

Power Systems

*Servicing the IBM Power System
S821LC (8001-12C) or the IBM CS821
(8005-12N)*

IBM

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*Servicing the IBM Power System
S821LC (8001-12C) or the IBM CS821
(8005-12N)*

IBM

Note

Before using this information and the product it supports, read the information in “Safety notices” on page v, “Notices” on page 89, the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125-5823.

This edition applies to IBM Power Systems™ servers that contain the POWER8® processor and to all associated models.

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Safety notices

Safety notices may be printed throughout this guide:

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

World Trade safety information

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

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

German safety information

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

Laser safety information

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

Laser compliance

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

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

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- If IBM supplied the power cord(s), connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
 - 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.
- Assume that an electrical safety hazard is present. Perform all continuity, grounding, and power checks specified during the subsystem installation procedures to ensure that the machine meets safety requirements.
- Do not continue with the inspection if any unsafe conditions are present.
- Before you open the device covers, unless instructed otherwise in the installation and configuration procedures: Disconnect the attached AC power cords, turn off the applicable circuit breakers located in the rack power distribution panel (PDP), and disconnect any telecommunications systems, networks, and modems.

DANGER:

- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. For AC power, remove the power cords from the outlets.
3. For racks with a DC power distribution panel (PDP), turn off the circuit breakers located in the PDP and remove the power from the Customer's DC power source.
4. Remove the signal cables from the connectors.
5. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. For AC power, attach the power cords to the outlets.
5. For racks with a DC power distribution panel (PDP), restore the power from the Customer's DC power source and turn on the circuit breakers located in the PDP.
6. Turn on the devices.

Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

(R001 part 1 of 2):

DANGER: Observe the following precautions when working on or around your IT rack system:

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack mounted devices and do not use them to stabilize your body position (for example, when working from a ladder).



- Each rack cabinet might have more than one power cord.
 - For AC powered racks, be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
 - For racks with a DC power distribution panel (PDP), turn off the circuit breaker that controls the power to the system unit(s), or disconnect the customer's DC power source, when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

(R001 part 2 of 2):

CAUTION:

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- *(For sliding drawers.)* Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.



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

CAUTION:

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

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:
 - Remove all devices in the 32U position (compliance ID RACK-001 or 22U (compliance ID RR001) and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are little-to-no empty U-levels between devices installed in the rack cabinet below the 32U (compliance ID RACK-001 or 22U (compliance ID RR001) level, unless the received configuration specifically allowed it.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 230 mm (30 x 80 in.).
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
- Do not use a ramp inclined at more than 10 degrees.
- When the rack cabinet is in the new location, complete the following steps:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
- If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

(R002)

(L001)



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

(L002)



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

(L003)



or



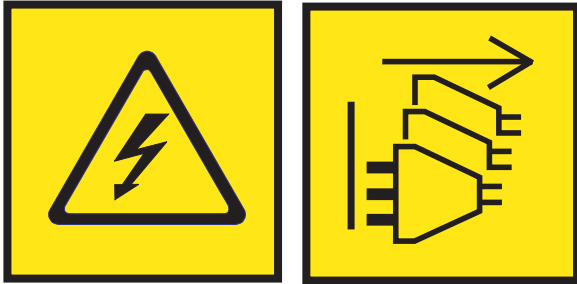
or



or



or



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

(L007)



CAUTION: A hot surface nearby. (L007)

(L008)



CAUTION: Hazardous moving parts nearby. (L008)

All lasers are certified in the U.S. to conform to the requirements of DHHS 21 CFR Subchapter J for class 1 laser products. Outside the U.S., they are certified to be in compliance with IEC 60825 as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

CAUTION:

This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

(C026)

CAUTION:

Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. Although shining light into one end and looking into the other end of a disconnected optical fiber to verify the continuity of optic fibers may not injure the eye, this procedure is potentially dangerous. Therefore, verifying the continuity of optical fibers by shining light into one end and looking at the other end is not recommended. To verify continuity of a fiber optic cable, use an optical light source and power meter. (C027)

CAUTION:

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

CAUTION:

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following information: laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam. (C030)

CAUTION:

The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do Not:

- ___ Throw or immerse into water
- ___ Heat to more than 100°C (212°F)
- ___ Repair or disassemble

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C003)

CAUTION:

Regarding IBM provided VENDOR LIFT TOOL:

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

Power and cabling information for NEBS (Network Equipment-Building System) GR-1089-CORE

The following comments apply to the IBM servers that have been designated as conforming to NEBS (Network Equipment-Building System) GR-1089-CORE:

The equipment is suitable for installation in the following:

- Network telecommunications facilities
- Locations where the NEC (National Electrical Code) applies

The intrabuilding ports of this equipment are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of this equipment *must not* be metalically 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 metalically 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.

Removing and replacing parts

Use these procedures to remove and replace failing parts. These parts are referred to as field replaceable units (FRUs).

Note: See the International Information Bulletin for Customers - Installation of IBM Machines (<http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>). This bulletin (Publication number SC27-6601-00) provides a list of the key IBM system installation activities and those activities that might be billable activities.

Before you begin a replacement, complete these tasks:

1. If you are completing a replacement procedure that might put your data at risk, ensure, if possible, that you have a current backup of your system or logical partition (including operating systems, licensed programs, and data).
2. Review the installation or replacement procedure for the feature or part.
3. Note the significance of color on your system.
 - The color **terracotta** on the part indicates you might not need to power off the system to complete service. This determination depends on your system configuration, and you might need to complete steps to prepare the system before a service action can be completed on the system with the system power turned on.
 - The color **blue** on the part indicates that the procedure might require the system to be shut down before servicing. Check your service procedure before you attempt the repair.
4. Ensure that you have access to a medium, flat-blade screwdriver, and a Phillips screwdriver.
5. If parts are incorrect, missing, or visibly damaged, contact the provider of the part or your next level of support.

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.

- Assume that an electrical safety hazard is present. Perform all continuity, grounding, and power checks specified during the subsystem installation procedures to ensure that the machine meets safety requirements.
- Do not continue with the inspection if any unsafe conditions are present.
- Before you open the device covers, unless instructed otherwise in the installation and configuration procedures: Disconnect the attached AC power cords, turn off the applicable circuit breakers located in the rack power distribution panel (PDP), and disconnect any telecommunications systems, networks, and modems.

DANGER:

- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. For AC power, remove the power cords from the outlets.
3. For racks with a DC power distribution panel (PDP), turn off the circuit breakers located in the PDP and remove the power from the Customer's DC power source.
4. Remove the signal cables from the connectors.
5. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. For AC power, attach the power cords to the outlets.
5. For racks with a DC power distribution panel (PDP), restore the power from the Customer's DC power source and turn on the circuit breakers located in the PDP.
6. Turn on the devices.

Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

Attention:

Failure to follow the step-by-step sequence for FRU removal or installation might result in FRU or system damage.

For safety, airflow purposes and thermal performance, the service access cover must be installed and fully seated before you power the system on.

For safety and airflow purposes and thermal performance, if you remove parts from the system, you must ensure that PCIe tail-stock fillers are present.

Use the following precautions whenever you handle electronic components or cables.

- The electrostatic discharge (ESD) kit and the ESD wrist strap must be used when you handle logic cards, single chip modules (SCM), multichip modules (MCM), electronic boards, and disk drives.
- Keep all electronic components in the shipping container or envelope until you are ready to install them.
- If you remove and then reinstall an electronic component, temporarily place the component on an ESD pad or blanket.

Removing and replacing a storage drive in the 8001-12C or 8005-12N

Learn how to remove and replace a storage drive in the IBM Power® System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

About this task

The storage drive might be a hard disk drive (HDD) or a solid-state drive (SSD).

Removing a disk drive from the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system

Learn how to remove a disk drive in the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

Before you begin

You can remove and replace SATA and SAS front drives with the system powered on and running.

When removing and replacing NVMe drives, the system needs to be powered down; for instructions, see “Stopping the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 74.

Procedure

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

Attention:

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

Based on how the drive is connected, use the following table to identify the drive, and to enable the drive to be safely removed from the system.

Drive type	Use these commands
SATA drives connected to system backplane	“mvCLI commands” on page 74
SATA or SAS drives connected to Low Profile 12Gb/s 8-port SAS Internal RAID Adapter (FC EKAA)	“StorCLI commands” on page 75
SATA or SAS drives connected to 12Gb/s 8-Port SAS Internal RAID Adapter (FC EKAB)	“sas3ircu commands” on page 76
NVMe drives connected to Dual-port Internal NVMe Host Bus Adapter (FC EKAE)	“NVMe commands” on page 77

3. Unlock the drive bay handle (**B**) by pushing in the handle release (**A**) as shown in Figure 1 on page 4. The handle (**B**) snaps out towards you. If the handle does not snap out all the way, the drive does not slide out of the system. If the drive does not match the serial number you wrote down in the previous step, reinstall the drive in the bay you removed it from, and check the other drive bays.

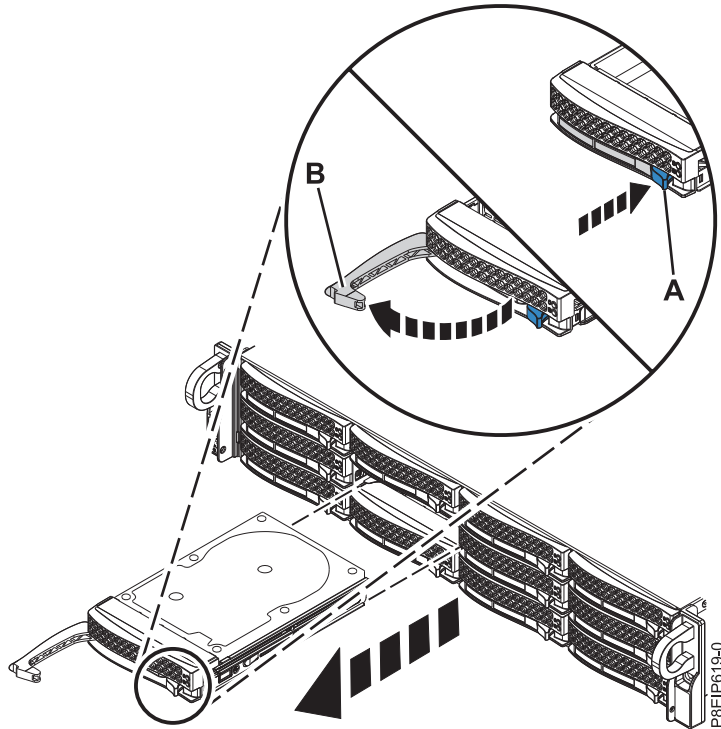


Figure 1. Removing a drive

4. Support the bottom of the drive as you slide it out of the system. Do not hold the drive by the handle.
5. If you are removing more than one drive, repeat the steps in this procedure until all drives are removed.
6. Remove a drive from the tray.
 - For a 3.5-inch drive, unfasten the drive from the sides of the tray by removing four screws (2 on each side), as shown in Figure 2 on page 5.

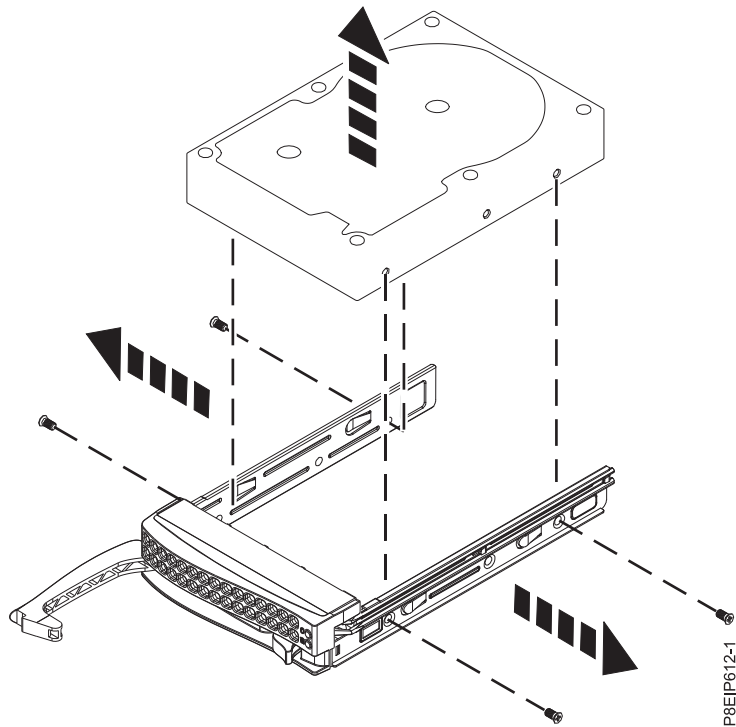


Figure 2. Removing the 3.5-inch drive from the tray

- A 2.5-inch drive slides out of the tray.
 - a. Turn the tray upside down as shown in Figure 3.
 - b. Open the retention spring (A).
 - c. Lift the 2.5-inch drive (B) out of the tray as shown in Figure 4 on page 6.
 - d. Close the retention spring.
 - e. Turn the tray right side up.

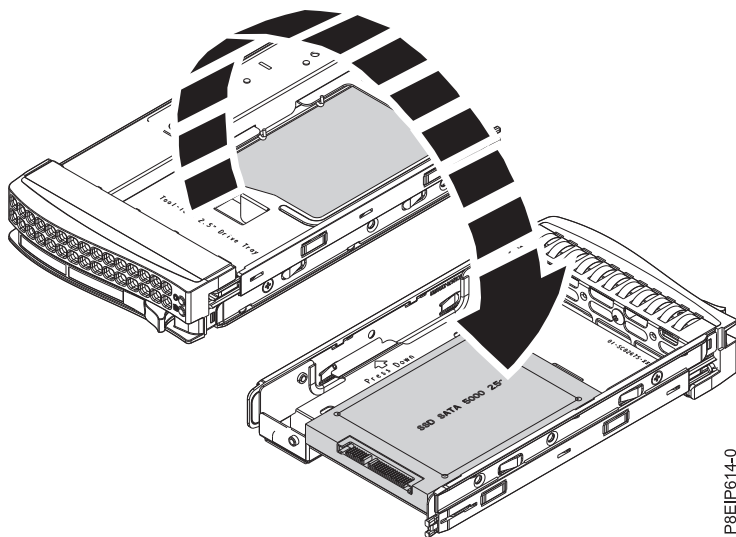


Figure 3. Turning the 2.5-inch tray upside-down

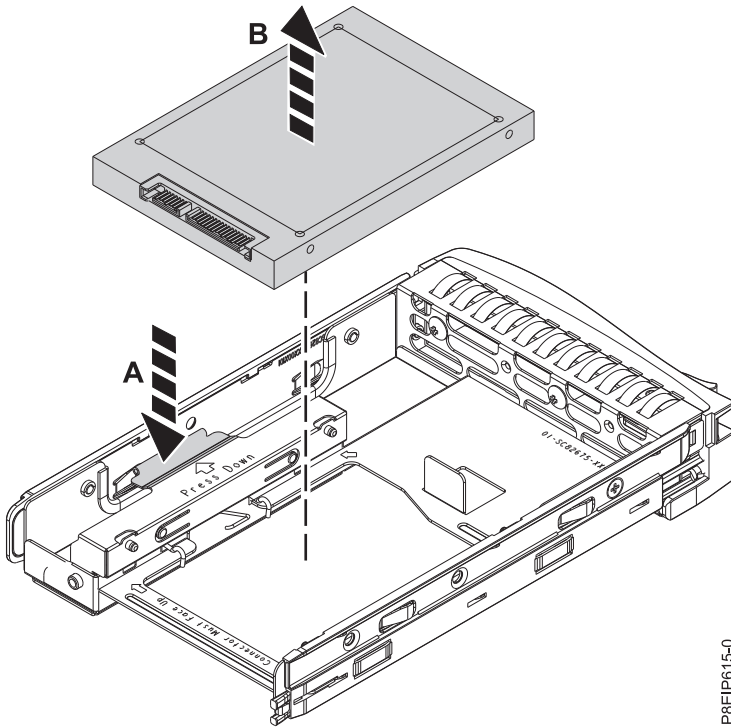


Figure 4. Removing the 2.5-inch drive from the tray

Replacing a disk drive in the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system

Learn how to replace a disk drive in the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Install a drive into the tray. Orient the drive such that the connectors are pointing to the rear of the drive.
 - A 3.5-inch drive fills the tray, as shown in Figure 5 on page 7. Fasten the drive to the sides of the tray with four screws (two screws on each side).

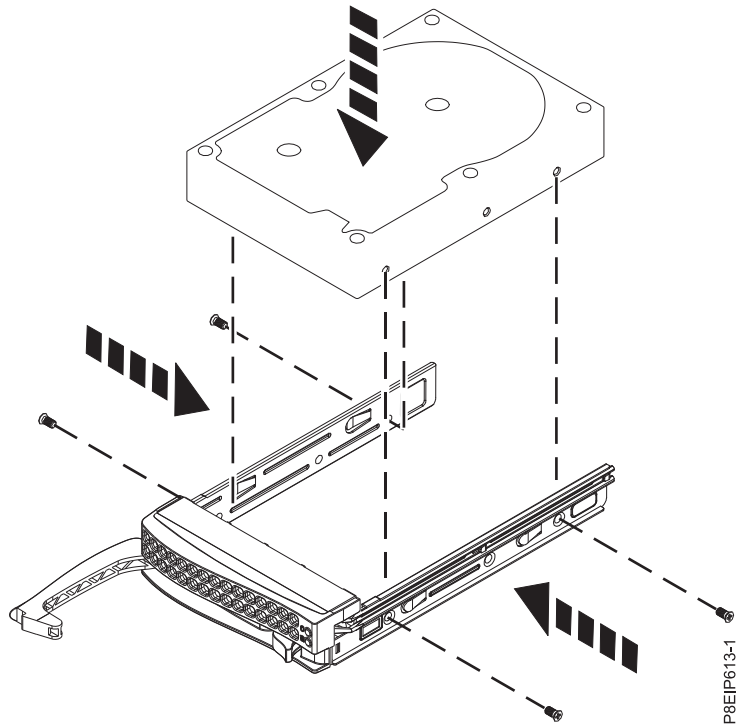


Figure 5. Mounting the 3.5-inch drive in the tray

- A 2.5-inch drive slides into the rear of the tool-less drive carrier.
 - a. Turn the tray upside down as shown in Figure 6.
 - b. Open the retention spring (B) as shown in Figure 7 on page 8.
 - c. Place the 2.5-inch drive (A) into the tray, aligning the pins with the screw holes in the drive.
 - d. When the pins are aligned, close the retention spring, allowing the pins to secure the drive in the tray.
 - e. Turn the tray right side up.

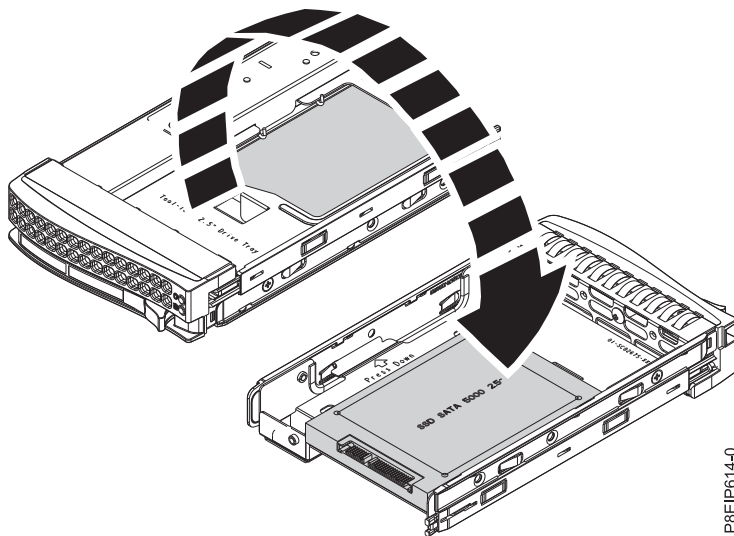
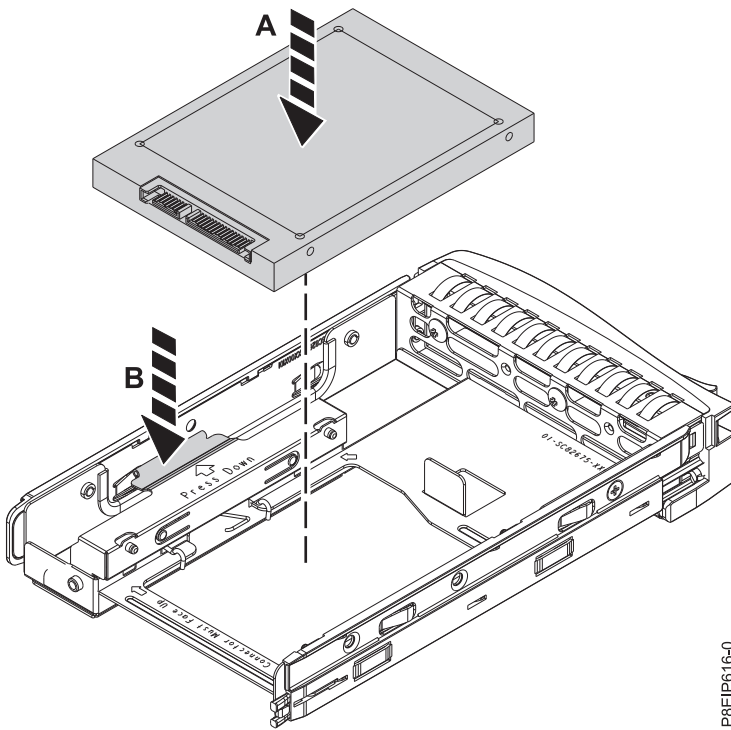


Figure 6. Turning the 2.5-inch tray upside-down



P8EIP616-0

Figure 7. Mounting the 2.5-inch drive in the tray

3. Support the drive by the bottom as you position the drive, and insert it into the drive slot.

Important: Ensure that the drive is fully seated and is all the way into the system.

4. Lock the drive bay handle (A) by pushing in the handle release until it locks at (B) as shown in Figure 8 on page 9.

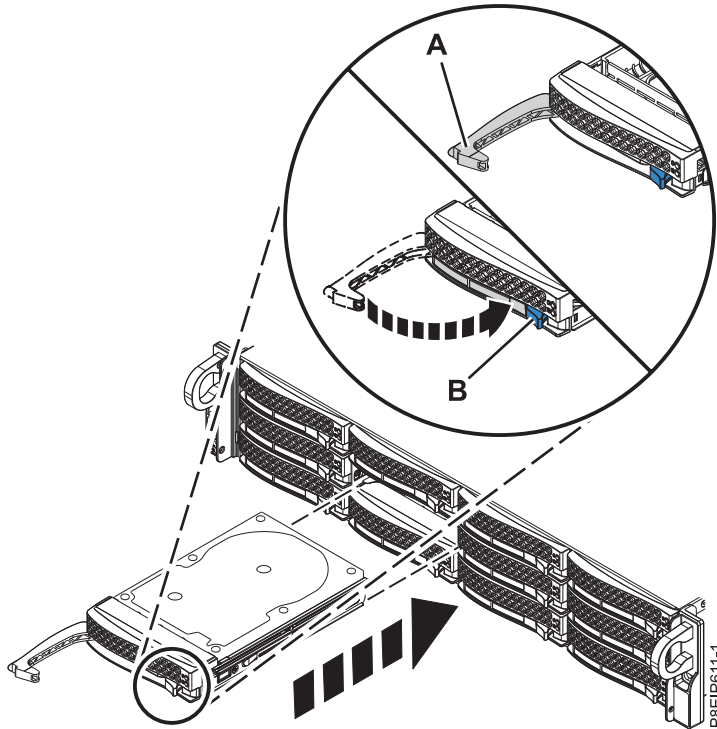


Figure 8. Disk drive lock detail

5. If you replaced an NVMe drive, power the system back on. For instructions, see “Starting the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 73.
6. Configure the installed drive for your environment.
After you insert the new drive, you need to rescan for the device.

Ubuntu Linux operating system

To run the **rescan-scsi-bus** command in the Ubuntu Linux operating system, log in to the system as the root user, and run the following command:

```
rescan-scsi-bus
```

The **rescan-scsi-bus** tool is available in the `scsiutils` package; install the package by using the following command:

```
sudo apt-get install scsiutils
```

Red Hat Enterprise Linux (RHEL) version 7.2

To run the `rescan` command in the RHEL version 7.2 operating system, log in to the system as the root user, and run the command:

```
rescan-scsi-bus.sh -a
```

The **rescan-scsi-bus** tool is available in the `sg3_utils` package; install the package by using the following command:

```
yum install sg3_utils
```

You can also want to refer to: Adding a Storage Device or Path (https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/Storage_Administration_Guide/logical-unit-add-remove.html).

7. Load or restore data from your backup media.

Removing a drive on module from the 8001-12C or 8005-12N system

Learn how to remove a drive on module (DOM) from the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

Locate the drive. Ensure that the media device is unmounted from the Linux system and if needed, remove the media from the device. Use these commands: “mvCLI commands” on page 74.

Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

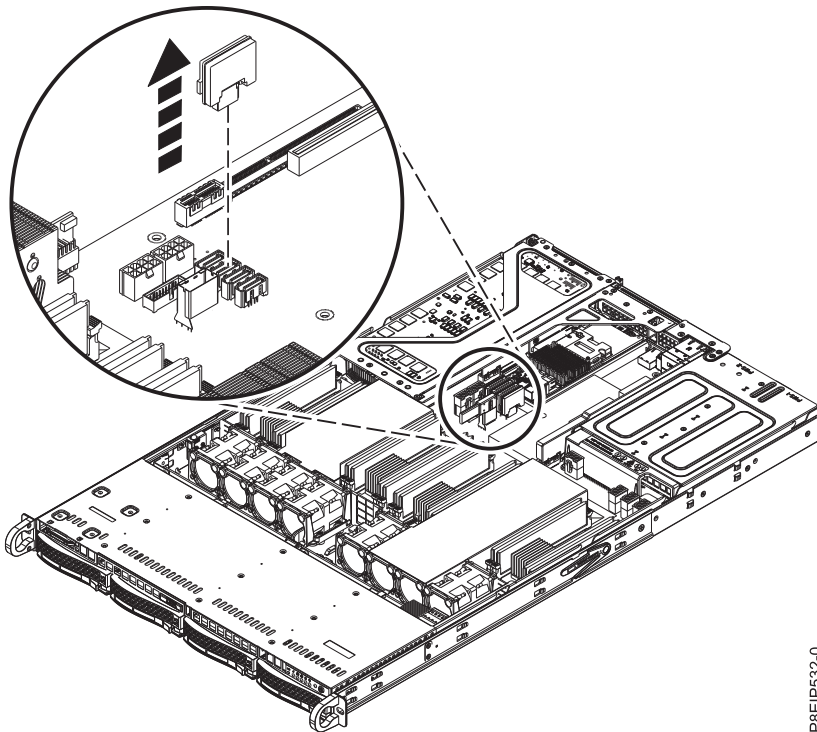
Procedure

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

Attention:

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

2. Remove the DOM from the system backplane as shown in Figure 9.



P8EIP532-0

Figure 9. Removing a DOM

Replacing a drive on module in the 8001-12C or 8005-12N system

Learn how to replace a drive on module (DOM) in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

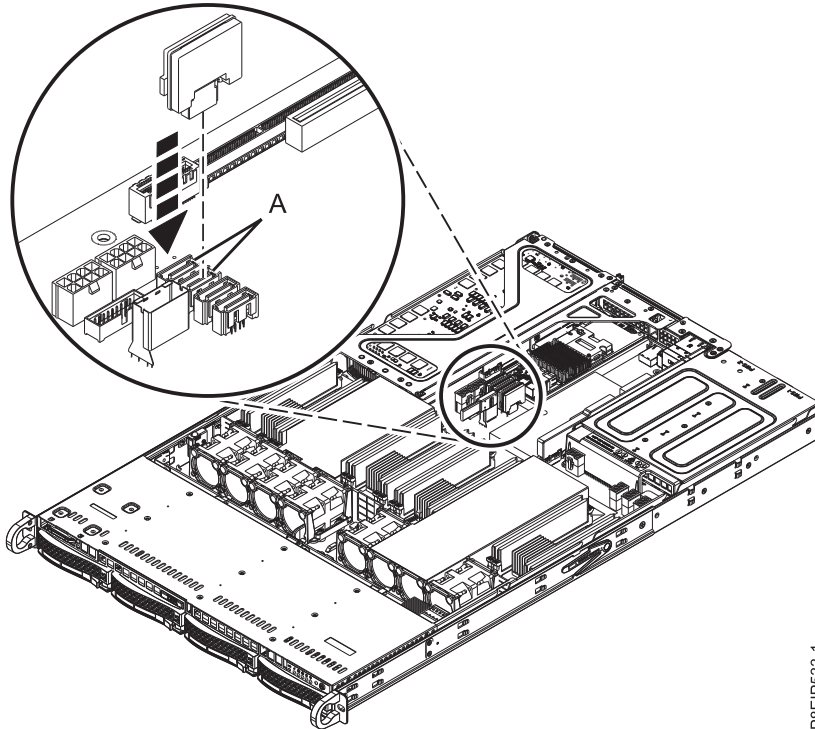
Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Install the DOM into the system backplane, in positions **(A)**, as shown in Figure 10. Depending on the DOM model, you may also have to plug in a small power cord for the DOM. Ensure you plug the connectors in properly.



P8EIP533-1

Figure 10. Installing a DOM

3. Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

4. Configure the installed drive for your environment.

After you insert the new drive, you need to rescan for the device.

Ubuntu Linux operating system

To run the **rescan-scsi-bus** command in the Ubuntu Linux operating system, log in to the system as the root user, and run the following command:

```
rescan-scsi-bus
```

The **rescan-scsi-bus** tool is available in the `scsiutils` package; install the package by using the following command:

```
sudo apt-get install scsiutils
```

Red Hat Enterprise Linux (RHEL) version 7.2

To run the `rescan` command in the RHEL version 7.2 operating system, log in to the system as the root user, and run the command:

```
rescan-scsi-bus.sh -a
```

The **rescan-scsi-bus** tool is available in the `sg3_utils` package; install the package by using the following command:

```
yum install sg3_utils
```

You can also want to refer to: Adding a Storage Device or Path (https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/Storage_Administration_Guide/logical-unit-add-remove.html).

5. Load or restore data from your backup media.

Removing and replacing the disk drive backplane in the 8001-12C or 8005-12N

Learn how to remove and replace the disk drive backplane in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

About this task

You can use a commercially available magnetic tip screwdriver to remove and replace the screws.

Removing the disk drive backplane from the 8001-12C or 8005-12N

Learn how to remove the disk drive backplane in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Label and remove the drive signal cables (A), the operator console cable (B), and drive power cable (C) from the system backplane as shown in Figure 11. Using your thumb, press the release latch on the connector to remove the cable.

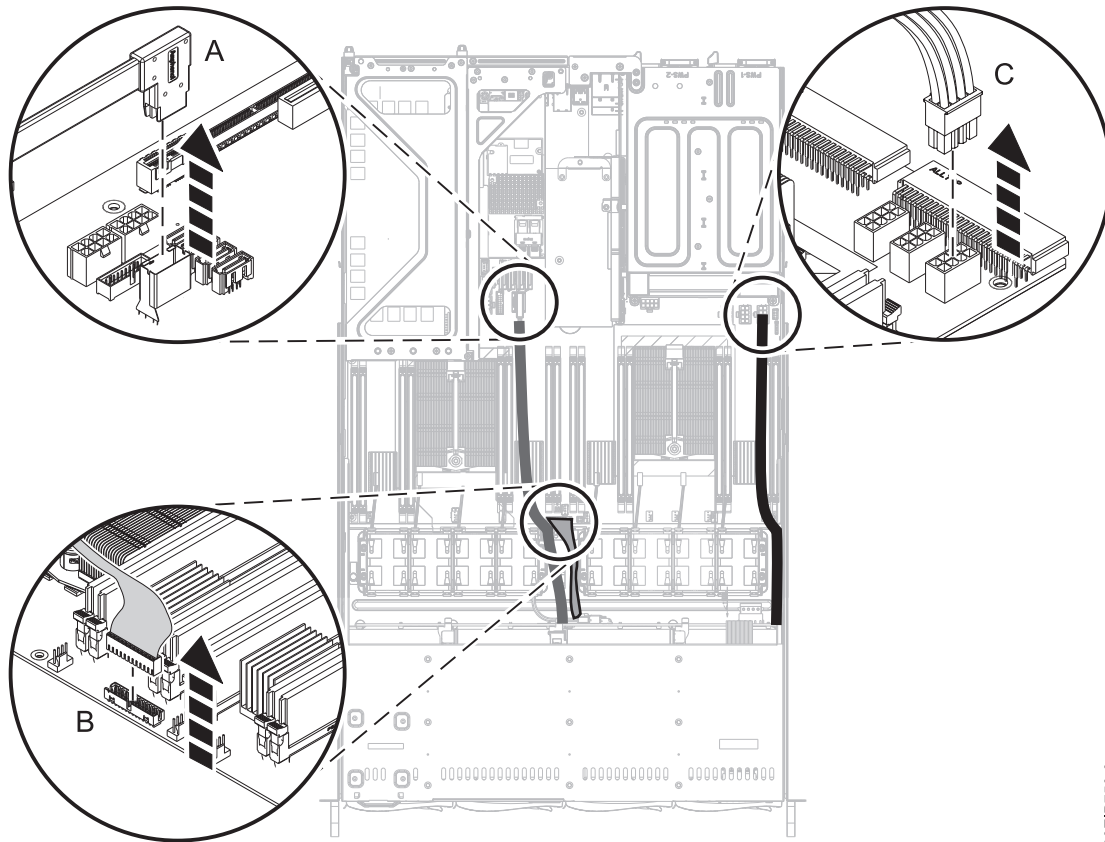
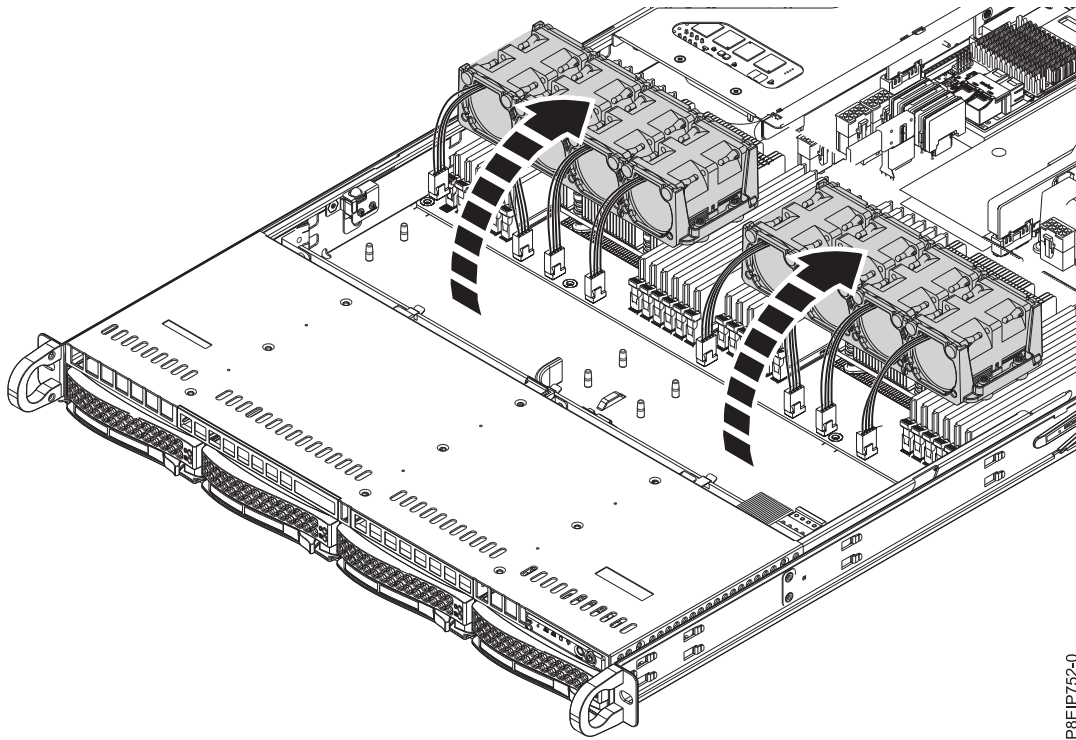


Figure 11. Disconnecting the drive signal and power cables

3. Move the fan housings out of the way as shown in Figure 12 on page 14. They do not need to be disconnected.

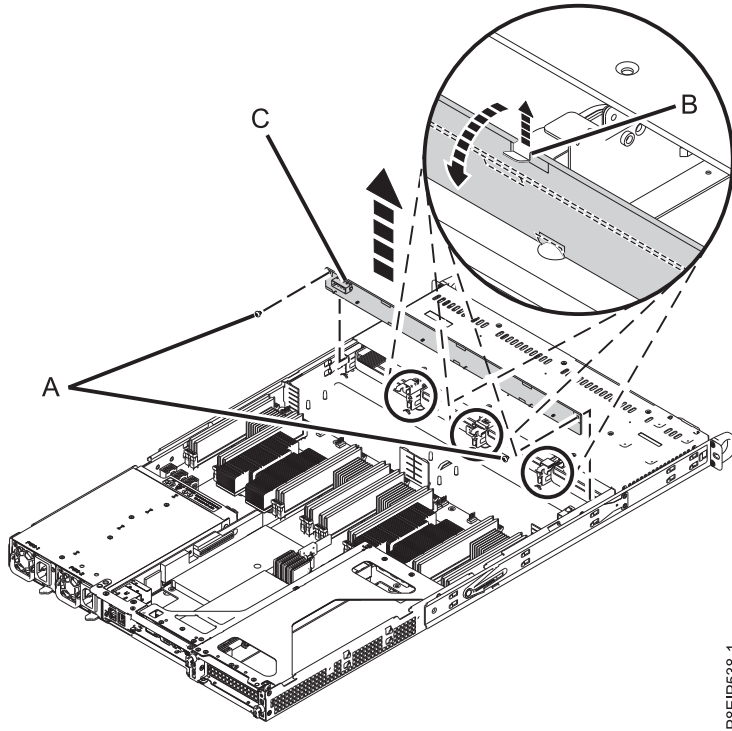
P8EIP750-0



P8EIP752-0

Figure 12. Moving the fans

4. Partially remove the front drive trays. You do not need to completely remove the drives; pull them out about 2 cm (1 in). For instructions, see “Removing a disk drive from the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 3.
5. Remove the disk drive backplane as shown in Figure 13 on page 15.
 - a. Remove the two screws (**A**), one from each side, from the top of the disk drive backplane.
 - b. Pivot the top of the disk drive backplane towards the rear of the system to free the backplane from the three retaining clips (**B**).
 - c. Lift the backplane (**C**) from the system.



P8EIP538-1

Figure 13. Removing the disk drive backplane and screws

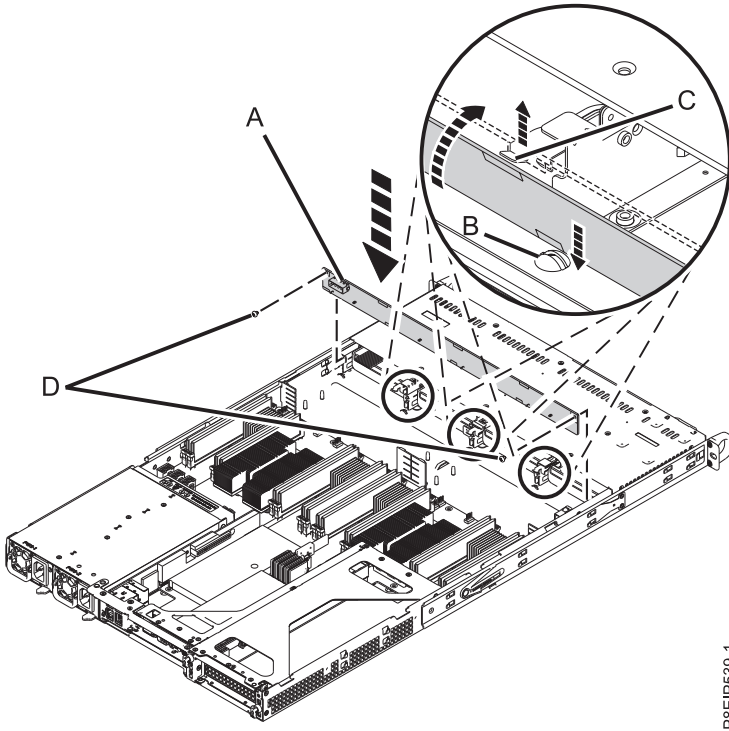
6. Place the disk drive backplane and cables on the table.

Replacing the disk drive backplane in the 8001-12C or 8005-12N

Learn how to replace the disk drive backplane in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Procedure

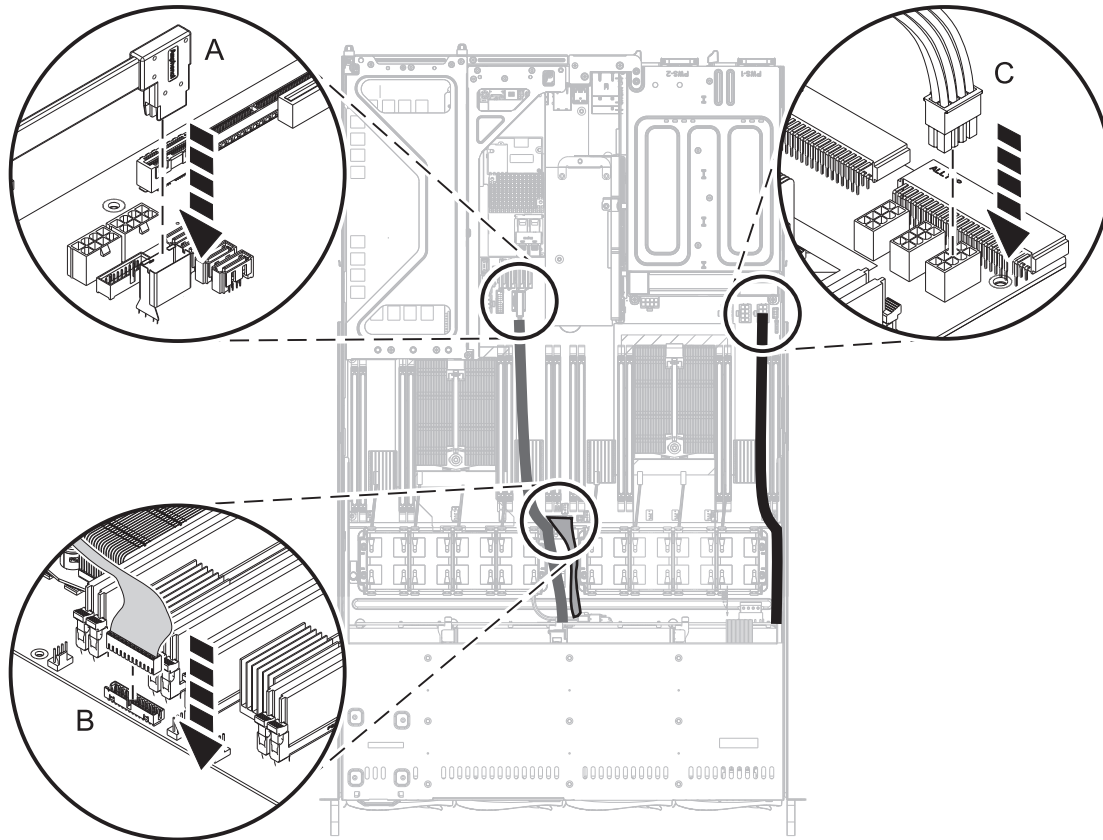
1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Remove the replacement disk drive backplane and cables from the protective plastic envelope.
3. Move the cables from the old disk drive backplane to the new card.
4. Replace the disk drive backplane as shown in Figure 14 on page 16.
 - a. Insert the disk drive backplane (A) into the system using the alignment slots (B) in the chassis.
 - b. Snap the card into place so that it is held by the retaining clips (C).
 - c. Replace the two screws (D), one on each side, in the top of the disk drive backplane.



P8EIP539-1

Figure 14. Installing the disk drive backplane

5. Fully insert the front drive trays. For instructions, see “Replacing a disk drive in the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 6.
6. Using the labels, replace the drive signal cables (A), (B), and drive power cable (C) into the system backplane as shown in Figure 15 on page 17. Ensure that the cable latch clip snaps into place on the connector.



P8EIP751-0

Figure 15. Connecting the drive signal and power cables

7. Replace the fans. For instructions, see “Replacing a system fan in the 8001-12C or 8005-12N” on page 21.

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

Removing and replacing fans in the 8001-12C or 8005-12N

Learn how to remove and replace the fans in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Removing a system fan from the 8001-12C or 8005-12N

Learn how to remove the fans in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

(L008)



CAUTION: Hazardous moving parts nearby. (L008)

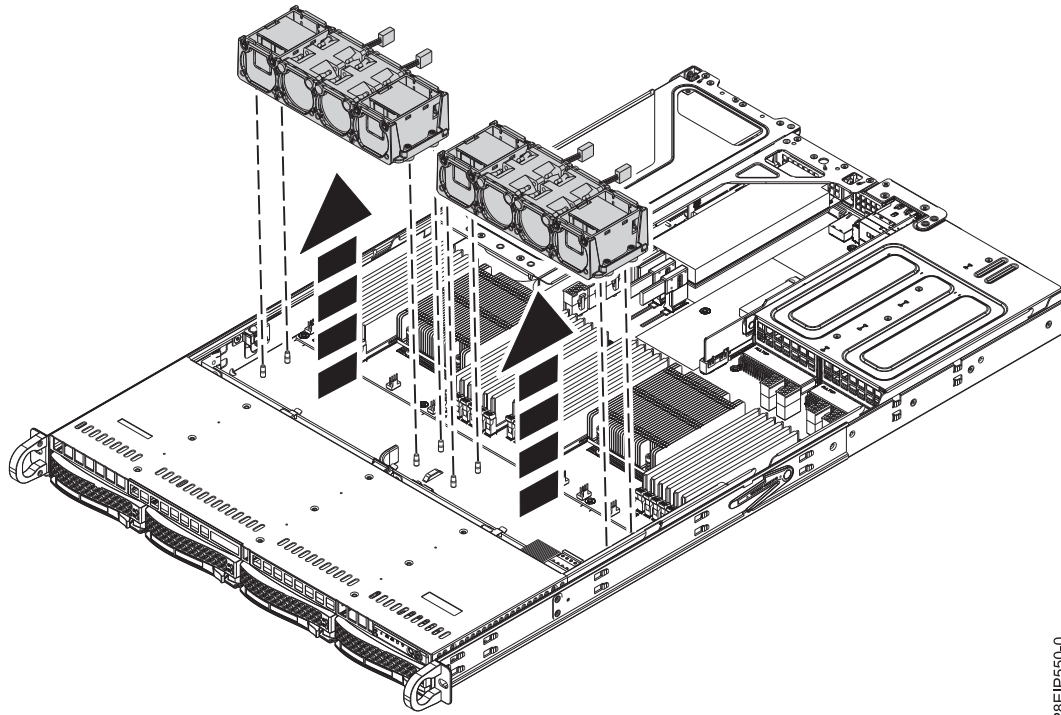
Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Lift the holder for the fans as shown in Figure 16 on page 19. The fans are easier to remove when the holder is slightly lifted.



P8EIP550-0

Figure 16. Removing the fan holder

3. Push the fan up from the holder as shown in Figure 17 on page 20.

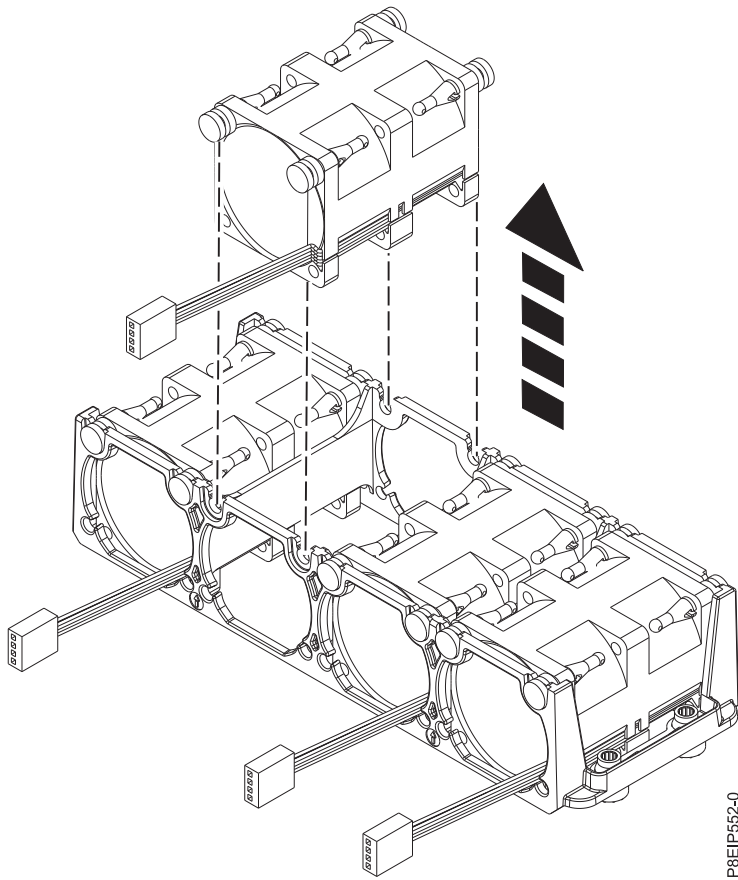


Figure 17. Removing a fan

4. To disconnect a fan cable, release the connector clip (**B**) and carefully pull up the connector (**A**) from the system backplane, as shown in Figure 18 on page 21. Do not pull on the wires. Feed the cable through the fan holder.

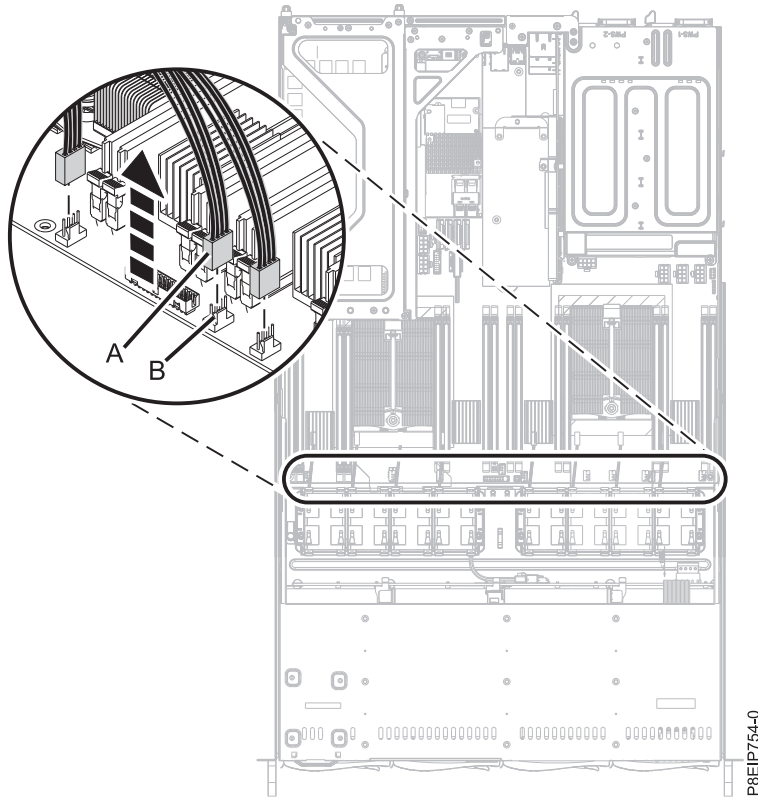


Figure 18. Disconnecting the fan cable

Replacing a system fan in the 8001-12C or 8005-12N

Learn how to replace the fans in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. With the fan holder lifted, push the fan into the housing as shown in Figure 19 on page 22. Align the standoffs in the fan with the slots in the fan holder.

