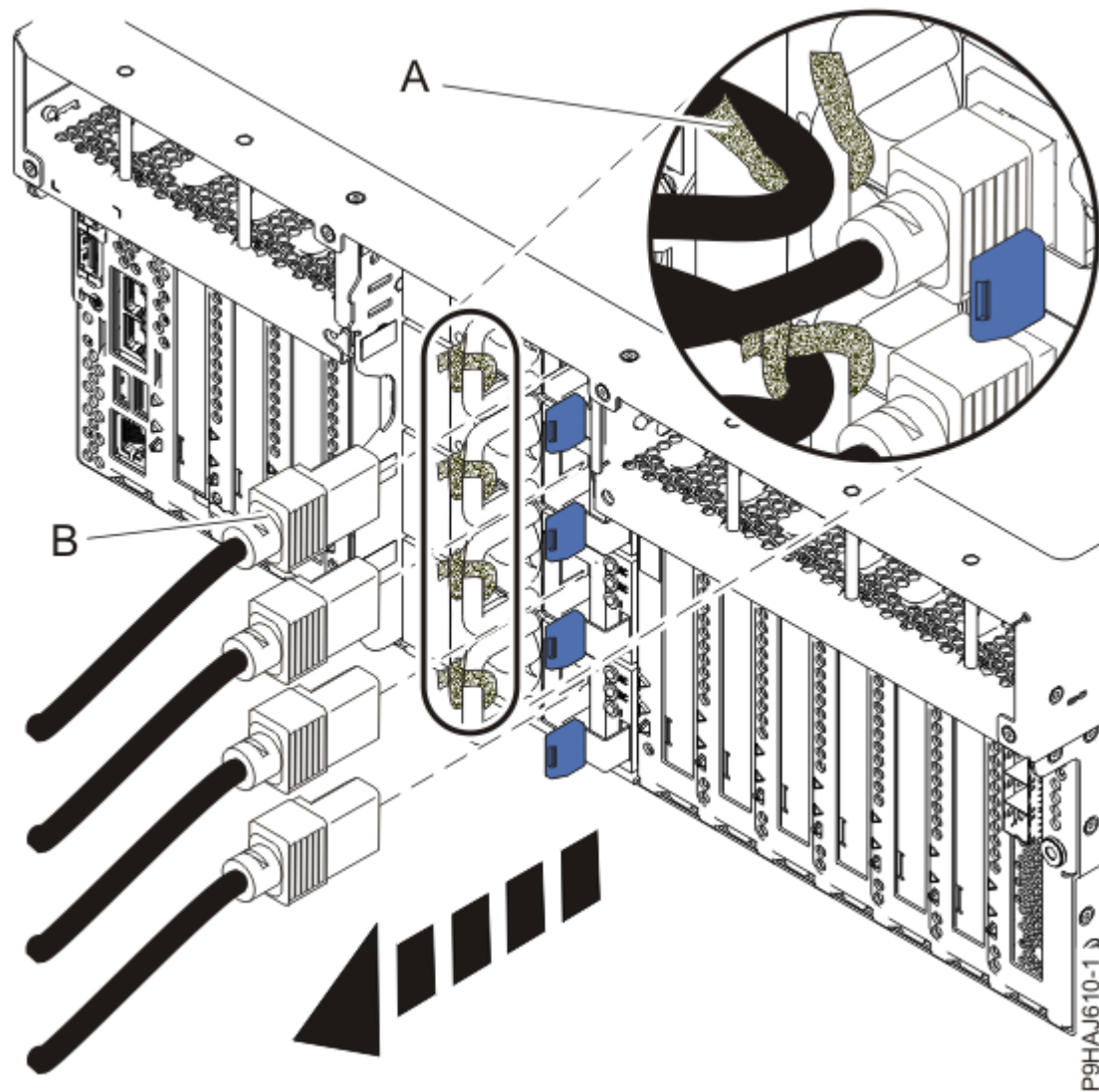


Figure 48. Removing the power cords from a rack-mounted server

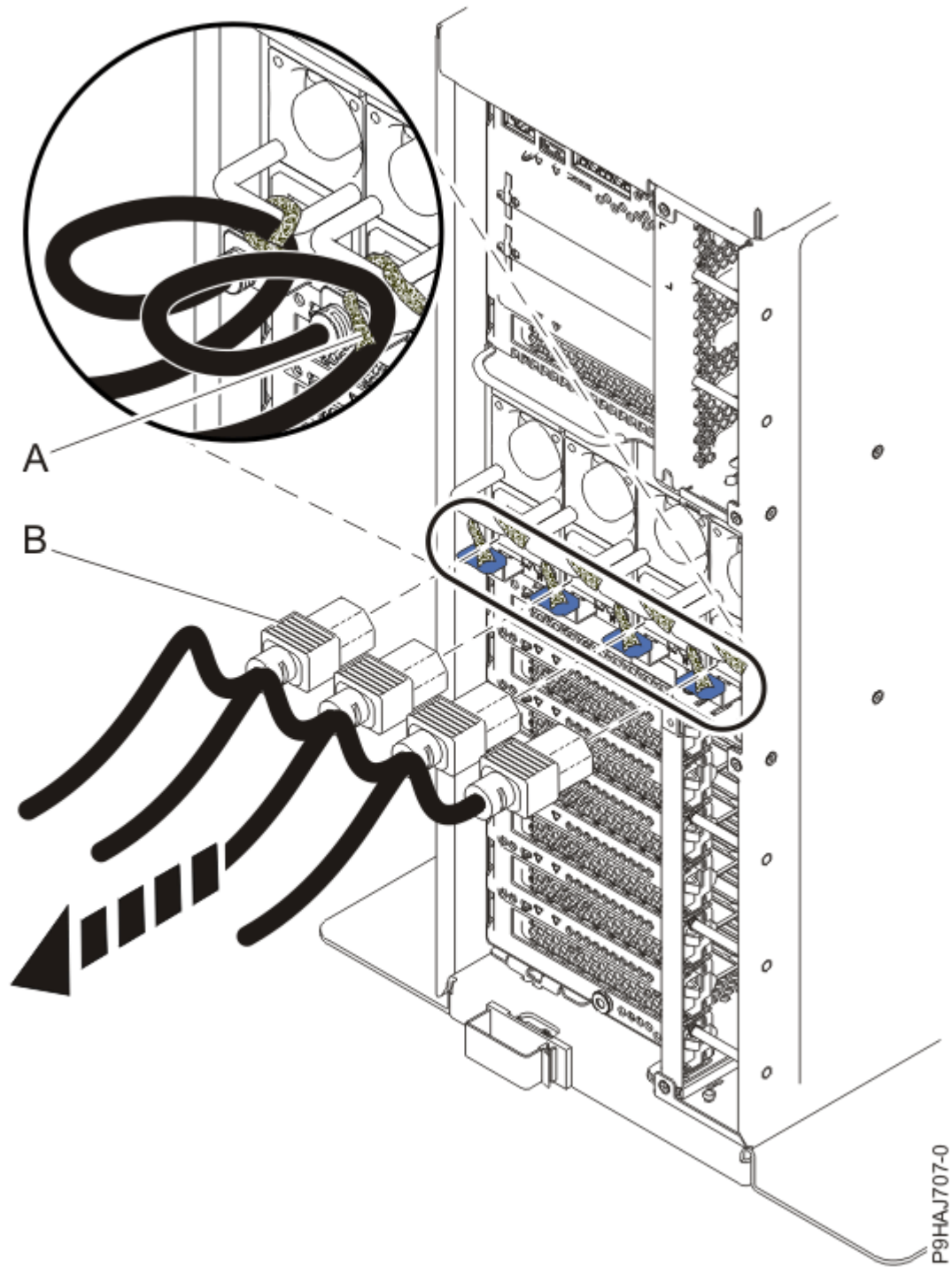
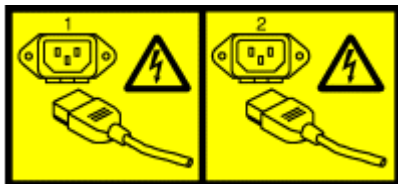


Figure 49. Removing the power cords from a stand-alone server

(L003)



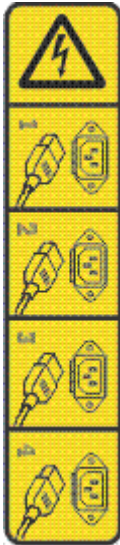
or



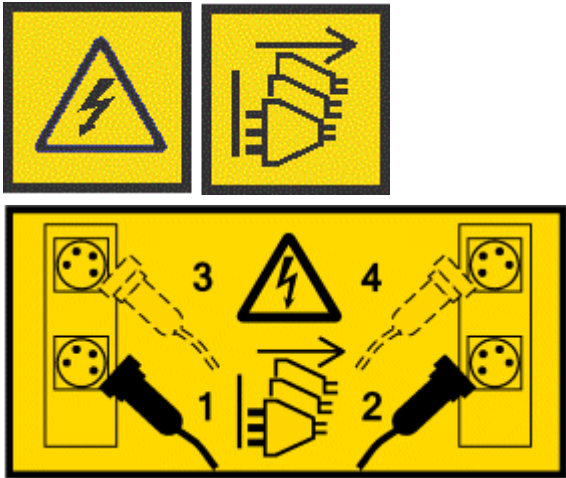
or

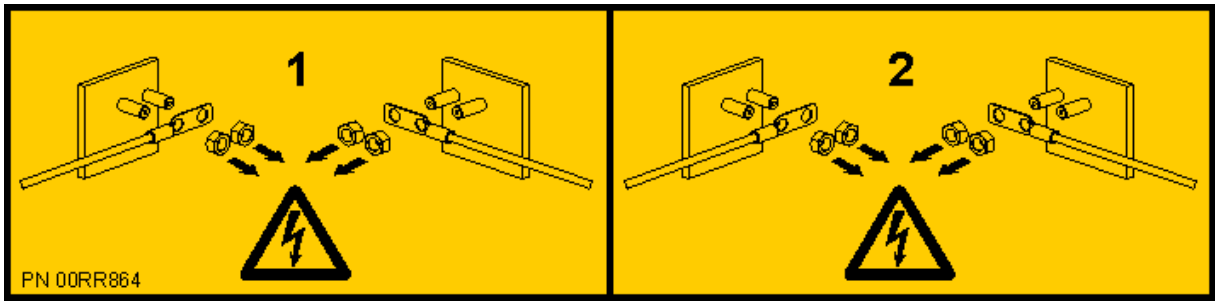


or



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)

11. If the cable management arm is open, close it by completing the following steps:

- a) Swing the cable management arm towards the server.
- b) Insert the inner cable management arm tab **(A)** into the outer mounting bracket **(B)** until it clicks into place as shown. The inner mounting bracket **(C)** is not used on the left side.

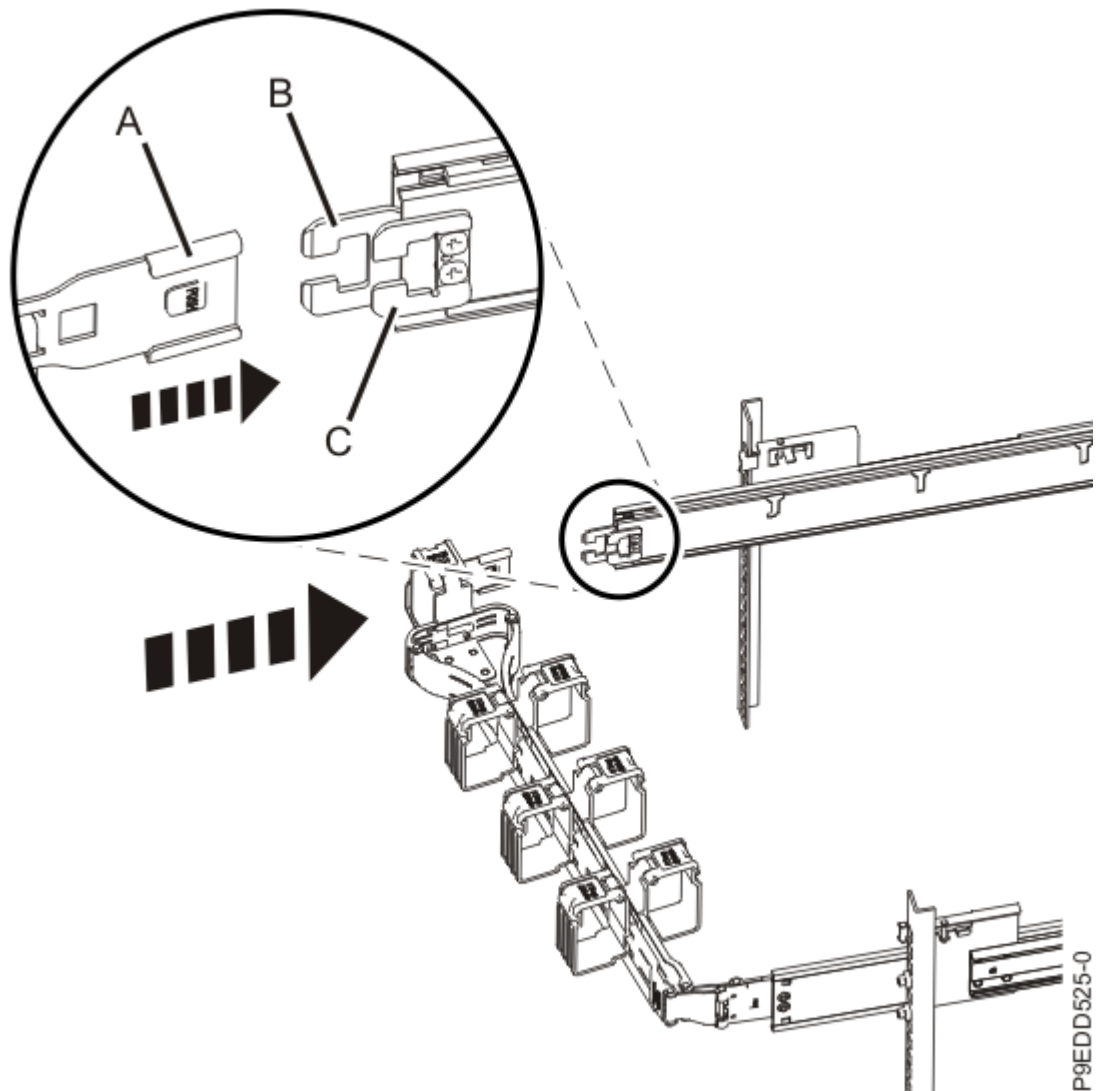


Figure 50. Closing the cable management arm

12. If applicable, open the rack front door.

13. For a rack-mounted system, open the side latches (**A**) and pull the latches to slide the system unit fully into the service position until the slides click and hold the system unit securely. Ensure that the screws inside the latches are not secured to the rack.

See the following figure.

Remove the hook-and-loop fasteners that secure the cable management arms. Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the system do not catch or bind as you pull the system unit into the service position.

