

Disk Drives for the E5-700

ESCALA Power7



REFERENCE
86 A1 08FF 01

ESCALA Power7

Disk Drives for the E5-700

This publication concerns the following models:

- Bull Escala E5-700 (Power 750 / 8233-E8B)
- Bull Escala M6-700 (Power 770 / 9117-MMB)
- Bull Escala M7-700 (Power 780 / 9179-MHB)

References to Power 755 / 8236-E8C models are irrelevant.

Hardware

March 2010

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FRANCE

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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, a safety information booklet is included in the publications package shipped with the product. The booklet 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 in the booklet. You should also refer to the booklet any time you do not clearly understand any safety information in the U.S. English publications.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

DANGER

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

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.



- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

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.

(R001)

CAUTION:

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

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- 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)

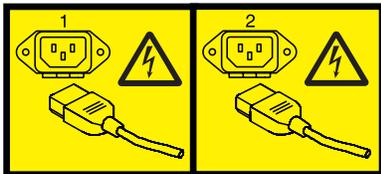
(L001)



(L002)



(L003)



or



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. (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)

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

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

The equipment is suitable for installation in the following:

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

The intrabuilding ports of this equipment are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of this equipment *must not* be metallically connected to the interfaces that connect to the OSP (outside plant) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

Note: All Ethernet cables must be shielded and grounded at both ends.

The ac-powered system does not require the use of an external surge protection device (SPD).

The dc-powered system employs an isolated DC return (DC-I) design. The DC battery return terminal *shall not* be connected to the chassis or frame ground.

Disk drives

You might need to install, or remove and replace a disk drive.

Related information

 [Backplanes](#)

Chapter 1. What's new in Disk drives

Read about new or significantly changed information in Disk drives since the previous update of this topic collection.

February 2010

- Added information for IBM Power Systems™ servers that contain the POWER7™ processor.

Chapter 2. Installing a disk drive or solid-state drive

You can install a Small Computer System Interface (SCSI), serial-attached SCSI (SAS) disk drive, or solid-state drive (SSD) in the server or expansion unit. Use the procedures in this section to perform this task.

Your system or logical partition can either be powered off or powered on when you install the disk drive.

Solid-state drives

To install and configure solid-state drives (SSD), you must review the supported machine type model, adapter, and configuration details.

Solid[®]-state drives, also known as flash drives, follow many of the same rules as a regular hard-disk drive (HDD). For example, SSDs physically resemble, install in the same manner, and in most of the same slots as HDDs. However, some restrictions and configuration rules that apply to SSD are different from HDD. The following tables can help you determine which operating system, adapter, machine type model, and disk drive configuration rules apply to your system.

After you have reviewed the configuration rules, you can install the drive as you would any other disk drive. For more information, see Chapter 2, “Installing a disk drive or solid-state drive.”

Restriction: Solid-state drives must be part of a RAID array or System Mirroring (IBM i).

Select the operating system for the server or partition where you will install drives from the following list:

- Solid-state drive rules for the AIX[®] operating system
- Solid-state drive rules for the Linux[®] operating system
- Solid-state drive rules for the IBM i operating system

Attention: Before installing SSD into your system, you must ensure that you have all the prerequisite updates for both the SSD and the adapters. To do this, go to the IBM Prerequisite Web site: http://www-912.ibm.com/e_dir/eServerPrereq.nsf.

Table 1. Solid-state drive rules for the AIX operating system

Machine type model	Adapter	Mixing rules
5886	<ul style="list-style-type: none">• (5904) - PCI-X DDR 1.5GB Cache SAS RAID Adapter• (5906 and 5908) - PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)• (5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	<ul style="list-style-type: none">• Solid-state drives and hard-disk drives cannot be mixed in this drive enclosure.• A maximum of eight drives are supported in this configuration.• Only one 5886 can be attached to the adapter, or pair of adapters, when solid-state drives are installed.• Same rules apply when using dual SAS Raid adapters connected to 5886.

Table 1. Solid-state drive rules for the AIX operating system (continued)

Machine type model	Adapter	Mixing rules
8233-E8B and 8236-E8C	<ul style="list-style-type: none"> • (5679) - SAS RAID Enablement: internal adapter • (5904) - PCI-X DDR 1.5GB Cache SAS RAID Adapter • (5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter 	<ul style="list-style-type: none"> • SSD and HDD can never be mixed in the same RAID array or mirroring group. • SSD and HDD can be mixed in the system disk drive backplane if the backplane is not split. • SSD and HDD can both be present in a split backplane if each side of the split backplane has only SSD or HDD. Restriction: Split backplane for these models is not supported with dual SAS Raid adapters. <p>Remember: SSD must be on one side of the split backplane and HDD must be on the other side of the split backplane. SSD and HDD drive types cannot be mixed within a parity set. If you are mixing SSD and HDD in a system, ensure that you have enough of each drive type to manage your protection scheme.</p>
5802	(5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	<ul style="list-style-type: none"> • SSD and HDD cannot be mixed in the same system disk drive backplane. • SSD and HDD can both be present in a split backplane if each side of the split backplane has only SSD or HDD. SSD must be on one side of the split backplane and HDD must be on the other side of the split backplane. • SSD and HDD cannot be mixed on a pair of 5903 adapters. • A maximum of nine SSDs are supported on a pair of 5903 adapters.

Table 2. Solid-state drive rules for the Linux operating system

Machine type model	Adapter	Mixing rules
5886	<ul style="list-style-type: none"> • (5904) - PCI-X DDR 1.5GB Cache SAS RAID Adapter • (5906 and 5908) - PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC) • (5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter 	<ul style="list-style-type: none"> • Solid-state drives and hard-disk drives cannot be mixed in this drive enclosure. • A maximum of eight drives are supported in this configuration. • Only one 5886 can be attached to the adapter, or pair of adapters, when solid-state drives are installed. • Same rules apply when using dual SAS Raid adapters connected to 5886.

Table 2. Solid-state drive rules for the Linux operating system (continued)

Machine type model	Adapter	Mixing rules
8233-E8B and 8236-E8C	<ul style="list-style-type: none"> • (5679) - SAS RAID Enablement: internal adapter • (5904) - PCI-X DDR 1.5GB Cache SAS RAID Adapter • (5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter 	<ul style="list-style-type: none"> • SSD and HDD can never be mixed in the same RAID array or mirroring group. • SSD and HDD can be mixed in the system disk drive backplane if the backplane is not split. • SSD and HDD can both be present in a split backplane if each side of the split backplane has only SSD or HDD. Restriction: Split backplane for these models is not supported with dual SAS Raid adapters. <p>Remember: SSD must be on one side of the split backplane and HDD must be on the other side of the split backplane. SSD and HDD drive types cannot be mixed within a parity set. If you are mixing SSD and HDD in a system, ensure that you have enough of each drive type to manage your protection scheme.</p>
5802	(5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	<ul style="list-style-type: none"> • SSD and HDD cannot be mixed in the same system disk drive backplane. • SSD and HDD can both be present in a split backplane if each side of the split backplane has only SSD or HDD. SSD must be on one side of the split backplane and HDD must be on the other side of the split backplane. • SSD and HDD cannot be mixed on a pair of 5903 adapters. • A maximum of nine SSDs are supported on a pair of 5903 adapters.

Table 3. Solid-state drive rules for the IBM i operating system

Machine type model	Adapter	Mixing rules
5886	<ul style="list-style-type: none"> • (5904) - PCI-X DDR 1.5GB Cache SAS RAID Adapter • (5906 and 5908) - PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC) • (5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter 	<ul style="list-style-type: none"> • Solid-state drives and hard-disk drives cannot be mixed in this drive enclosure. • A maximum of eight drives are supported in this configuration. • Only one 5886 can be attached to the adapter, or pair of adapters, when solid-state drives are installed. • Same rules apply when using dual SAS Raid adapters connected to 5886.

Table 3. Solid-state drive rules for the IBM i operating system (continued)

Machine type model	Adapter	Mixing rules
8233-E8B and 8236-E8C	<ul style="list-style-type: none"> • (5679) - SAS RAID Enablement: internal adapter • (5904) - PCI-X DDR 1.5GB Cache SAS RAID Adapter • (5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter 	<ul style="list-style-type: none"> • SSD and HDD cannot be mixed in the same RAID array or mirroring group. • SSD and HDD can be mixed in the system disk-drive backplane. Remember: You can not mix SSD and HDD drive types within a parity set. If you are mixing SSD and HDD in a system, ensure that you have enough of each drive type to manage your protection scheme.
5802	(5903) - PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	<ul style="list-style-type: none"> • SSD and HDD cannot be mixed in the same system disk drive backplane. • SSD and HDD can both be present in a split backplane if each side of the split backplane has only SSD or HDD. SSD must be on one side of the split backplane and HDD must be on the other side of the split backplane. • SSD and HDD cannot be mixed on a pair of 5903 adapters. • A maximum of nine SSDs are supported on a pair of 5903 adapters.