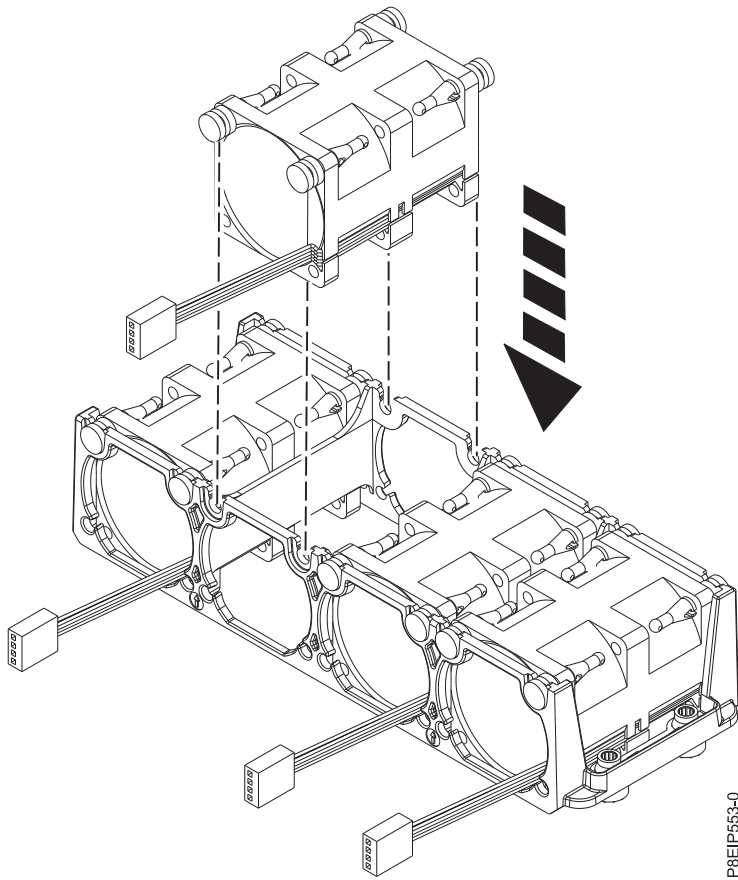
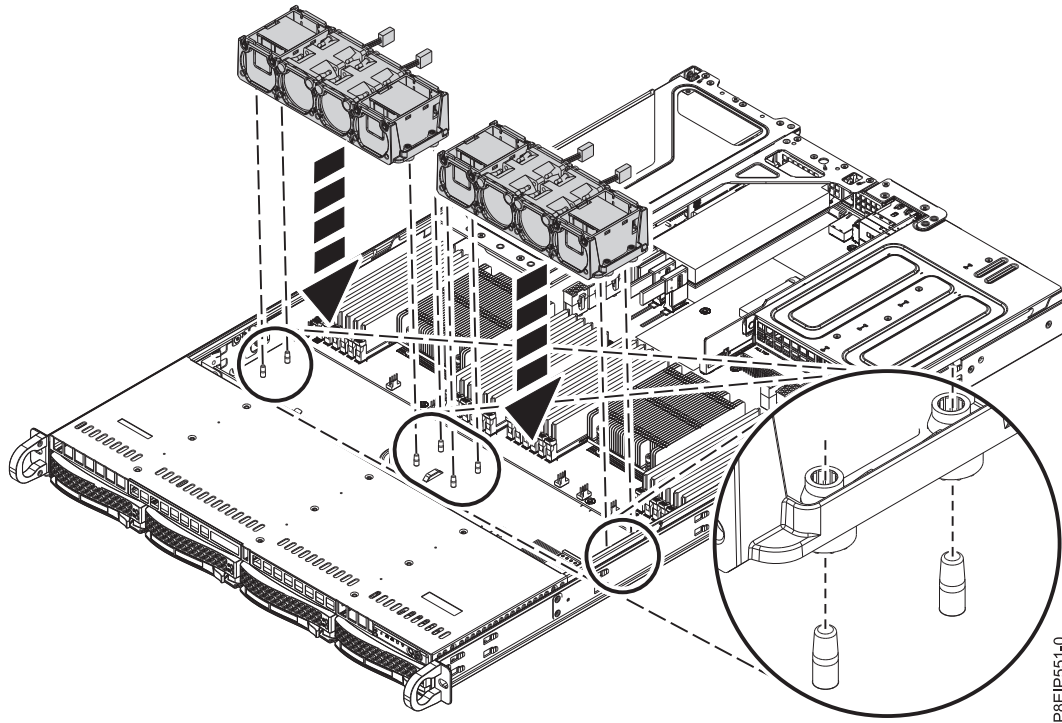


Figure 19. Replacing a fan

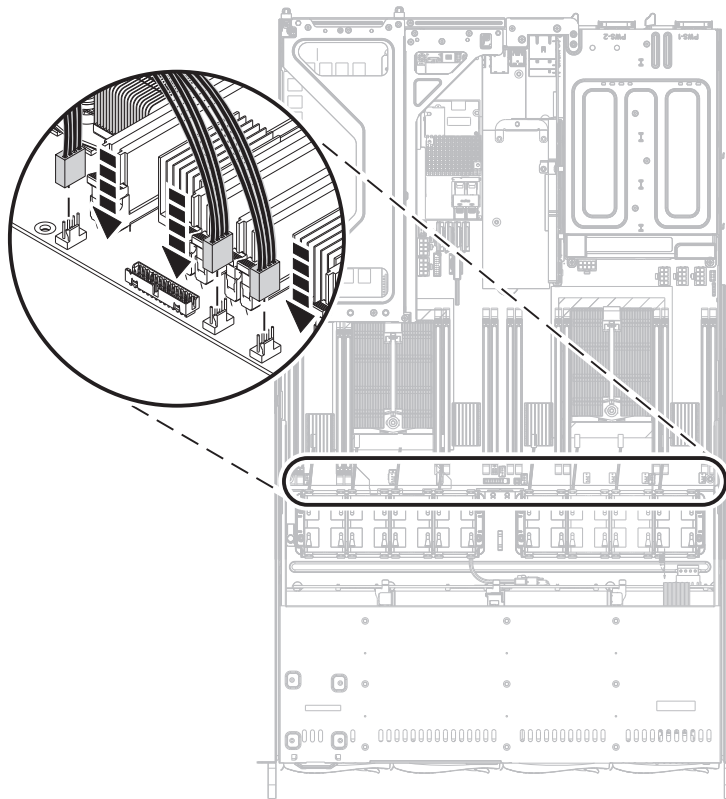
3. Replace the fan holder into the chassis. Align the holes in the fan holder with the pins in the bottom of the chassis as shown in Figure 20 on page 23. For the fan holder near the cover switch, temporarily move the cover switch wires out of the way. When the fan holder is seated into the system, replace the wires next to the fan holder.



P8EIP551-0

Figure 20. Aligning the fan holder

4. Connect the fan cable to the system backplane, as shown in Figure 21.



P8EIP755-0

Figure 21. Replace plug

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

Removing and replacing a graphics processing unit in the 8001-12C or 8005-12N

Learn how to remove and replace a graphics processing unit in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Removing the graphics processing unit from the 8001-12C or 8005-12N system

Learn how to remove the graphics processing unit from the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

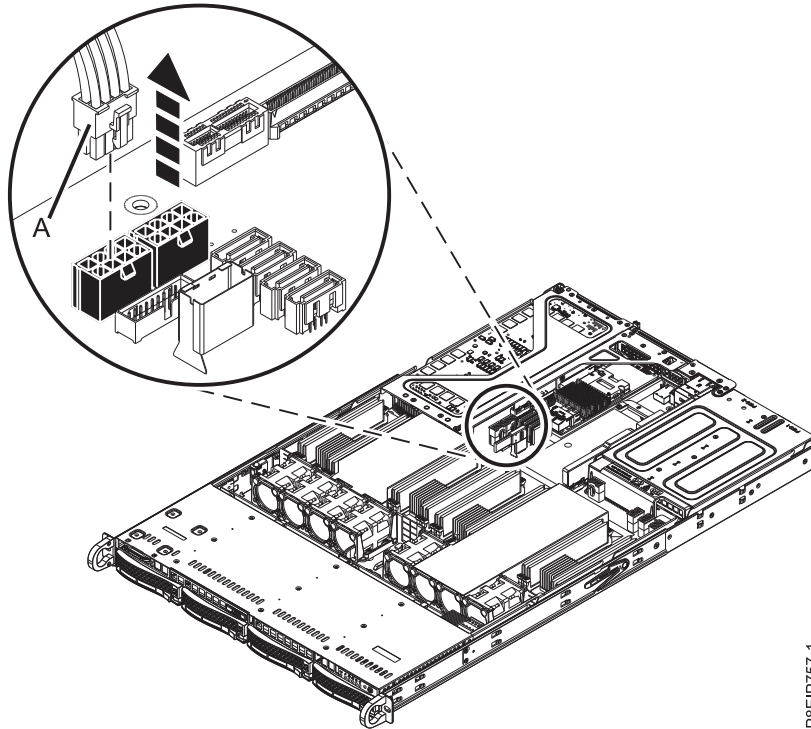
Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

Procedure

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

Attention:

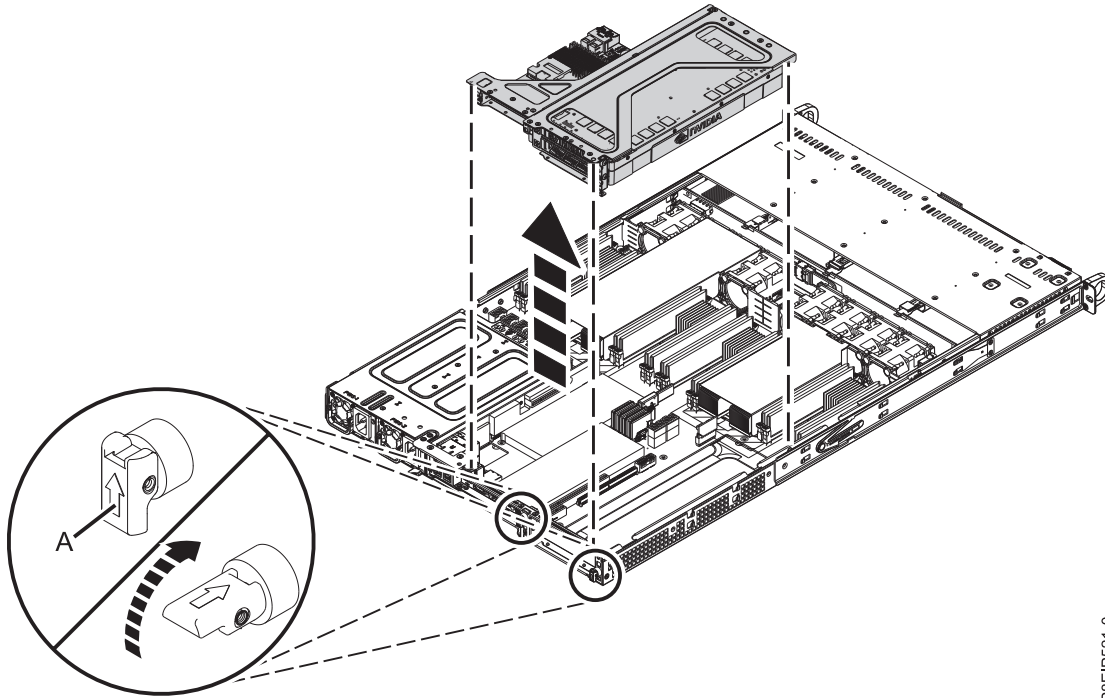
- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Unplug the GPU power cable (A) from the system backplane as shown in Figure 22 on page 25. Using your thumb, press the release latch on the connector to remove the cable.



P8EIP757-1

Figure 22. Unplugging the GPU power cable

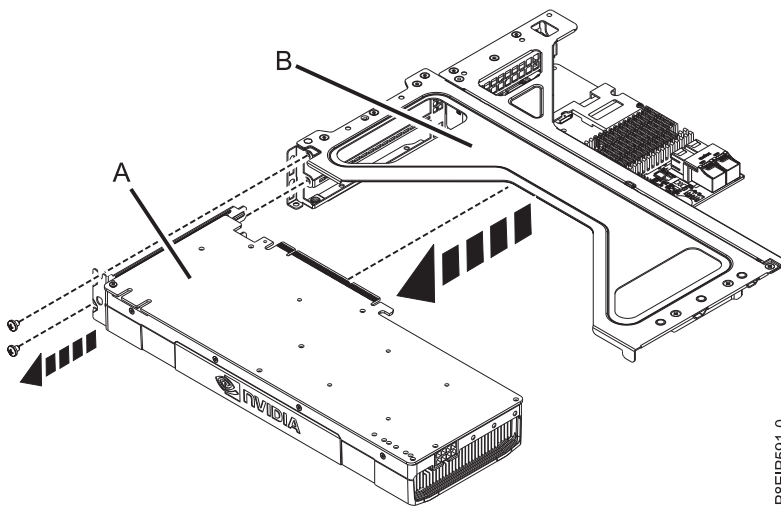
3. The GPU can share the PCIe riser card with other PCIe adapters. Label and remove any cables and plugs that extend out of the adapters.
4. Remove the PCIe riser as shown in Figure 23 on page 26.
 - a. Retract the retaining pins (A) so that the arrows on the tabs point to the system.
 - b. Lift the PCIe riser from the system.



P8EIP521-0

Figure 23. Removing the PCIe riser

5. Place the PCIe adapter riser and cards on an ESD surface, with the riser up and the GPU extending sideways.
6. Unplug the GPU (A) from the PCIe adapter riser (B) as shown in Figure 24.



P8EIP591-0

Figure 24. Removing the GPU from the riser

Replacing the graphics processing unit in the 8001-12C or 8005-12N system

Learn how to replace a graphics processing unit in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Plug the GPU (A) into the PCIe adapter riser (B) as shown in Figure 25. Secure the GPU tailstock with one or two screws as needed.

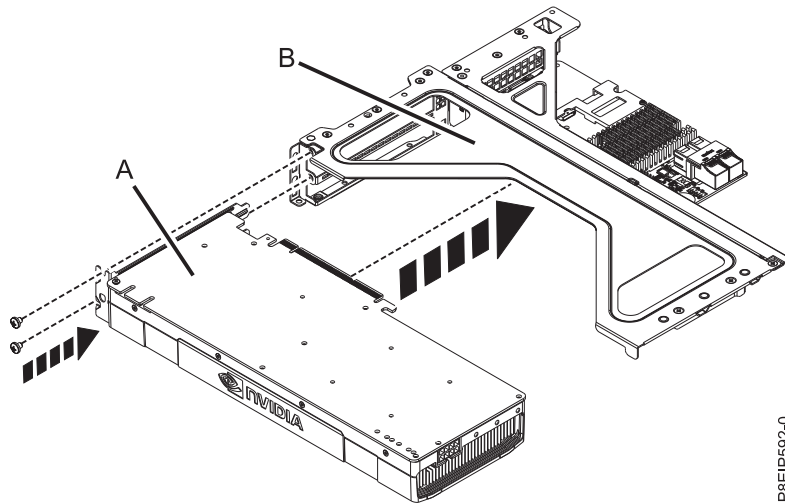
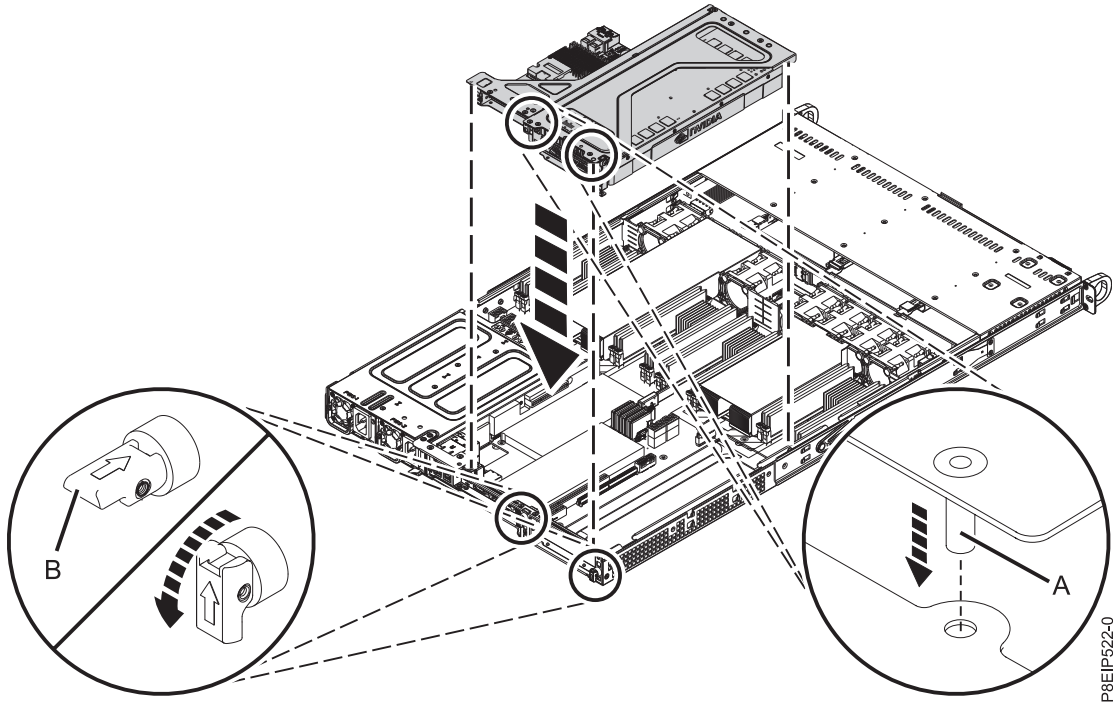


Figure 25. Inserting the GPU into the riser

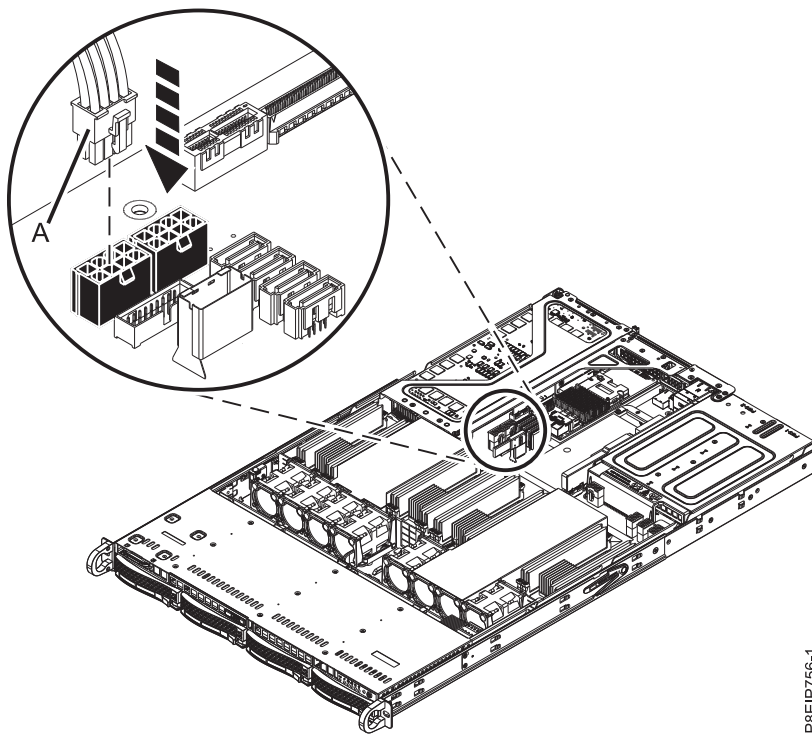
3. Place the PCIe adapter riser and the cards it contains into the system backplane as shown in Figure 26 on page 28.
 - a. Ensure that the PCIe holder release pins (B) are retracted, so the arrows point into the system.
 - b. Use the alignment pins (A) and slots to help you properly insert the riser cards and replace the cover
 - c. Reset the retaining pins to secure the PCIe cage.



P8EIP522-0

Figure 26. Replacing the PCIe riser

4. Using your labels, replace any cables and plugs that you removed from the adapters.
5. Plug the GPU power cable into the system backplane as shown in Figure 27. Ensure that the cable latch clip snaps into place on the connector.



P8EIP756-1

Figure 27. Plugging the GPU power cable into the system backplane

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

Removing and replacing memory in the 8001-12C or 8005-12N

Learn how to remove and replace memory in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

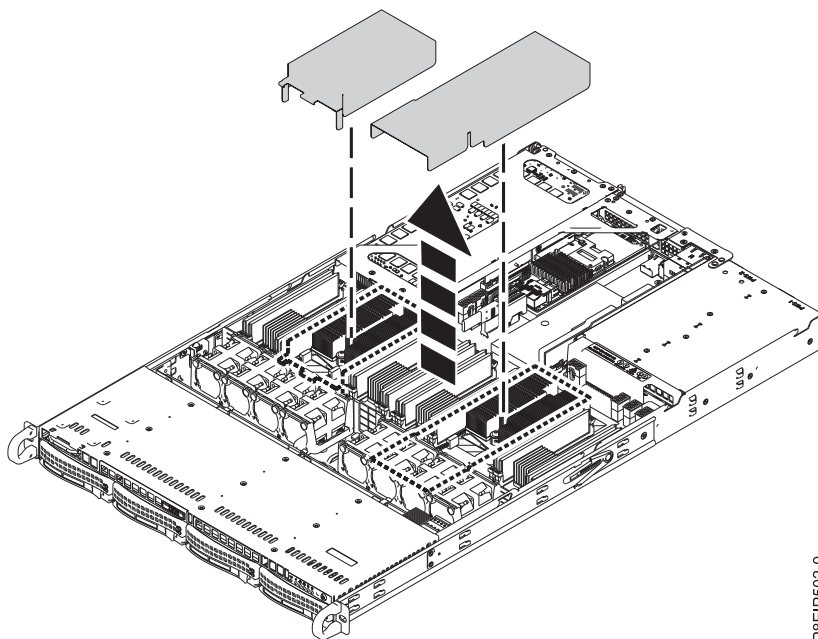
Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Depending on the memory location, you might need to remove the system processor air baffles. Carefully unsnap and lift the processor air baffle from the system.



P8EIP502-0

Figure 28. Removing the processor air baffle

3. Remove the memory DIMM.

- a. Locate the memory DIMM that you want to remove.
- b. Unlock the memory DIMM by simultaneously pushing the locking tabs away from the memory DIMM, in the direction that is shown in Figure 29. Be sure to unlock both tabs at the same time. The lever action of opening the tabs pushes the memory DIMM out of the slot.
- c. Hold the memory DIMM by the edges and pull it out of the slot.

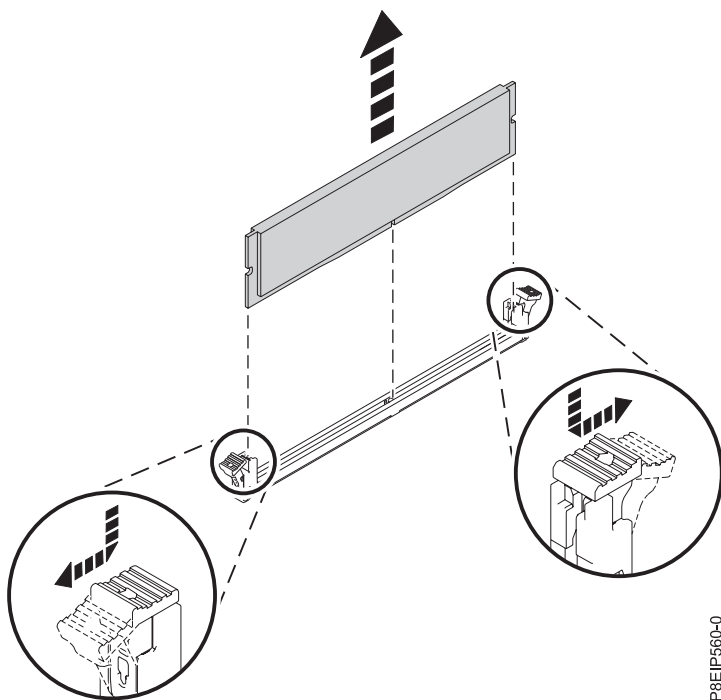
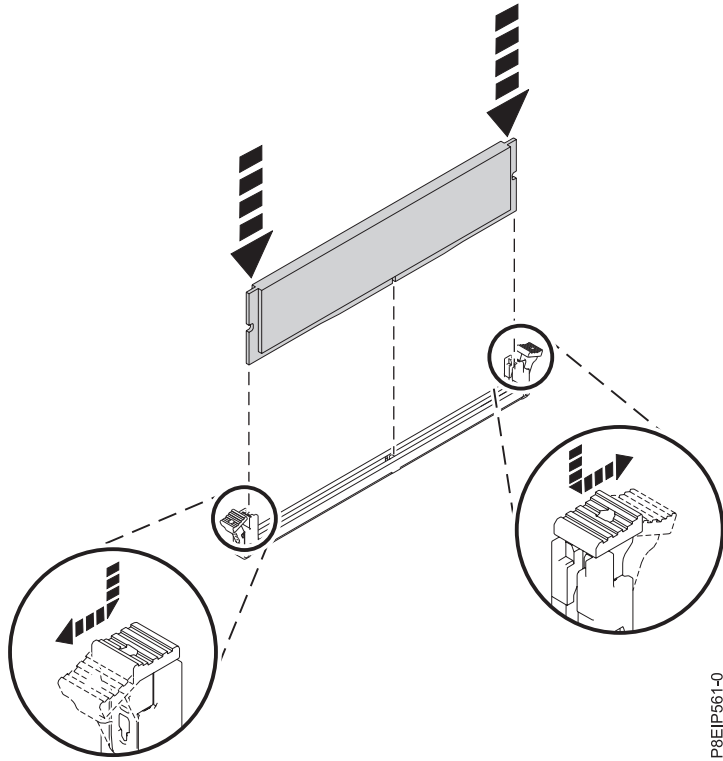


Figure 29. Removing the memory DIMM

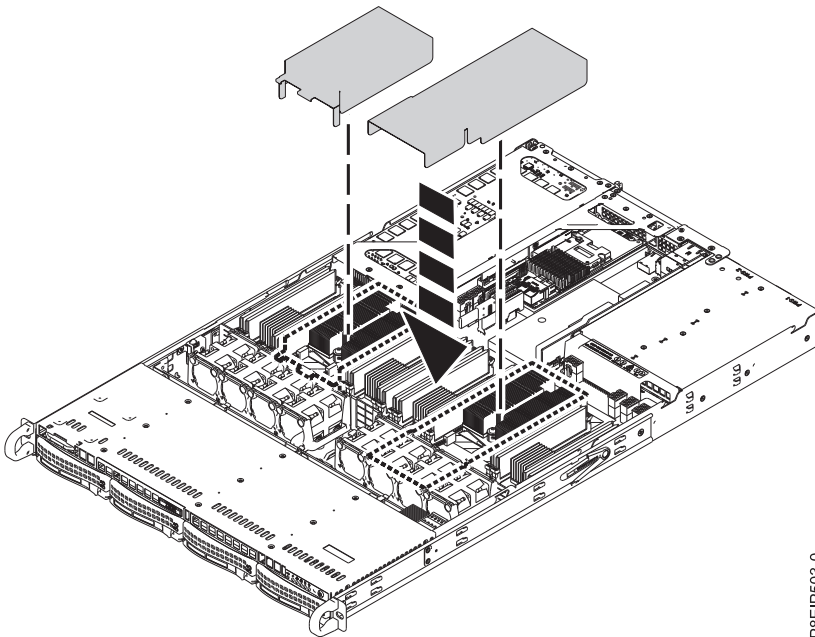
4. Insert the memory DIMM.
 - a. Grasp the memory DIMM along its edges and align it with the slot on the system backplane.
Attention: Memory is keyed to prevent it from being installed incorrectly. Note the location of the key tab within the memory connector before you attempt to install it.
 - b. Press firmly on each side of the memory DIMM until the locking tab locks in place with an audible click.



P8EIP561-0

Figure 30. Inserting the memory DIMM

5. If you removed the system processor air baffle, replace it. Insert the edge of the baffle into the fan support. Then, carefully press the baffle down into place.