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.



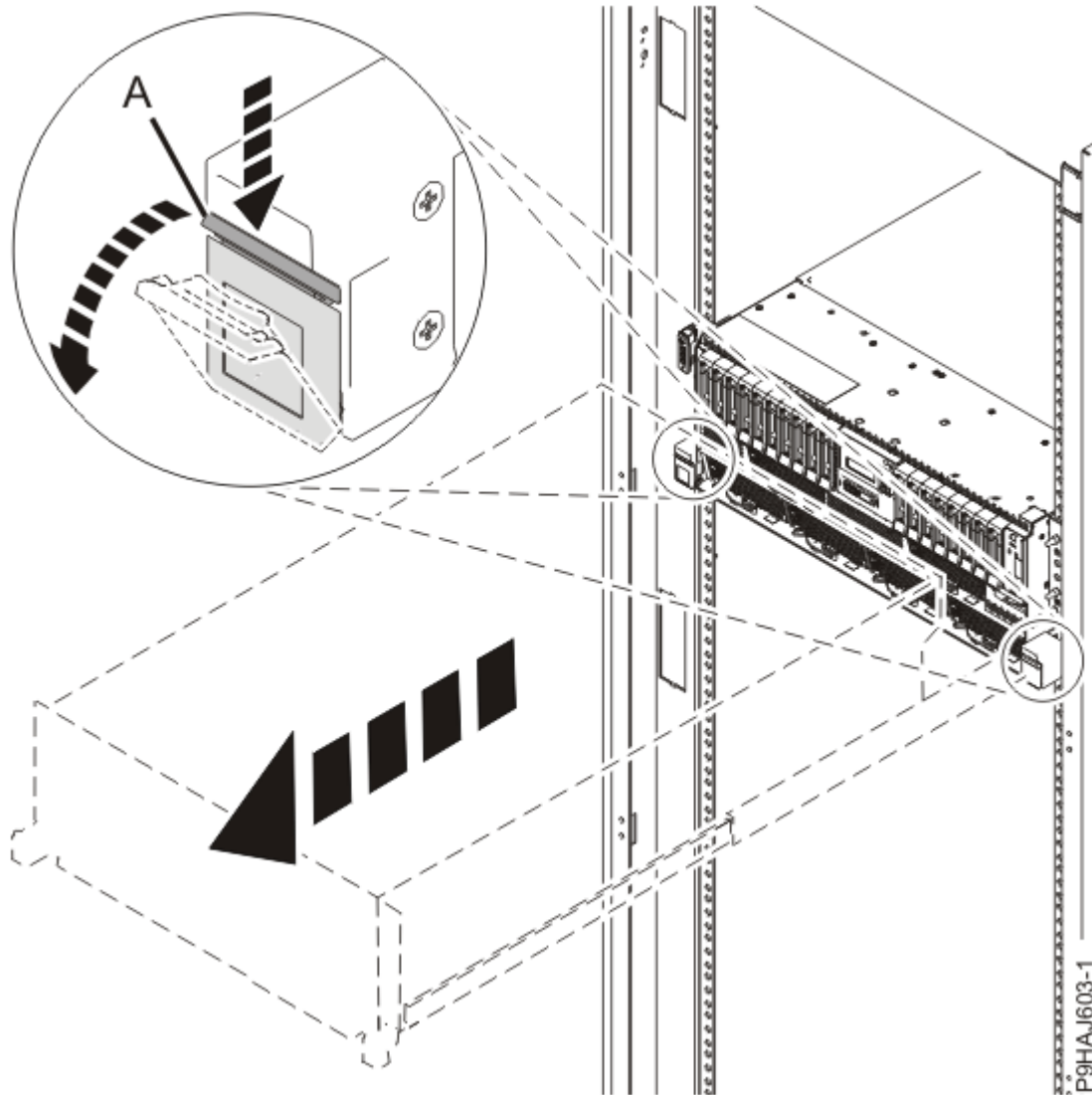


Figure 51. Releasing the side latches

14. 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.

15. Remove the service access cover.

For a rack-mounted system, complete the following steps. Refer to [Figure 52](#) on page 73.



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.

- a. Release the service cover latch by pushing the release latch **(A)** in the direction shown.
- b. Slide the cover **(B)** off the system unit. When the front of the service access cover clears the upper frame ledge, lift the cover up and off the system unit.

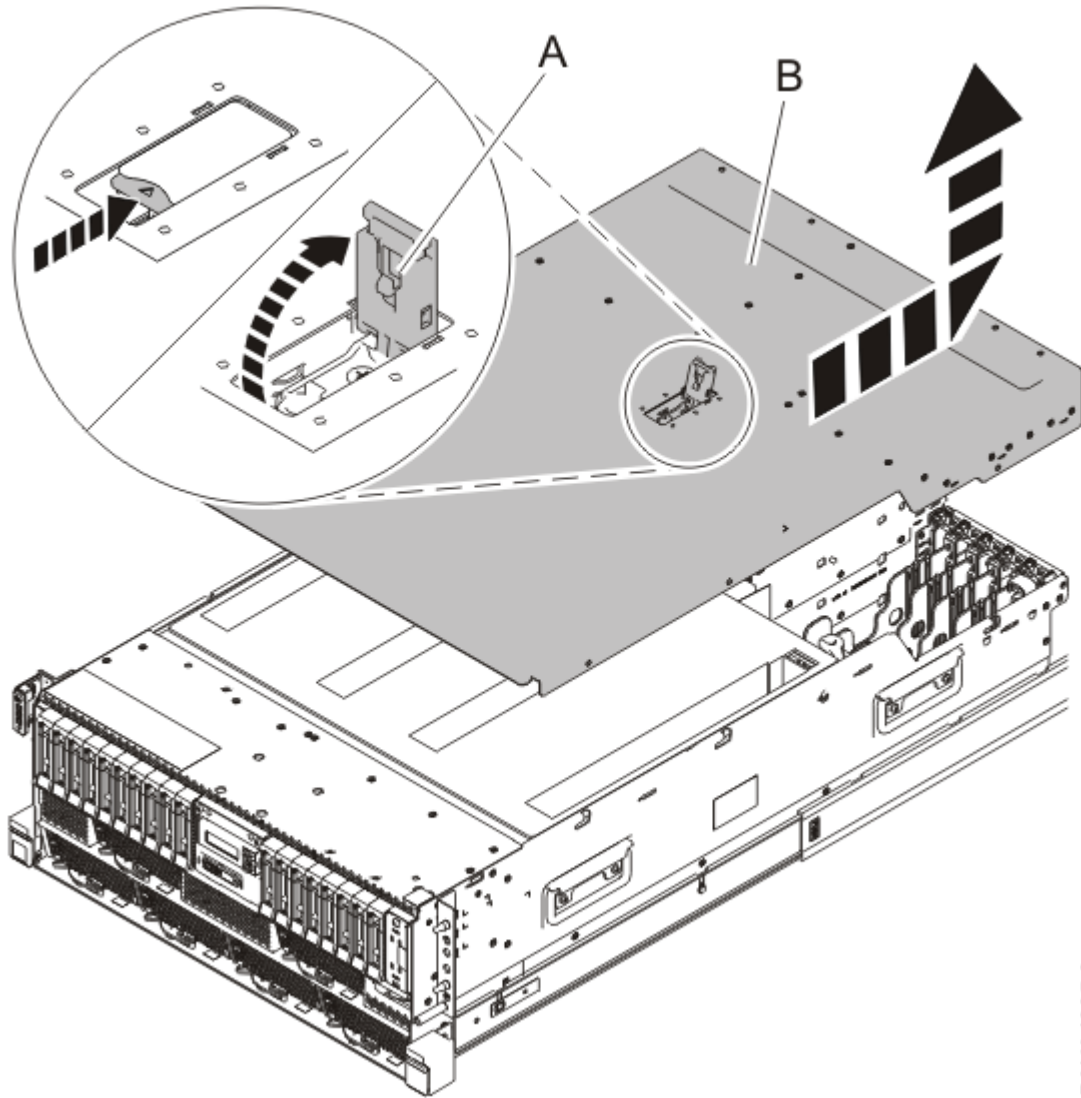


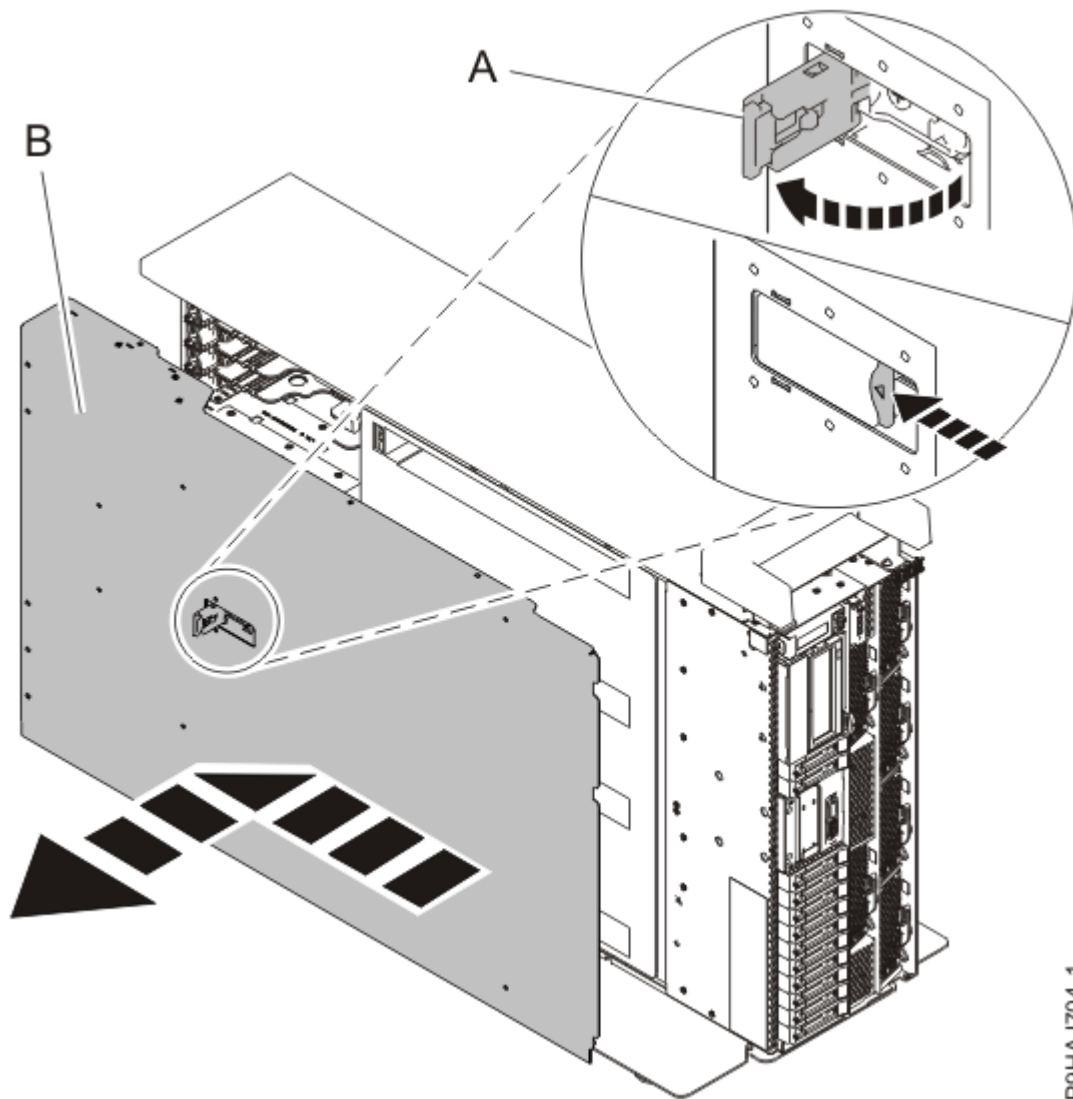
Figure 52. Removing the service access cover from a rack-mounted system

For a stand-alone system, complete the following steps. Refer to [Figure 53 on page 74](#).



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.

- a. Release the latch by pushing the release latch **(A)** in the direction shown.
- b. Slide the cover **(B)** off the system unit. When the front of the service access cover has cleared the upper frame ledge, lift the cover up and off the system unit.



P9HAJ704-1

Figure 53. Removing the service access cover

Permanently removing an adapter from the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system

To permanently remove an adapter 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. Set the adapter latch (A) in the target slot to the open position by rotating the latch (A) in the direction that is shown in the following figure.

See [Figure 54 on page 75](#) and [Figure 55 on page 76](#).


(L007)



 **CAUTION:** A hot surface nearby. (L007)

3. Carefully grasp the adapter **(B)** by its top edge or tailstock, and remove the adapter from the slot as shown in the following figure.

See [Figure 54 on page 75](#) and [Figure 55 on page 76](#).

 **Attention:** A pin on the tailstock of the adapter resembles a removable screw. Do not remove this pin. It is required for correct alignment and seating.