Related tasks

“Installing a disk drive or solid-state drive with the AIX system or logical partition powered on”

You can install a disk drive or solid-state drive in a system or expansion unit while the AIX operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

“Installing a disk drive or solid-state drive with the Linux system or logical partition powered on” on page 16

You might need to install a disk drive or solid-state drive in a system or expansion unit while the Linux operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

“Installing a disk drive or solid-state drive with the IBM i system or logical partition powered on” on page 37

You might need to install a disk drive or solid-state drive in a system or expansion unit while the IBM i operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

“Installing a disk drive or solid-state drive with the system or logical partition powered off” on page 48

You might need to install a disk drive in a system or logical partition that controls the disk drive location with the power off. Use the procedure in this section to perform this task.

Related information

Cabling the 5802 disk subsystem

Installing a disk drive or solid-state drive with the AIX system or logical partition powered on

You can install a disk drive or solid-state drive in a system or expansion unit while the AIX operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

If you are installing Solid State Drives, review the configuration rules and then return here. For more information, see “Solid-state drives” on page 5.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention: The powered-on procedure is a complex set of steps that must be performed precisely as instructed to avoid potential data loss or system damage. You might also consider the powered-off procedure, which is a simpler task that involves less risk of data loss or system damage. For instructions, see “Installing a disk drive or solid-state drive with the system or logical partition powered off” on page 48.

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. If applicable, remove the system unit door, remove the expansion unit door, or open the rack.
3. If applicable, remove the front cover.
4. Determine the next available disk drive position in your system or expansion unit. For information, see Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.

Note: When you have a system with an expansion unit, fill the slot positions in the system unit first. However, you can choose a different disk drive placement depending on your data protection strategy.

5. Record the position where the new disk drive will be installed. For example, the next available disk drive slot might be P3-D4.
6. Perform the following steps to install a disk drive.

Install the disk drive

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. Press Enter to continue.
4. On the Function Selection display, select **Task Selection**.
5. On the Tasks Selection display, select **Hot Plug Task**.
6. Select **SCSI and SCSI RAID Hot Plug Manager**.
7. Select **Attach a Device to a SCSI Hot Swap Enclosure Device**. A list of empty slots in the SCSI hot swap enclosure device is shown.
8. Select the slot where you want to install the disk drive and press Enter.
The disk drive slot enters the Identify state. The concurrent maintenance light for the slot begins flashing. To view the locations of the concurrent maintenance lights, select the model into which you are installing a disk drive. For a list of models, see Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.
9. If the slot you want to use contains a disk-drive filler, store the filler for future use, or discard it, then move on to step Insert the disk drive.

Note: The disk drive filler is a single piece that does not attach to the new disk drive.

Important: .

Pull the disk-drive filler from the slot that you want to use, as shown in Figure 1 on page 12

Attention:

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

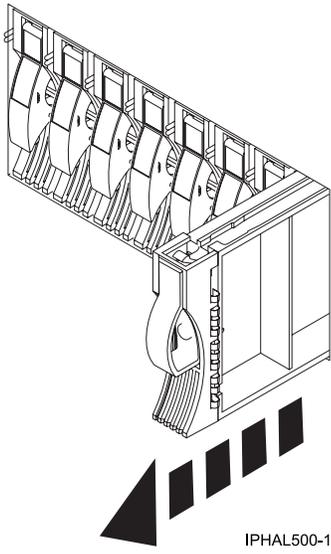


Figure 1. Removing a disk-drive filler from a model .

10. If the slot you want to use contains a disk-drive filler, complete the following step.
Remove the disk-drive bezel latch (A) from the front of the filler, as shown in the following figure.

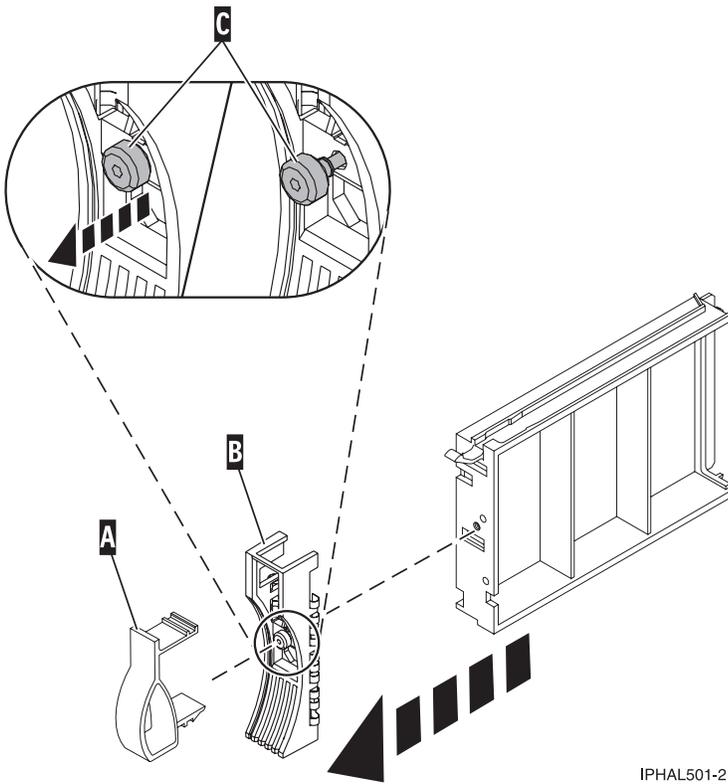
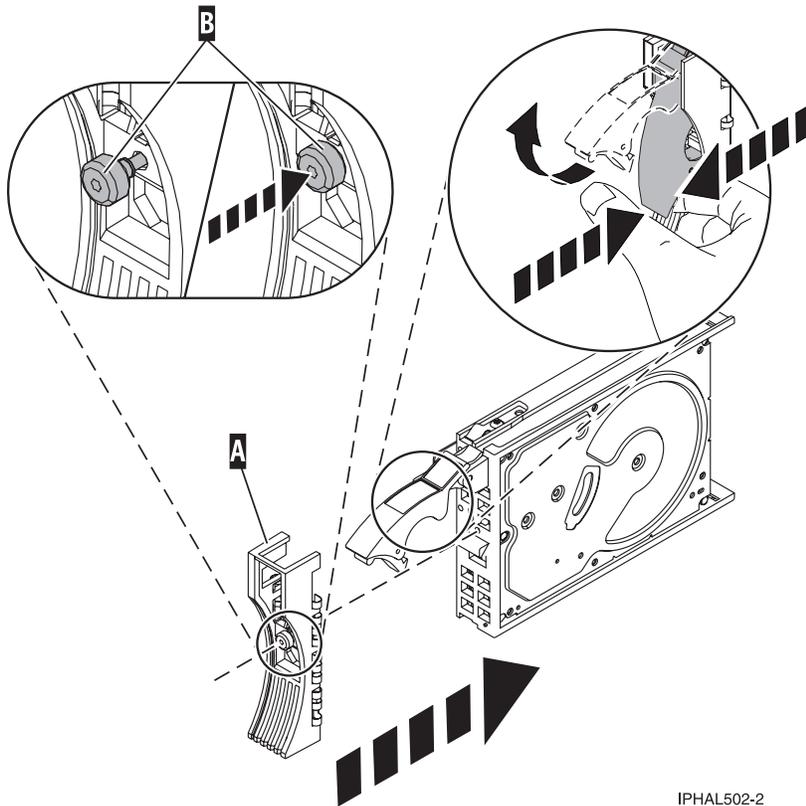


Figure 2. Removing a disk-drive bezel from a disk-drive filler

11. If the slot you want to use contains a disk-drive filler, complete the following step.
Loosen, and then pull out on the thumbscrew (C) to release the bezel (B) from the front edge of the filler.

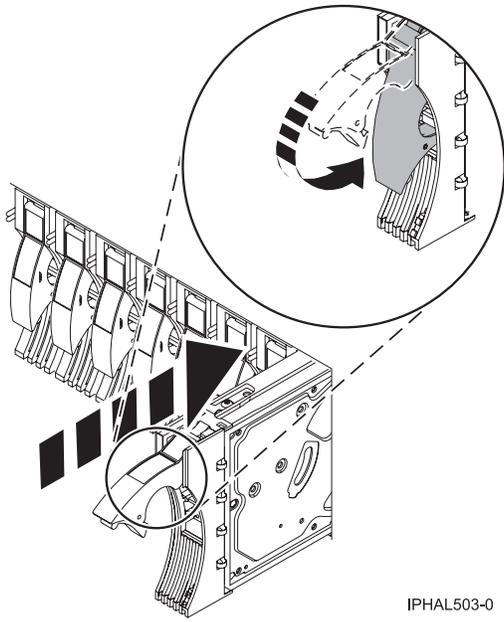
12. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
13. Remove the disk drive from the static-protective package.
14. Unlock the disk drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
15. If the disk drive you are installing does not have a bezel preinstalled, then complete the following step.
Attach the disk-drive bezel **(A)** to the disk drive, as shown in the following figure.