P8EIP503-0

Figure 31. Installing the processor air baffle

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

Removing and replacing PCIe adapters in the 8001-12C or 8005-12N

Learn how to remove and replace Peripheral Component Interconnect (PCI) Express (PCIe) adapters in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Removing a PCIe adapter from the 8001-12C or 8005-12N system

Learn how to remove a PCIe adapter from the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. An adapter can share a PCIe riser card with other adapters. Label and remove any cables and plugs that extend out of the adapters. See Figure 32.

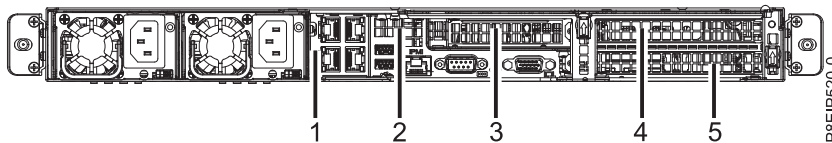
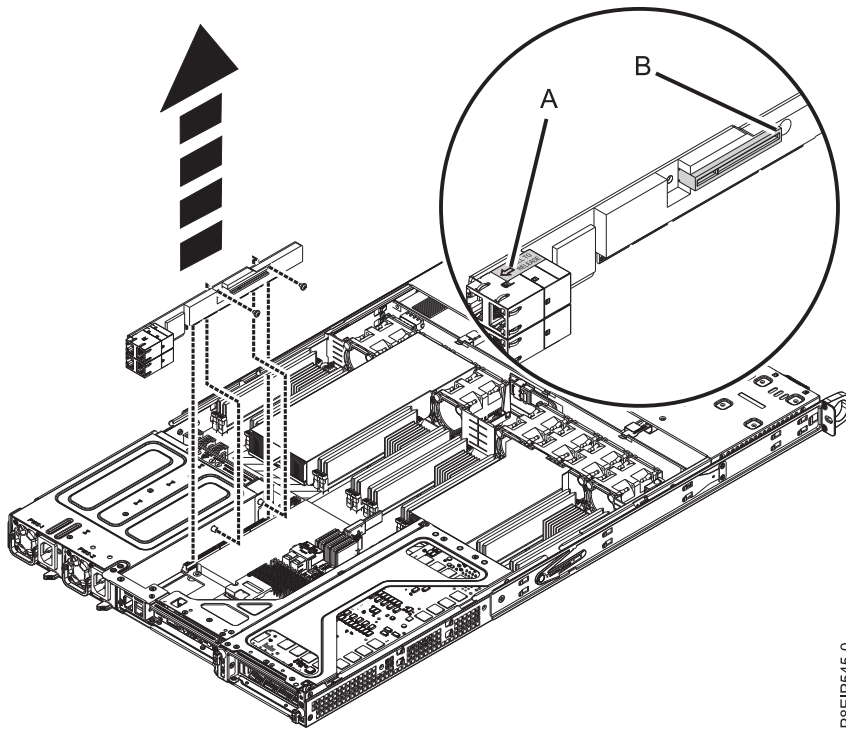


Figure 32. 8001-12C PCIe adapter positions

Position	Step
1 (UIO Network)	4
2 (UIO Slot1)	3
3, 4, 5 (PLX Slot1, WIO Slot1, WIO Slot2)	5 on page 33

3. If you are working with a PCIe adapter in positions 2, if the adapter has a special tailstock support, unscrew the tailstock from the support. Remove the adapter from the PCIe riser.
4. If you are working with the PCIe riser card in position 1, do the following steps:
 - a. If a PCIe adapter is in position 2, label and remove that adapter. Set it on an ESD mat for future replacement.

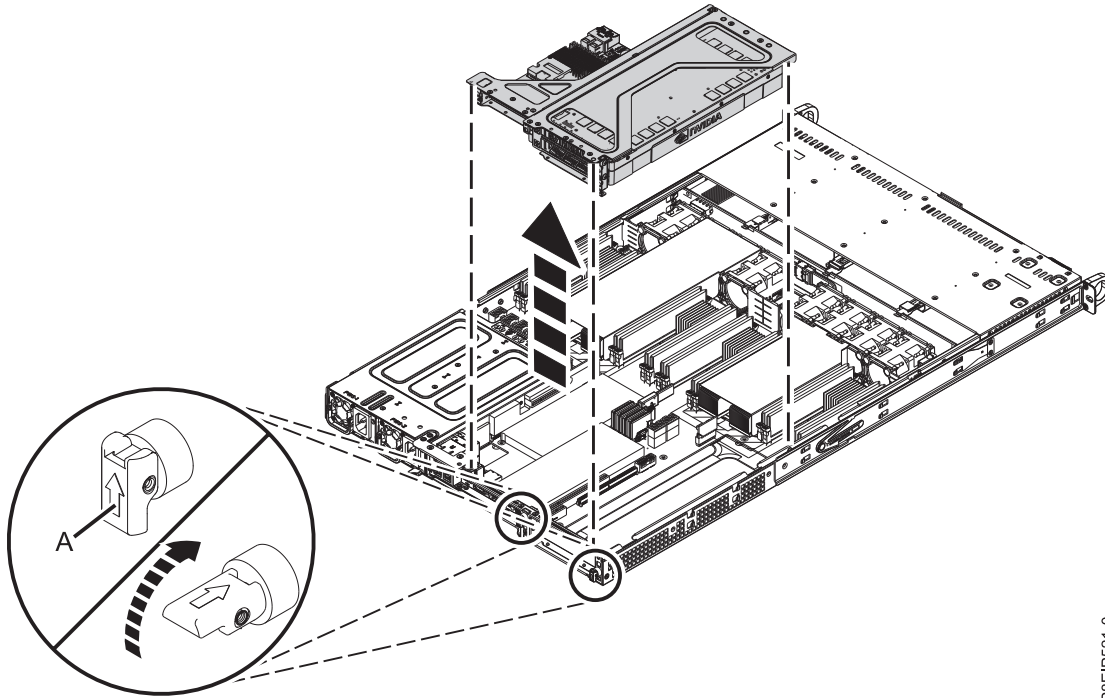
- b. Remove the two screws that secure the PCIe riser card to the chassis as shown in Figure 33.
- c. Lift the PCIe adapter riser at points **(A)** and **(B)** from the system backplane.



P8EIP545-0

Figure 33. Removing the PCIe riser screws

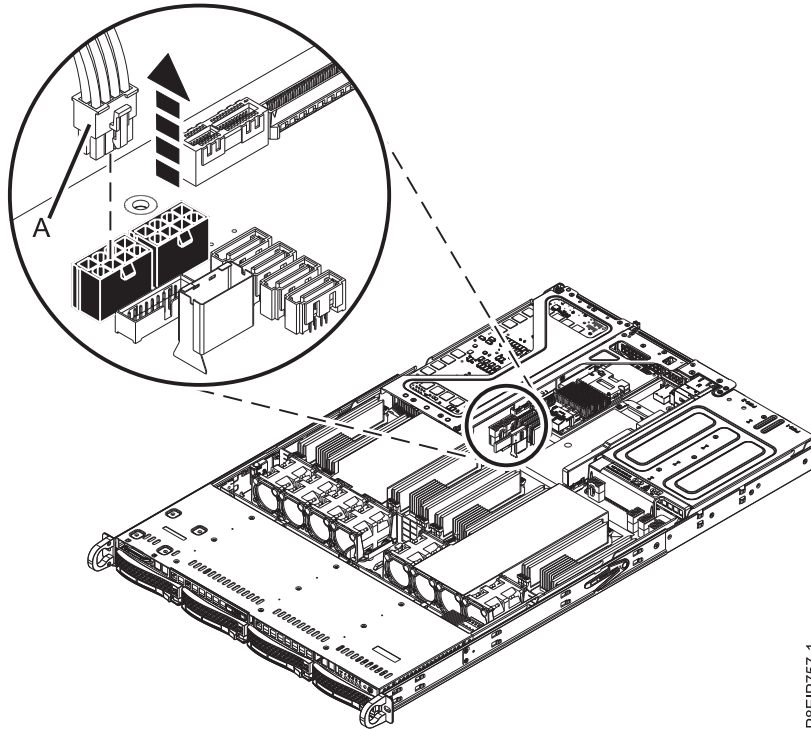
5. If the PCIe adapter to remove is in positions 3, 4, or 5, you must remove the PCIe cage and riser.
 - a. Remove the PCIe riser as shown in Figure 34 on page 34.
 - 1) Retract the retaining pins **(A)** so that the arrows on the tabs point to the system.
 - 2) Lift the PCIe riser from the system.



PS8EIP521-0

Figure 34. Removing the PCIe riser

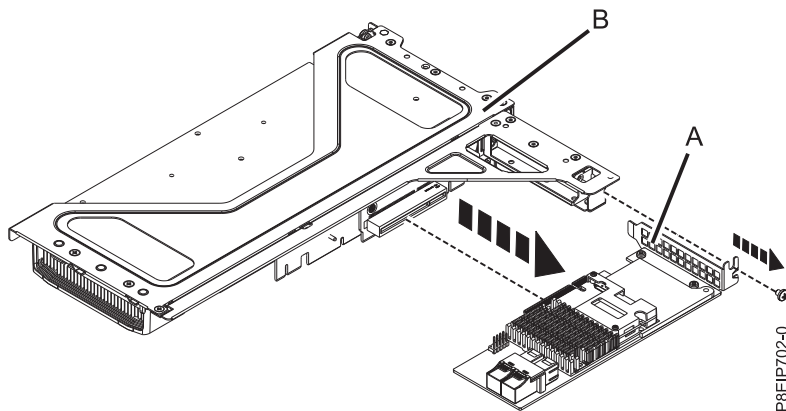
- b. If you are removing a storage drive adapter, label and disconnect the signal cables from the adapter.
- c. If the riser contains a GPU, remove the power cable (A) from the system backplane as shown in Figure 35 on page 35. Using your thumb, press the release latch on the connector to remove the cable.



P8EIP757-1

Figure 35. Unplugging the GPU power cable

- d. Place the PCIe cage upside down on an ESD surface.
6. Remove the adapter to be replaced from the riser as shown in Figure 36.
 - a. Remove the screw that secures the PCIe adapter to the PCIe cage.
 - b. Remove the PCIe adapter from the riser.



P8EIP702-0

Figure 36. Removing a PCIe adapter from position 3 of the riser

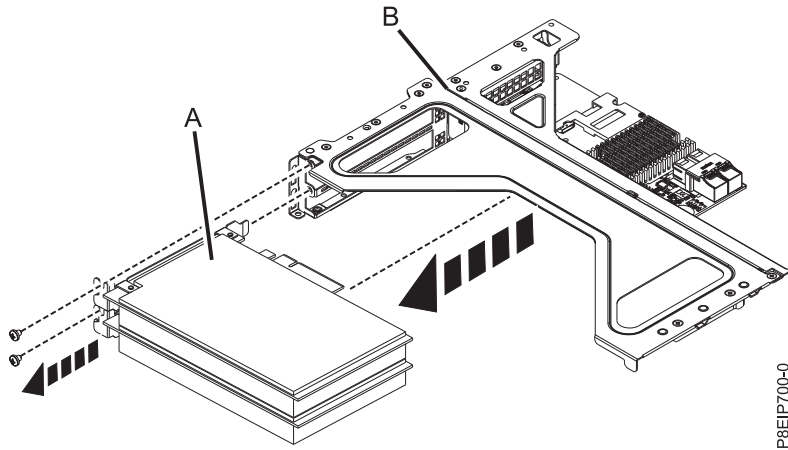


Figure 37. Removing a PCIe adapter from position 4 or 5 of the riser

7. If you need to remove the riser cards for positions 3 (A), or 4 or 5 (B); remove the screws that secure the PCIe riser card to the cage (C) as shown in Figure 38.

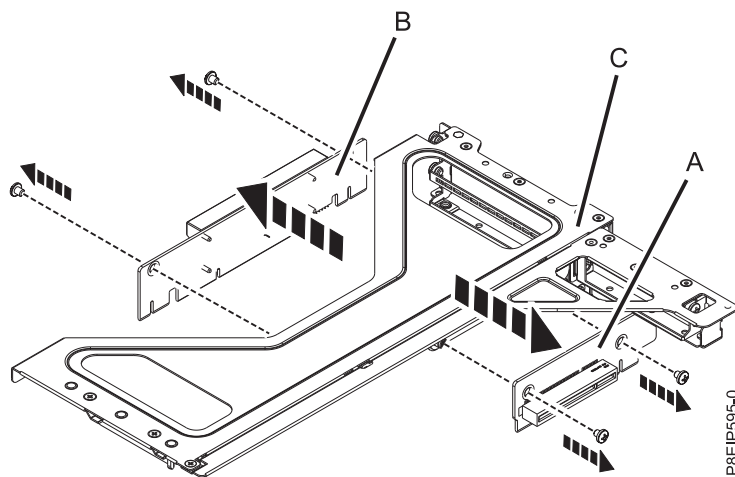


Figure 38. Removing the PCIe riser cards from the adapter cage

Replacing a PCIe adapter in the 8001-12C or 8005-12N system

Learn how to replace a PCIe adapter in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Refer to the PCIe adapter positions as shown in Figure 39.

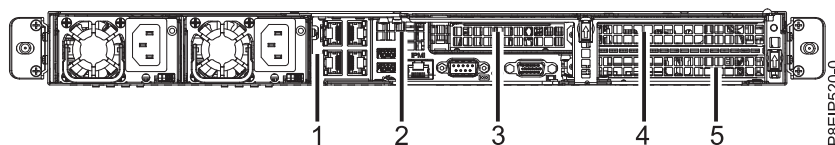


Figure 39. 8001-12C PCIe adapter positions

Position	Step
1 (UIO Network)	4
2 (UIO Slot1)	3
3, 4, 5 (PLX Slot1, WIO Slot1, WIO Slot2)	5

3. If you are working with a PCIe adapter in position 2, do the following:
 - a. Remove the standard tailstock from the adapter.
 - b. If you are inserting a storage drive adapter, connect the signal cables to the adapter before inserting the adapter. See "Drive installation details for the 8001-12C system" on page 87 for cabling information.
 - c. If needed, install a support bracket for the PCIe adapter to the system backplane. Also install a special support tailstock to the PCIe adapter.
 - d. Insert the adapter into the PCIe riser.
 - e. If you installed the support bracket for the PCIe adapter, fasten the special support tailstock to that bracket.
4. If you are working with the PCIe adapter in position 1, do the following steps:
 - a. Replace the PCIe adapter riser into the system backplane.
 - b. Replace the two screws to secure the PCIe riser card to the chassis as shown in Figure 40.
 - c. If a PCIe adapter was in position 2, replace that adapter.

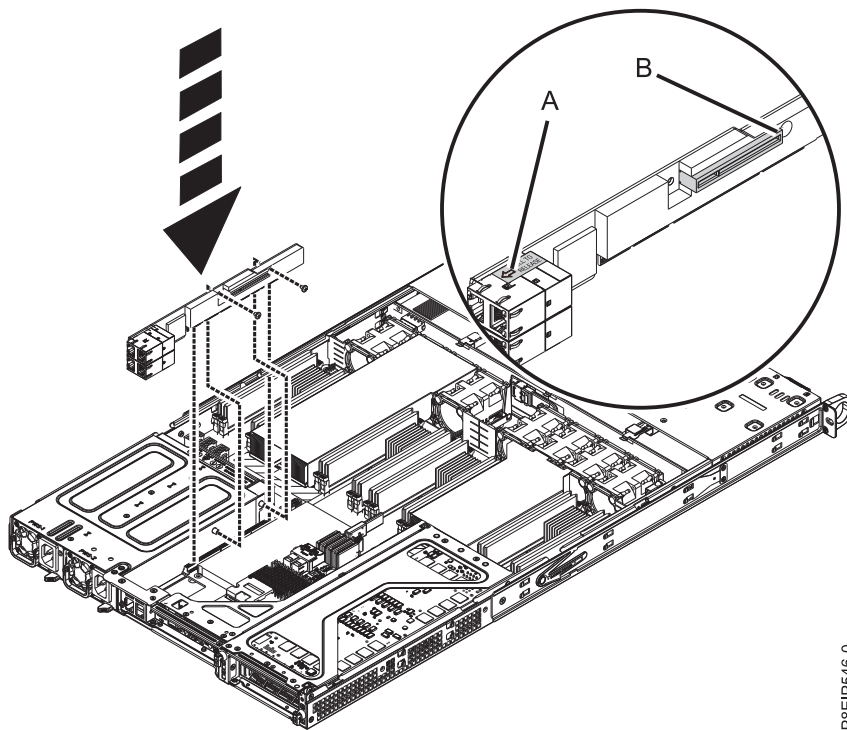


Figure 40. Replacing the PCIe riser screws

5. If you need to replace the riser cards for positions 3 (A), or 4 or 5 (B); replace the screws that secure the PCIe riser card to the cage (C) as shown in Figure 41 on page 38.

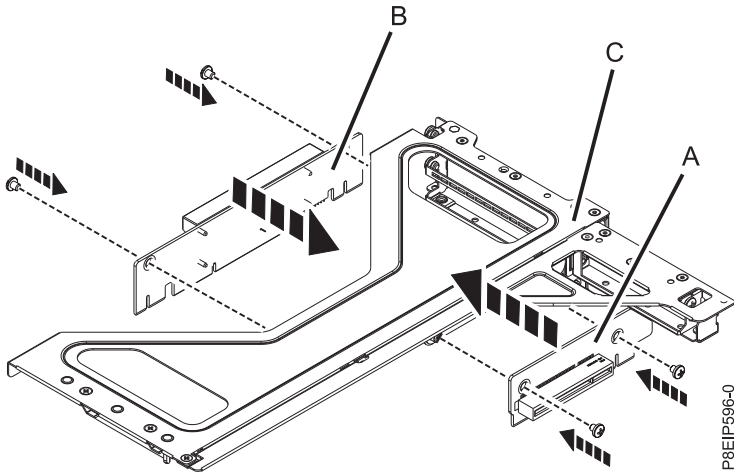


Figure 41. Replacing the PCIe riser cards in the adapter cage

6. If the PCIe adapter to replace is in positions 3, 4 or 5, do the following steps:
 - a. If you are inserting a storage drive adapter, using your labels, connect the signal cables to the adapter before inserting the adapter.
 - b. Insert the adapter (A) into the riser (B) as shown in Figure 42, aligning it properly and inserting it fully into the slot. Secure the adapter tail-stock with 1 or 2 screws as needed.

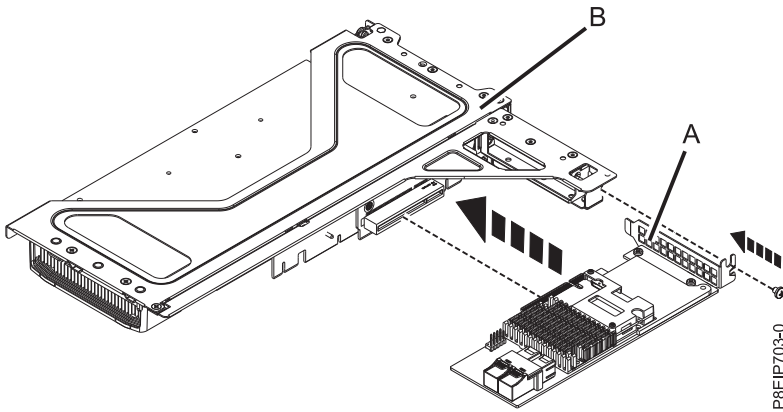


Figure 42. Inserting an adapter into position 3 of the riser

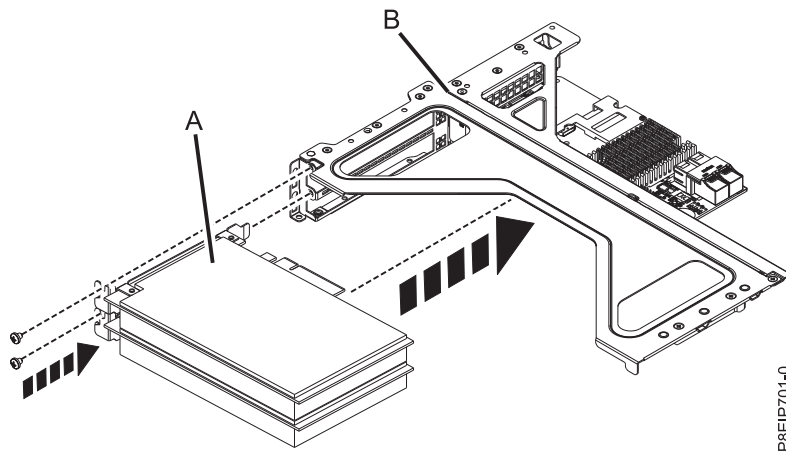


Figure 43. Inserting an adapter into position 4 or 5 of the riser

- c. If the riser contains a GPU, replace the power cable **(A)** into the system backplane as shown in Figure 44.

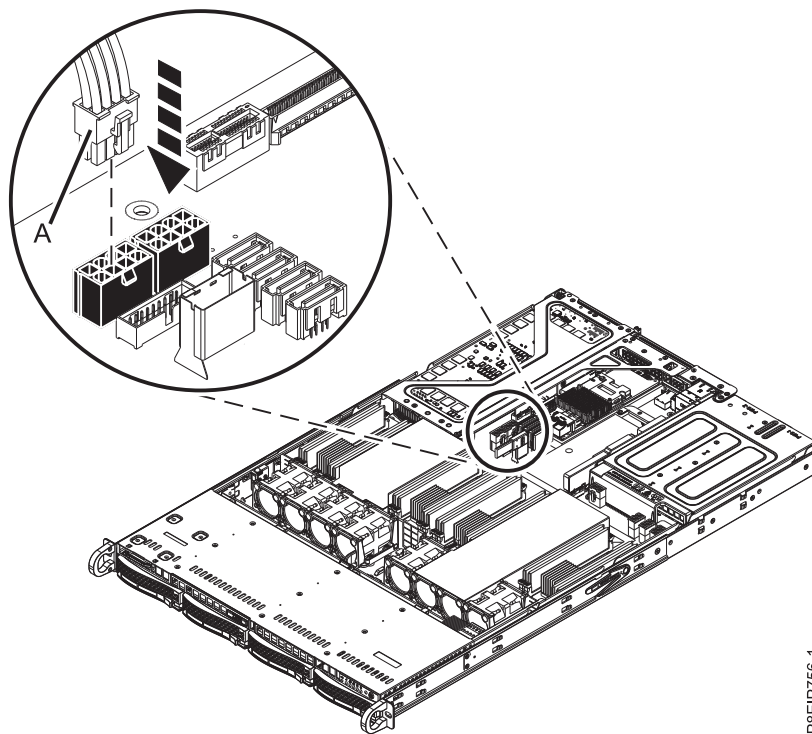


Figure 44. Plugging the GPU power cable

- d. Place the PCIe adapter riser and the cards it contains into the system backplane as shown in Figure 45 on page 40.
 - 1) Ensure that the PCIe holder release pins **(B)** are retracted, so the arrows point into the system.
 - 2) Use the alignment pins **(A)** and slots to help you properly insert the riser cards and replace the cover
 - 3) Reset the retaining pins to secure the PCIe cage.

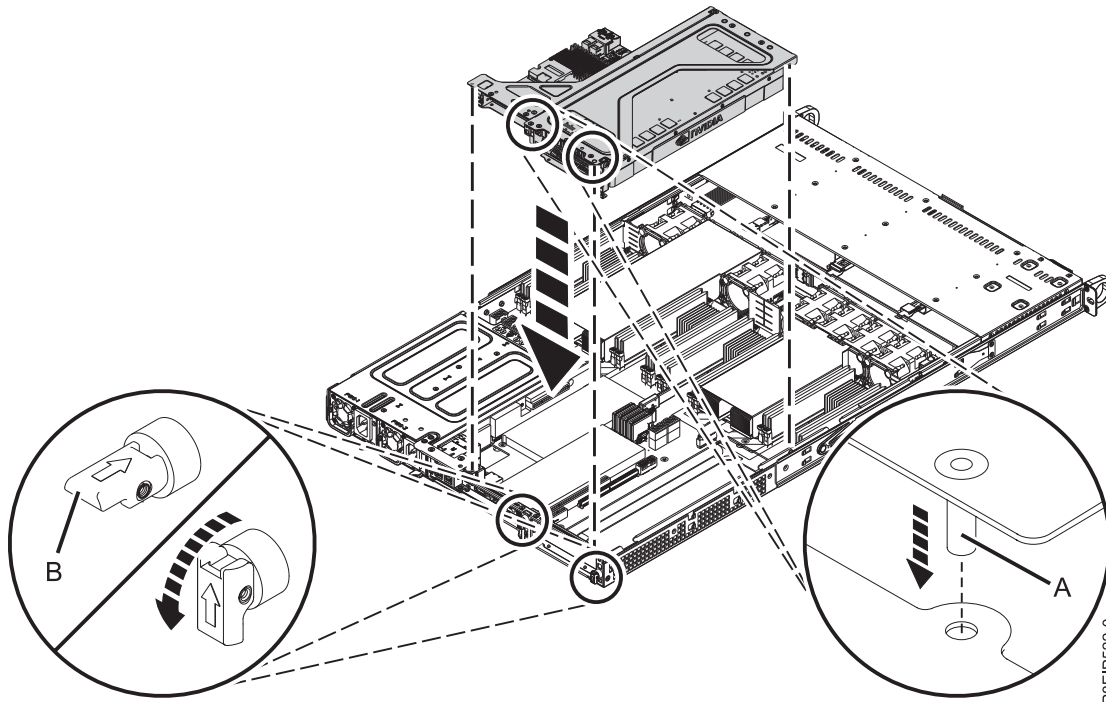


Figure 45. Replacing the PCIe riser

- Using your labels, replace any cables and plugs that you removed from the adapters.

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

Removing and replacing the system backplane in the 8001-12C or 8005-12N

Learn how to remove and replace the system backplane in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

Before you begin replacing the system backplane, record the system serial number and machine model type. After you replace the system backplane, you must set the system serial number and machine model type in the system backplane.

About this task

You can use a commercially available magnetic tip screwdriver to remove and replace the screws.

Removing the system backplane in the 8001-12C or 8005-12N

Learn how to remove the system backplane in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

Before you begin replacing the system backplane, record the system serial number and machine model type. After you replace the system backplane, you must set the system serial number and machine model type in the system backplane.

Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

About this task

You can use a commercially available magnetic tip screwdriver to remove and replace the screws.

As part of the system backplane replacement, the system processor modules are moved from the old system backplane to the new system backplane.