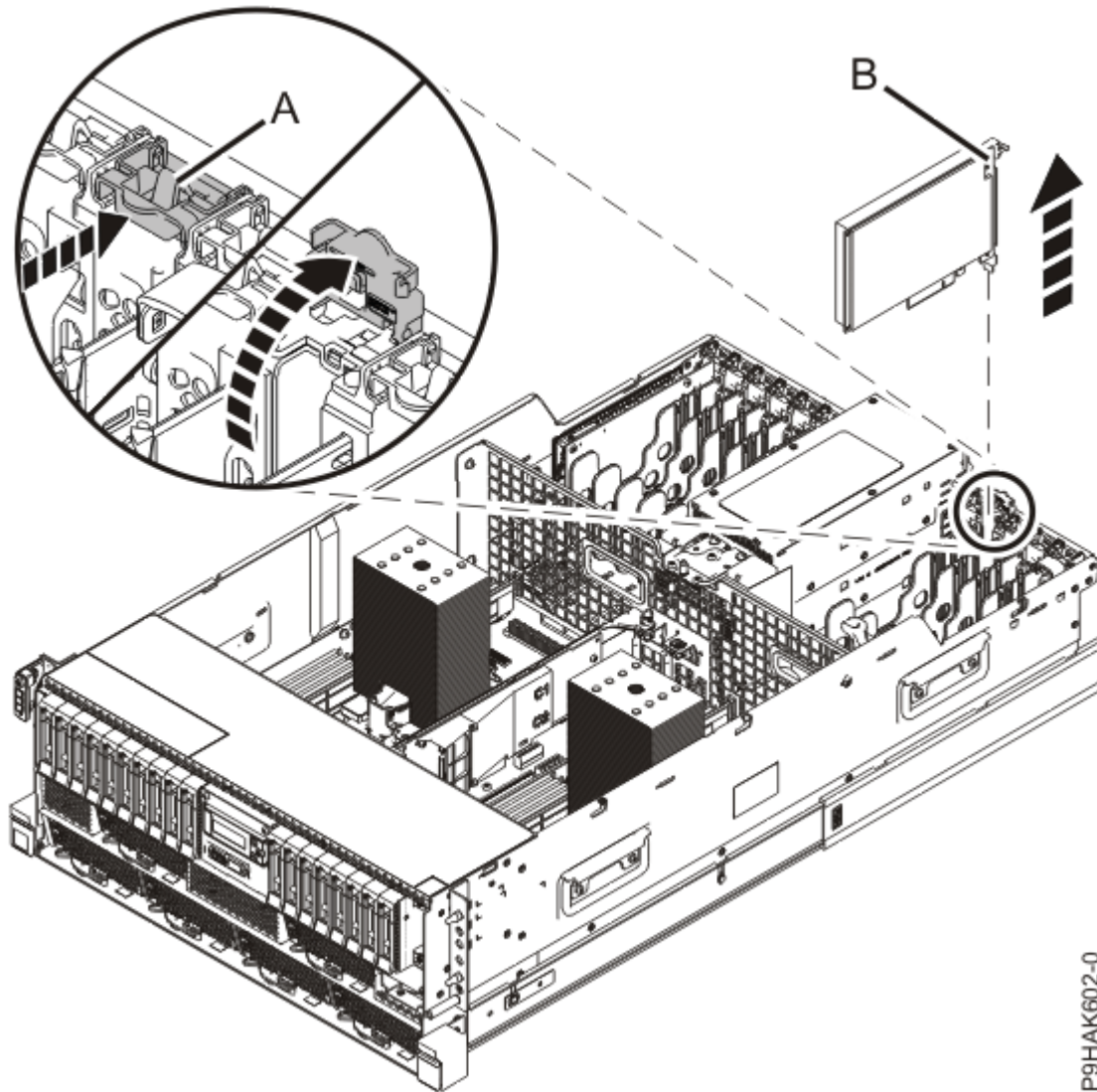


Figure 54. Removing an adapter from a 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S rack-mounted system

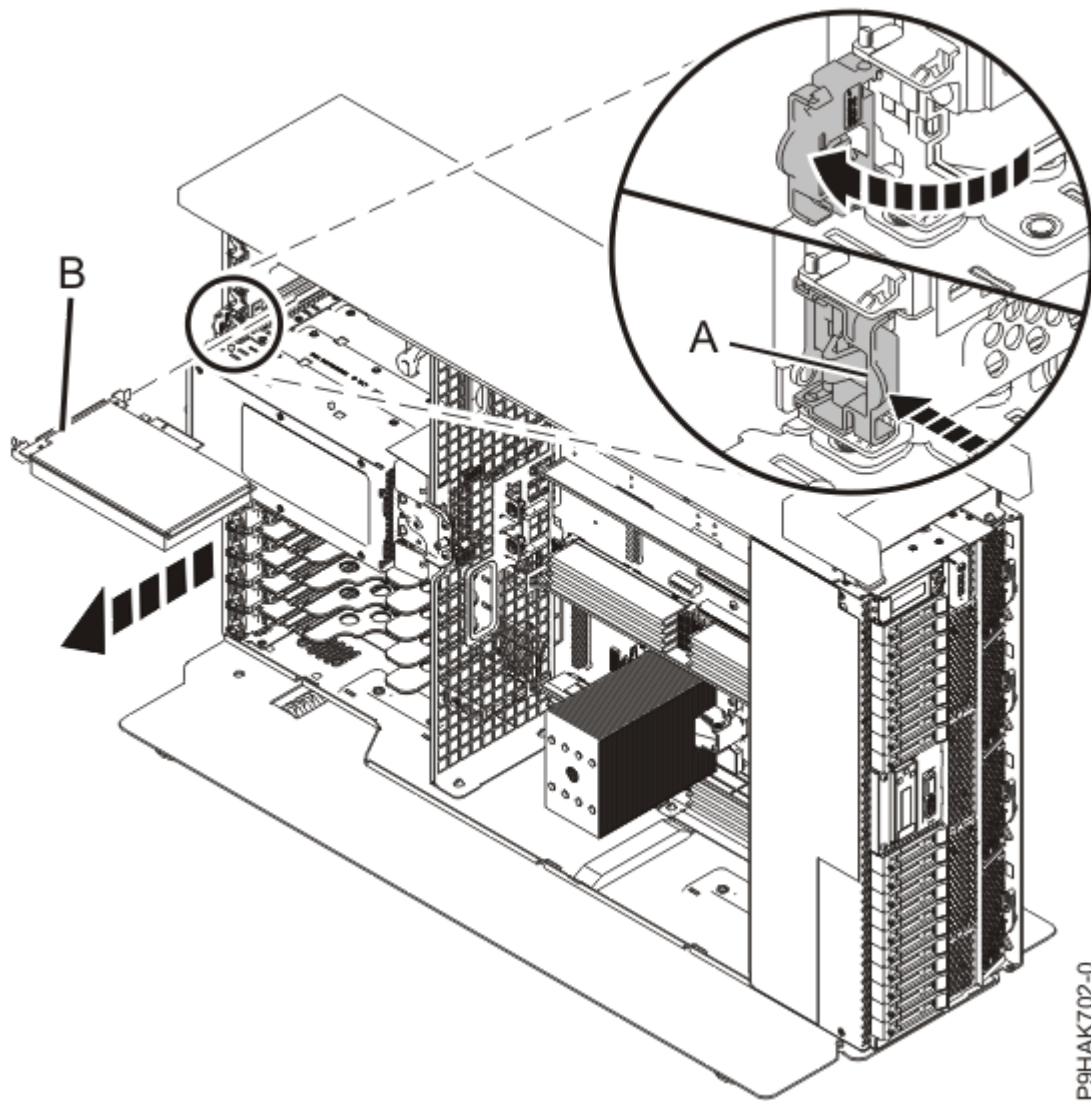
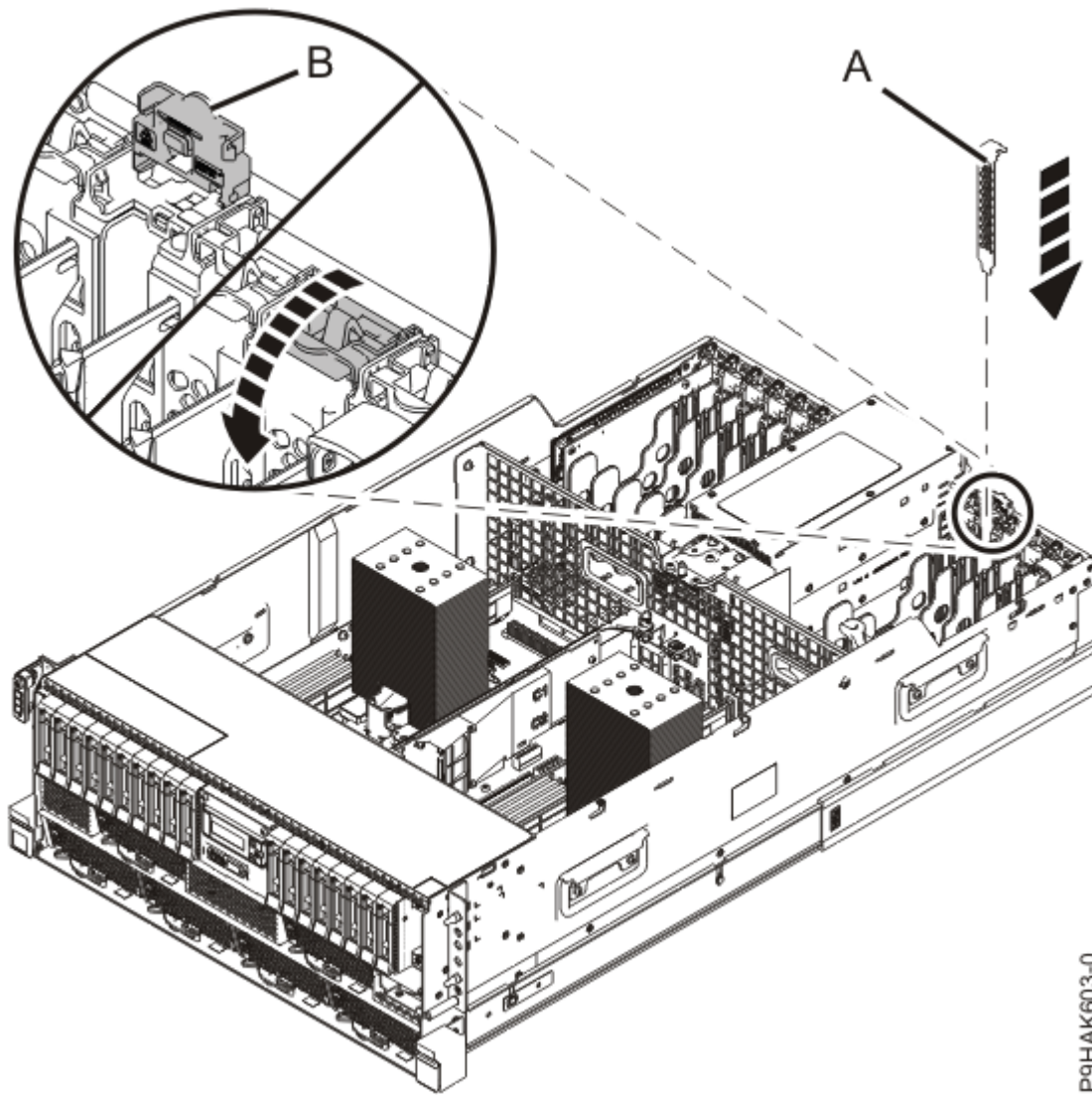


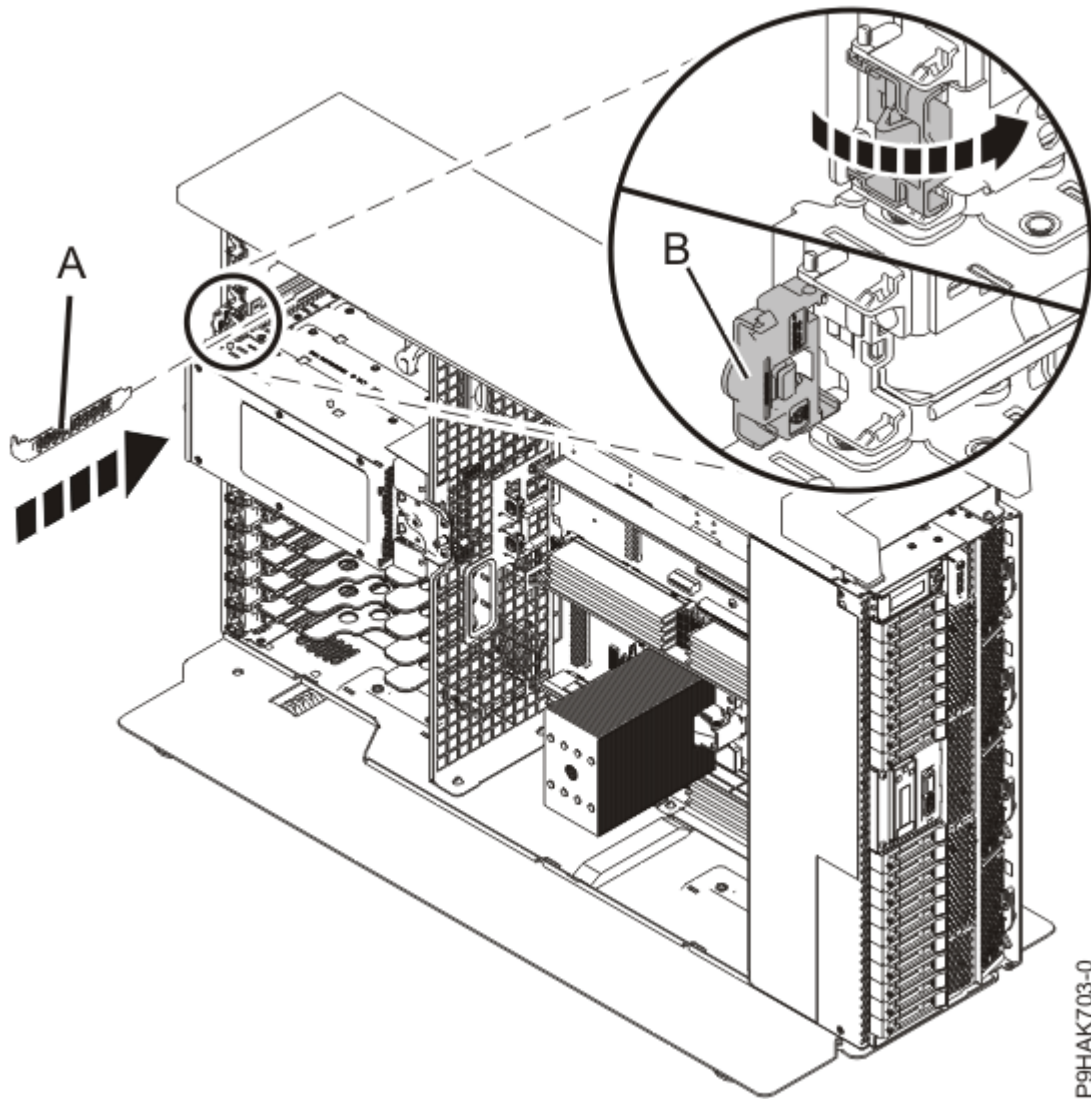
Figure 55. Removing an adapter from the 9009-41A stand-alone system

4. Place the removed adapter on an approved ESD surface.
5. After permanently removing an adapter, you must install a filler in the empty slot. To install a filler, complete the following steps:
 - a) Carefully grasp the filler and align the filler with the slot and its connector on the system backplane, as shown in [Figure 56 on page 77](#) and [Figure 57 on page 78](#).
 - b) Press the filler firmly into the slot, as shown in [Figure 56 on page 77](#) and [Figure 57 on page 78](#).