IPHAL502-2

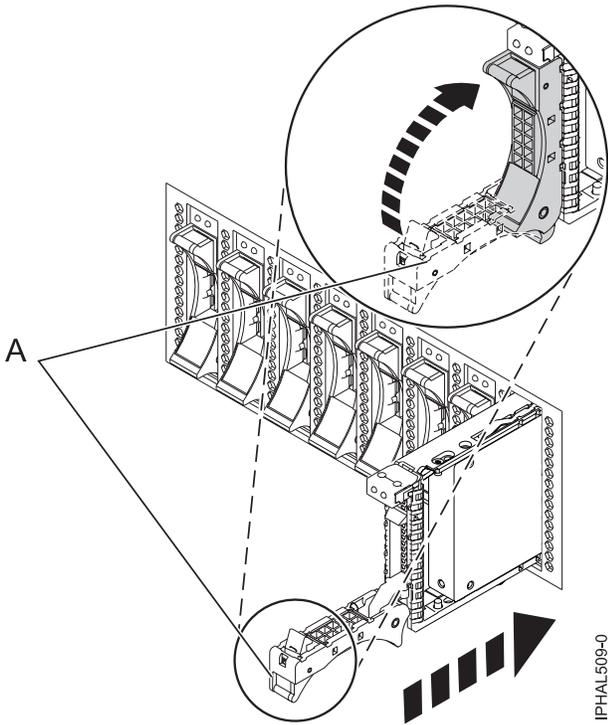
Figure 3. Installing a disk-drive bezel on a disk drive

16. If the disk drive you are installing does not have a bezel preinstalled, then complete the following step.
Press in and then tighten the thumbscrew **(B)** to secure the bezel **(A)** to the disk drive.
17. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
18. Slide the disk drive into the system unit until it stops, as shown in Figure 4 on page 14.
19. Push the disk drive handle in until it locks. The light on the disk drive will turn on.



IPHAL503-0

Figure 4. Installing a disk drive in a model



IPHAL509-0

Figure 5. Installing a small-form factor disk drive

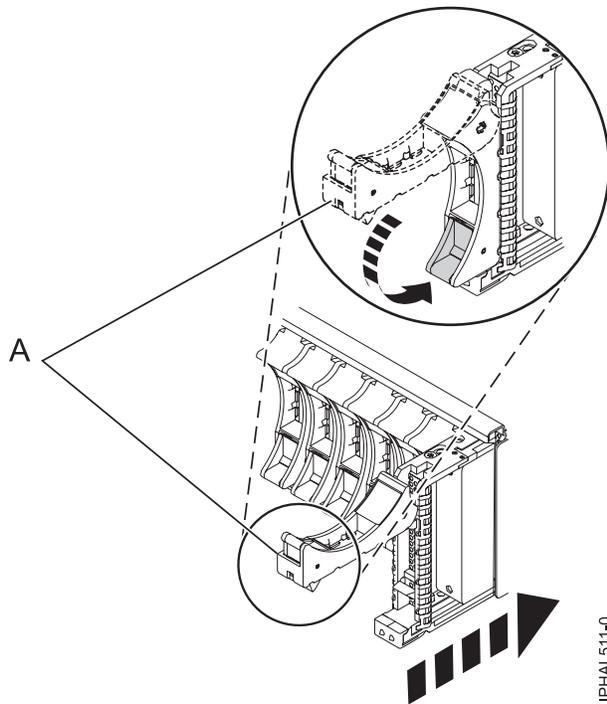


Figure 6. Installing a small-form factor disk drive in the 5803 expansion unit

20. Press Enter.
21. If you are installing more than one disk drive, repeat step 1 on page 11 through step 20 until all disk drives are installed.
22. Cancel to get to the SCSI and SCSI RAID Hot Plug Manager menu.
23. Select **Configure Added/Replaced Devices**.
24. Exit to the command line.

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit, or rack door.
3. Verify the installed part. For instructions, see “Verifying an installed feature or replaced part in an AIX system or logical partition” on page 182.
4. To prepare the newly installed disk drive for use, go to “Preparing a disk drive for use in an AIX system or logical partition” on page 125.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Installing a disk drive or solid-state drive with the Linux system or logical partition powered on

You might need to install a disk drive or solid-state drive in a system or expansion unit while the Linux operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

If you are installing Solid State Drives, review the configuration rules and then return here. For more information, see “Solid-state drives” on page 5.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention: Be sure you read these instructions carefully and understand the complexity of the powered-on procedure before you begin.

If any of the following steps apply to you, go to “Installing a disk drive or solid-state drive with the system or logical partition powered off” on page 48.

- You are installing a disk drive that will be connected with the 6203 or 6204 SCSI adapter.
- You do not feel comfortable using the powered-on procedure.

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. If applicable, remove the system unit door, expansion unit door, or the rack door.
3. If applicable, remove the front cover.
 - If you have a front cover from any other models, remove the front cover.
4. Look at the front of the system or expansion unit and determine the next available disk drive position. For information, see Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.

Note: When you have a system with an expansion unit, fill the slot positions in the system unit first. However, you can choose a different disk drive placement depending on your data protection strategy.

5. Record the position where the new disk drive will be installed. For example, the next available disk drive position might be P3-D4.

Install a SCSI disk drive in a system or expansion unit using Linux kernel 2.4 or Linux kernel 2.6.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Installing a disk drive using Linux kernel 2.4

If you are installing a disk drive in a location that is controlled by Linux kernel 2.4, follow the procedure in this section to perform this task.

Install the disk drive

1. If the slot you want to use contains a disk-drive filler, store the filler for future use, or discard it, then move on to step 7 on page 20.

Note: The disk drive filler is a single piece that does not attach to the new disk drive.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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.
- a. Pull the disk-drive filler from the slot, as shown in Figure 7.

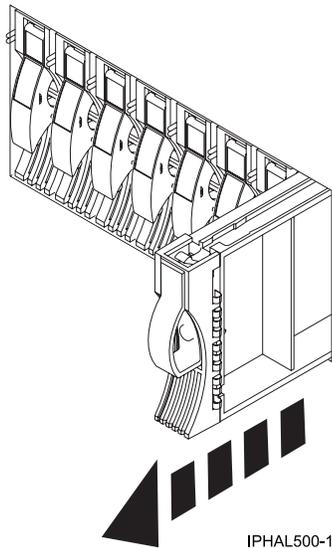
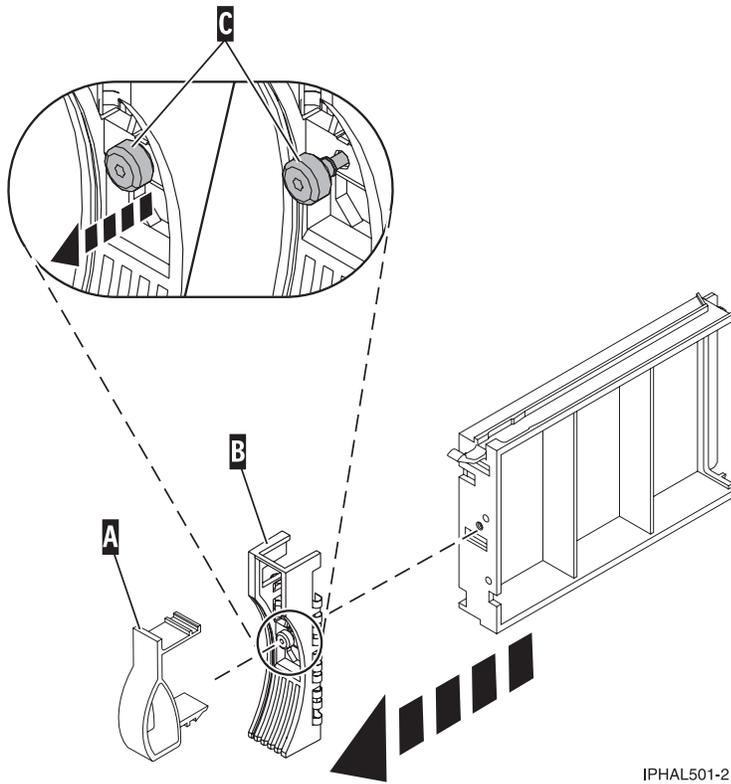


Figure 7. Removing a disk-drive filler from model

- b. Pull off the disk-drive bezel latch (A) from the front of the filler, as shown in the following figure.