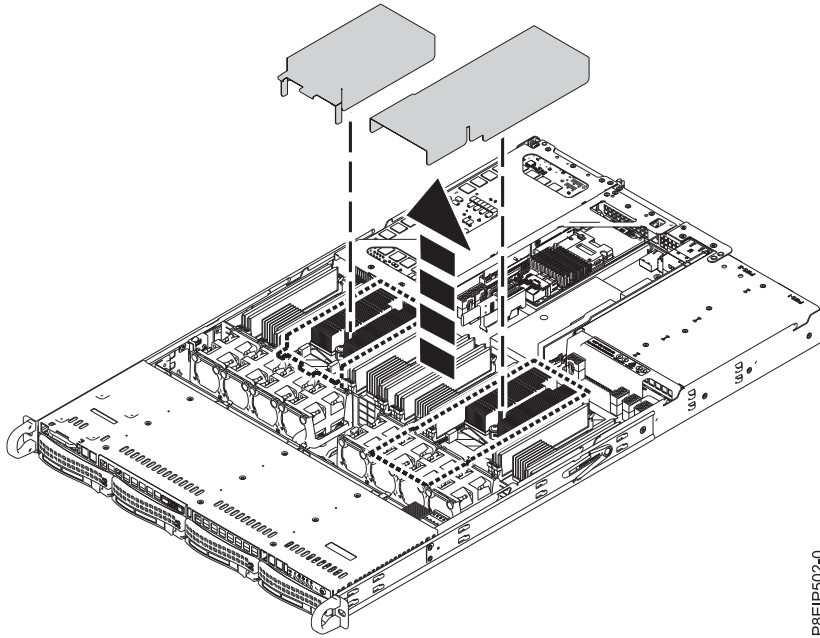
As part of the system processor module replacement, the heat sink is removed. When the heat sink is removed from the system processor module, the thermal interface material (TIM) is typically adhered to the heat sink. Unless damaged, the TIM that is adhered to the heat sink can be reused. If the TIM is damaged, do not reuse the removed heat sink. Before you begin the processor removal and replacement procedure, ensure that you have a spare TIM and heat sink on hand.

Procedure

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

Attention:

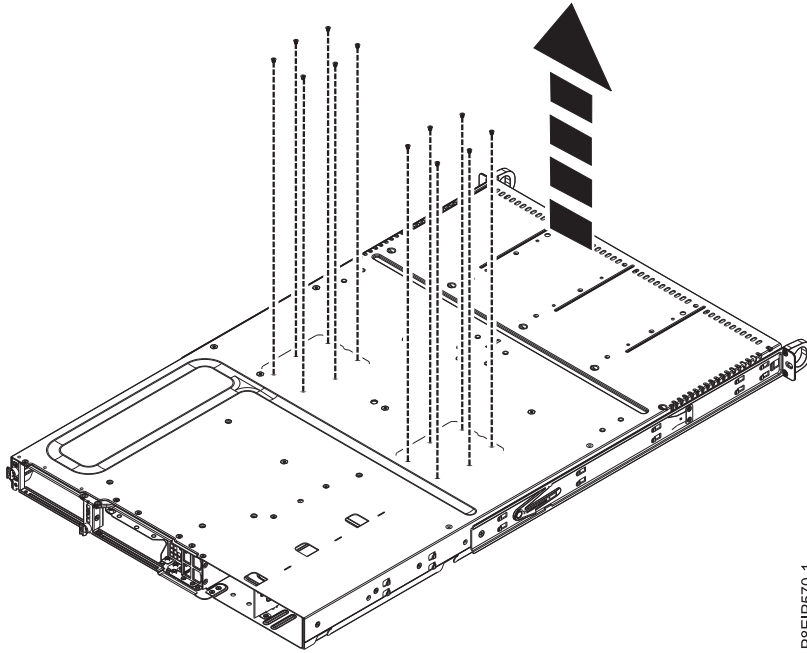
- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Remove both power supplies from the system. For instructions, see “Removing a power supply from the 8001-12C, 8001-22C, 8005-12N, or 8005-22N” on page 78.
 3. Remove the processor air baffle as shown in Figure 46 on page 42. Carefully unsnap and lift the processor air baffle from the system.



P8EIP502-0

Figure 46. Removing the processor air baffle

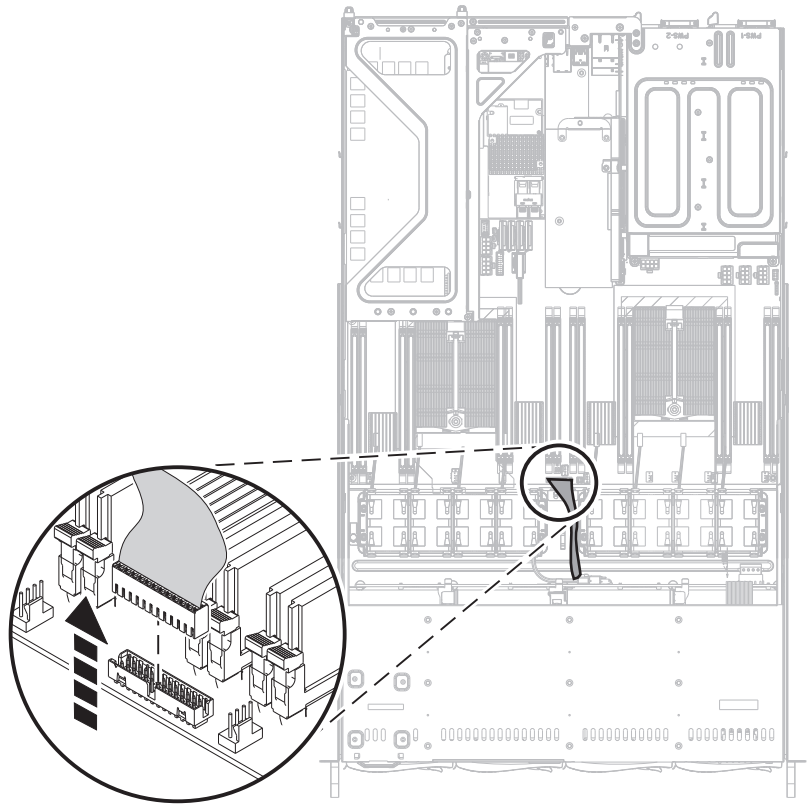
4. Label and remove the memory DIMMs, recording their slot locations. For instructions, see “Removing and replacing memory in the 8001-12C or 8005-12N” on page 29.
5. Remove all the fans and housings from the system. For instructions, see “Removing a system fan from the 8001-12C or 8005-12N” on page 17.
6. Noting their slot locations, label, and remove the PCIe risers and adapters. For instructions, see “Removing a PCIe adapter from the 8001-12C or 8005-12N system” on page 32. Remove the large PCIe riser first.
7. Remove the 12 screws that support the processor sockets from below the chassis.
 - a. Turn the system over, upside down.
 - b. Remove the 12 screws from the bottom. The screw locations are shown in Figure 47 on page 43.
 - c. Turn the system over, right side up.



P8EIP570-1

Figure 47. Processor socket screws on bottom of chassis

8. Remove the drive signal and drive power cables from the system backplane. For instructions, see “Removing the disk drive backplane from the 8001-12C or 8005-12N” on page 12.
9. Remove the operator panel cable from the system backplane as shown in Figure 48.



P8EIP758-0

Figure 48. Removing the operator panel cable

10. Remove the 14 screws from the system backplane. The screw locations are shown in Figure 49.

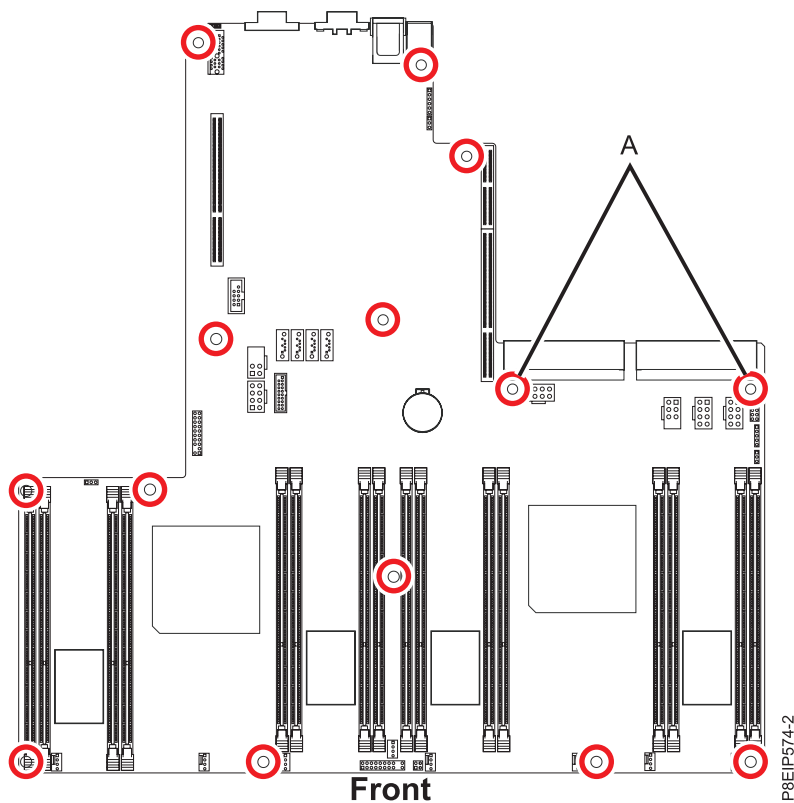
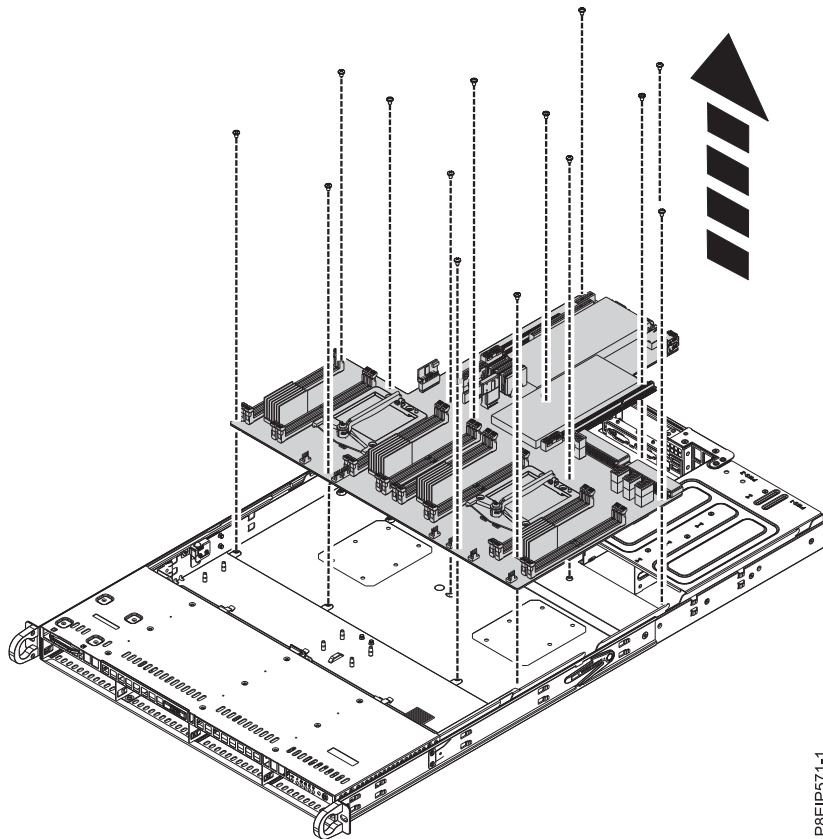


Figure 49. Screw locations. The two screws at **(A)** are black and slightly longer.

11. Moving the front cables out of the way, and carefully holding the processor heat sink, move the system backplane slightly forwards and up to remove it. See Figure 50 on page 45.



P8EIP571-1

Figure 50. Lifting out the system backplane

12. Place the system backplane on an ESD mat.

Replacing the system backplane in the 8001-12C or 8005-12N

Learn how to replace the system backplane in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Remove the replacement system backplane from the static-protective package and place it on an ESD mat.

The following steps move the system processor module from the old system backplane to the new system backplane:

3. Loosen the load arm screw (A) of the system processor heat sink (B) that you are removing with a #3 Phillips screw driver. The load arm pivots in the direction that is shown in Figure 51 on page 46.

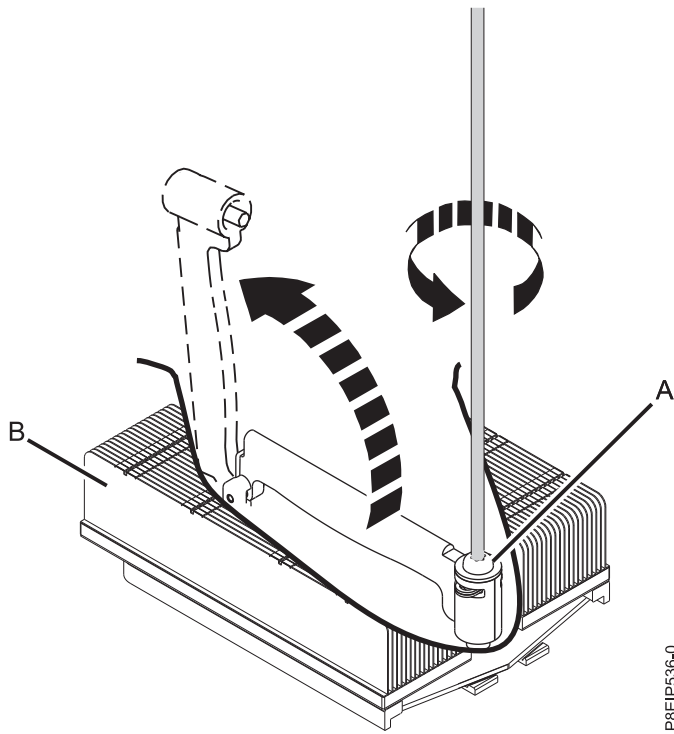


Figure 51. Loosening heat sink load arm screw

4. Grip the heat sink and remove it by lifting straight up as shown in Figure 52.

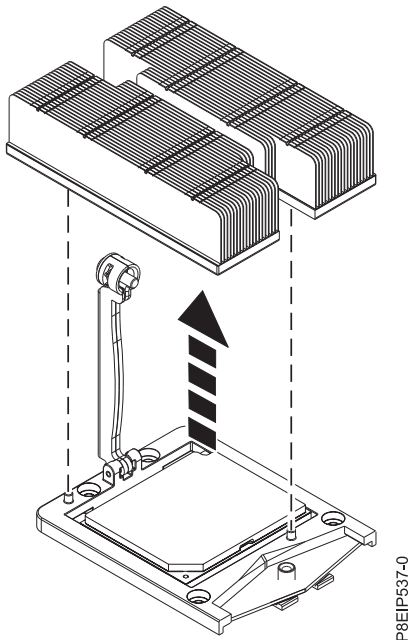


Figure 52. Removing the heat sink

5. Place the heat sink upside down on a clean surface.
6. Inspect the system processor socket area and remove any dust or debris (use a can of compressed air).

7. Lower the vacuum pen tool onto the system processor module to install. Fully press the top of the pen (A) and hold the pen in the center of the system processor module as shown in Figure 53. Release the top of the pen to fasten the pen onto the system processor module.

Note: To prevent the system processor module from falling, do not press the tip while holding the pen and the system processor module. Minimize the time and distance that you have the pen holding the system processor module in case the vacuum seal releases early.

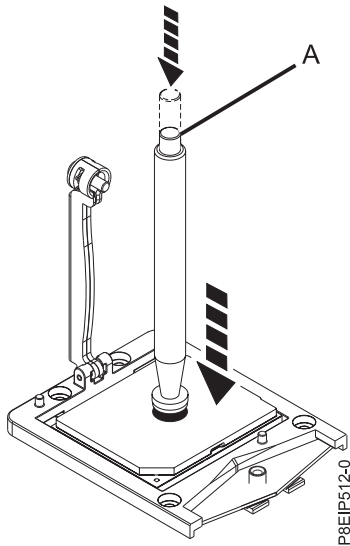


Figure 53. Lowering the removal tool onto the system processor module

8. Holding the pen, lift the pen and system processor module from the old system backplane socket to transfer it to the new system backplane socket.
9. Install the system processor module:
 - a. Lower the pen and system processor module onto the socket as shown in Figure 54 on page 48. Align the beveled corner of the processor with the beveled corner on the socket. Use care to lower the tool evenly without tilting the processor.

Note: Do not attempt to slide the tool and the system processor module in any direction while the system processor module is touching the socket.

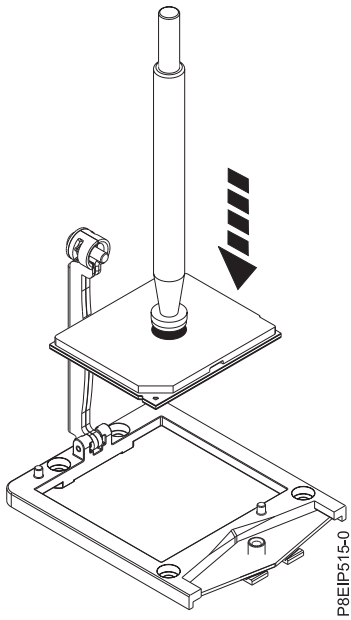


Figure 54. Lowering the processor into the socket

- b. After the system processor module is properly aligned, press the top of the pen to release it from the processor. Lift the pen off the processor.
10. Move the processor heat sink to the processor. If either the TIM or the heat sink is damaged, replace both the TIM and the heat sink. Carefully lower the heat sink over the system processor module, ensuring that the holes in the heat sink (A) align with the two guide pins (B) on the socket, as shown in Figure 55.

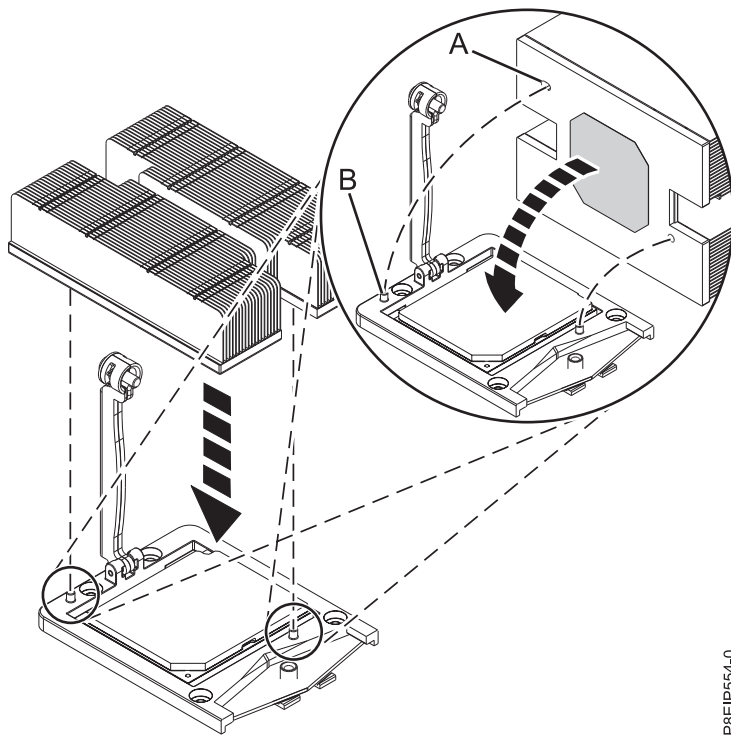


Figure 55. Installing the heat sink

11. Move the load arm (A) into position over the heat sink (B) and tighten the load arm screw with a #3 Phillips screw driver, as shown in Figure 56.

Note: Do not overtighten the load arm screw.
The following steps continue installing components into the new system backplane:

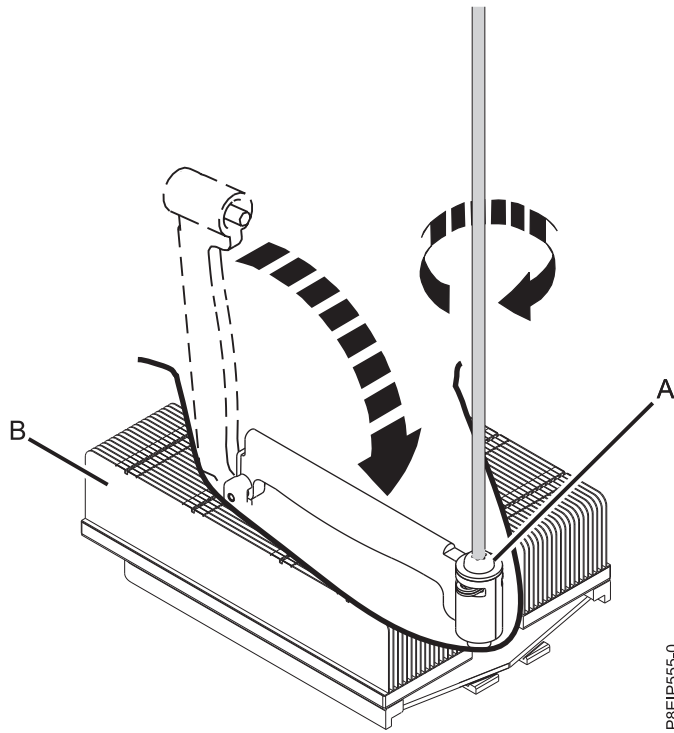


Figure 56. Tightening the load arm screw

12. Moving the front cables out of the way, and carefully holding the processor heat sink, lower the system backplane into the chassis, then slide it slightly back. See Figure 57 on page 50.

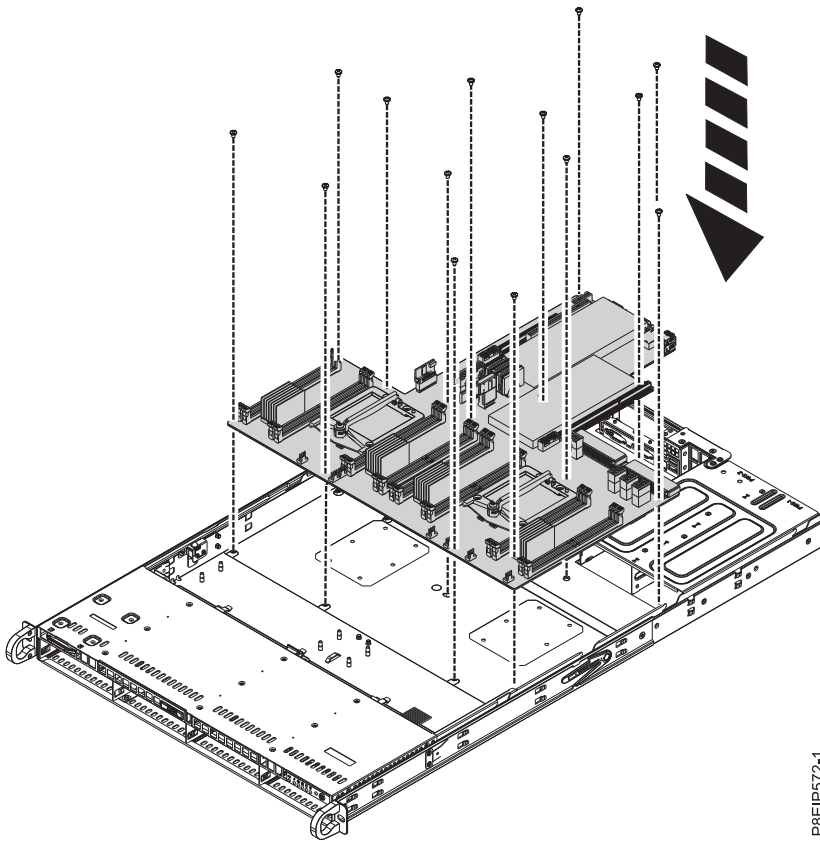


Figure 57. Replacing the system backplane

13. Align and screw the 14 screws into the system backplane. The screw locations are shown in Figure 58 on page 51.

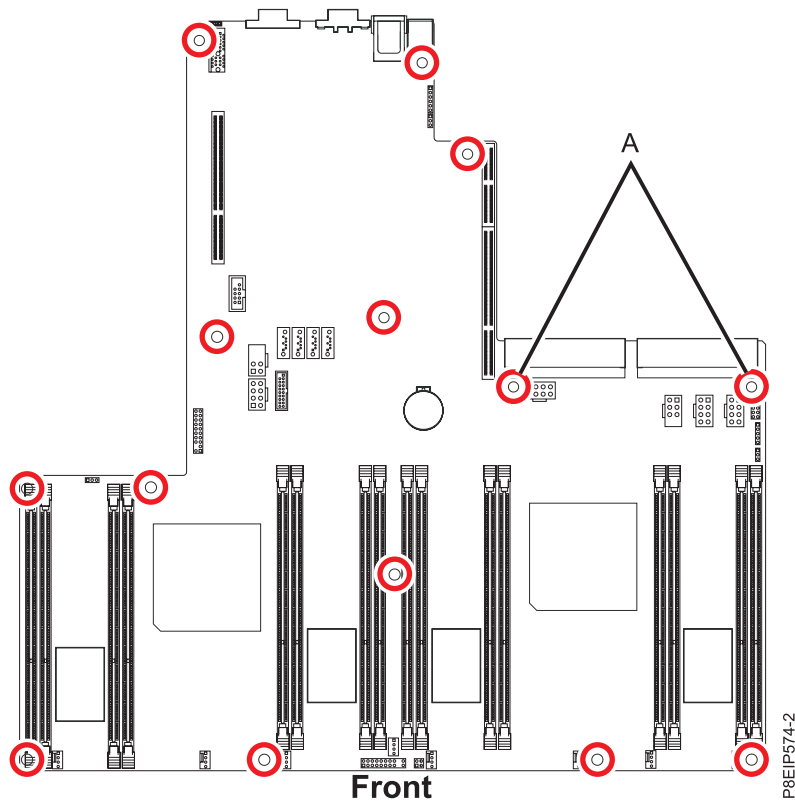


Figure 58. Screw locations. The two screws at **(A)** are black and slightly longer.

14. Replace the drive signal and drive power cables from the system backplane. For instructions, see “Replacing the disk drive backplane in the 8001-12C or 8005-12N” on page 15.
15. Replace the operator panel cable into the system backplane as shown in Figure 59 on page 52.