P9HAK603-0

Figure 56. Installing a filler in an adapter slot in the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S rack-mounted system



P9HAK703-0

Figure 57. Installing a filler in an adapter slot in the 9009-41A stand-alone system

Preparing the 9009-41A, 9009-41G, 9009-42A, 9009-42G, 9223-42H, or 9223-42S system for operation after permanently removing an adapter

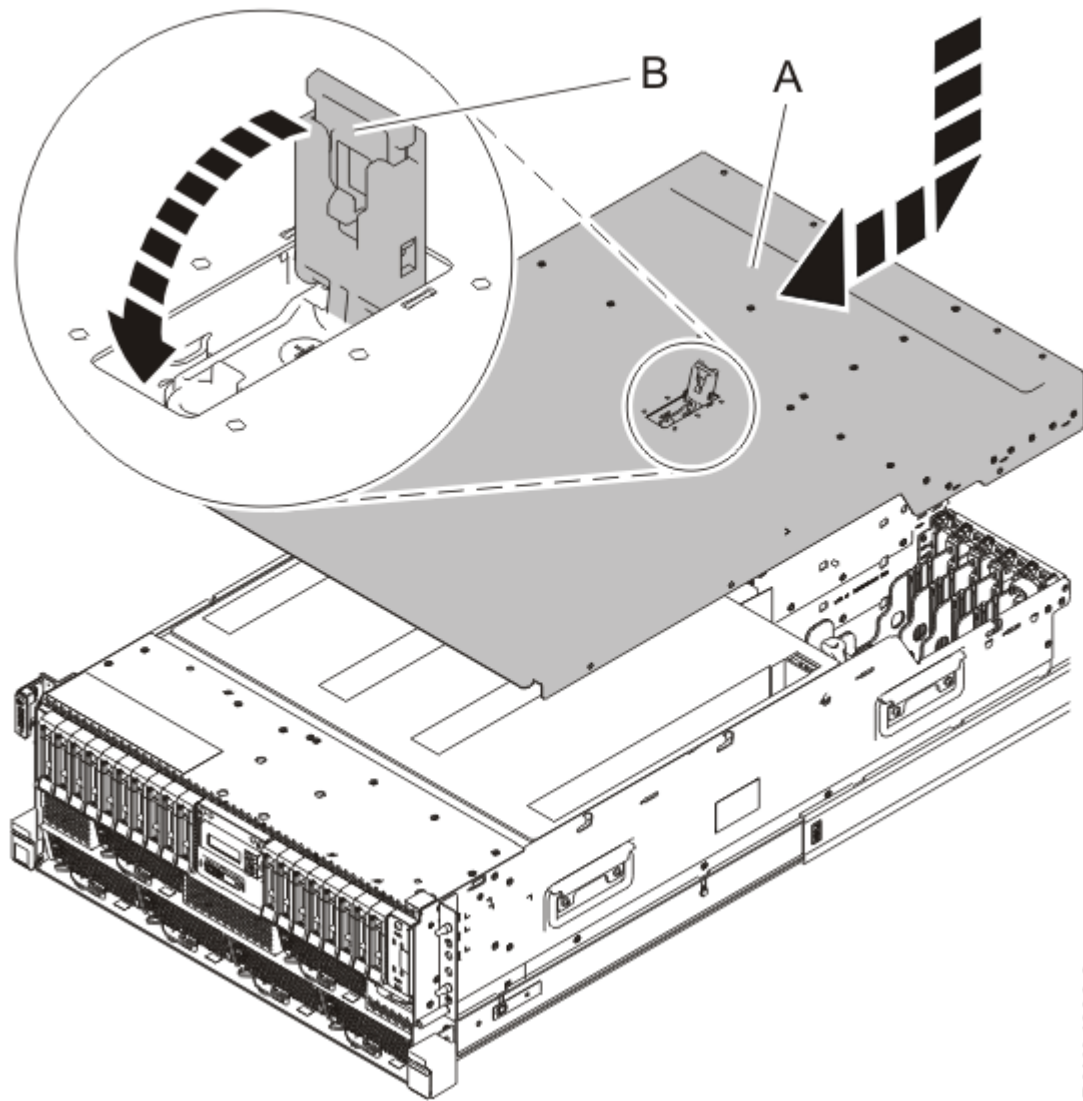
To prepare the system for operation after permanently removing an adapter, complete the steps in this procedure.

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. Replace the service access cover.

For a rack-mounted system, complete the following steps. Refer to [Figure 58 on page 79](#).

- a. Slide the cover **(A)** onto the system unit.
- b. Close the release latch **(B)** by pushing it in the direction shown.



P9HAJ606-2

Figure 58. Installing the service access cover

For a stand-alone system, complete the following steps. Refer to [Figure 59 on page 80](#).

- a. Slide the cover **(B)** on to the system unit as shown.
- b. Close the latch release **(A)** by pushing it in the direction shown.

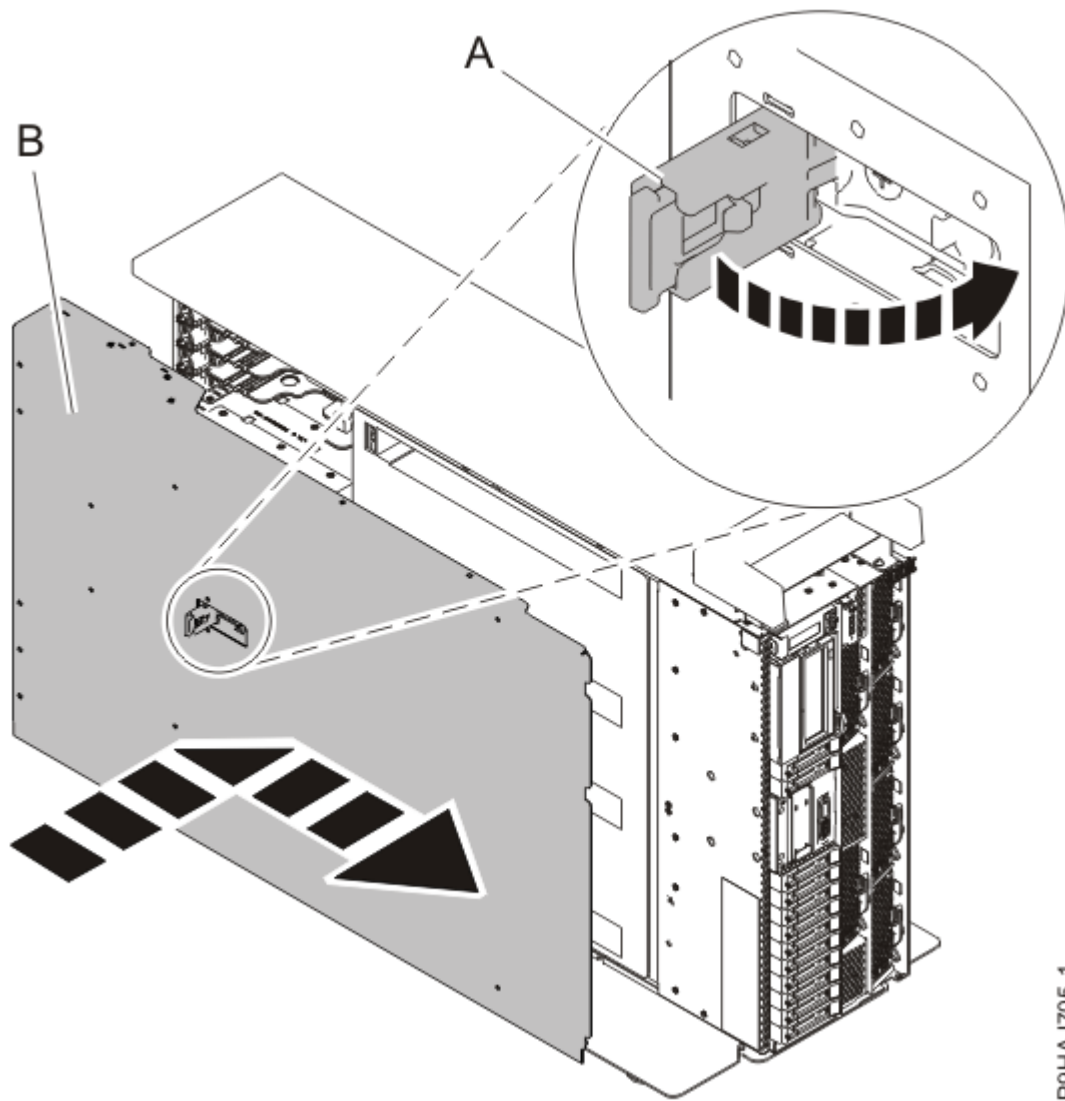


Figure 59. Installing the service access cover

3. For a rack-mounted system, unlock the blue rail safety latches (**A**) as shown in [Figure 60 on page 81](#) by pushing them inward.

Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the unit do not catch or bind as you push the unit into the operating position.

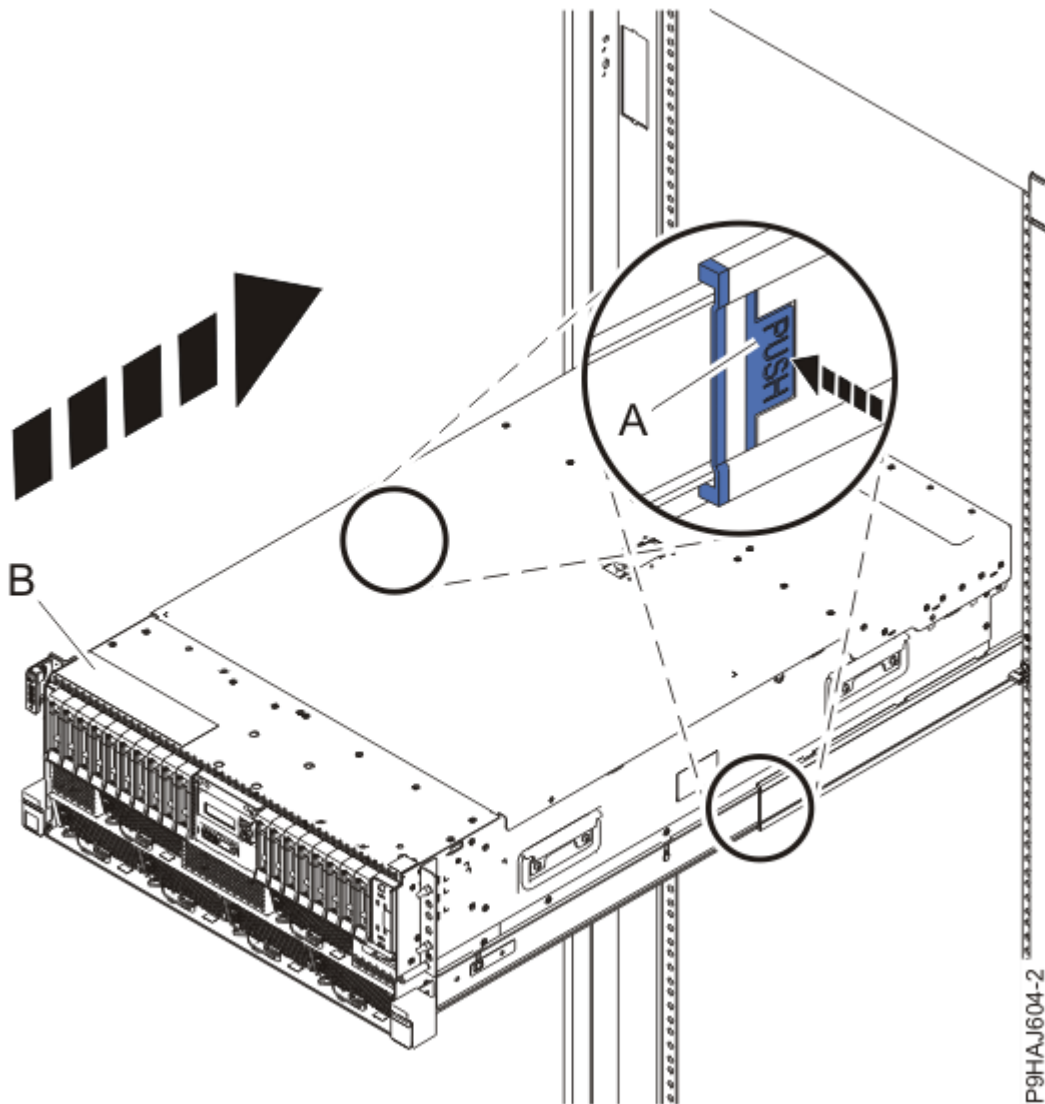


Figure 60. Placing the system into the operating position

4. For a rack-mounted system, push the system unit **(B)** as shown in the previous figure back into the rack until both release latches lock the system into position.

Secure the cable management arm with hook-and-loop fasteners around the back side of the cable management arm, but not around the cables.

5. If necessary to view the identify LEDs or to manage cables at the rear of a rack-mounted system, open the cable management arm by completing the following steps:

Note: If you are removing or replacing the system backplane, you must open the cable management arm.

- a) Release the mounting bracket from the cable management arm assembly by pressing the indentation **(A)** on the inner cable management arm tab.

The cable management arm releases from the outer mounting bracket in the direction shown.

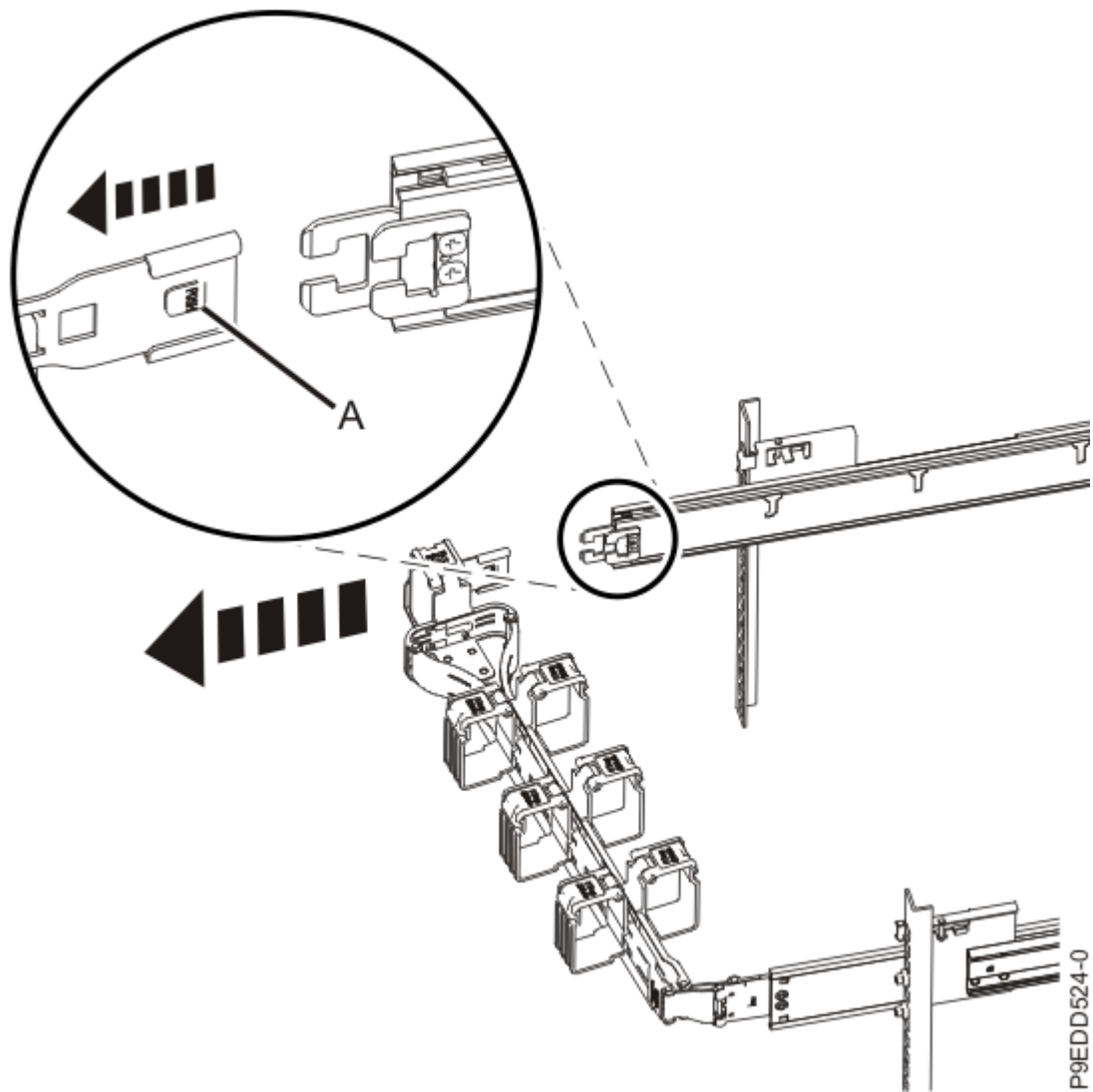


Figure 61. Releasing the cable management arm

- b) Swing the cable management arm away from the system.