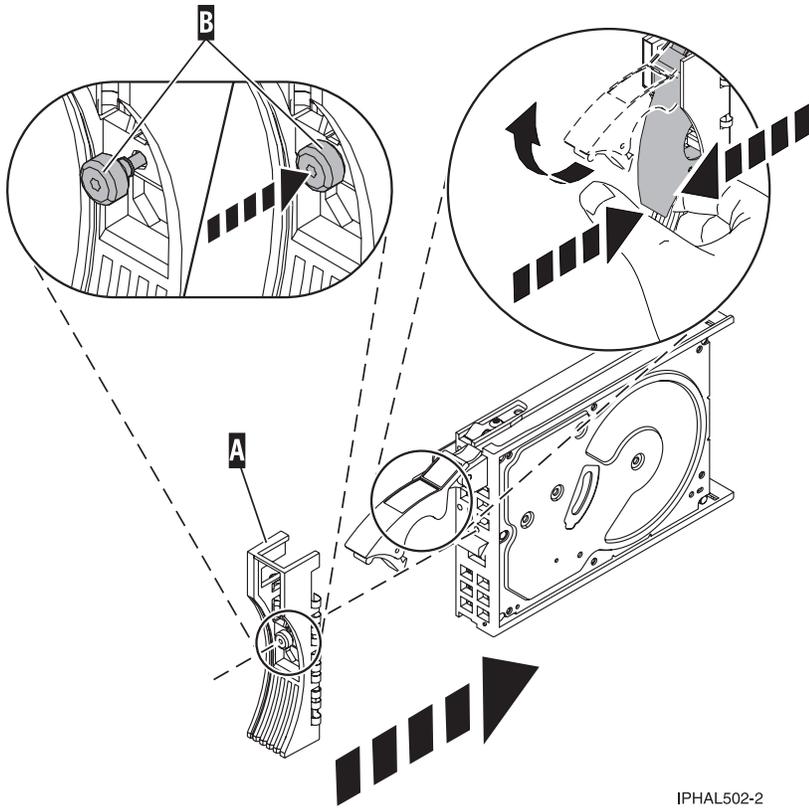


IPHAL501-2

Figure 8. Removing the disk-drive bezel

- c. Loosen, and then pull out on the thumbscrew (C) to release the disk-drive bezel (B) from the front edge of the filler.
2. Find the package that contains the new disk drive.

Attention: Disk drives are fragile. Handle with care.
3. Remove the disk drive from the static-protective package. Record the serial number (use the last 4 digits) of the disk drive.
4. Unlock the disk drive handle by squeezing and pulling it out toward you. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
5. If your disk drive does not have a bezel preinstalled, follow these steps to install the disk-drive bezel on the new disk drive:
 - a. Attach the bezel (A) to the disk drive, as shown in the following figure.



IPHAL502-2

Figure 9. Installing a disk-drive bezel

- b. Press in and then tighten the thumbscrew (**B**) to secure the bezel to the disk drive.
6. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
7. Slide the disk drive into the system.

Slide the disk drive all the way in to the system or expansion unit and then lock it in place by pushing in the disk drive handle, as shown in Figure 10 on page 21.

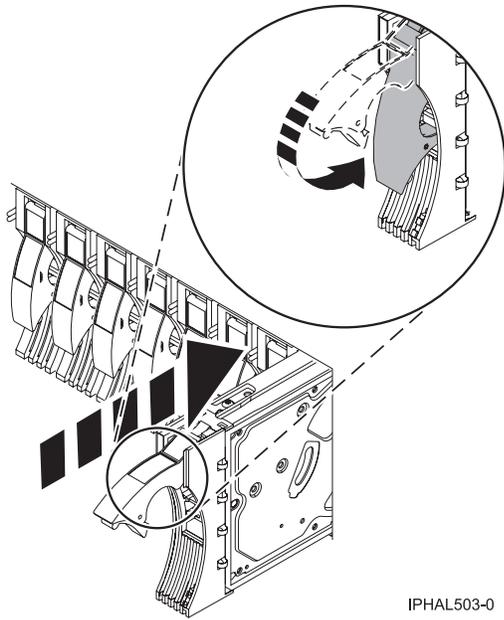


Figure 10. Installing a disk drive in a model

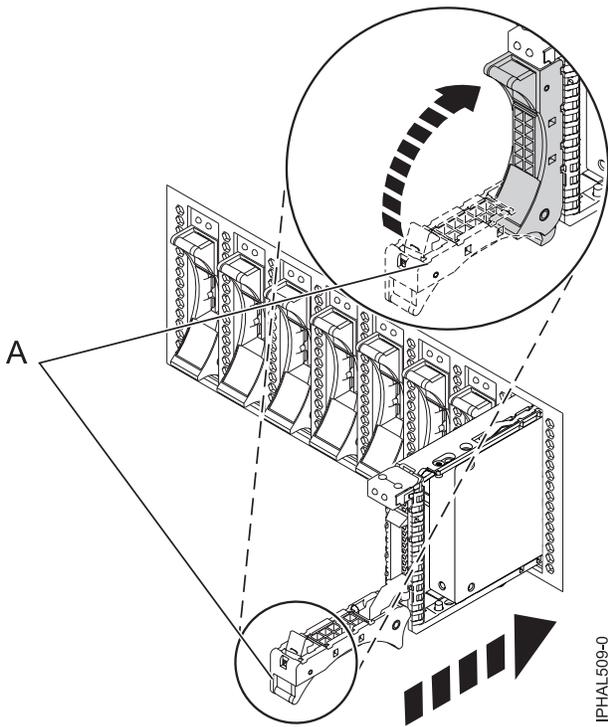


Figure 11. Installing a small-form factor disk drive

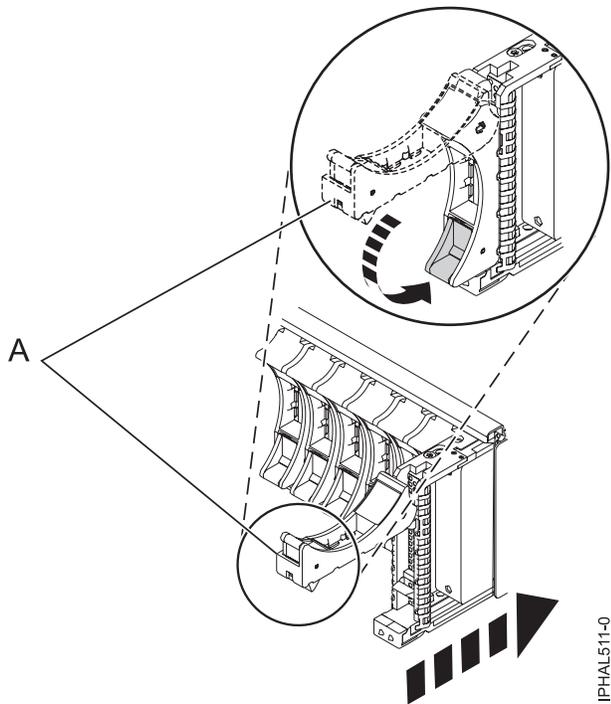


Figure 12. Installing a small-form factor disk drive in the 5803 expansion unit

Note: The concurrent maintenance light stops blinking and remains on when you have installed the disk drive correctly.

To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:

- “Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures” on page 122
 - “Disk drive locations and concurrent maintenance lights for the 5886 disk enclosure” on page 120
 - “Disk drive locations and concurrent maintenance lights for the 5802 expansion unit” on page 124
8. If you are installing more than one disk drive, repeat step 1 on page 17 through step 7 on page 20, until all disk drives are installed.
 9. Log in as root user.
 10. Wait 30 seconds after installing the disk drive, and then type `iprconfig` on the command line of the Linux session. Press Enter. The Work with Disk Units display is shown.
 11. Select **Display disk hardware status** from the Work with Disk Units display. Press Enter. A Display Disk Hardware Status display is shown, similar to the following figure.

```

Display Disk Hardware Status

Serial  Vendor  Product          Resource      Hardware
Number  ID       ID              Model Name       Status
03132041 IBM     2780001         001 /dev/ipr3    Operational
000015A5 IBM     ST373453LC      079          DPY/Active
E3V1WEAB IBM     IC35L036UCDY10-0 070          DPY/Active
E3V0J55B IBM     IC35L036UCDY10-0 079          DPY/Active
E3V1W1UB IBM     IC35L036UCDY10-0 070          DPY/Active
04B81193 IBM     3C98D203        210 /dev/sdi     Operational
000227CE IBM     ST336605LC      020 /dev/sdh     Operational
00000001 IBM     570B001         001 /dev/ipr2    Operational
00006719 IBM     ST336607LC      020 /dev/sdd     Operational
E3V0E77B IBM     IC35L036UCDY10-0 020 /dev/sde     Operational
0007E0C4 IBM     ST373453LC      020 /dev/sdf     Operational
00000001 IBM     5702001         001 /dev/ipr1    Operational
03060038 IBM     5703001         001 /dev/ipr0    Operational
More...

Press Enter to continue.

e=Exit      q=Cancel      r=Refresh  f=PageDn  b=PageUp
d=Display disk unit details  p=Display device parity status

```

Figure 13. Display Disk Hardware Status display

12. Locate the disk drive that you installed. The serial number might be 0.
 - If the disk drive is displayed as a model 50 disk, you are done. If not, follow these steps:
 - a. Find the /dev/sdx name associated with the disk drive that you installed.
 - b. Exit to the command line.
 - c. Type `sg_map` on the command line and press Enter.
 - d. Using the output from running the `sg_map` command, correlate the /dev/sdx device to a /dev/sgx device.
 - e. Type `sg_inq /dev/sgx` on the command line using the /dev/sgx value from the previous step. Press Enter.
 - f. Type `iprconfig` on the command line and press Enter.
 - g. Select **Display disk hardware status** from the Work with Disk Units display. Press Enter.
 - h. The serial number for the newly installed disk drive will be displayed on the Display Hardware Status display.
13. Record the resource name, when you configure the disk drive.