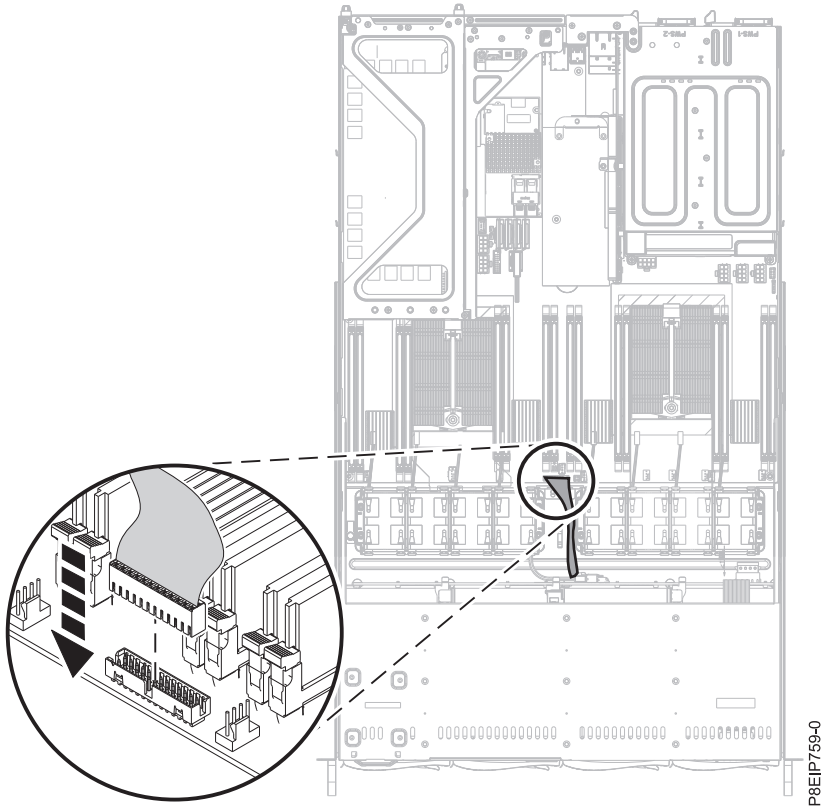
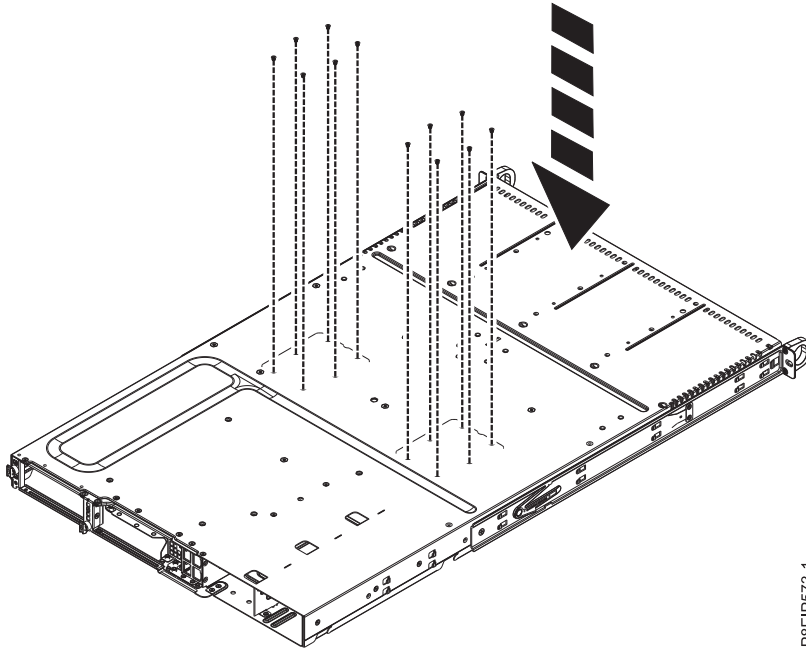


Figure 59. Replacing the operator panel cable

16. Replace the 12 screws from below the chassis that support the processor sockets.
 - a. Turn the system over, upside down.
 - b. Replace the 12 screws from the bottom. The screw locations are shown in Figure 60 on page 53.
 - c. Turn the system over, right side up.



P8EIP573-1

Figure 60. Processor socket screws on bottom of chassis

17. Using your labels, replace the PCIe risers and adapters. For instructions, see “Replacing a PCIe adapter in the 8001-12C or 8005-12N system” on page 36. Replace the riser next to the power supply first.
18. Replace the eight fan power connectors into the system backplane. For instructions, see “Replacing a system fan in the 8001-12C or 8005-12N” on page 21.
19. Using your labels, replace the memory DIMMs. For instructions, see “Removing and replacing memory in the 8001-12C or 8005-12N” on page 29.
20. Install the processor air baffle as shown in Figure 61 on page 54. Insert the edge of the baffle into the fan support. Then, carefully press the baffle down into place.

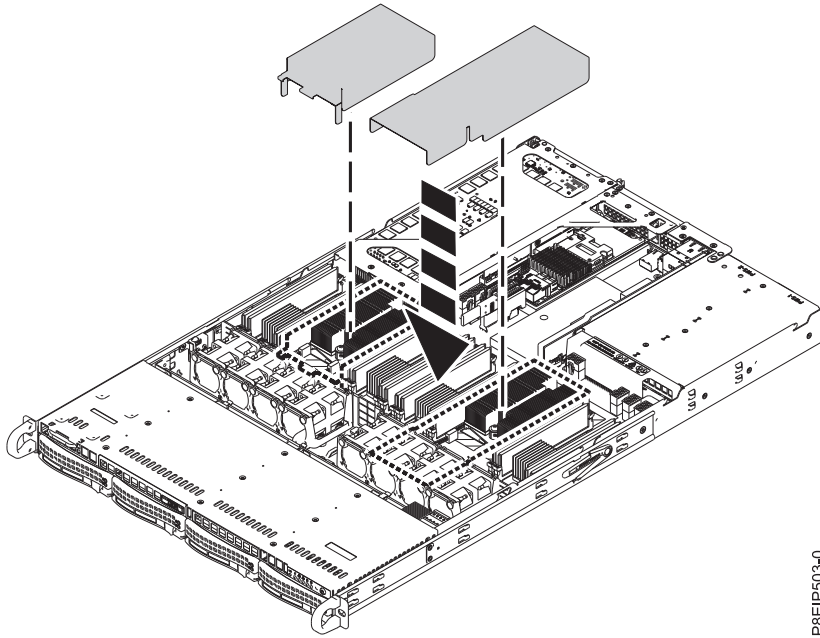


Figure 61. Installing the processor air baffle

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

After you replace the system backplane, you must set the system serial number and model number in the system backplane by using the vital product data (VPD) update tool. To download the tool, complete the following steps:

1. Go to the Scale-out LC system VPD update tool website (www-304.ibm.com/support/customerarcare/sas/f/lopdiags/scaleOutLCdebugtool.html).
2. Download the Scale-out LC system VPD update tool.
3. Follow the directions that are provided with the tool to update the VPD.

Removing and replacing a system processor module in the 8001-12C or 8005-12N

Learn how to remove and replace a system processor module in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Removing a system processor module from the 8001-12C or 8005-12N system

Learn how to remove a system processor module from the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

About this task

As part of the system processor module replacement, the heat sink is removed. When the heat sink is removed from the system processor module, the thermal interface material (TIM) is typically adhered to the heat sink. Unless damaged, the TIM that is adhered to the heat sink can be reused. If the TIM is damaged, do not reuse the removed heat sink. Before you begin the processor removal and replacement procedure, ensure that you have a spare TIM and heat sink on hand.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Open the packaging of the new system processor module and place the cover upside down next to the tray, as shown in Figure 62. The cover is used for the system processor module that you are replacing.

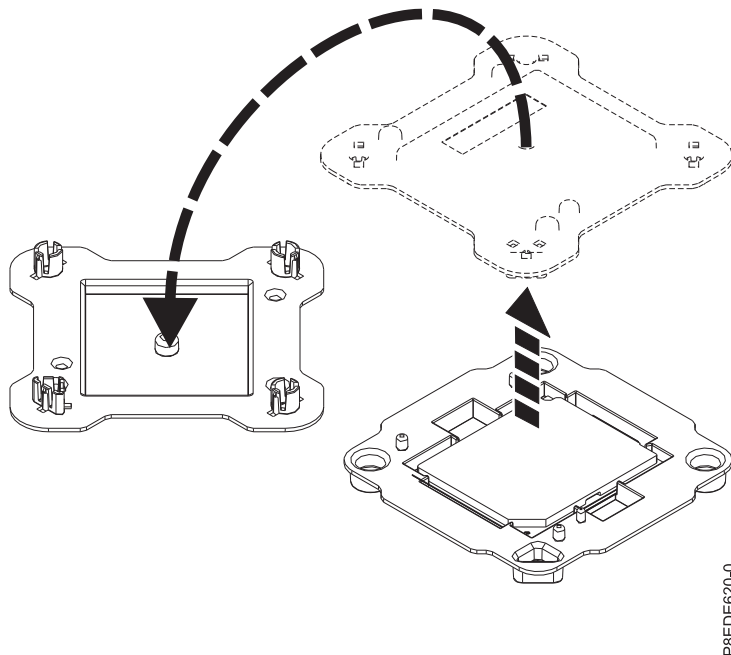
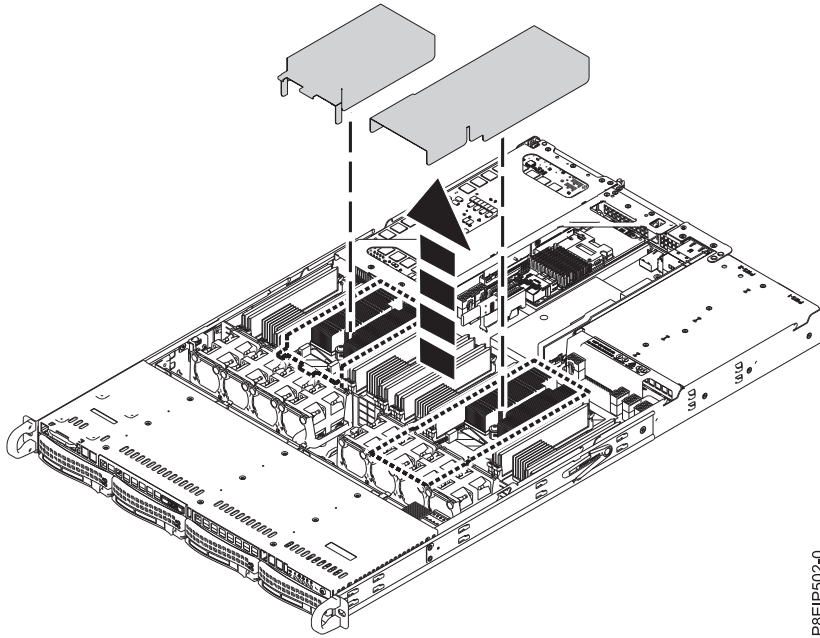


Figure 62. Opening the system processor module packaging

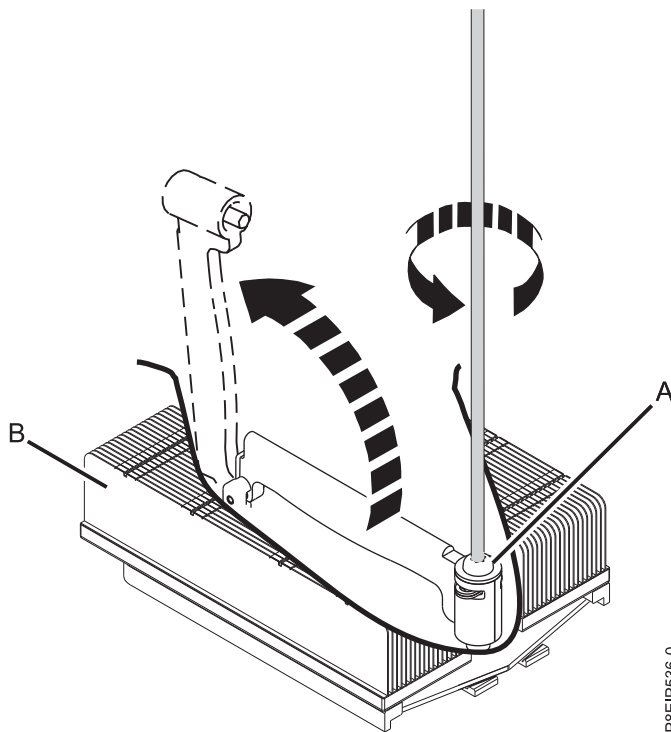
3. Remove the processor air baffle as shown in Figure 63 on page 56. Carefully unsnap and lift the processor air baffle from the system.



P8EIP502-0

Figure 63. Removing the processor air baffle

4. Loosen the load arm screw (A) of the system processor heat sink (B) that you are removing with a #3 Phillips screw driver. The load arm pivots up in the direction that is shown in Figure 64.



P8EIP536-0

Figure 64. Loosening heat sink load arm screw

5. Grip the heat sink and remove it by lifting straight up as shown in Figure 65 on page 57.

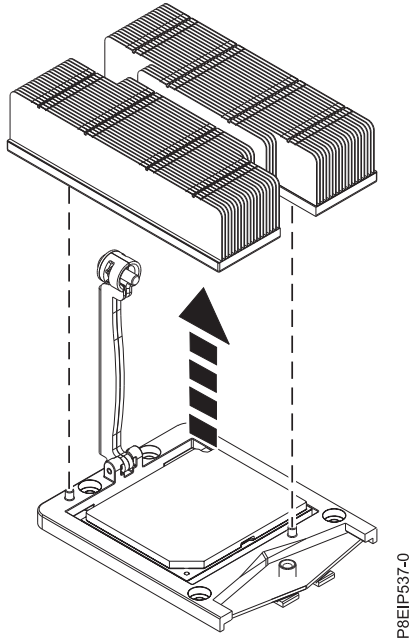


Figure 65. Removing the heat sink

6. Place the heat sink upside down on a clean surface.
7. Inspect the system processor socket area and remove any dust or debris (use a can of compressed air).
8. Lower the vacuum pen tool onto the system processor module. Fully press the top of the pen (**A**) and hold the pen in the center of the processor module as shown in Figure 66. Release the top of the pen to fasten the pen onto the processor module.

Note: To prevent the system processor module from falling, do not press the tip while holding the pen and the system processor module. Minimize the time and distance that you have the pen holding the system processor module in case the vacuum seal releases early.

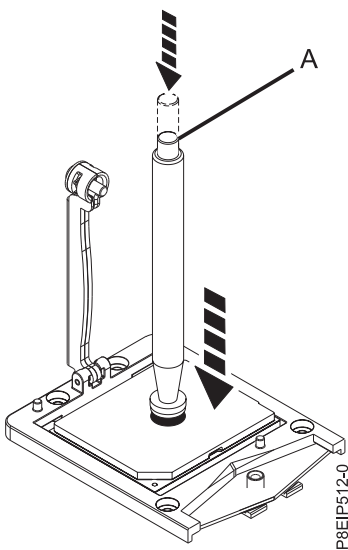


Figure 66. Locking the vacuum pen to the system processor module

9. Holding the vacuum pen, lift the pen and system processor module from the socket. Place them at an angle on the top cover of the system processor module packaging as shown in Figure 67. Setting the system processor module at an angle on the top cover of the system processor module packaging will make it easier to pick up and place in the packaging after you replace the system processor module.

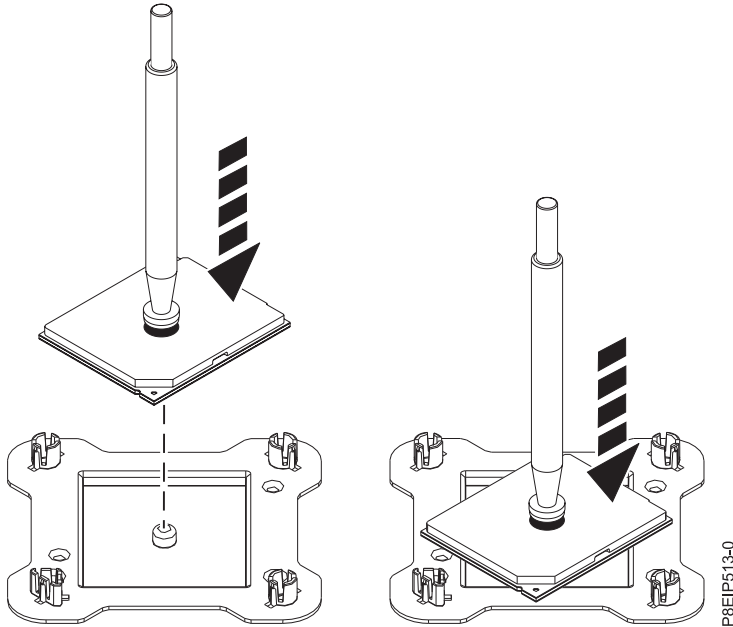


Figure 67. Placing the processor at an angle on the top cover of the packaging

10. Press the top of the pen to release the system processor module onto the cover.

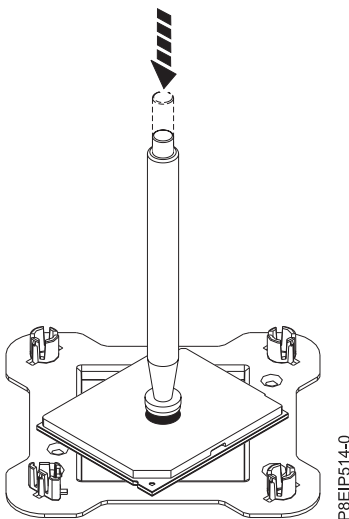


Figure 68. Releasing the pen

Replacing a system processor module for the 8001-12C or 8005-12N

Learn how to replace a system processor module in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Inspect the system processor socket area and remove any dust or debris (use a can of compressed air).
3. Lower the vacuum pen tool onto the system processor module to install. Fully press the top of the pen (**A**) and hold the pen in the center of the system processor module as shown in Figure 69. Release the top of the pen to fasten the pen onto the system processor module.

Note: To prevent the system processor module from falling, do not press the tip while holding the pen and the system processor module. Minimize the time and distance that you have the pen holding the system processor module in case the vacuum seal releases early.

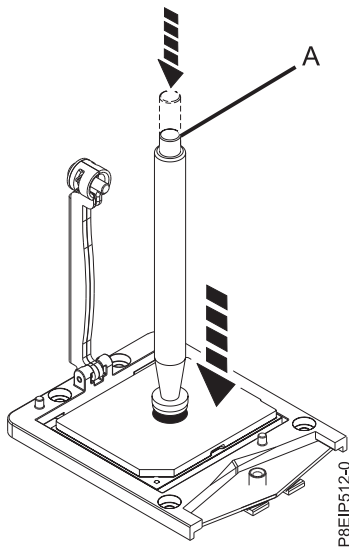


Figure 69. Lowering the removal tool onto the system processor module

4. Install the system processor module:
 - a. Lower the pen and system processor module onto the socket as shown in Figure 70 on page 60. Align the beveled corner of the processor with the beveled corner on the socket. Use care to lower the tool evenly without tilting the processor.

Note: Do not attempt to slide the tool and the system processor module in any direction while the system processor module is touching the socket.

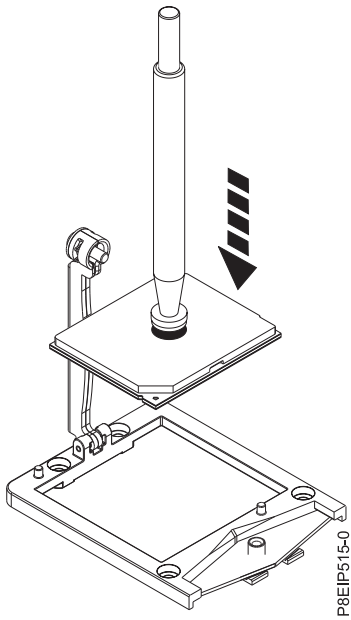


Figure 70. Lowering the processor into the socket

- b. After the system processor module is properly aligned, press the top of the pen to release it from the processor. Lift the pen off the processor.
5. If either the TIM or the heat sink is damaged, replace both the TIM and the heat sink. The TIM is pre-applied to the heat sink. Carefully lower the heat sink over the system processor module, ensuring that the holes in the heat sink (A) align with the two guide pins (B) on the socket, as shown in Figure 71.

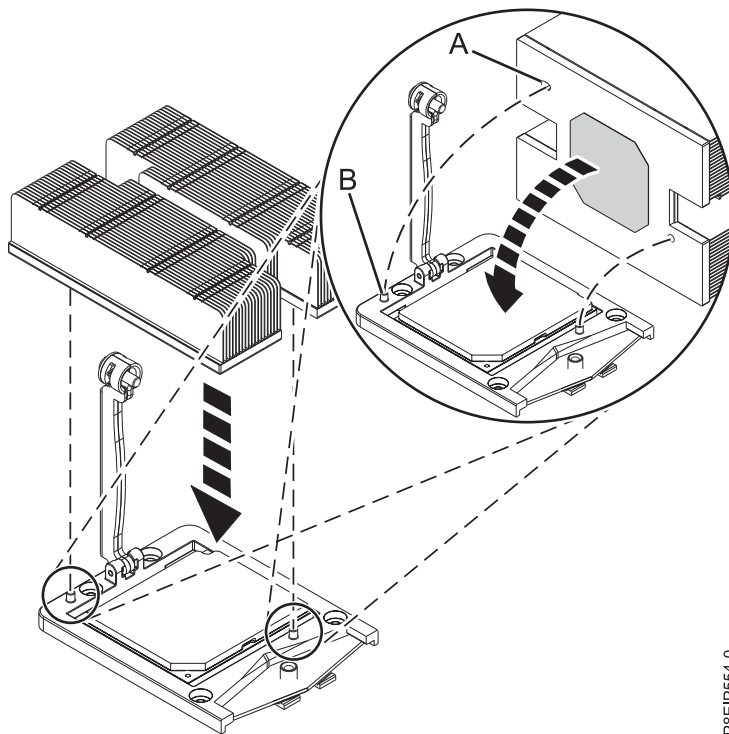


Figure 71. Installing the heat sink

6. Move the load arm (A) into position over the heat sink (B) and tighten the load arm screw with a #3 Phillips screw driver, as shown in Figure 72.

Note: Do not overtighten the load arm screw.

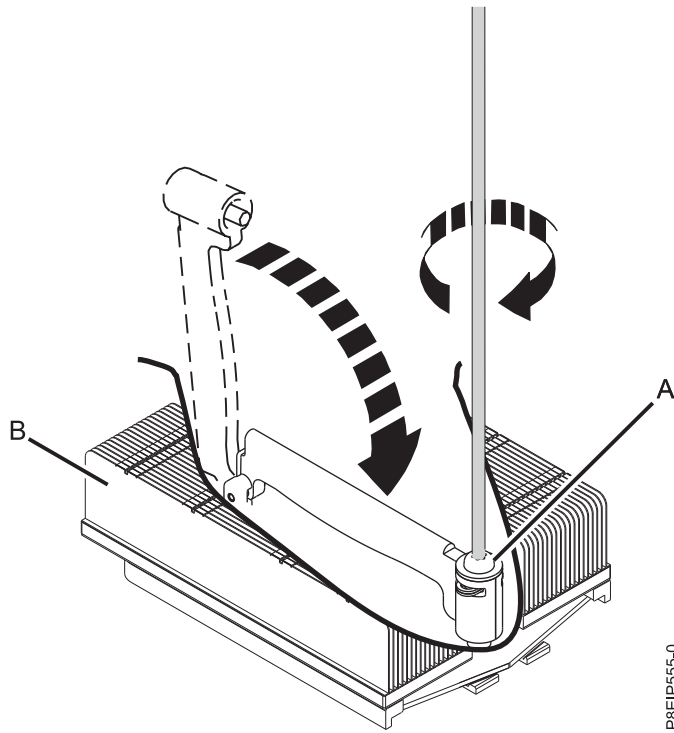
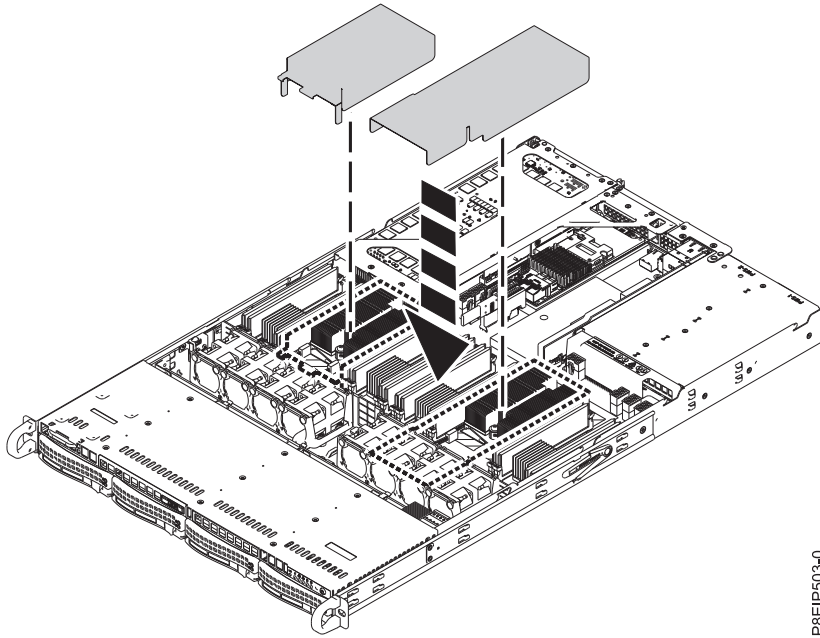


Figure 72. Tightening the load arm screw

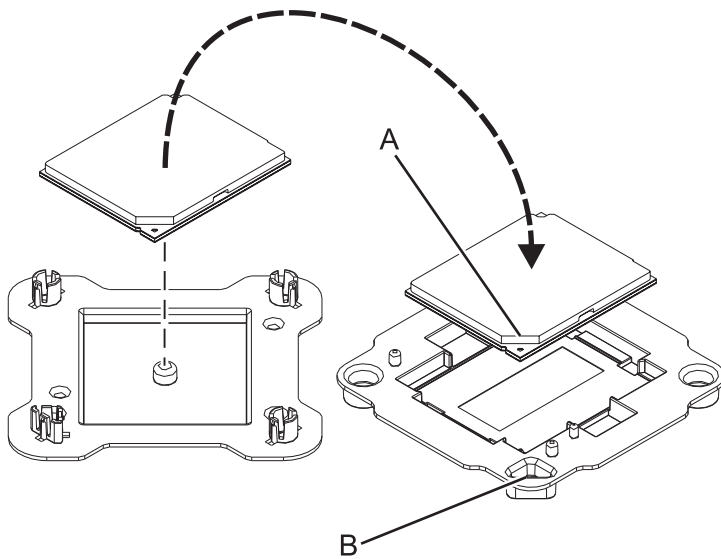
7. Install the processor air baffle as shown in Figure 73 on page 62. Insert the edge of the baffle into the fan support. Then, carefully press the baffle down into place.



P8EIP503-0

Figure 73. Installing the processor air baffle

8. Lightly grip the system processor module that you replaced by the edges and lift it off the shipping cover. Align the beveled corner of the module (A) to the corner of the tray with the triangle (B) and place it in the tray, as shown in Figure 74.