In the image, the inner cable management arm tab is shown on the left side as you are facing the system from the rear. However, the cable management arm can also be installed so that the inner cable management arm tab is on the right side of the system.



CAUTION: To avoid causing damage to the arm, open the cable management arm just long enough to complete these repairs.

6. 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 62](#) on page 83 or [Figure 63](#) on page 84.

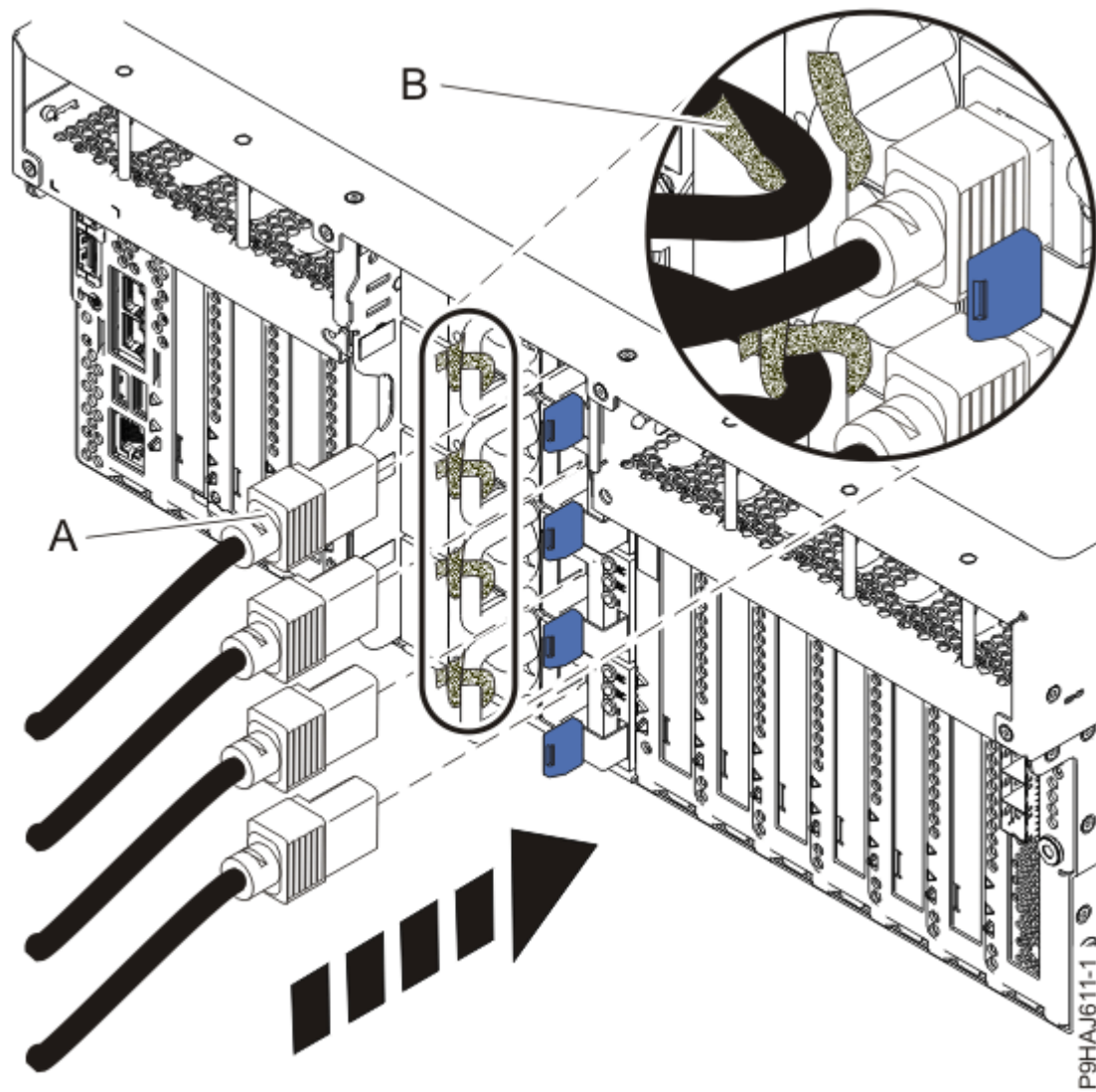


Figure 62. Connecting the power cords to a rack-mounted system

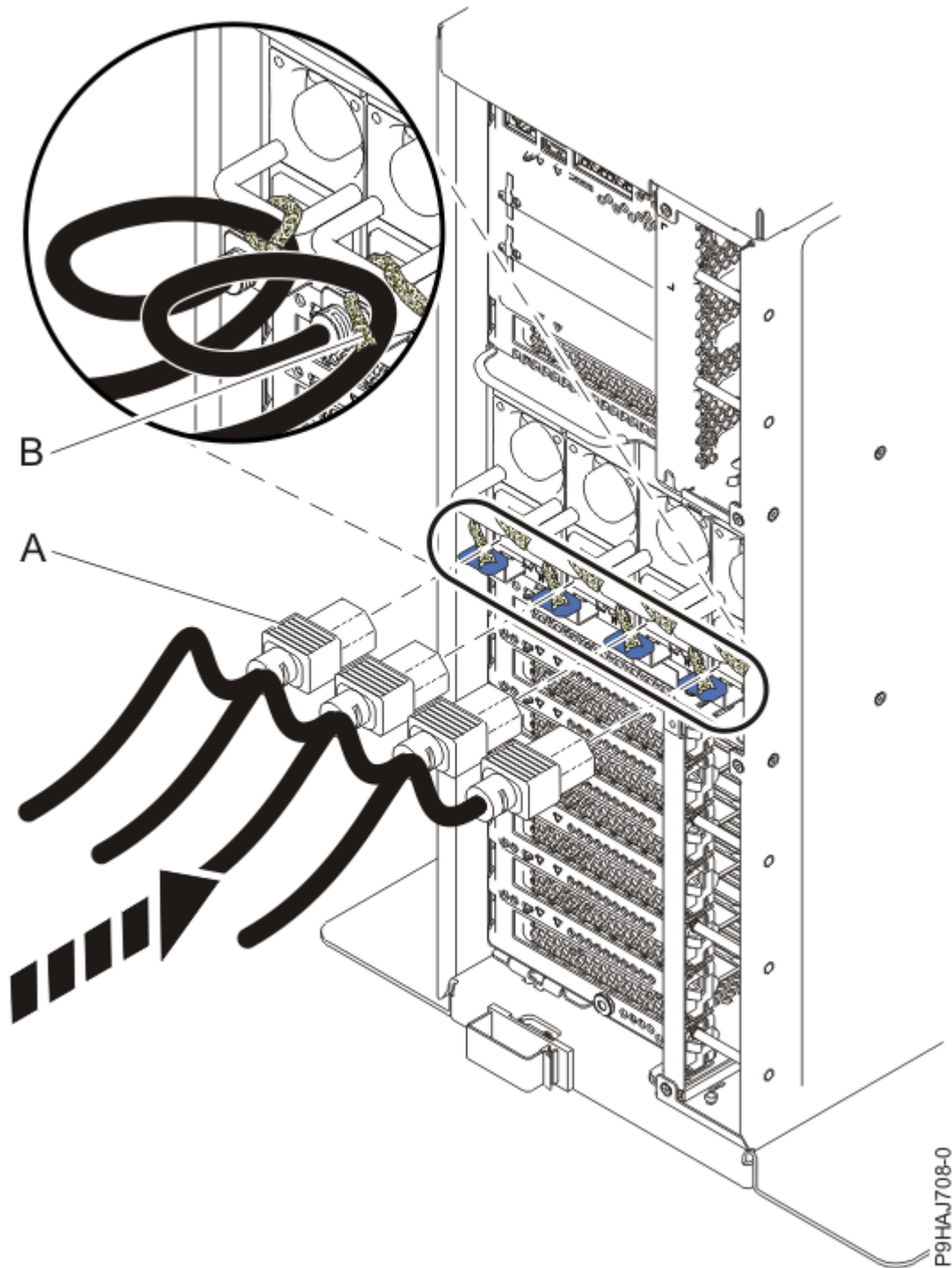


Figure 63. Connecting the power cords to a stand-alone system

7. If the cable management arm is open, close it by completing the following steps:
 - a) Swing the cable management arm towards the server.
 - b) Insert the inner cable management arm tab **(A)** into the outer mounting bracket **(B)** until it clicks into place as shown. The inner mounting bracket **(C)** is not used on the left side.

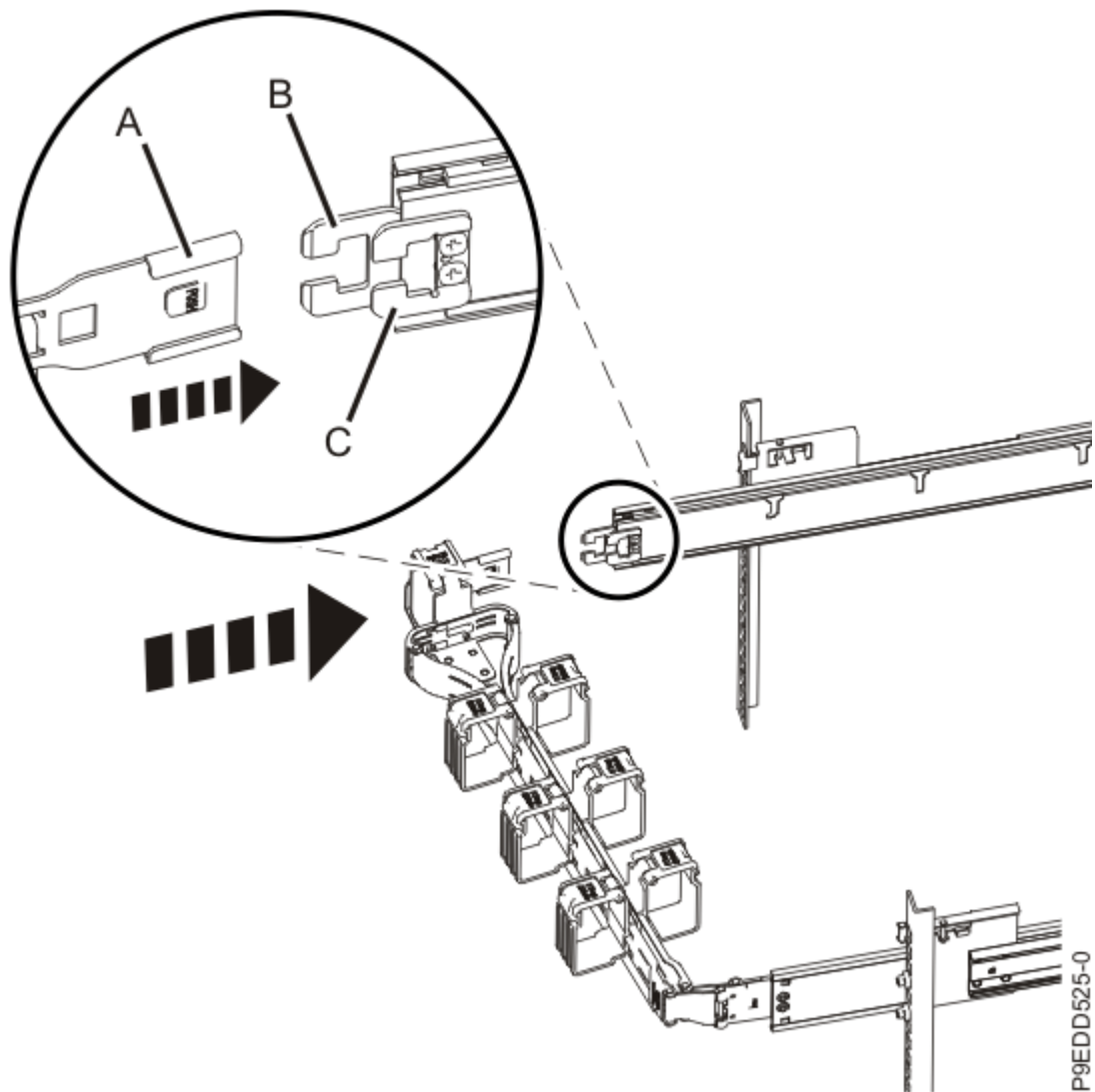


Figure 64. Closing the cable management arm

8. Close the rack door at the rear of the system.
9. 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).
10. 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).
11. Place the removed adapter in a safe place.

Related procedures for installing and removing adapters

Find procedures that are related to installing and removing adapters.

Avoiding electric shock

Find information about precautions you should take to avoid electric shock when working on or around a computer system.



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)

Handling static-sensitive devices

Find information about precautions you must take to prevent damage to electronic components from static electricity discharge.

Electronic boards, adapters, media drives, and disk drives are sensitive to static electricity discharge. These devices are wrapped in antistatic bags to prevent this damage. Take the following precautions to prevent damage to these devices from static electricity discharge.

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
- When you are using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when you are using or working on electrical equipment.

- If you do not have a wrist strap, before you remove the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system.
- With the device still in its antistatic bag, touch it to the metal frame of the system.
- Grasp cards and boards by the edges. Avoid touching the components and gold connectors on the adapter.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before you pick it up again, touch the antistatic bag and the metal frame of the system at the same time.
- Handle the devices carefully to prevent permanent damage.

Updating the worldwide port name for a new 5735 IOA

If you exchange a 5735 Fibre Channel input/output adapter (IOA), the IBM external storage subsystem must be updated to use the worldwide port name (WWPN) of the new 5735 IOA. Any SAN hardware that uses the WWPN zoning might also need updating.

For instructions on how to update the external storage subsystem or SAN hardware configurations, see the documentation for those systems.

The WWPN for the Fibre Channel IOA can be found by using the Hardware Service Manager in SST or DST to display details about the 5735 IOA Logical Hardware Resource information, and use the port worldwide name field.