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Configure the newly installed disk drive for your environment. For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Installing the disk drive using Linux kernel 2.6

If you are installing a disk drive in a location that is controlled by Linux kernel 2.6, follow the procedure in this section to perform this task.

Install the disk drive

1. Log in as root user.
2. Type `lsslot` on the command line of the Linux session and press Enter.

A display similar to the following figure, is shown.

```
x0537p1:~ # lsslot
# Slot          Description      Linux Name      Device(s)
U787A.001.DNZ00XV-P1-C1 Logical I/O Slot 0000:00:02.0  ethernet
U787A.001.DNZ00XV-P1-C2 Logical I/O Slot 0000:00:02.2  pci
U787A.001.DNZ00XV-P1-C3 Logical I/O Slot 0001:00:02.2  pci1069,b166
U787A.001.DNZ00XV-P1-C4 Logical I/O Slot 0000:00:02.6  pci1069,b166
U787A.001.DNZ00XV-P1-C5 Logical I/O Slot 0001:00:02.6  pci1014,0180
U787A.001.DNZ00XV-P1-T5 Logical I/O Slot 0000:00:02.4  ethernet
U787A.001.DNZ00XV-P1-T7 Logical I/O Slot 0000:00:02.3  usb
U787A.001.DNZ00XV-P1-T10 Logical I/O Slot 0001:00:02.4  scsi
U787A.001.DNZ00XV-P1-T12 Logical I/O Slot 0001:00:02.3  ide
U9111.520.10D3C6C-V1-C0 Virtual I/O Slot 30000000      vty
```

Figure 14. Find the Linux Name for the location for which you want to install the disk drive.

3. Note the Linux Name for the slot that contains the adapter under which you want to install the disk drive.
4. Type `iprconfig` on the command line of the Linux session and press Enter. The IBM Power RAID Configuration Utility display is shown.
5. Select **Work with disk unit recovery** from the IBM Power RAID Configuration Utility display. Press Enter.
6. Select **Concurrent add device** from the Work with Disk Unit Recovery display. Press Enter.
A Concurrent Device Add display, similar to the following figure, is shown.

```
Concurrent Device Add
Choose a single location for add operations
1=Select

OPT Name  PCI/SCSI Location      Description      Status
-----
          0000:41:01.0.1/0:5:      Empty
          0000:41:01.0.1/1:8:      Empty
          0001:61:01.0.2/0:8:      Empty
```

Figure 15. Example Concurrent Device Remove display

7. Type option 1 next to the location into which you want to install the disk drive and press Enter.
The Verify Device Concurrent Add display is shown.
A concurrent maintenance light indicates the slot where the disk drive can be installed.

8. Press Enter on the Verify Device Concurrent Add display to verify the location.
9. If the slot you want to use contains a disk-drive filler, store the filler for future use, or discard it, then move on to step 16 on page 27.

Note: The disk drive filler is a single piece that does not attach to the new disk drive.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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.
- a. Pull the disk-drive filler from the slot as shown in Figure 16.

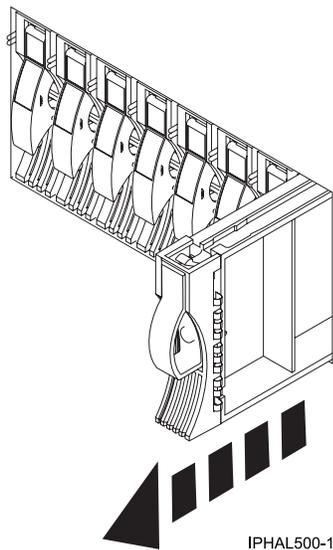
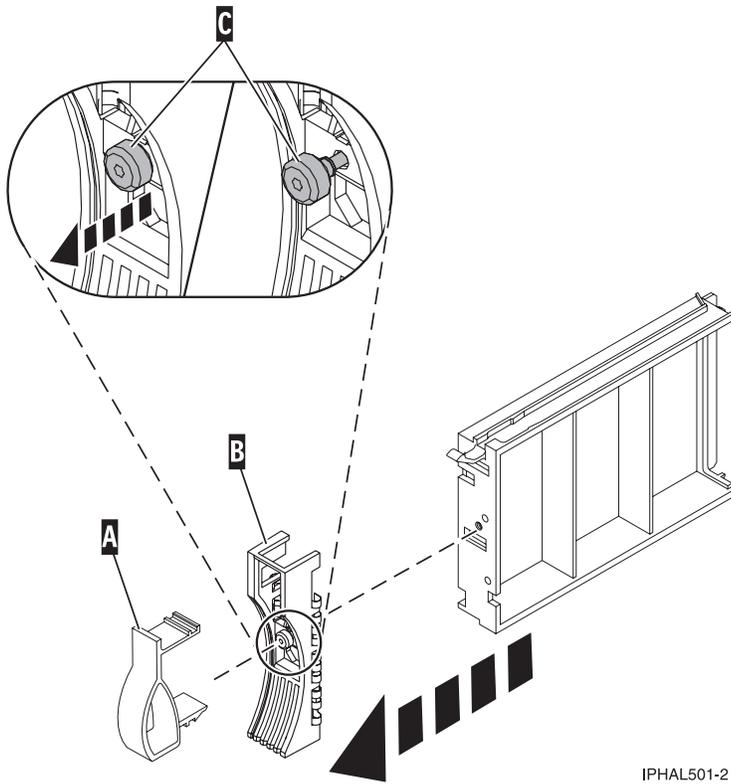


Figure 16. Removing a disk-drive filler from model

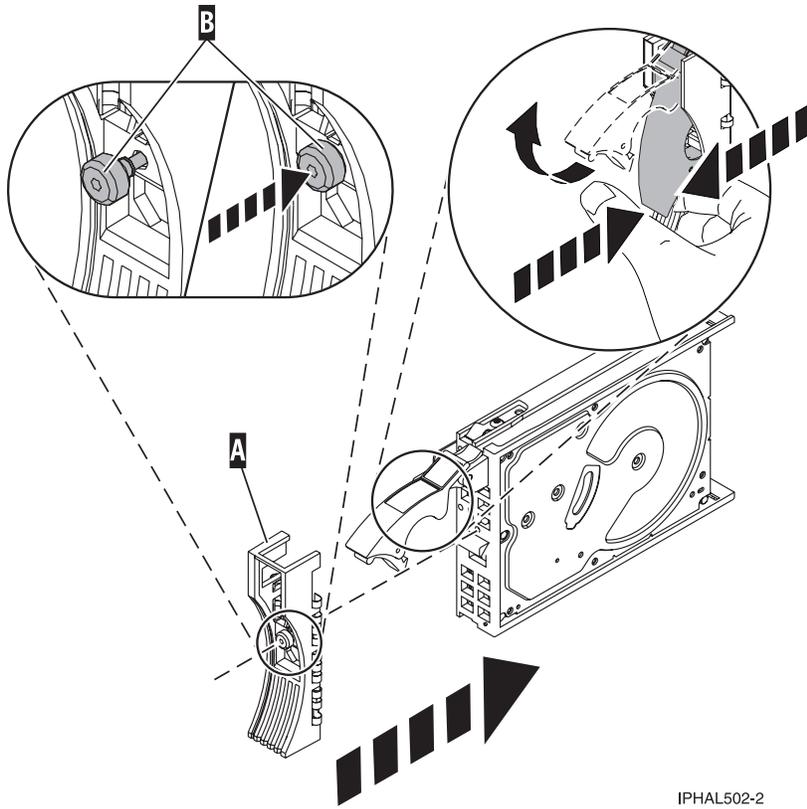
- b. Pull off the disk-drive bezel latch (A) from the front of the filler, as shown in the following figure.



IPHAL501-2

Figure 17. Removing a disk-drive bezel from the disk drive.

- c. Loosen, and then pull out on the thumbscrew (C) to release the disk-drive bezel (B) from the front edge of the filler.
10. Find the package that contains the new disk drive.
- Attention:** Disk drives are fragile. Handle with care.
11. Remove the disk drive from the static-protective package. Record the serial number (use the last 4 digits) of the disk drive.
12. Unlock the disk drive handle by squeezing and pulling it out toward you. If the handle is not all the way out, the disk drive cannot slide into the system or expansion unit.
13. If your disk drive does not have a bezel preinstalled, follow these steps to install the disk-drive bezel on the new disk drive:
 - a. Attach the bezel (A) to the disk drive, as shown in the following figure.



IPHAL502-2

Figure 18. Attaching the disk-drive bezel to the disk drive.