P8EDE608-0

Figure 74. Placing the system processor module into the shipping tray

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

Removing and replacing the time-of-day battery in the 8001-12C or 8005-12N

Learn how to remove and replace the time-of-day battery in the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

Before you begin

Power off the system and place it in the service position. For instructions, see “Preparing the 8001-12C or 8005-12N system to remove and replace internal parts” on page 70.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. If the time-of-day battery is covered by a PCIe adapter, move the adapter out of the way. For instructions, see “Removing a PCIe adapter from the 8001-12C or 8005-12N system” on page 32.
 3. Remove the time-of-day battery (**A**) as shown in Figure 75 on page 64. When you remove the battery, do not use a metallic tool to disengage it from its slot.

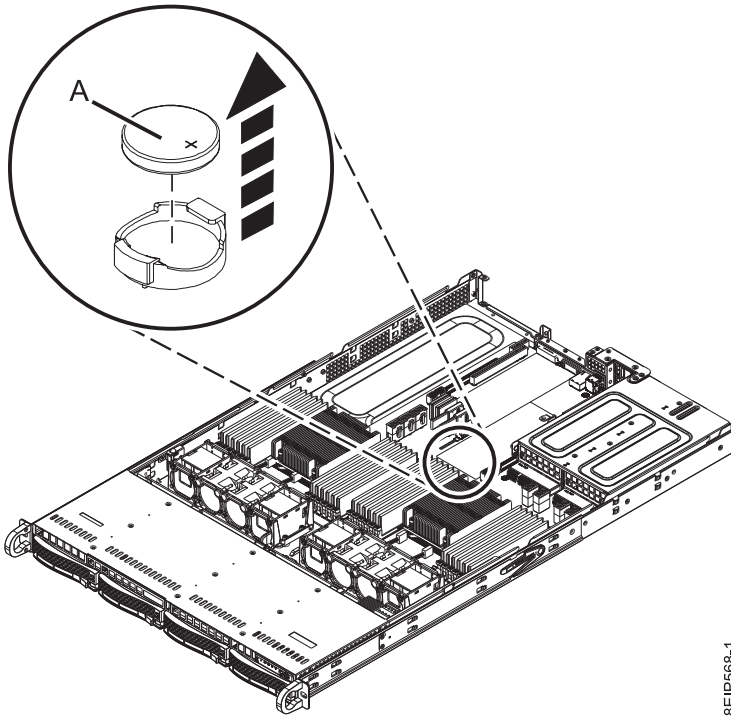


Figure 75. Time-of-day battery location

4. Replace the time-of-day battery. The orientation of the + of the battery is up.
5. If you moved a PCIe adapter to access the battery, replace the adapter. For instructions, see “Replacing a PCIe adapter in the 8001-12C or 8005-12N system” on page 36.

What to do next

Prepare the system for operation. For instructions, see “Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts” on page 72.

You need to set the system's time after replacing the battery. You can set the time after the system is running by logging into the web GUI.

Common procedures for servicing or installing features in the 8001-12C or 8005-12N

Learn about the common procedures related to installing, removing, and replacing features in the IBM Power System S821LC (8001-12C) system.

Before you begin

Observe these precautions when you are installing, removing, or replacing features and parts.

About this task

These precautions are intended to create a safe environment to service your system and do not provide steps for servicing your system. The installation, removal, and replacement procedures provide the step-by-step processes that are required to service your 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.
- Assume that an electrical safety hazard is present. Perform all continuity, grounding, and power checks specified during the subsystem installation procedures to ensure that the machine meets safety requirements.
- Do not continue with the inspection if any unsafe conditions are present.
- Before you open the device covers, unless instructed otherwise in the installation and configuration procedures: Disconnect the attached AC power cords, turn off the applicable circuit breakers located in the rack power distribution panel (PDP), and disconnect any telecommunications systems, networks, and modems.

DANGER:

- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. For AC power, remove the power cords from the outlets.
3. For racks with a DC power distribution panel (PDP), turn off the circuit breakers located in the PDP and remove the power from the Customer's DC power source.
4. Remove the signal cables from the connectors.
5. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. For AC power, attach the power cords to the outlets.
5. For racks with a DC power distribution panel (PDP), restore the power from the Customer's DC power source and turn on the circuit breakers located in the PDP.
6. Turn on the devices.

Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

(R001 part 1 of 2):

DANGER: Observe the following precautions when working on or around your IT rack system:

- Heavy equipment–personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack mounted devices and do not use them to stabilize your body position (for example, when working from a ladder).



- Each rack cabinet might have more than one power cord.
 - For AC powered racks, be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
 - For racks with a DC power distribution panel (PDP), turn off the circuit breaker that controls the power to the system unit(s), or disconnect the customer's DC power source, when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

(R001 part 2 of 2):

CAUTION:

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- (For sliding drawers.) Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.



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

Procedure

1. If you are installing a new feature, ensure that you have the software that is required to support the new feature. See IBM Prerequisite.
2. If you are installing or replacing something that might put your data at risk, ensure, wherever possible, that you have a current backup of your system or logical partition (including operating systems, licensed programs, and data).
3. Review the installation or replacement procedure for the feature or part.
4. Note the significance of color on your system.

Blue or terra-cotta on a part of the hardware indicates a touch point where you can grip the hardware to remove it from or install it in the system, or open or close a latch. Terra-cotta might also indicate that the part can be removed and replaced with the system or logical partition powered on.
5. Ensure that you have access to a medium flat-blade screwdriver, a Phillips screwdriver, and a pair of scissors.
6. If parts are incorrect, missing, or visibly damaged, do the following steps:
 - If you are replacing a part, contact the provider of your parts or next level of support.
 - If you are installing a feature, contact one of the following service organizations:
 - The provider of your parts or next level of support.
 - In the United States, the IBM Rochester Manufacturing Automated Information Line (R-MAIL) at 1-800-300-8751.

In countries and regions outside of the United States, use the following website to locate your service and support telephone numbers:

<http://www.ibm.com/planetwide>

7. If you encounter difficulties during the installation, contact your service provider, your IBM reseller, or your next level of support.

8. For thermal performance, ensure that the top cover is on when the system is running.
9. If you are installing new hardware in a logical partition, you need to understand and plan for the implications of partitioning your system. For information, see Logical Partitioning.

Identifying the system that contains the part to replace

Learn how to determine which system has the part you want to replace.

LEDs on the 8001-12C or 8005-12N system

Use this information as a guide to the LEDs on the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

The LEDs indicate various system status. If the part does not have a problem indicator LED, you can use a troubleshooting program such as **impitool** to identify the issue.

The front LEDs are shown in Figure 76.

- The green LED (6) indicates the power status.
- The identify LED (2) can indicate the following states:
 - Solid blue indicates that the local UID button was pressed.
 - Flashing blue indicates that a remote UID command was run.
 - Solid red indicates that the system is overheated.
 - Flashing red at 1 Hz indicates that a fan failed.
 - Flashing red at 0.25 Hz indicates that a power supply failed.
- The amber LED (5) flashes when there is SATA drive activity, for SATA drives directly attached to the system backplane.
- The network activity LEDs (3) and (4) flash when there is network activity on the feature EKA6 four port network card.

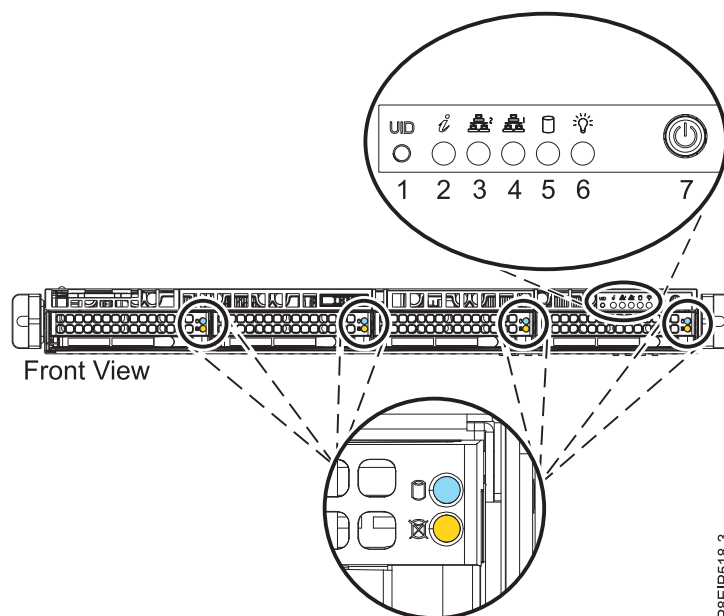


Figure 76. LEDs on the front of the system

LEDs are also located on the rear of the system; see Figure 77 on page 69.

The identify LED is at (2). Turn it on by using a system identify command or by pressing the UID button.

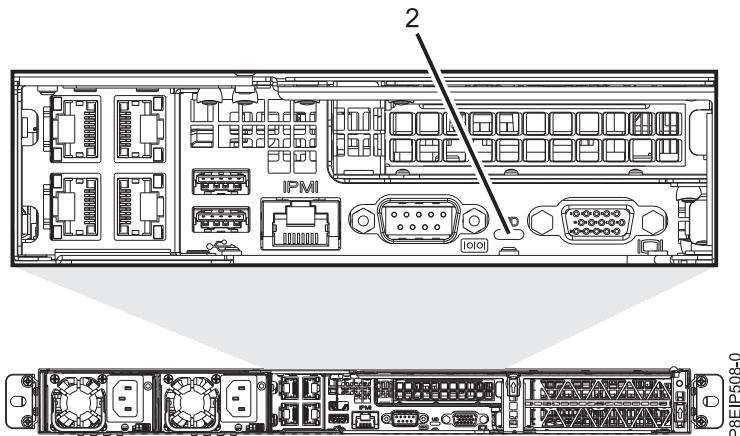


Figure 77. LEDs on the rear of the system

Drive LEDs can indicate the following states:

- Blue activity LED can indicate the following states:
 - When there is no activity, the LED is off for SATA drives; on for SAS drives.
 - Flashing blue indicates activity
- Red status LED can indicate the following states. The status LED does not work when SATA drives are directly attached to the system backplane.
 - Steady red indicates that the drive failed
 - Flashing red at 4 Hz identifies the drive
 - Flashing red at 1 Hz indicates that the drive is rebuilding

Power supply LEDs can indicate the following states:

- Steady green indicates that power is on
- Steady amber indicates that power is off, or a power fault occurred
- Flashing amber indicates that the power supply is overheating

Identifying the 8001-12C, 8001-22C, 8005-12N, or 8005-22N that needs servicing

Use the Intelligent Platform Management Interface (IPMI) program to turn on the blue identify LED to help you find the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) system that needs servicing.

Procedure

Use the **ipmitool** command to activate the blue system identify LED. For in-band networks, enter the following chassis identify command:

```
ipmitool -I <interface> chassis identify <interval>
```

interface

The interface that you are using to connect to the system. For example, usb.

interval

The time to turn on the identify LED in seconds. The default value is 15. This means that the LED is on for 15 seconds and then turns off for 15 seconds. A value of zero (0) turns off the LED. A value of force turns on the LED and leaves it on until turned off.

To run the command remotely over the LAN, enter the following chassis identify command:

```
ipmitool -I lanplus -H <hostname> -U <username> -P <password> chassis identify <interval>
```

Preparing the 8001-12C or 8005-12N system to remove and replace internal parts

Learn how to prepare the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system to remove and replace internal parts.

Procedure

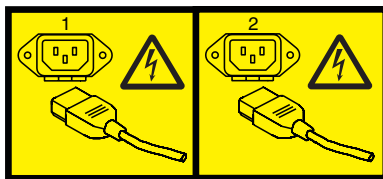
1. Complete the prerequisite tasks. For instructions, see “Before you begin” on page 65.
2. Identify the part and the system that you will be working on. For instructions, see “Identifying the system that contains the part to replace” on page 68.
3. Attach the electrostatic discharge (ESD) wrist strap.

Attention:

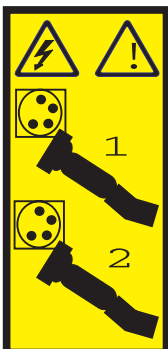
- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
4. Stop the system. For instructions, see “Stopping the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 74.
 5. Disconnect the power source from the system by unplugging the system. For instructions, see “Disconnecting the power cords from an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 85.

Note: The system might be equipped with redundant power supply. Before you continue with this procedure, ensure that all power to your system is disconnected.

(L003)



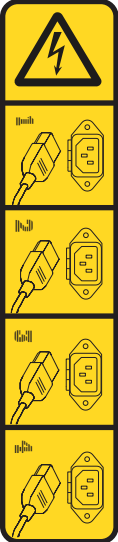
or



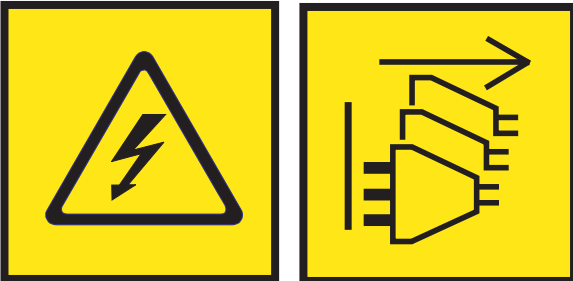
OR



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)

(L005)



CAUTION: Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in splattered metal, burns, or both. (L005)

6. Place the system into the service position. For instructions, see “Placing an 8001-12C system into the service position” on page 82.

CAUTION:

Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

(L012)



or



CAUTION: Pinch hazard. (L012)

7. Remove the service access cover. For instructions, see “Removing the service access cover from an 8001-12C or 8005-12N system” on page 80.

Preparing the 8001-12C or 8005-12N system for operation after you remove and replace internal parts

Learn how to prepare the IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system for operation after you remove and replace internal parts.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Replace the service access cover. For instructions, see “Installing the service access cover on an 8001-12C or 8005-12N system” on page 81.
3. Place the system into the operating position. For instructions, see “Placing an 8001-12C system into the operating position” on page 84.

(L012)



or



CAUTION: Pinch hazard. (L012)

4. Reconnect the power cords to the system. For instructions, see “Connecting the power cords to an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 86.
5. Start the system. For instructions, see “Connecting the power cords to an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 86.
6. If you installed or replaced a PCIe adapter, update the adapter firmware. See http://www.ibm.com/support/knowledgecenter/HW4P4/p8ei8/p8ei8_update_other_adapter.htm (www.ibm.com/support/knowledgecenter/HW4P4/p8ei8/p8ei8_update_other_adapter.htm).
7. Verify the installed part. For instructions, see Verifying a repair (www.ibm.com/support/knowledgecenter/POWER8/p8ei3/p8ei3_verifyrepair.htm).

Starting and stopping the 8001-12C, 8001-22C, 8005-12N, or 8005-22N

Learn how to start and stop the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) system to perform a service action or system upgrade.

Starting the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system

You can use the power button to start the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

About this task

Attention: For safety, airflow purposes and thermal performance, the service access cover must be installed and fully seated before you power on the system.

You can use this procedure to power on the system; or you can use a console and the IPMI tool to power on the system.

Procedure

1. Before you press the power button, ensure that the power supplies are connected to the system unit and that the power cables are connected to a power source.
2. Press the power button (7) shown in Figure 78 or Figure 79 on page 74. You may have to press the switch for 0.5 to 3 seconds.

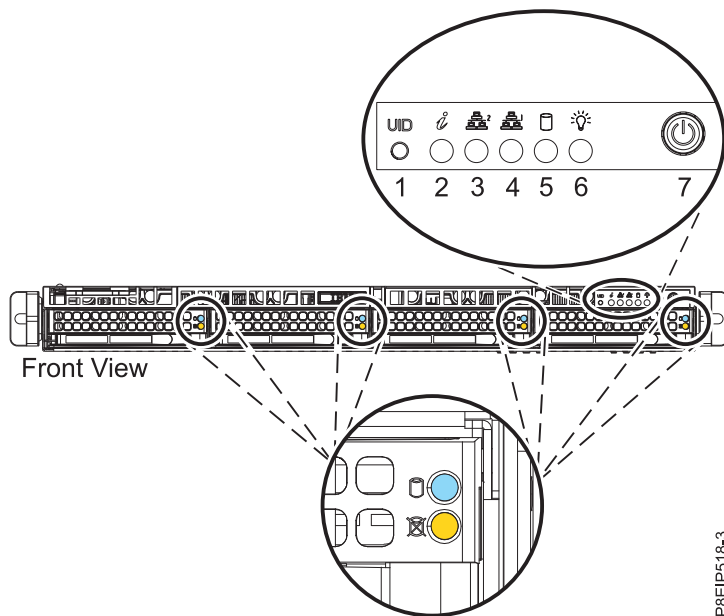


Figure 78. Power switch for 8001-12C

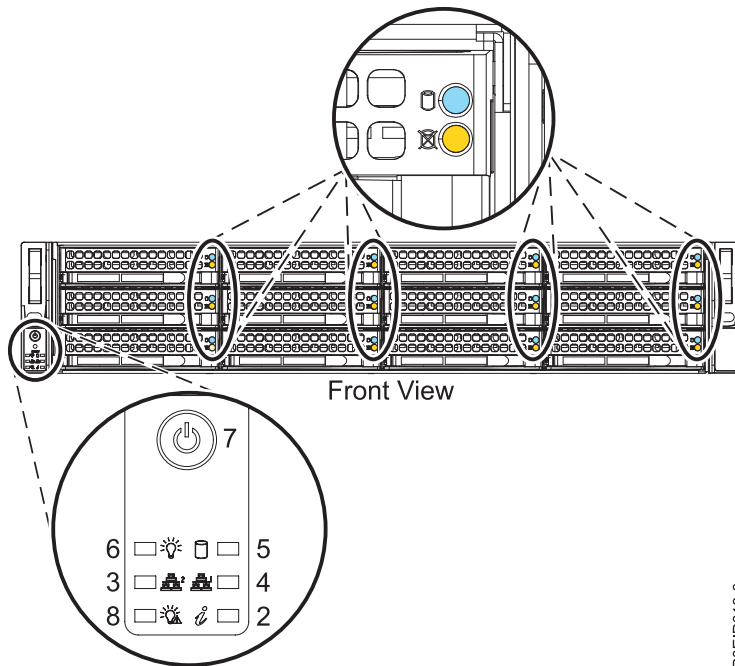


Figure 79. Power switch for 8001-22C

What to do next

If you press the power button and the system does not start, contact your next level of support or your service provider.

Stopping the 8001-12C, 8001-22C, 8005-12N, or 8005-22N system

Learn how to stop the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems to complete another task.

Procedure

You can use the Linux **shutdown** command to stop and power down the system.

For example, the following command will shut down the system in 10 minutes and send the message "Repairs coming" to the users.

```
shutdown -P +10 "Repairs coming"
```

The **-P** setting instructs the system to shut down and then power down. The **+** indicates the time in minutes before the shutdown occurs.

Drive commands for 8001-12C, 8001-22C, 8005-12N, or 8005-22N

Learn about the storage drive commands for the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

mvCLI commands

Learn about the mvCLI commands. They are for SATA drives and drive on modules (DOMs) that are directly connected to the system backplane without using a PCIe adapter.

To enter the mvCLI commands, enter this command to enable the commands:

```
modprobe sg
```

Run this mvCLI command to start it's shell mode:

```
./mvcli
```

To select the drive adapter, enter the following command. Valid values are 0 and 1. For example:

```
adapter -i 1
```

To show all physical disks and IDs:

```
info -o pd
```

To list the serial number of a drive:

```
info -o pd -i <id of drive>
```

To show all host bus adapters (HBAs):

```
info -o hba
```

To check for errors on a disk:

```
smart -p <disk_ID#>
```

You can also get the drive serial number by using the hdparm command from a shell. The setting `sd_x` indicates the drive.

```
hdparm -i /dev/sd_x
```

To create a virtual disk, where "MyVirtualDisk" is the name for the new array, and 0 and 1 are the physical IDs of the SATA DOMs from a previous `info -o pd` command:

```
create -o vd -r1 -n "MyVirtualDisk" -d 0,1
```

If the virtual disk was successfully created, show a new RAID virtual disk:

```
info -o vd
```

To take the device offline so that it can be removed:

1. Identify the disk to remove; for example, `sda` or `sdb`.
2. Log in as the root user. For example, to remove the `sda` drive, run the following command:

```
echo 0 > /sys/block/sda/device/delete
```

StorCLI commands

Learn about the StorCLI commands. They are for feature code EKAA using a PCIe adapter.

If the command is not installed, download the utility from <http://avagotech.com>. You can find the download by searching that site for `storcli`. Get their latest "MegaRAID Storcli" download; the file is at <https://docs.broadcom.com/docs/STORCLI-v1-21-12-Linux.zip>. To install, follow their documentation. Unzip the file; then for:

RHEL

1. Navigate to the Linux folder.
2. Install the package by running this command, where `x.xx-x` equals the version of the utility. :

```
rpm -ivh <StorCLI-x.xx-x.noarch.rpm>
```

Ubuntu:

1. Navigate to the Ubuntu folder.
2. Install the debian file by using this command:

```
dpkg -i storcli_x.xx-x._all.deb
```

If you need to make the storcli run, use the following command:

```
chmod +x /path/to/file/filename
```

You can check the permissions of the file to see if it is executable by using the following command:

```
ls -l /path/to/file/filename
```

To upgrade the StorCLI RPM, run:

```
rpm -Uvh <StorCLI-x.xx-x.noarch.rpm>
```

To show a summary of the drive and controller status:

```
storcli show
```

To show a list of all controllers and drives that need attention:

```
storcli show all
```

To show information about the drives:

```
storcli /cx[/eall]/sall show
```

To locate a physical disk by turning on the identify LED:

```
storcli /cx[/ex]/sx start locate
```

To turn off the identify LED:

```
storcli /cx[/ex]/sx stop locate
```

To prepare a drive for removal:

```
storcli /cx[/ex]/sx spindown
```

To prepare a drive for use:

```
storcli /cx[/ex]/sx spinup
```

sas3ircu commands

Learn about the sas3ircu command. This command is for feature code EKAB using a PCIe adapter.

If the sas3ircu command is not installed, download the utility from <ftp://ftp.supermicro.com/driver/P8DTU/>. You can find the download by searching that site for sas3ircu; currently: **LSI MegaRAID and HBA (AOC-Utility) > SMC-Broadcom (Supermicro 12Gbs SAS HBA - AOC-S3008L-L8i) > AOC-S3008L-L8i > Tools.**

To install:

1. Download the sas3ircu command.
2. Copy the sas3ircu command file to the /usr/local/bin directory.
3. To enable the command to be executed, as root, run the command:

```
chmod +x sas3ircu
```

General SAS3IRCU command syntax:

```
sas3ircu <controller_#> <command> <parameters>
```

To list the controllers:

```
sas3ircu list
```

To show the controller status:

```
sas3ircu <controller_#> status
```

To turn the drive light on:

```
sas3ircu <controller_#> locate <Enclosure:Bay> ON
```

And off:

```
sas3ircu <controller_#> locate <Enclosure:Bay> OFF
```

To view additional help for the command:

```
sas3ircu help
```

NVMe commands

Learn about the NVMe commands. These commands are for NVMe drives together with feature code EKAE using an NVMe PCIe adapter.

If the `nvme` command is not installed, download the utility from <https://github.com/linux-nvme/nvme-cli>. Follow the installation instructions found on that site.

To determine which drive you want to replace, use the command:

```
nvme list
```

If you are searching for a failed drive, you can check each drive using the command:

```
nvme smart-log <device>
```

To turn on the identify LED, use the command:

```
dd if=/dev/nvmeX of=/dev/null
```

You can also use the `ledctl` command from the optional `ledmon` package:

```
ledctl locate=/dev/rsnvmeX
```

To get the device serial number for verification, use the command:

```
nvme id-ctrl /dev/nvmeX | grep -i sn
```

To take the device offline so that it can be removed:

```
sh -c"echo 0 >/sys/block/nvmeX/device/delete"
```

Sensor readings GUI display

The sensor readings GUI display is a way to quickly determine the general health status of the server without having to look at the detailed system event log (SEL) information.

To view the sensor readings GUI display, log in to the BMC web interface. Click **Server Health > Sensor Readings**.

Some occurrences of errors in the system might not appear in the sensor readings GUI. After you view the sensor readings GUI display, use the SEL logs to view any active SEL events that indicate a service action event.

Sensor readings display operation

Most sensors are initially gray, then change status and color during the boot process when the FRU is initialized and either determined to be good (green) or faulty (red). No sensor display is available until you can get to the sensor display selection on the BMC, which means that the system attains a certain power level or that the BMC finishes initializing. The indicator color of the sensor is determined based on the sensor status at time of invocation of the display. The sensor display maintains the sensor status indicator color until the display is refreshed, which updates the sensor value with the latest status.

Changes to SEL events changes color of sensor indicator when you refresh or restart the display. Sensor status display also starts over with a reboot or a power cycle.

Sensor status indicator descriptions

Gray indicator:

- FRU not plugged
- Sensor not initialized
- Sensor function is not initialized

Red (faulty) indicator:

- Critical threshold exceeded (an event requires a service action)
- Service action required for hard fail
- Partial function failure that reached a “service action required” state
- A deconfigured resource requires a service action

Green (good) indicator:

- FRU or sensor is plugged in and fully operational
- Recoverable event is below the critical “service action required” threshold
- FRU or sensor returned to “normal” operating range (for threshold sensors)

Removing and replacing a power supply in the 8001-12C, 8001-22C, 8005-12N, or 8005-22N

Learn how to remove and replace power supplies in the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

Removing a power supply from the 8001-12C, 8001-22C, 8005-12N, or 8005-22N

Learn how to remove power supplies in the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

About this task

If a single power supply failed, it can be replaced while the system is running.

Procedure

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

Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
 - When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Label and remove the power cord from the power supply to remove. For instructions, see “Disconnecting the power cords from an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 85.
 3. Remove the power supply from the system.
 - a. To unseat the power supply from its position in the system, push the locking-tab to the left as shown in Figure 80.
 - b. Grasp the power supply handle with one hand, and pull the power supply partially out of the system.
 - c. Place your other hand underneath the power supply and pull the power supply out of the system and place it on an ESD mat.