The 16-digit WWPN can also be determined by appending the digits 1000 to the beginning of the 12-digit IEEE address that is found on the tailstock label of the Fibre Channel IO adapter.

Removing and replacing the tailstock on an adapter

Find information about removing and replacing the tailstock on an adapter. You can replace the tailstock on an adapter if the adapter has a different tailstock.

Before you begin

You must have removed the adapter or the adapter filler from the system.

About this task

The tailstock for individual adapters can be either tall (high-profile) or short (low-profile). New systems ship with the correct tailstock on the cards already installed. Through unique feature codes, a miscellaneous equipment specification (MES) also ships with the correct sized tailstock. For repairs, however, replacement parts usually ship with high-profile tailstock. If the failed adapter was a low-profile adapter installed in the system, then you must exchange the tall tailstock that was shipped on the replacement card with the low-profile tailstock from the failed card.

Note: A Phillips screwdriver is required to complete the procedure.

To remove and replace an adapter tailstock, choose from the following options:

- [Removing the tailstock from a failed adapter or adapter filler](#)
- [Removing the tailstock from a new adapter](#)
- [Replacing the tailstock in a new adapter](#)

Procedure

Removing the tailstock from a failed adapter or adapter filler

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.

- Using a Phillips screwdriver, unscrew the two screws **(A)** that attach the tailstock **(B)** to the adapter, as shown in [Figure 65](#) on page 88.

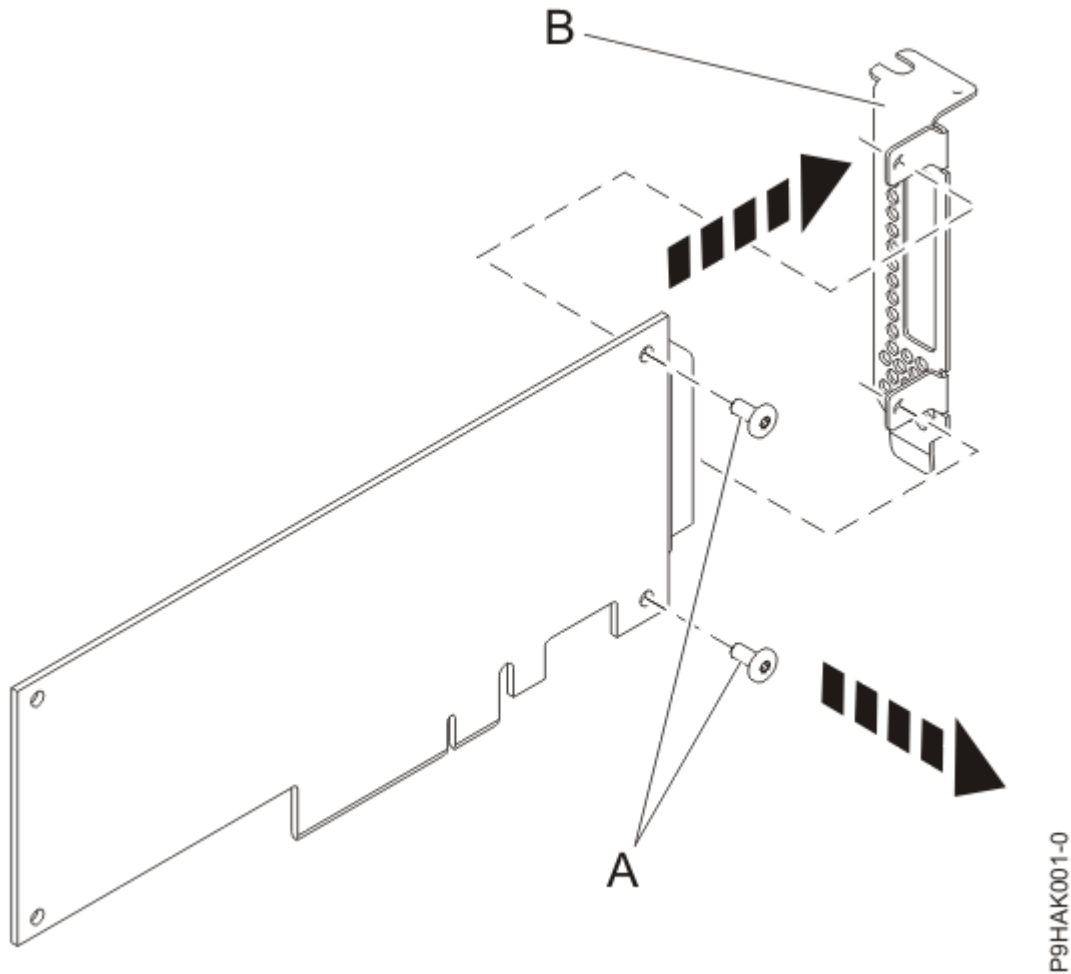
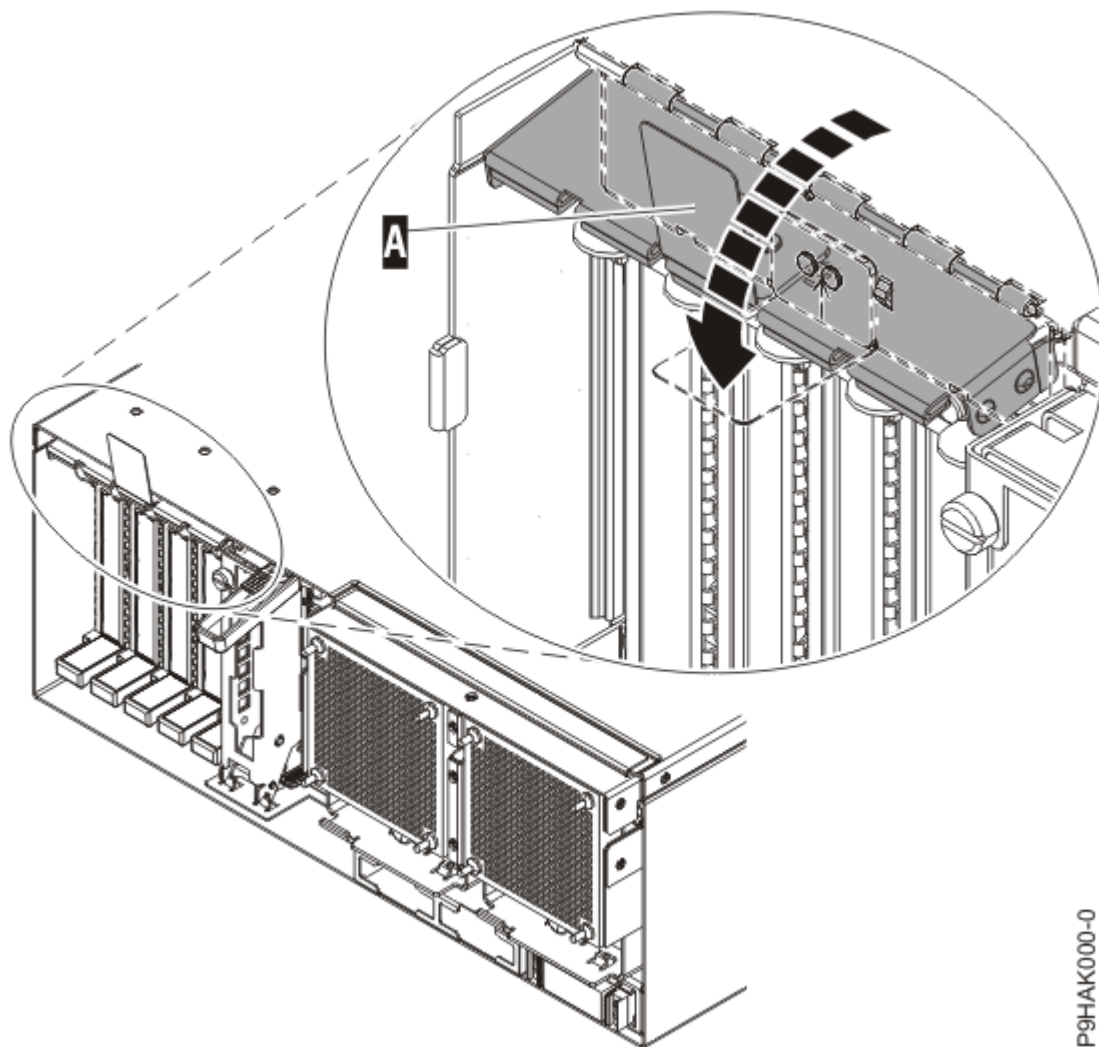


Figure 65. Removing the low-profile tailstock from an adapter

- Detach the tailstock from the adapter and place the tailstock and the screws on a flat, static-protective surface.
- If you are removing the tailstock from a 4-Port 10/100/1000 Base-TX adapter, there is only one screw to remove. After removing the screw, disengage the tabs from the card hardware and remove the tailstock.
- If you are removing the tailstock from an Ethernet or Fibre Channel adapter that has small form-factor pluggable (SFP) transceivers, you must first remove the SFP transceivers. To remove the SFP transceivers, complete the following steps:
 - Place the card flat on a static-protective surface.
 - Open the latch **(A)** by rotating it down and away from the card as shown in [Figure 66](#) on page 89.
 - Slide the transceiver **(B)** out of the adapter hardware.
 - Repeat for the other transceiver.



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Figure 66. Removing SFP transceivers from adapters

6. If necessary, remove the adapter from the antistatic package.

Attention: Avoid touching the components and gold connectors on the adapter.

Removing the tailstock from a new adapter

7. 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.
8. Using a Phillips screwdriver, unscrew the two retaining screws **(A)** that attach the high-profile tailstock **(B)** to the new adapter, as shown in [Figure 67 on page 90](#).

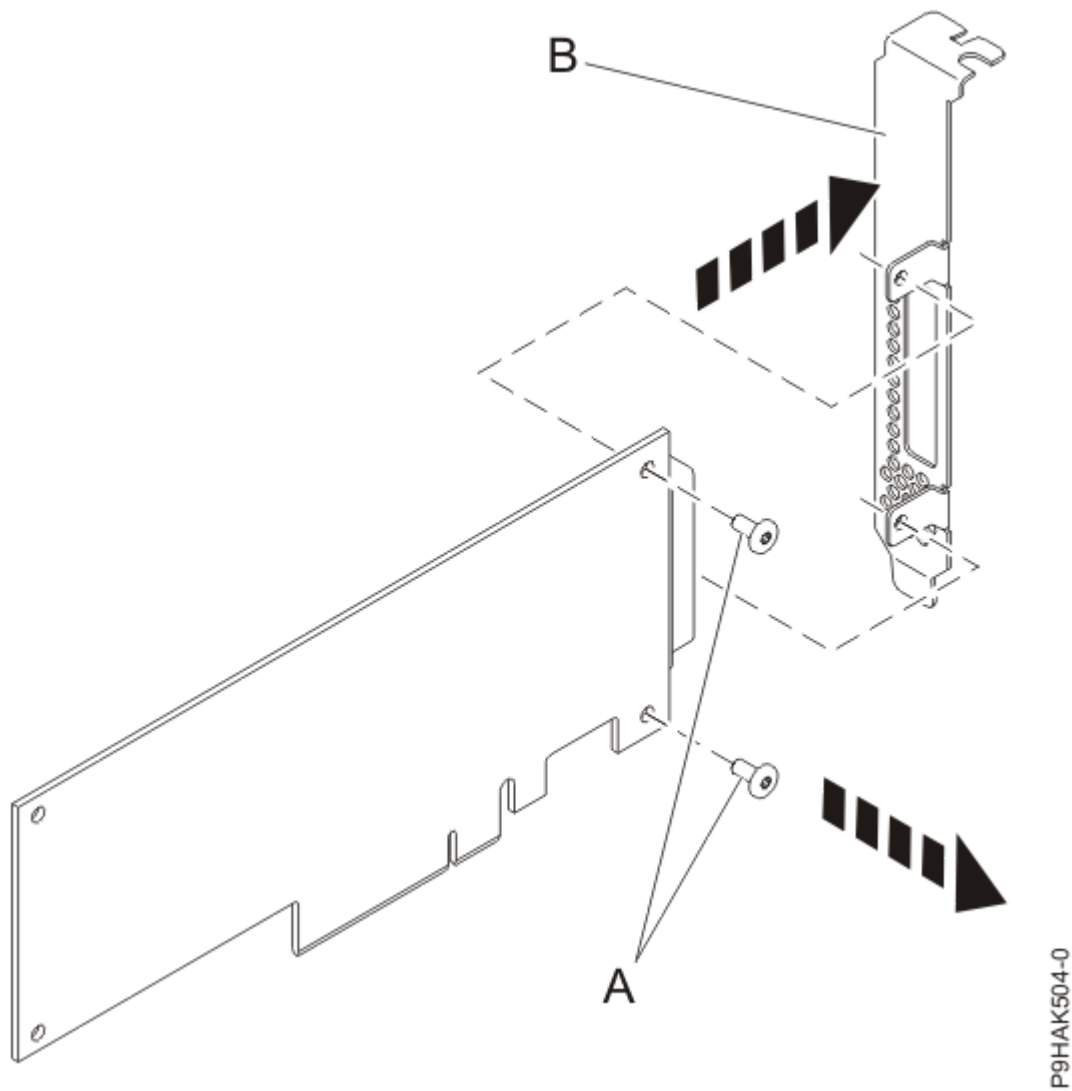


Figure 67. Removing the high-profile tailstock from a new adapter

9. If the new adapter is a 4-Port 10/100/1000 Base-TX adapter, see [“4” on page 88](#) for removing the tailstock and then return here.
10. If the new adapter is an Ethernet or Fibre Channel adapter, see [“5” on page 88](#) for removing the tailstock and then return here.
11. Detach the tailstock from the new adapter and store the tailstock and its screws in the antistatic package that the new adapter shipped in.