- b. Press in and then tighten the thumbscrew (**B**) to secure the bezel to the disk drive.
14. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
15. The Complete Device Concurrent Add display is shown.
16. Slide the disk drive into the system.

Slide the disk drive all the way in into the system or expansion unit and then lock it in place by pushing in the disk drive handle, as shown in Figure 19 on page 28.

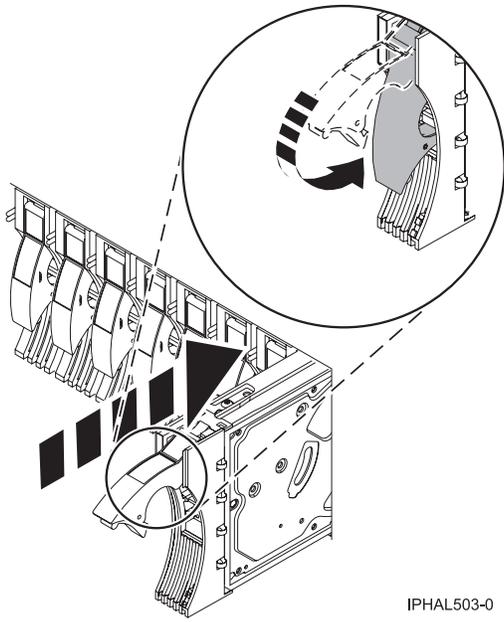


Figure 19. Installing a disk drive in a model

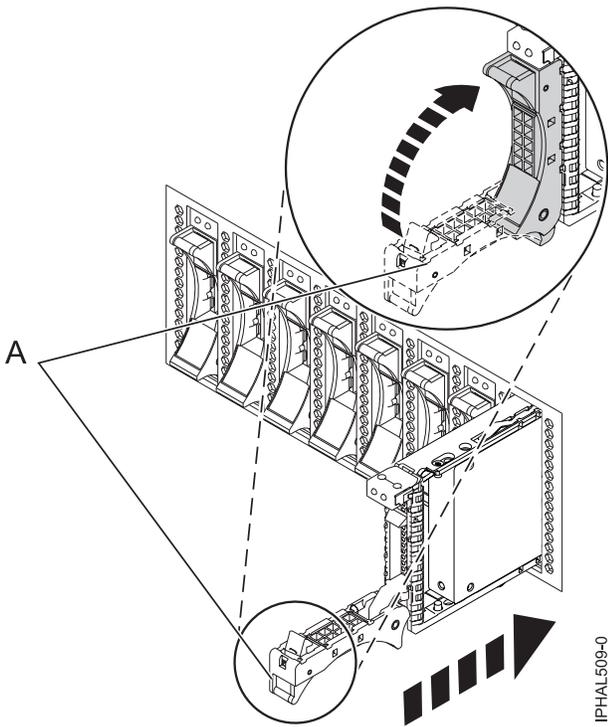


Figure 20. Installing a small-form factor disk drive

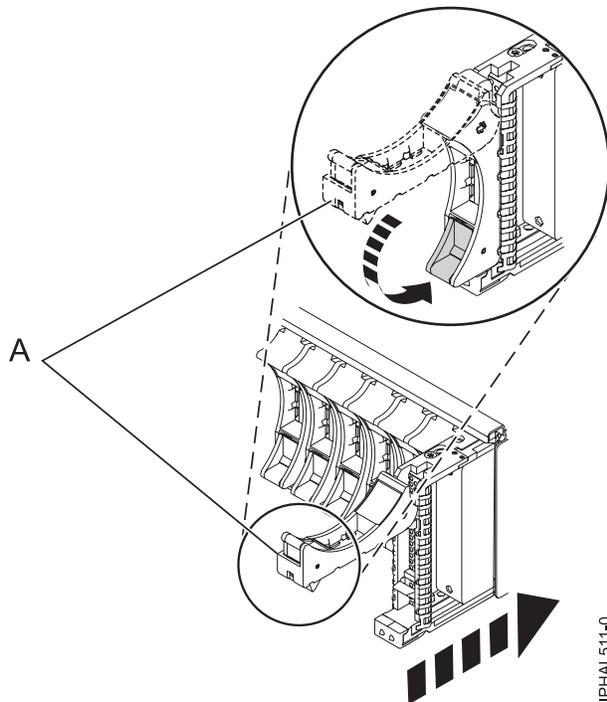


Figure 21. Installing a small-form factor disk drive in the 5803 expansion unit

17. Press Enter. The concurrent maintenance light stops blinking and remains on when you have installed the disk drive properly.

To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:

- “Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures” on page 122
- “Disk drive locations and concurrent maintenance lights for the 5886 disk enclosure” on page 120
- “Disk drive locations and concurrent maintenance lights for the 5802 expansion unit” on page 124

18. If you are installing more than one disk drive, repeat step 2 on page 24 through step 17 until all disk drives are installed.

Verify that the new disk drive is operational

To verify that the new disk drive is operational, follow these steps:

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter. The IBM Power RAID Configuration Utility display is shown.
3. Select **Display hardware status**.

The Display Hardware Status display is shown, similar to the following figure.

```

Display Hardware Status

Type option, press Enter.
l=Display hardware resource information details

OPT Name  PCI/SCSI Location      Description      Status
-----
          0000:01:01.0.0/    PCI-X SCSI Adapter  Operational
          0000:41:01.0.1/    PCI-X SCSI Adapter  Operational
sda       0000:41:01.0.1/0:3:0    Physical Disk       Active
sdb       0000:41:01.0.1/0:4:0    Physical Disk       Active
sdc       0000:41:01.0.1/0:8:0    Physical Disk       Active
sdd       0000:41:01.0.1/1:3:0    Physical Disk       Active
sde       0000:41:01.0.1/1:4:0    Physical Disk       Active
sdf       0000:41:01.0.1/1:5:0    Physical Disk       Active
sdg       0001:61:01.0.2/        PCI-X SCSI RAID Adapter  Operational
          0001:61:01.0.2/0:3:0    Physical Disk       Active
          0001:61:01.0.2/0:6:0    Advanced Function Disk  Active
sdi       0001:61:01.0.2/0:9:0    Physical Disk       Active
sdh       0001:61:01.0.2/255:0:0    RAID 10 Disk Array    Failed
          0001:61:01.0.2/0:4:0    RAID 10 Array Member  Failed
          0001:61:01.0.2/0:5:0    RAID 10 Array Member  Failed

e=Exit  q=Cancel  r=Refresh  t=Toggle

```

Figure 22. Example Display Hardware Status

4. Verify that the disk drive that you installed is shown on this display.

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Configure the newly installed disk drive for your environment. For information, go to the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Installing a disk drive or solid-state drive with the Virtual I/O Server system or logical partition powered on

You can install a disk drive or solid-state drive in a system or expansion unit while the Virtual I/O Server operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention: The powered-on procedure is a complex set of steps that must be performed precisely as instructed to avoid potential data loss or system damage. You might also consider the powered-off procedure, which is a simpler task that involves less risk of data loss or system damage. For instructions, see “Installing a disk drive or solid-state drive with the system or logical partition powered off” on page 48.

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. Remove the front covers. For instructions, see “Removing and replacing covers and doors” on page 177
3. Determine the next available disk drive position in your system or expansion unit. For information, see Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.

Note: When you have a system with an expansion unit, fill the slot positions in the system unit first. However, you can choose a different disk drive placement depending on your data protection strategy.

4. Record the position where the new disk drive will be installed. For example, the next available disk drive slot might be P3-D4.
5. Perform the following steps to install a disk drive.

Install the disk drive

1. Log in as root user.
2. At the command line, type `diagmenu` and press Enter.
3. Press Enter to continue.
4. On the Function Selection display, select **Task Selection**.
5. On the Tasks Selection display, select **Hot Plug Task**.
6. Select **SCSI and SCSI RAID Hot Plug Manager**.
7. Select **Attach a Device to a SCSI Hot Swap Enclosure Device**. A list of empty slots in the SCSI hot swap enclosure device is shown.
8. Select the slot where you want to install the disk drive and press Enter.
The disk drive slot enters the Identify state. The concurrent maintenance light for the slot begins flashing. To view the locations of the concurrent maintenance lights, select the model you are installing a disk drive in to. For a list of models see, Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.
9. If the slot you want to use contains a disk-drive filler, store the filler for future use, or discard it, then move on to step Insert the disk drive.

Note: The disk drive filler is a single piece that does not attach to the new disk drive.

Important: .