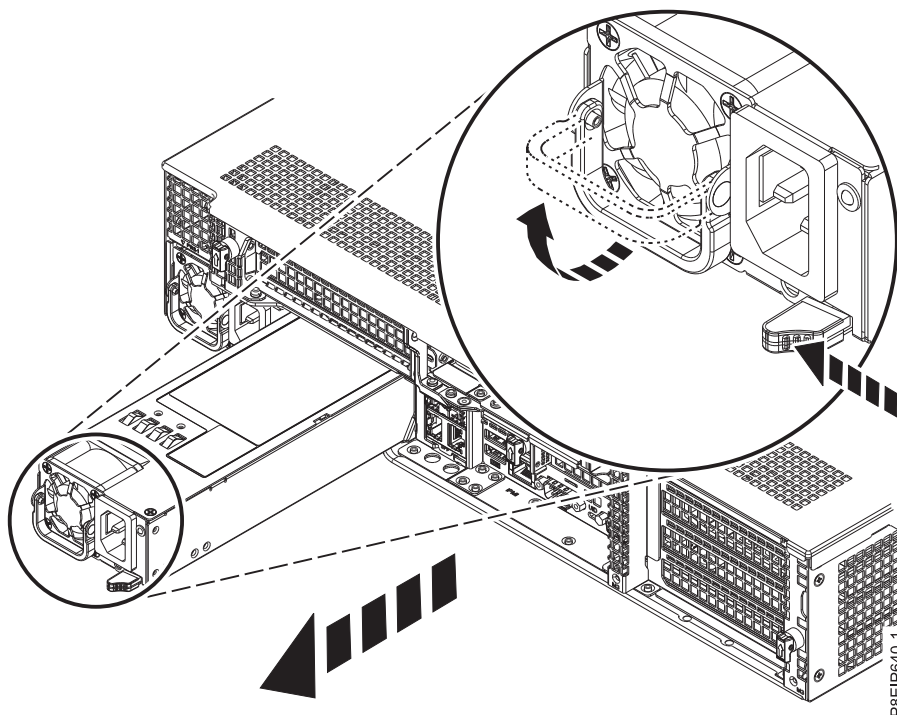


Figure 80. Removing a power supply from the system

Replacing a power supply in the 8001-12C, 8001-22C, 8005-12N, or 8005-22N

Learn how to replace power supplies in the IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap attached. If not, attach it now.
2. Align the power supply with the bay as shown in Figure 81. The fan is on the left; the plug is on the right. Slide the power supply into the system until the latch locks in place.

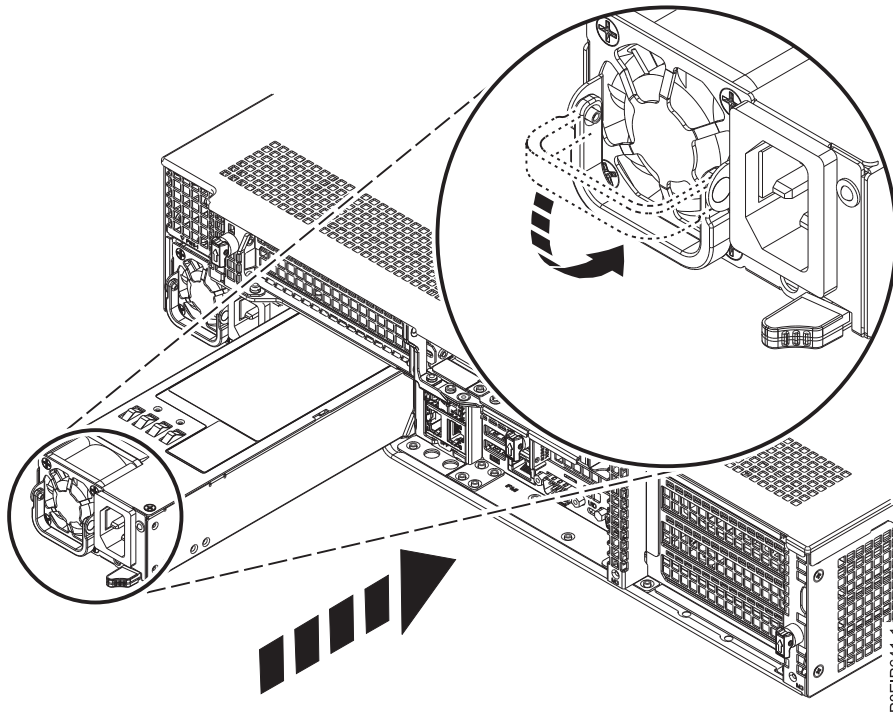


Figure 81. Replacing a power supply in the system

3. Reconnect the power cord. For instructions, see "Connecting the power cords to an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system" on page 86.

Removing and replacing covers on an 8001-12C or 8005-12N system

Learn how to remove and replace the covers for an IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system so that you can access the hardware parts or service the system.

Removing the service access cover from an 8001-12C or 8005-12N system

Learn how to remove the service access cover from an IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

About this task

Attention: For safety, airflow purposes and thermal performance, the service access cover must be installed and fully seated before you power on the system.

Procedure

1. Ensure that you removed both power cords from the system. For instructions, see “Disconnecting the power cords from an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system” on page 85.
(L005)



CAUTION: Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in splattered metal, burns, or both. (L005)

2. Remove the two cover screws (1), from the rear of the cover.
3. Press both buttons on the top cover (2) to release the latches as shown in Figure 82, and push the cover back about 0.5 in (1 cm) until it stops. If the buttons do not easily press down, partially remove the drives directly under the buttons.

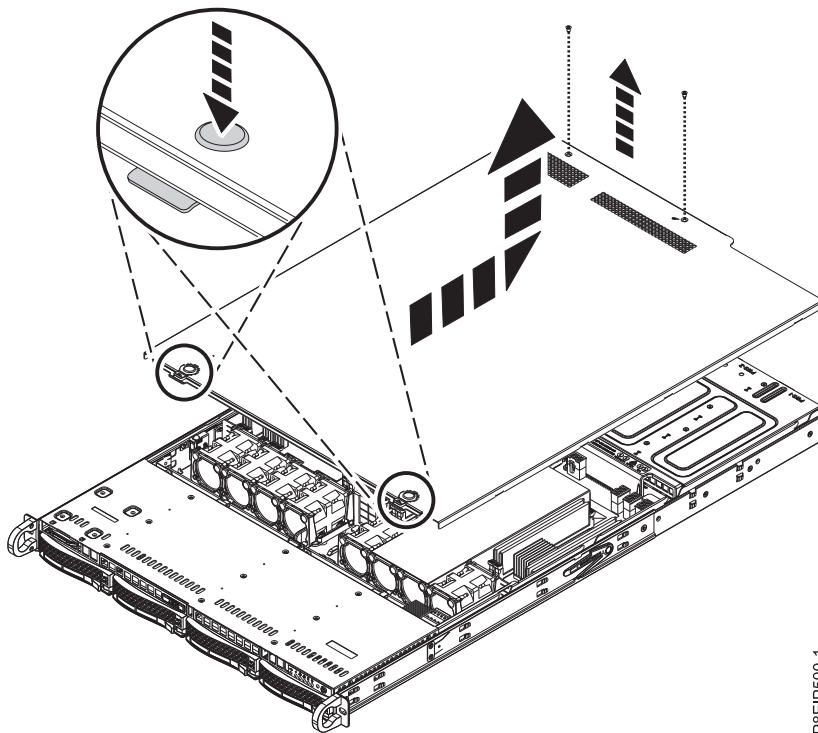


Figure 82. Releasing and opening the cover

4. Lift up the front of the cover up and remove it from the system.

Installing the service access cover on an 8001-12C or 8005-12N system

Learn how to install the service access cover on a rack-mounted IBM Power System S821LC (8001-12C) or the IBM CS821 (8005-12N) system.

About this task

Attention: For safety, airflow purposes and thermal performance, the service access cover must be installed and fully seated before you power on the system.

Procedure

1. Place the rear of the cover on the system. Pivot to front of the cover down until it rests on the system.
2. Slide the cover forwards until it latches into place as shown in Figure 83.

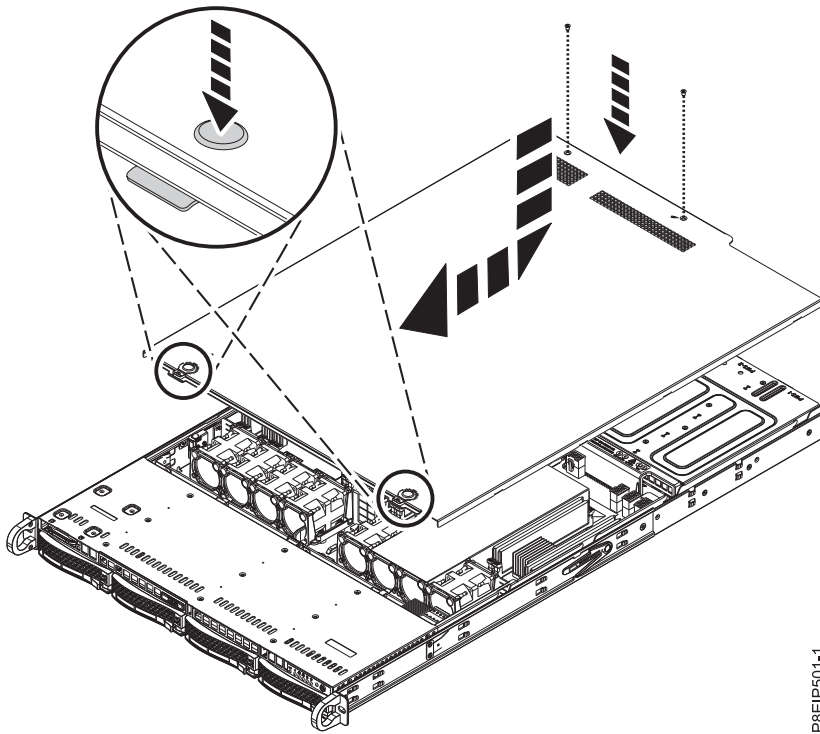


Figure 83. Replacing and securing the cover

3. Replace the two cover screws (2) at the rear of the cover.

Service and operating positions for 8001-12C

Learn how to place an IBM Power System S821LC (8001-12C) system into the service or operating position.

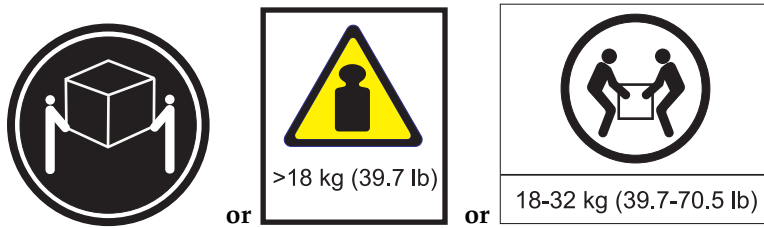
Placing an 8001-12C system into the service position

Learn how to place an IBM Power System S821LC (8001-12C) system into the service position.

Before you begin

The systems must be removed from the rails for servicing.

CAUTION:



The weight of this part or unit is between 18 and 32 kg (39.7 and 70.5 lb). It takes two persons to safely lift this part or unit. (C009)

Notes:

- When you slide a system out of a rack, ensure that all stability plates are firmly installed to prevent the rack from toppling. Slide only one system out at a time.
- When the rails are fully extended, the rail safety latches lock into place. This action prevents the system from being pulled out too far.

Procedure

1. Label and remove all cables from the rear of the system.
2. Remove the front screws that secure the system to the rack from both sides of the system as shown in Figure 84.

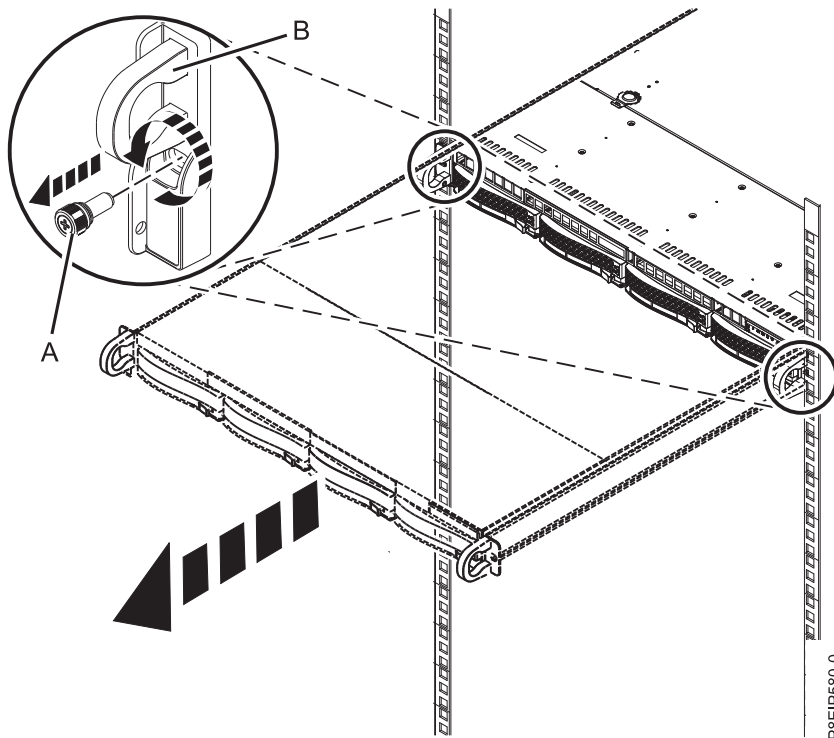


Figure 84. Removing the front screws and removing the system from the rack

3. Pull the system unit out of the rack.

CAUTION:

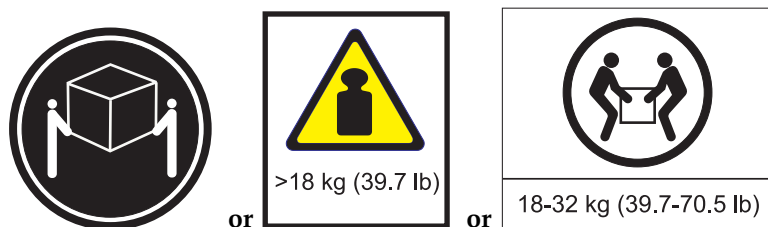
- The chassis rails only extend about half of the distance of the chassis. Once the safety latches are released, the chassis only slides forward a few inches before disengaging from the rails. Be prepared to support the full weight of the chassis as you remove it from the slide rails.
 - The chassis contains most of the weight in the back side of the unit. When you remove the system, take care to be ready to support the weight by grasping the chassis closer to the back of the unit.
4. Using two people, release the rail safety latches and remove the system from the rails. The safety latches work in opposite directions; the latch on one side moves up while the latch on the other side moves down.
 5. Carefully set the system on a table with an appropriate ESD surface.

Placing an 8001-12C system into the operating position

Learn how to place an IBM Power System S821LC (8001-12C) system into the operating position.

About this task

CAUTION:



The weight of this part or unit is between 18 and 32 kg (39.7 and 70.5 lb). It takes two persons to safely lift this part or unit. (C009)

Procedure

1. Using two people, one on each side of the system, lift the system from the table.
2. Align the system rails on each side of the system with the rack slide rails.
3. Push the system into the rack until you hear each rail click into place.
4. Before releasing your hold on the system, ensure that the rails are engaged by sliding the system forward into service lock position. Check that the rails are properly seated. If the rails are not fully engaged, the system could drop.
5. Release the rail safety latches (**A**), as shown in Figure 85 on page 85, then push the system fully into the rack. The safety latches work in opposite directions; the latch on one side moves up while the latch on the other side moves down.

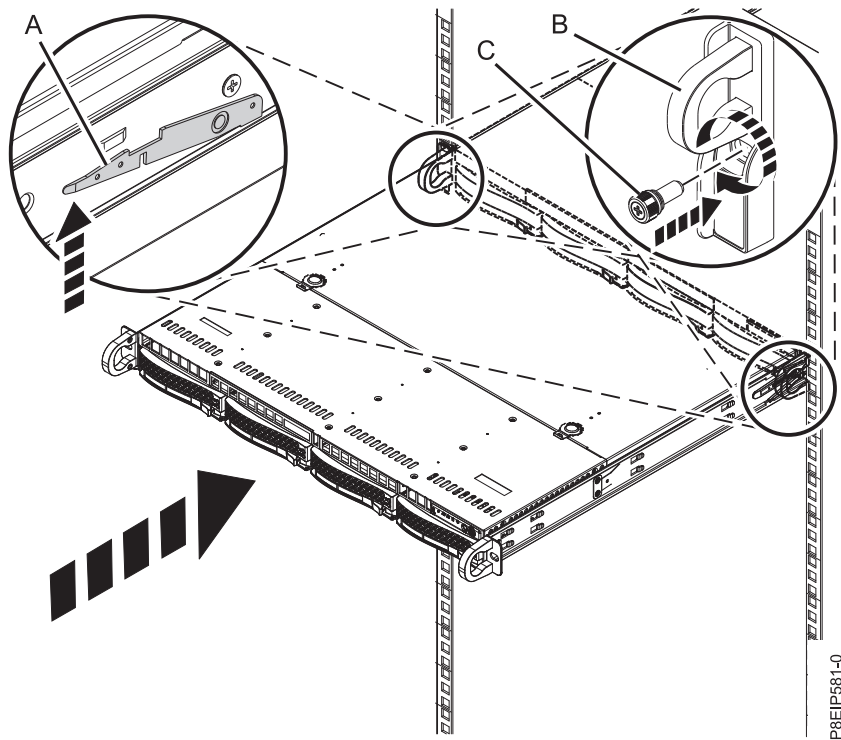


Figure 85. Placing the system into the operating position

6. Fasten the two front screws (C) to secure the system to the rack.
7. Using your labels, reconnect the cables at the rear of the system unit.
8. If you removed the storage drives, using your labels, replace the drives in their proper locations.
9. If you removed the power supplies, replace them. For instructions, see “Replacing a power supply in the 8001-12C, 8001-22C, 8005-12N, or 8005-22N” on page 80.

Power cords

Learn how to disconnect and connect the power cords on IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) systems.

Disconnecting the power cords from an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system

Learn how to disconnect the power cords from an IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) system.

Before you begin

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

Procedure

1. Identify the system unit that you are servicing in the rack.
2. Label and disconnect the power cords from the system unit as shown in Figure 86 on page 86.

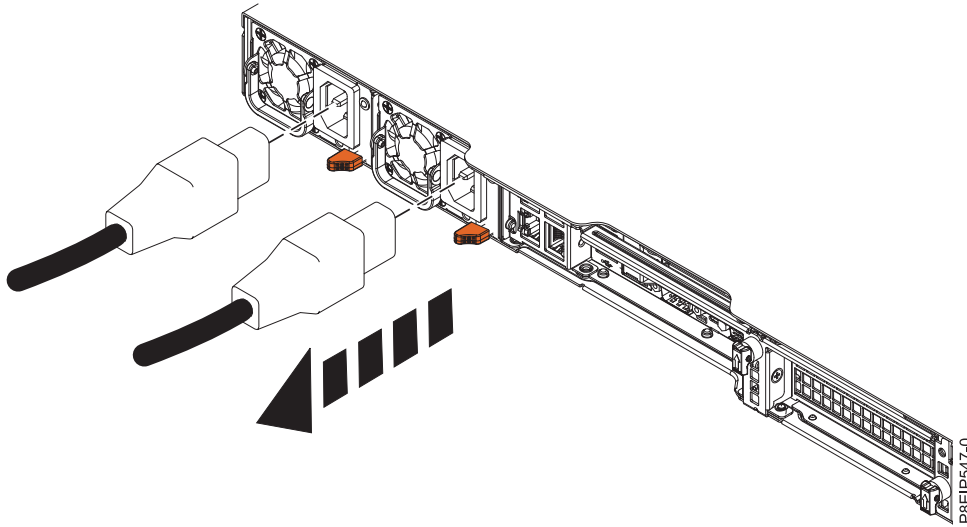


Figure 86. Removing the power cords from the system

Connecting the power cords to an 8001-12C, 8001-22C, 8005-12N, or 8005-22N system

Learn how to connect the power cords to an IBM Power System S821LC (8001-12C), the IBM Power System S822LC for Big Data (8001-22C), the IBM CS821 (8005-12N), or the IBM CS822 (8005-22N) system.

Procedure

Using your labels, reconnect the power cords to the system unit as shown in Figure 87.

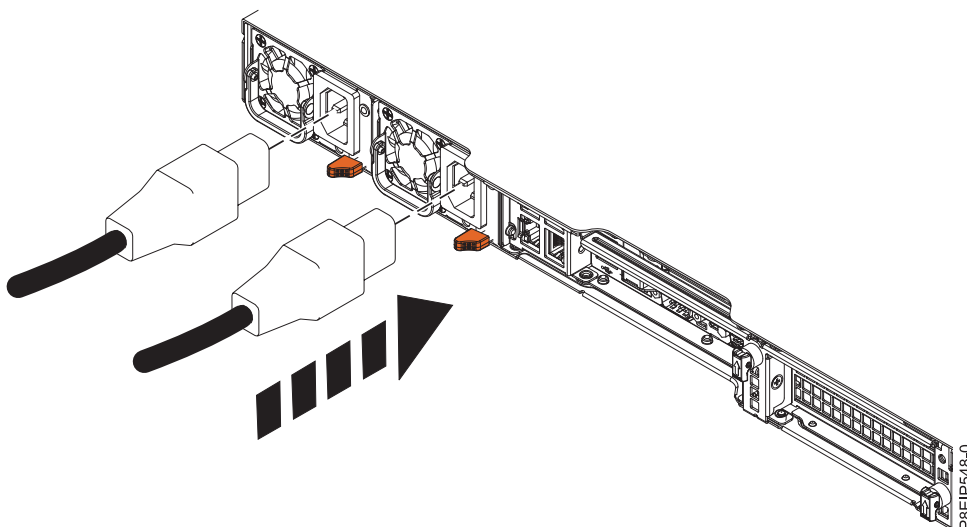


Figure 87. Connecting the power cords to the system

Additional information

Drive installation details for the 8001-12C system

Find information about the drive installation options for the IBM Power System S821LC (8001-12C) system.

SATA Drives

The 8001-12C system can support four SATA drives directly connected to the SATA ports and controller on the system backplane. The SATA drives can be installed into the front drive bay locations. SATA drive cables connect the disk drive backplane to the SATA sockets on the system backplane.

Use SATA cables to connect the SATA ports on the system backplane to the SATA ports on the disk drive backplane.

You can plug SATA drive on module (DOM) drives directly into the system backplane. Up to two SATA DOM drives can be installed. Use the two orange SATA connectors.

SAS Drives

With system feature codes EKB1 or EKB2, and by using SATA/SAS RAID adapters, the 8001-12C system can support up to four SATA/SAS drives. Adapter feature codes EKAA and EKAB each support up to eight SAS drives, but the system is physically limited to four.

Use SAS cables to connect the SAS ports on the PCIe adapter cards to the SAS ports on the disk drive backplane.

If you are installing a RAID adapter, see the adapter documentation for information on configuring the drives.

As an example, consider this configuration:

- Feature code EKAA supporting four front-mounted SATA/SAS drives.
- Two SATA DOMs plugged into the system backplane.

NVMe Enabled System and Drives

When the system has one or more NVMe adapters, feature code EKAE, the system supports NVMe drives. To support up to two NVMe drives, you need a feature code EKAE PCIe adapter. To support up to four NVMe drives, you need two EKAE PCIe adapters. Figure 88 shows the adapter positions. The first EKAE PCIe adapter needs to go in position 2 (UIO Slot1); the second needs to go in position 3 (PLX Slot1).

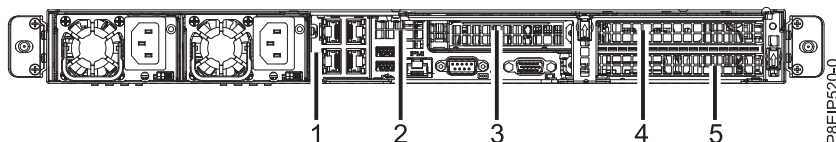


Figure 88. 8001-12C PCIe adapter positions

The first two NVMe drives need to be plugged into drive locations 1 and 2 as shown in Figure 89 on page 88. The second two NVMe drives need to be plugged into drive locations 3 and 4.

NVMe drives are only supported on host operating systems; NVMe drives are not supported by guest operating systems. On systems with RHEL 7.3 or later, or Ubuntu 16.04 or later, NVMe drives can be used as bootable drives. Port 1 of the internal NVMe host bus adapter must be plugged into NVMe port 1 on the disk drive backplane.

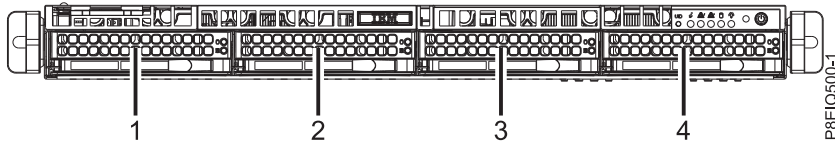


Figure 89. NVMe drive locations

As an example, consider this configuration:

- Four NVMe front-mounted drives with two EKAE PCIe adapters.
- Two SATA DOMs plugged into the system backplane.

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

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

Keyboard navigation

This product uses standard navigation keys.

Interface information

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

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

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

Vendor software

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

Related accessibility information

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

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

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Electronic emission notices

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

Class A Notices

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

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Compliance Statement

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

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

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

Warning: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

VCCI Statement - Japan

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

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

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

Japan Electronics and Information Technology Industries Association Statement

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

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

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

高調波電流規格 JIS C 61000-3-2 適合品

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

高調波電流規格 JIS C 61000-3-2 準用品

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

- 回路分類 : 6 (単相、PFC回路付)
- 換算係数 : 0

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

高調波電流規格 JIS C 61000-3-2 準用品

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

- 回路分類 : 5 (3相、PFC回路付)
- 換算係数 : 0

Electromagnetic Interference (EMI) Statement - People's Republic of China

声 明

此为 A 级产品,在生活环境
中,该产品可能会造成无线电干
扰。在这种情况下,可能需要用
户对其干扰采取切实可行的措
施。

Declaration: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may need to perform practical action.

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

The following is a summary of the EMI Taiwan statement above.

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user will be required to take adequate measures.

IBM Taiwan Contact Information:

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

Electromagnetic Interference (EMI) Statement - Korea

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

Germany Compliance Statement

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

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

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

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

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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

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

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road

Armonk, New York 10504
Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland GmbH
Technical Relations Europe, Abteilung M456
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 (0) 800 225 5426
email: HalloIBM@de.ibm.com

Generelle Informationen:

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

Electromagnetic Interference (EMI) Statement - Russia

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

Class B Notices

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

Federal Communications Commission (FCC) Statement

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

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

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

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

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

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Compliance Statement

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

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

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IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 800 225 5426
email: halloibm@de.ibm.com

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取扱説明書に従って正しい取り扱いをして下さい。 VCCI-B

Japan Electronics and Information Technology Industries Association Statement

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

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

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

高調波電流規格 JIS C 61000-3-2 適合品

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

高調波電流規格 JIS C 61000-3-2 準用品

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

- 回路分類 : 6 (単相、PFC回路付)
- 換算係数 : 0

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

高調波電流規格 JIS C 61000-3-2 準用品

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

- 回路分類 : 5 (3相、PFC回路付)
- 換算係数 : 0

IBM Taiwan Contact Information

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

Germany Compliance Statement

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

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

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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

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

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

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

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland GmbH
Technical Relations Europe, Abteilung M456
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 (0) 800 225 5426
email: HalloIBM@de.ibm.com

Generelle Informationen:

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

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