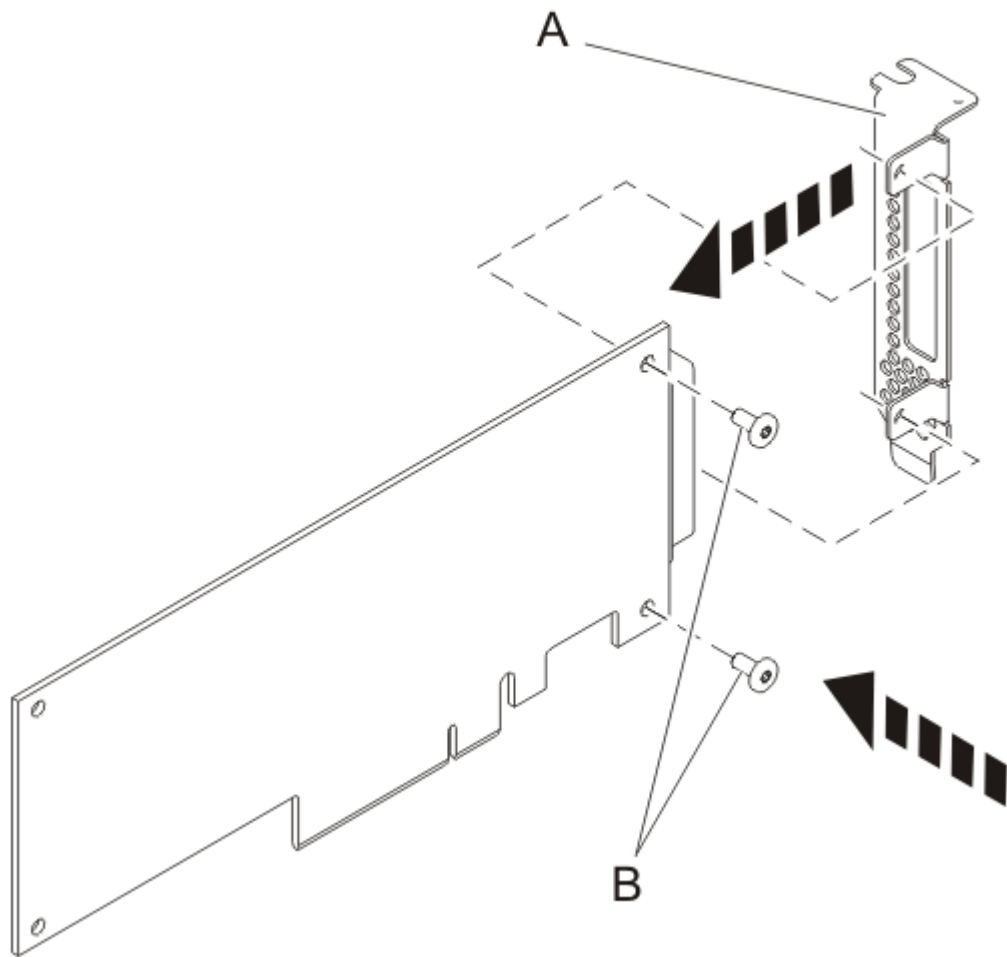
Replacing the tailstock in a new adapter

12. 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.
13. Place the adapter, component-side up, on a flat, antistatic surface.



Attention: A pin on the tailstock of the adapter resembles a removable screw. Do not remove this pin. It is required for correct alignment and seating.

14. Using a Phillips screwdriver and the two retaining screws (B), attach the tailstock (A) from the failed adapter onto the new adapter, as shown in [Figure 68 on page 91](#).



P9HAK505-0

Figure 68. Attaching the low-profile tailstock to an adapter

15. If the new adapter is a 4-Port 10/100/1000 Base-TX Express adapter, first engage the tailstock with the tabs on the card hardware. After the tailstock is attached, secure the tailstock with its screw.
16. If the new adapter is an Ethernet or Fibre Channel adapter, you must attach the SFP transceivers after you replace the tailstock.

To attach the SFP transceivers, complete the following steps:

- a) Place the card flat on a static-protective surface.
- b) Slide the transceiver **(A)** into the adapter hardware.
- c) With the latch **(B)** in the open position, push the latch by rotating it up and toward the card as shown in [Figure 69 on page 92](#).
- d) Repeat for the other transceiver.

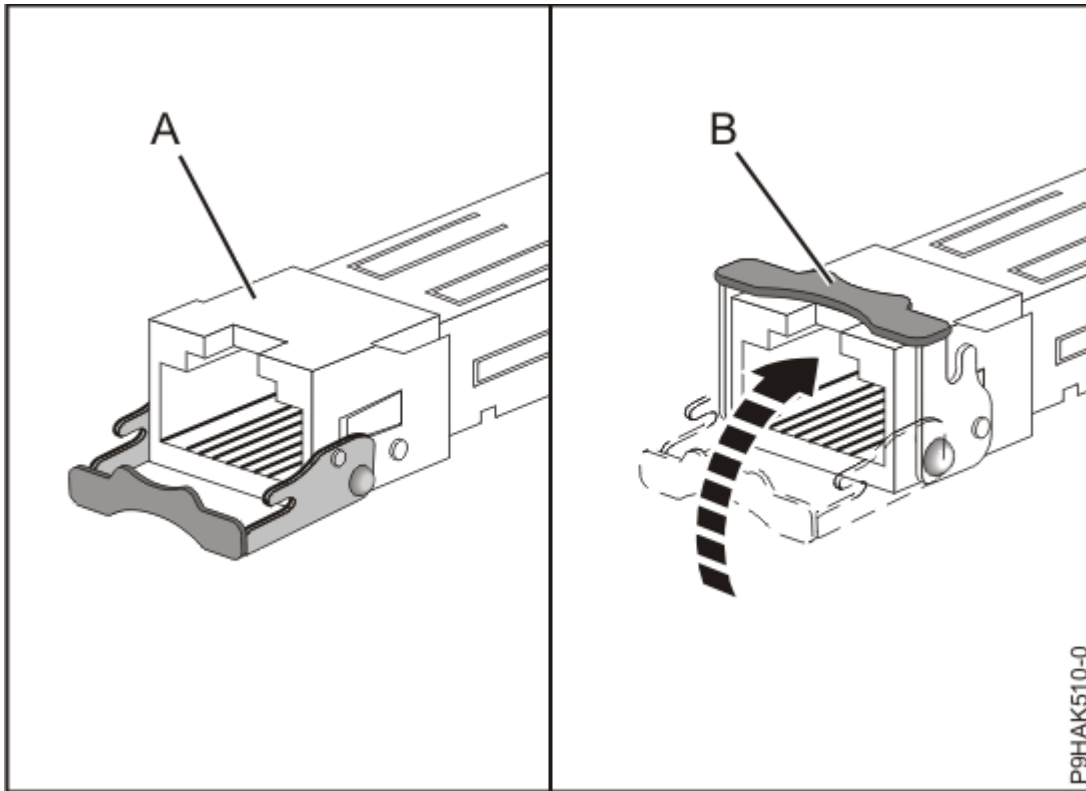


Figure 69. Replacing SFP transceivers in the adapter

17. Put the failed adapter in the shipping material and return it.

What to do next

Return to the procedure that sent you here.

Hot-plug manager access for AIX

Find information about how to service adapters with the system power on in AIX.

The instructions for servicing adapters with the system power on in AIX refer you to these procedures when it is appropriate to perform them.

Note: For an adapter to be serviced with the system power on, both the adapter and the system unit must support hot-plug procedures. To identify adapters that are hot-pluggable in the system you are servicing, refer to the following placement information: adapter placement.

Accessing the hot-plug management functions

Find information about how to use the hot-plug manager to service adapters with the system power turned on in AIX.

About this task

Note: Procedures that are completed with the system power turned on also known as hot-plug procedures. The hot-plug procedure for an adapter in an AIX system requires the system administrator to take the adapter offline before starting the procedure. Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

To access the hot-plug menus, complete the following steps:

Procedure

1. Log in as root user.
2. At the command line, type `smitty`.
3. Select **Devices**.
4. Select **PCI Hot Plug Manager** and press Enter.

The **PCI Hot-Plug Manager** menu displays.

For details about the menu options in the **PCI Hot-Plug Manager** screen, see [“PCI hot-plug manager menu”](#) on page 93.

What to do next

Return to the procedure that directed you here.

PCI hot-plug manager menu

Find information about how to use the PCI Hot Plug Manager to service PCI adapters with the system power on in AIX. The following options are available from the PCI Hot Plug Manager menu.

Note: For information about the PCI slot LED states, see [“Component LEDs”](#) on page 94.

Menu option	Description
List PCI hot-plug slots	Provides a descriptive list of all slots that support PCI hot-plug capability. If the listing for a slot indicates it holds an unknown device, select the Install/configure Devices added after IPL to configure the adapter in that slot.
Add a PCI hot-plug adapter	Allows the user to add a new PCI hot-plug-capable adapter to the slot with the system turned on. You will be asked to identify the PCI slot that you have selected prior to the actual operation. The selected PCI slot will go into the Action state and finally into the On state. Note: The system will indicate the slot holds an unknown device until you perform the Install/configure devices added after IPL option to configure the adapter.
Replace/remove a PCI hot-plug adapter	Allows the user to remove an existing adapter, or replace an existing adapter with an identical one. For this option to work, the adapter must be in the Defined state (see the "Unconfigure a Device" option). You will be asked to identify the PCI slot prior to the actual operation. The selected PCI slot will go into the Action state.
Identify a PCI hot-plug slot	Allows the user to identify a PCI slot. The selected PCI slot will go into the Identify state. See “Component LEDs” on page 94.
Unconfigure a device	Allows the user to put an existing PCI adapter into the Defined state if the device is no longer in use. This step must be completed successfully before starting any removal or replacement operation. If this step fails, the customer must take action to release the device.
Configure a defined device	Allows a new PCI adapter to be configured into the system if software support is already available for the adapter. The selected PCI slot will go into the On state.
Install/configure devices added after IPL	The system attempts to configure any new devices and tries to find and install any required software from a user-selected source.

The add, remove, and replace functions return information to the user indicating whether the operation was successful. If additional instructions are provided on the screen, complete the recommended actions. If the instructions do not resolve the problem, do the following:

- If the adapter is listed as Unknown, perform the **Install/configure devices Added After IPL** option to configure the adapter.
- If you receive a warning indicating that needed device packages are not installed, the system administrator must install the specified packages before you can configure or diagnose the adapter.
- If you receive a failure message indicating a hardware error, the problem might be either the adapter or the PCI slot. Isolate the problem by retrying the operation in a different PCI slot, or trying a different adapter in the slot. If you determine that you have failing hardware, call your service representative.
- *Do not* use **Install/configure devices added after IPL** if your system is set up to run HACMP clustering. Consult with your system administrator or software support to determine the correct method to configure the replacement device.

Component LEDs

Individual LEDs are located on or near the failing components. Use the information in this section to interpret the LEDs.

The LEDs are located either on the component itself or on the carrier of the component (for example, memory card, fan, memory module, or processor). LEDs are either green or amber.

Green LEDs indicate either of the following:

- Electrical power is present.
- Activity is occurring on a link. (The system could be sending or receiving information.)

Amber LEDs indicate a fault or identify condition. If your system or one of the components on your system has an amber LED turned on or flashing, identify the problem and take the appropriate action to restore the system to normal.

Resetting the LEDs in AIX

Individual LEDs are located on or near the failing components. You can use this procedure to reset the LEDs after you have completed a repair action.

About this task

After the repair action is complete, perform the following tasks:

Procedure

1. Log in as root user.
2. At the command line, type `diag`.
3. Select **Task Selection**.
4. Select **Log Repair Action**.
5. Select the device that was repaired.
6. Press F10 to exit diagnostics.

Results

If the Attention LED remains on after you have completed the repair action and reset the LEDs, call for service support.

Installing the AIX device driver software

Find information about how to install the AIX device driver software for a PCIe adapter.

Before you begin

If you are installing the AIX operating system at this time, install the adapter before you install the operating system. When you install the AIX operating system, the adapter device driver is automatically installed and the following procedure does not apply to your situation.

About this task

If you are installing only the device driver for a PCIe adapter, perform these steps:

Procedure

1. Log in to the system unit as root user.
2. Insert the media containing the device driver software (for example, the CD) into the media device.
If your system does not have a CD-ROM drive, refer to your system documentation for performing a Network Installation Management (NIM) installation.
3. Type the following command at the System Management Interface Tool (SMIT) fast path: `smit devinst`.
Press Enter. The Install Additional Device Software window appears with **INPUT device / directory for software** option highlighted.
4. Type the name of the input device that you are using, or press **F4** to select the input device from a list.
Press Enter. The **Install Additional Device Software** window is shown with the **SOFTWARE to install** option highlighted.
5. Press **F4** to select **List**.
6. Type `/` to display the **Find** window.
7. Type the device package name, and press Enter.
The device driver software is shown.
8. Press **F7** to select the highlighted device driver software, and press Enter.
The **Install Additional Device Software** window is displayed. The entry fields are automatically updated.
Press Enter twice to confirm. The **Command Status** window is displayed.
 - The message **RUNNING** is highlighted to indicate that the installation and configuration command is in progress.
 - When **RUNNING** changes to **OK**, scroll to the bottom of the page and locate the installation summary.
 - After a successful installation, **SUCCESS** is displayed in the **Result** column of the installation summary at the bottom of the page.
9. Remove the installation media from the drive.
10. Press **F10** to exit SMIT.
11. To verify that the device driver is installed, complete the following steps:
 - a) If necessary, log in as root user.
 - b) At the command line, type `lslpp -l devices.xxxxxxxxxx` where `xxxxxxxxxx` is the device package name.
Press Enter.
The following example shows when the adapter device driver is installed.

File set	Level	State	Description
Path: /usr/lib/objrepos devices.xxxxxxxxxx	5.3.8.0	COMMITTED	Adapter name software

Verify that the file sets are installed at the AIX version level you are running. Level 5.3.8.0 is an example. If no data is displayed on your screen, the adapter device driver was not installed correctly. Try reinstalling the driver.

Installing or replacing an adapter with the system power turned on in a Virtual I/O Server

Find information about how to install or replace an adapter in the Virtual I/O Server logical partition.

Before you begin

The Virtual I/O Server includes a Hot Plug Manager that is similar to the Hot Plug Manager in the AIX operating system. The Hot Plug Manager allows you to hot plug adapters into the system and then activate them for the logical partition without having to reboot the system. Use the Hot Plug Manager for adding, identifying, or replacing adapters in the system that are currently assigned to the Virtual I/O Server.

Prerequisites:

- If you are installing a new adapter, an empty system slot must be assigned to the Virtual I/O Server logical partition. This task can be done through dynamic logical partitioning (DLPAR) operations.
- If you are using a Hardware Management Console (HMC), you must also update the logical partition profile of the Virtual I/O Server so that the new adapter is configured to the Virtual I/O Server after you restart the system.
- If you are installing a new adapter, ensure that you have the software required to support the new adapter and determine whether there are any existing PTF prerequisites to install. For information about software prerequisites, see the [IBM Prerequisite website](http://www-912.ibm.com/e_dir/eServerPrereq.nsf) (http://www-912.ibm.com/e_dir/eServerPrereq.nsf).

About this task

Choose from the following tasks:

- [“Installing an adapter” on page 96](#)
- [“Replacing an adapter” on page 97](#)
- [“Unconfiguring storage adapters” on page 97](#)
- [“Preparing the client logical partitions” on page 98](#)

Installing an adapter

About this task

To install an adapter with the system power on in Virtual I/O Server, complete the following steps:

Procedure

1. From the Hot Plug Manager, select **Add a PCIe Hot Plug Adapter**, then press Enter.
The Add a Hot-Plug Adapter window is displayed.
2. Select the appropriate empty slot from those listed, and press Enter.
A fast-blinking amber LED located at the back of the server near the adapter indicates that the slot has been identified.

3. Follow the instructions on the screen to install the adapter until the LED for the specified slot is set to the Action state.
 - a. Set the adapter LED to the action state so that the indicator light for the adapter slot flashes
 - b. Physically install the adapter
 - c. Finish the adapter installation task in **diagmenu**.
4. Enter **cfgdev** to configure the device for the Virtual I/O Server.