Pull the disk-drive filler from the slot that you want to use, as shown in Figure 23 on page 33

Attention:

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

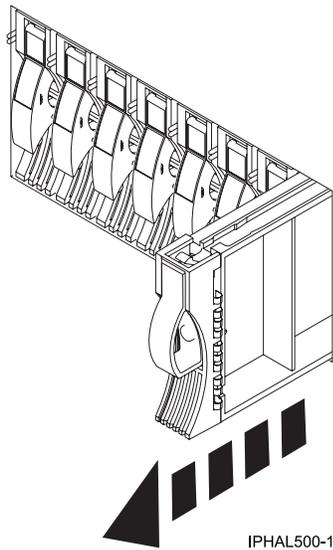
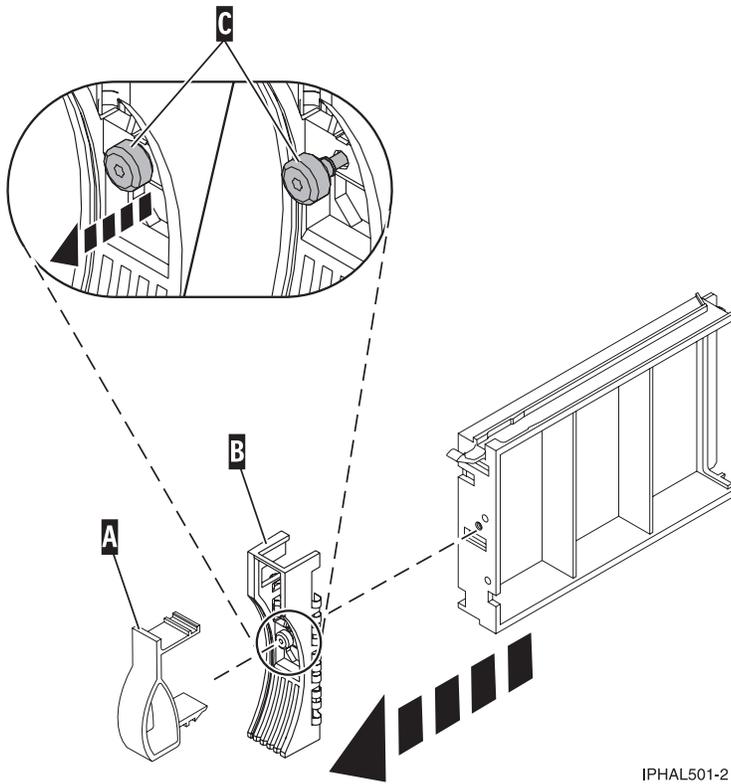


Figure 23. Removing a disk-drive filler from a model .

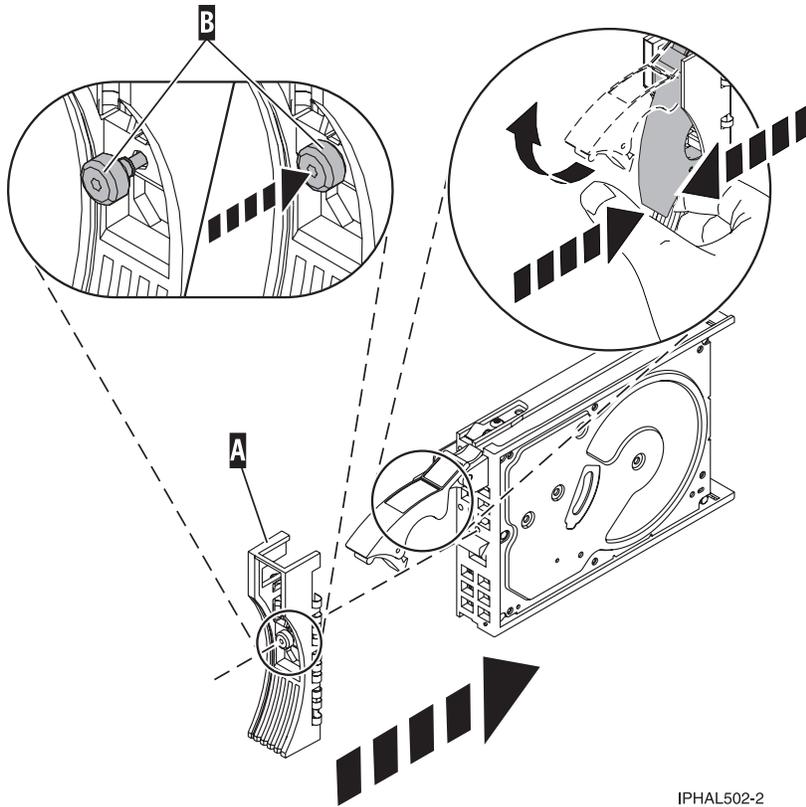
10. If the slot you want to use contains a disk-drive filler, complete the following step.
Remove the disk-drive bezel latch (**A**) from the front of the filler, as shown in the following figure.



IPHAL501-2

Figure 24. Removing a disk-drive bezel from a disk-drive filler

11. If the slot you want to use contains a disk-drive filler, complete the following step.
Loosen, and then pull out on the thumbscrew (C) to release the bezel (B) from the front edge of the filler.
12. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
13. Remove the disk drive from the static-protective package.
14. Unlock the disk drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
15. If the disk drive you are installing does not have a bezel preinstalled, then complete the following step.
Attach the disk-drive bezel (A) to the disk drive, as shown in the following figure.



IPHAL502-2

Figure 25. Installing a disk-drive bezel on a disk drive

16. If the disk drive you are installing does not have a bezel preinstalled, then complete the following step.
Press in and then tighten the thumbscrew **(B)** to secure the bezel **(A)** to the disk drive.
17. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
18. Slide the disk drive into the system unit until it stops, as shown in Figure 26 on page 36.
19. Push the disk drive handle in until it locks. The light on the disk drive will turn on.

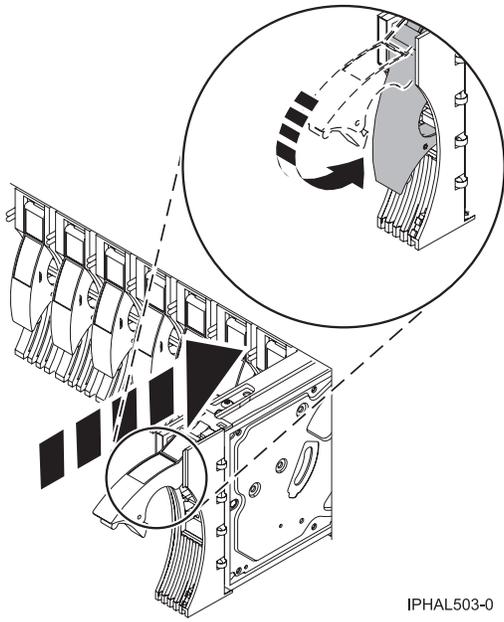


Figure 26. Installing a disk drive in a model

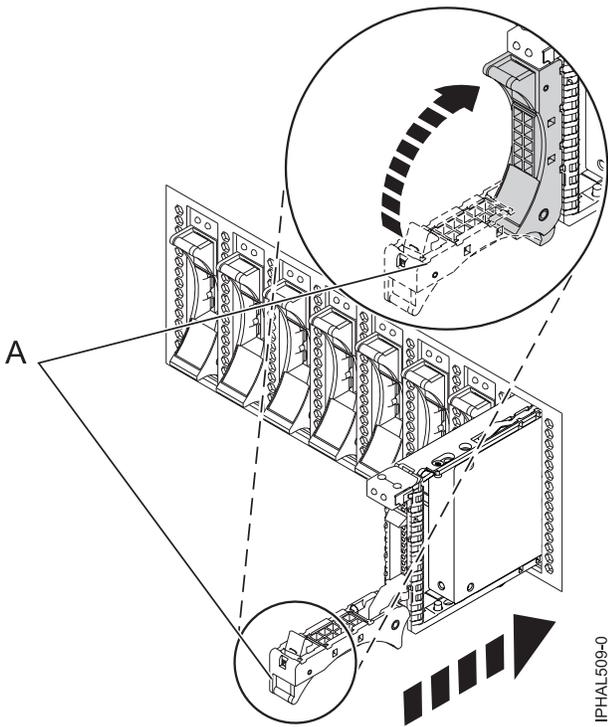


Figure 27. Installing a small-form factor disk drive

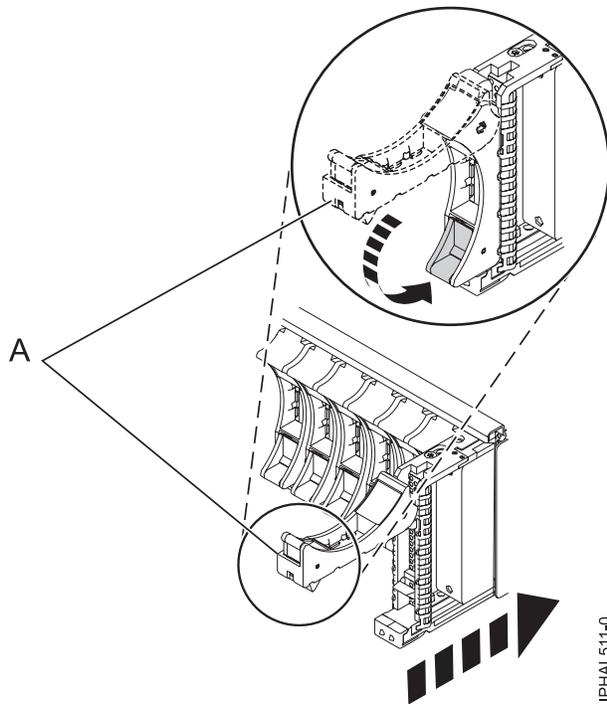


Figure 28. Installing a small-form factor disk drive in the 5803 expansion unit

20. Press Enter.
21. If you are installing more than one disk drive, repeat step 1 on page 32 through step 20 until all disk drives are installed.
22. Cancel to get to the SCSI and SCSI RAID Hot Plug Manager menu.
23. Select **Configure Added/Replaced Devices**.
24. Exit to the command line.