Results

If you are installing a PCIe, Fibre Channel adapter, it is now ready to be attached to a SAN and have LUNs assigned to the Virtual I/O Server for virtualization.

Replacing an adapter

Before you begin

Prerequisite: Before you can remove or replace a storage adapter, you must unconfigure that adapter. See [“Unconfiguring storage adapters” on page 97](#) for instructions.

About this task

To replace an adapter with the system power turned on in Virtual I/O Server, complete the following steps:

Procedure

1. From the PCIe Hot Plug Manager, select **Unconfigure a Device**, then press Enter.
2. Press F4 (or Esc +4) to display the **Device Names** menu.
3. Select the adapter you are removing in the **Device Names** menu.
4. In the **Keep Definition** field, use the Tab key to answer Yes. In the **Unconfigure Child Devices** field, use the Tab key again to answer YES, then press Enter.
5. Press Enter to verify the information on the **ARE YOU SURE** screen. Successful unconfiguration is indicated by the OK message displayed next to the Command field at the top of the screen.
6. Press F4 (or Esc +4) twice to return to the Hot Plug Manager.
7. Select **replace/remove PCIe Hot Plug adapter**.
8. Select the slot that has the device to be removed from the system.
9. Select **replace**.

A fast-blinking amber LED located at the back of the machine near the adapter indicates that the slot has been identified.
10. Press Enter which places the adapter in the action state, meaning it is ready to be removed from the system.

Unconfiguring storage adapters

About this task

Before you can remove or replace a storage adapter, you must unconfigure that adapter. Storage adapters are generally parent devices to media devices, such as disk drives or tape drives. Removing the parent requires that all attached child devices either be removed or placed in the define state.

Unconfiguring a storage adapter involves the following tasks:

- Closing all applications that are using the adapter you are removing, replacing, or moving
- Unmounting file systems

- Ensuring that all devices connected to the adapter are identified and stopped
- Listing all slots that are currently in use or a slot that is occupied by a specific adapter
- Identifying the adapter's slot location
- Making parent and child devices unavailable
- Making the adapter unavailable

If the adapter supports physical volumes that are in use by a client logical partition, then You can perform steps on the client logical partition before unconfiguring the storage adapter. For instructions, see [“Preparing the client logical partitions” on page 98](#). For example, the adapter might be in use because the physical volume was used to create a virtual target device, or it might be part of a volume group used to create a virtual target device.

To unconfigure SCSI, SSA, and Fibre Channel storage adapters, complete the following steps:

Procedure

1. Connect to the Virtual I/O Server command-line interface.
2. Enter `oem_setup_env` to close all applications that are using the adapter you are unconfiguring.
3. Type `lsslot -c PCI` to list all the hot plug slots in the system unit and display their characteristics.
4. Type `lsdev -C` to list the current state of all the devices in the system unit.
5. Type `umount` to unmount previously mounted file systems, directories, or files using this adapter.
6. Type `rmdev -l adapter -R` to make the adapter unavailable.



Attention: Do not use the `-d` flag with the `rmdev` command for hot plug operations because this action removes your configuration.

Preparing the client logical partitions

About this task

If the virtual target devices of the client logical partitions are not available, the client logical partitions can fail or they might be unable to perform I/O operations for a particular application. If you use the HMC to manage the system, you might have redundant Virtual I/O Server logical partitions, which allow for Virtual I/O Server maintenance and avoid downtime for client logical partitions. If you are replacing an adapter on the Virtual I/O Server and your client logical partition is dependent on one or more of the physical volumes accessed by that adapter, then You can take action on the client before you unconfigure the adapter.

The virtual target devices must be in the define state before the Virtual I/O Server adapter can be replaced. Do not remove the virtual devices permanently.

Procedure

To prepare the client logical partitions so that you can unconfigure an adapter, complete the following steps depending on your situation.

<i>Table 2. Situations and steps for preparing the client logical partitions</i>	
Situation	Steps
You have redundant hardware on the Virtual I/O Server for the adapter.	No action is required on the client logical partition.
HMC-managed systems only: You have redundant Virtual I/O Server logical partitions that, in conjunction with virtual client adapters, provide multiple paths to the physical volume on the client logical partition.	No action is required on the client logical partition. However, path errors might be logged on the client logical partition.

Table 2. Situations and steps for preparing the client logical partitions (continued)

Situation	Steps
HMC-managed systems only: You have redundant Virtual I/O Server logical partitions that, in conjunction with virtual client adapters, provide multiple physical volumes that are used to mirror a volume group.	<p>See the procedures for your client operating system. For example, for AIX, see Replacing a disk on the Virtual I/O Server in the Advanced POWER Virtualization Best Practices Redpaper.</p> <p>The procedure for Linux is similar to this procedure for AIX. For example, for AIX, see Replacing a disk on the Virtual I/O Server in the Advanced POWER Virtualization Best Practices Redpaper.</p> <p>The procedure for Linux is similar to this procedure for AIX.</p>
You do not have redundant Virtual I/O Server logical partitions.	<p>Shut down the client logical partition.</p> <p>For systems that are managed by the HMC, see Stopping a system (www.ibm.com/support/knowledgecenter/POWER9/p9haj/stopsyshmc.htm).</p>

Verifying that the hot-plug adapter tools are installed for the Linux operating system

Find information about how to verify that the hot-plug adapter tools are installed on your Linux system so you can then verify the adapter is installed.

Before you begin

Note: The hot-plug adapter tools are **not** available for the 5105-22E system.

Procedure

1. Enter the following command to verify that the hot-plug adapter tools are installed: `rpm -aq | grep powerpc-utils`.

If the command does not list any `powerpc-utils` packages, the Hot Plug tools are not installed.

2. Enter the following command to ensure that the `rpaphp` driver is loaded: `ls -l /sys/bus/pci/slots/`

The directory should contain data.

- If the directory is empty, the driver is not loaded or the system does not contain hot-plug adapter slots. The following is an example of the information displayed by this command:

```
drwxr-xr-x 15 root root 0 Feb 16 23:31 .
drwxr-xr-x  5 root root 0 Feb 16 23:31 ..
drwxr-xr-x  2 root root 0 Feb 16 23:31 0000:00:02.0
drwxr-xr-x  2 root root 0 Feb 16 23:31 0000:00:02.2
drwxr-xr-x  2 root root 0 Feb 16 23:31 0000:00:02.4
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.0
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.2
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.4
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.6
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.0
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.2
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.4
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.6
```

- If the directory does not exist, run the following command to mount the filesystem: `mount -t sysfs sysfs /sys`

3. Ensure the following tools are available in the `/usr/sbin` directory.

- lsslot
 - drmgr -c pci
4. Return to the procedure that sent you here.

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.

Using the operating system commands

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.

Running the AIX command to check the amount of remaining life in NVMe devices

Find information about using the AIX operating system to find the amount of remaining life in an NVMe device.

About this task

To find the amount of remaining life in an NVMe device by using the AIX operating system, complete the steps in this procedure.

Procedure

1. If the system has logical partitions, complete this procedure from the logical partition that owns the NVMe device
2. To use the AIX operating system to find the remaining life on an NVMe device, complete the following steps:
 - a) From the AIX command line, type `diag` and press Enter.
 - b) From the Function Selection menu, select **Task Selection > NVMe general health information**.
 - c) Select the NVMe device that you want to check remaining life for and press Enter.
 - d) View the **Percentage of NVM subsystem life used** field.

Is the value in the **Percentage of NVM subsystem life used** field 100%?

 - **Yes:** Continue with the next step.
 - **No:** Continue with step “4” on page 100.

3. The NVMe device is nearing its end of life and must be replaced. The NVMe device will soon reach the limit for the number of write operations that are supported. Write operations to the NVMe device become slower over time, and at some point the NVMe device becomes a read-only device. When the operating system writes data to a read-only device, the write operations are rejected, and the operating system considers the device as if a failure occurred. To support normal write operations, the NVMe device must be replaced.

Note: Failure of IBM NVMe devices is covered in the standard warranty and during the maintenance period only for devices that have not reached the maximum number of write cycles. Devices that reach this limit might fail to operate according to specifications and must be replaced. This replacement cost is not covered under the standard warranty or during the maintenance period.

This ends the procedure.

4. Does the **Critical Warning** field show **Available spare space has fallen below threshold**?
 - **Yes:** Continue with the next step.
 - **No:** A service action is not required. **This ends the procedure.**
5. The NVMe device is nearing its end of life and must be replaced. The NVMe device will soon reach the limit for the number of write operations that are supported. Write operations to the NVMe device

become slower over time, and at some point the NVMe device becomes a read-only device. When the operating system writes data to a read-only device, the write operations are rejected, and the operating system considers the device as if a failure occurred. To support normal write operations, schedule maintenance to replace the NVMe device at your earliest convenience.

Note: Failure of IBM NVMe devices is covered in the standard warranty and during the maintenance period only for devices that have not reached the maximum number of write cycles. Devices that reach this limit might fail to operate according to specifications and must be replaced. This replacement cost is not covered under the standard warranty or during the maintenance period.

This ends the procedure.

Running the IBM i command to check the amount of remaining life in NVMe devices

Find information about using the IBM i operating system to find the amount of remaining life in an NVMe device.

About this task

To find the amount of remaining life in an NVMe device by using the IBM i operating system, complete the steps in this procedure.

Procedure

1. If the system has logical partitions, complete this procedure from the logical partition that owns the NVMe device
2. To use the IBM i operating system to find the remaining life on an NVMe device, complete the following steps:
 - a) Sign on to an IBM i session with the security officer (QSECOFR) user profile.
 - b) To create an NVMe device report in a spool file, type the following command at the command line of the IBM i operating system and press Enter.

```
CALL PGM(QSMGSSTD) PARM('NVMEGAUGE' X'00000009' 'SSTD0100' X'00000000')
```

- c) To display the contents of the spool file, type `wrksp1f` at the command line of the IBM i operating system and press Enter.
The spool file contains a report of the NVMe devices.
 - d) View the **Percentage Used** field.
Is the value in the **Percentage Used** field 100%?
 - Yes: Continue with the next step.
 - No: Continue with step “4” on page 101.
3. The NVMe device is nearing its end of life and must be replaced. The NVMe device will soon reach the limit for the number of write operations that are supported. Write operations to the NVMe device become slower over time, and at some point the NVMe device becomes a read-only device. When the operating system writes data to a read-only device, the write operations are rejected, and the operating system considers the device as if a failure occurred. To support normal write operations, the NVMe device must be replaced.

Note: Failure of IBM NVMe devices is covered in the standard warranty and during the maintenance period only for devices that have not reached the maximum number of write cycles. Devices that reach this limit might fail to operate according to specifications and must be replaced. This replacement cost is not covered under the standard warranty or during the maintenance period.

This ends the procedure.

4. Is the value in the **Available spare space** field equal 1?

- **Yes:** Continue with the next step.
 - **No:** A service action is not required. **This ends the procedure.**
5. The NVMe device is nearing its end of life and must be replaced. The NVMe device will soon reach the limit for the number of write operations that are supported. Write operations to the NVMe device become slower over time, and at some point the NVMe device becomes a read-only device. When the operating system writes data to a read-only device, the write operations are rejected, and the operating system considers the device as if a failure occurred. To support normal write operations, schedule maintenance to replace the NVMe device at your earliest convenience.

Note: Failure of IBM NVMe devices is covered in the standard warranty and during the maintenance period only for devices that have not reached the maximum number of write cycles. Devices that reach this limit might fail to operate according to specifications and must be replaced. This replacement cost is not covered under the standard warranty or during the maintenance period.

This ends the procedure.

Running the Linux smart-log command to check the amount of remaining life in NVMe devices

Find information about using the Linux operating system smart-log command to find the amount of remaining life in an NVMe device.

About this task

To find the amount of remaining life in an NVMe device by using the Linux operating system smart-log command, complete the steps in this procedure.

Procedure

1. If the system has logical partitions, complete this procedure from the logical partition that owns the NVMe device
2. To use the Linux operating system to find the remaining life on an NVMe device, complete the following steps:
 - a) From the Linux command line, type the following command and press Enter.

```
nvme smart-log /dev/nvmeX -H
```

where *nvmeX* is the resource name of the NVMe device.

- b) View the **Percentage used** field.

Is the value in the **Percentage used** field 100%?

 - **Yes:** Continue with the next step.
 - **No:** Continue with step “4” on page 102.
3. The NVMe device is nearing its end of life and must be replaced. The NVMe device will soon reach the limit for the number of write operations that are supported. Write operations to the NVMe device become slower over time, and at some point the NVMe device becomes a read-only device. When the operating system writes data to a read-only device, the write operations are rejected, and the operating system considers the device as if a failure occurred. To support normal write operations, the NVMe device must be replaced.

Note: Failure of IBM NVMe devices is covered in the standard warranty and during the maintenance period only for devices that have not reached the maximum number of write cycles. Devices that reach this limit might fail to operate according to specifications and must be replaced. This replacement cost is not covered under the standard warranty or during the maintenance period.

This ends the procedure.

4. In the **critical_warning** portion of the command output, is the **Available Spare** field displayed?

- **Yes:** Continue with the next step.
 - **No:** Continue with step “6” on page 103.
5. Is the **Available Spare** field equal to 1?
- **Yes:** The NVMe device has low spares. Continue with step “7” on page 103.
 - **No:** A service action is not required. **This ends the procedure.**
6. Complete the following steps to determine if the NVMe device has low spares:
- a) View the **critical_warning** field.
 - b) The **critical_warning** field is a hexadecimal number. Convert the hexadecimal number to a binary number.
 - c) Is the rightmost digit of the binary number equal to 1?
 - **Yes:** The NVMe device has low spares. Continue with the next step.
 - **No:** A service action is not required. **This ends the procedure.**
7. The NVMe device is nearing its end of life and must be replaced. The NVMe device will soon reach the limit for the number of write operations that are supported. Write operations to the NVMe device become slower over time, and at some point the NVMe device becomes a read-only device. When the operating system writes data to a read-only device, the write operations are rejected, and the operating system considers the device as if a failure occurred. To support normal write operations, schedule maintenance to replace the NVMe device at your earliest convenience.
- Note:** Failure of IBM NVMe devices is covered in the standard warranty and during the maintenance period only for devices that have not reached the maximum number of write cycles. Devices that reach this limit might fail to operate according to specifications and must be replaced. This replacement cost is not covered under the standard warranty or during the maintenance period.

This ends the procedure.

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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](http://www.w3.org/TR/wai-aria/) (www.w3.org/TR/wai-aria/), to ensure compliance with [US Section 508](http://www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards) (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](http://www.w3.org/TR/WCAG20/) (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.

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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.

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Warning: This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

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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

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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
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Generelle Informationen:

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

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Responsible Party:

International Business Machines Corporation
New Orchard Road
Armonk, New York 10504
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