Complete the procedure

1. Replace the front cover. For instructions on replacing the cover, see “Removing and replacing covers and doors” on page 177.
2. Verify the installed part. For instructions, see “Verifying the installed part” on page 182.

Installing a disk drive or solid-state drive with the IBM i system or logical partition powered on

You might need to install a disk drive or solid-state drive in a system or expansion unit while the IBM i operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

If you are installing Solid State Drives, review the configuration rules and then return here. For more information, see “Solid-state drives” on page 5.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention: The powered-on procedure is a complex set of steps that must be performed exactly to avoid potential data loss or system damage. You might also consider the powered-off procedure, which is a simpler task that involves less risk of data loss or system damage. For instructions, see “Installing a disk drive or solid-state drive with the system or logical partition powered off” on page 48.

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. Determine the next available disk drive position for your system or expansion unit. For information, see Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.
3. Record the position where the new disk drive will be installed. For example, the next available disk drive slot might be P3-D4.

4. If your system is managed by a Hardware Management Console (HMC), use the HMC to complete the steps for installing the disk drive. For instructions, see “Installing a feature by using the Hardware Management Console” on page 181. If you do not have an HMC, do the following steps to install a disk drive.

Prepare to install the disk drive

1. Record the physical location where the new disk drive will be installed.

The physical location has the following form: U787A.001.AAAXXXX-P3-D4 where P3-D4 is the position of the disk drive in the system unit or expansion unit. Find the U787A.001.AAAXXXX location information from the control panel display on the system unit or expansion unit.

If you cannot find the location information from the control panel, find the feature code (FC) and sequence number (SN or SEQ) on the label that appears on the front of the system unit or expansion unit, as shown in the following figure.



Figure 29. Example of a system or expansion unit label

In this example, U787A.001.AAAXXXX-P3-D4, U787A.001 comes from the feature code (FC) on the label, AAAXXXX comes from the last seven digits of the sequence number (SN or SEQ) on the label, and P3-D4 is the slot where you are installing the disk drive as shown in Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.

In the example, U5074.001.AAAXXXX-DB3-D32, you would install a disk drive in the expansion unit with type 5074, model 001, sequence number AAAXXXX, and disk drive position DB3-D32.

2. Sign on to service level authority.
3. Type `strsst` on the command line of the IBM i session and press Enter.
4. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Remember: The service tools password is case sensitive.

5. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
6. Select **Hardware service manager** from the Start a Service Tool display. Press Enter.
7. If the slot you want to use contains a disk-drive filler, store the filler for future use, or discard it, then move on to step “Install the disk drive” on page 41.

Note: The disk drive filler is a single piece that does not attach to the new disk drive.

Attention:

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

- a. Pull the disk-drive filler from the slot, as shown in the following figure.

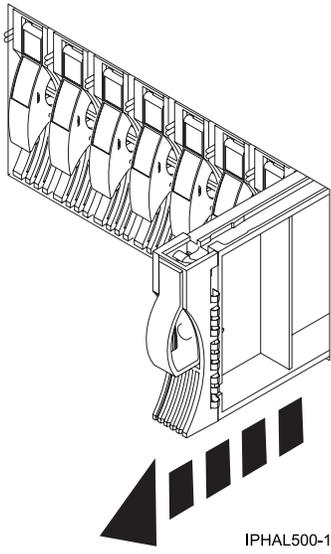


Figure 30. Removing a disk-drive filler

b. Pull off the disk drive bezel latch (A) from the front of the filler, as shown in the following figure.

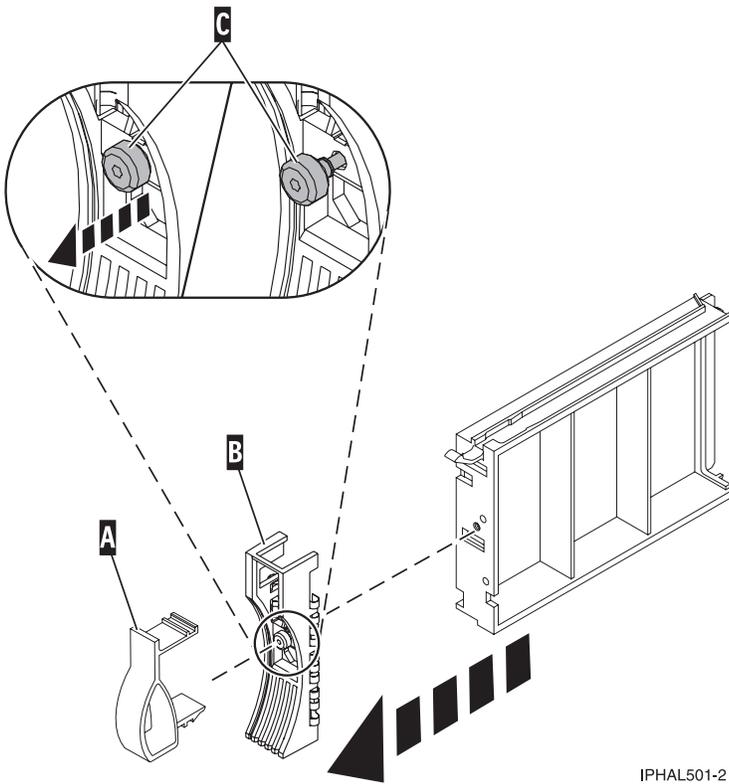
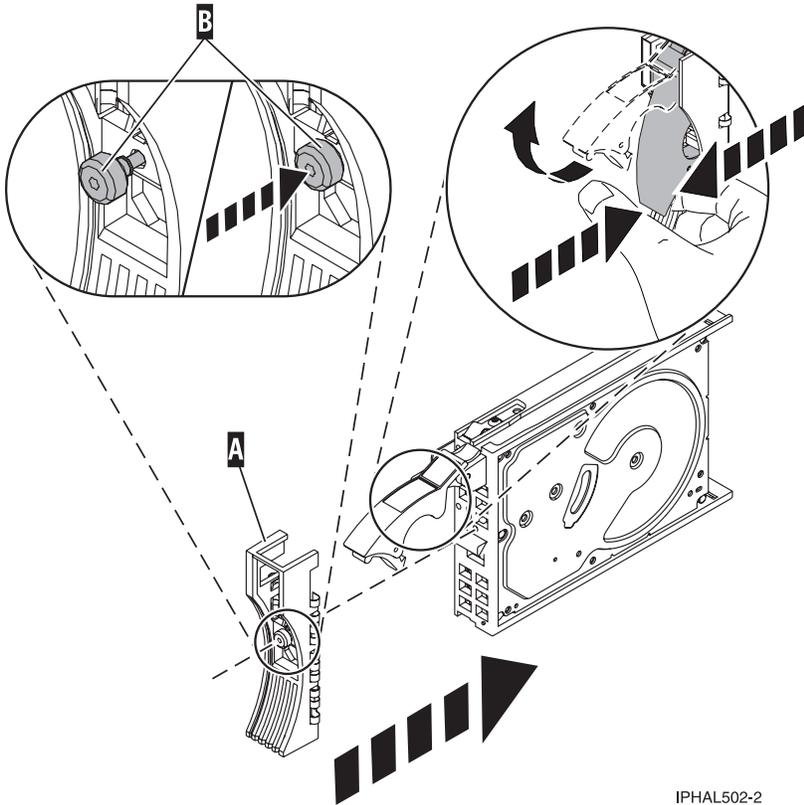


Figure 31. Removing a disk-drive bezel

c. Loosen, and then pull out the thumbscrew (C) to release the disk-drive bezel (B) from the front edge of the filler.

Install the disk drive

1. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
2. Remove the disk drive from the protective package. Record the serial number (use the last 4 digits) of the disk drive.
3. Unlock the disk drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
4. Follow these steps to install the disk-drive bezel on the new disk drive:
 - a. Attach the bezel (A) to the disk drive, as shown in the following figure.



IPHAL502-2

Figure 32. Installing a disk-drive bezel on a disk drive

- b. Press in and then tighten the thumbscrew (B) to secure the bezel to the disk drive.
5. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
 6. Slide the disk drive halfway into the system or expansion unit.
 7. Select **Device Concurrent Maintenance** from the Hardware Service Manager display. Press Enter. The Device Concurrent Maintenance is displayed, as shown in the following figure.

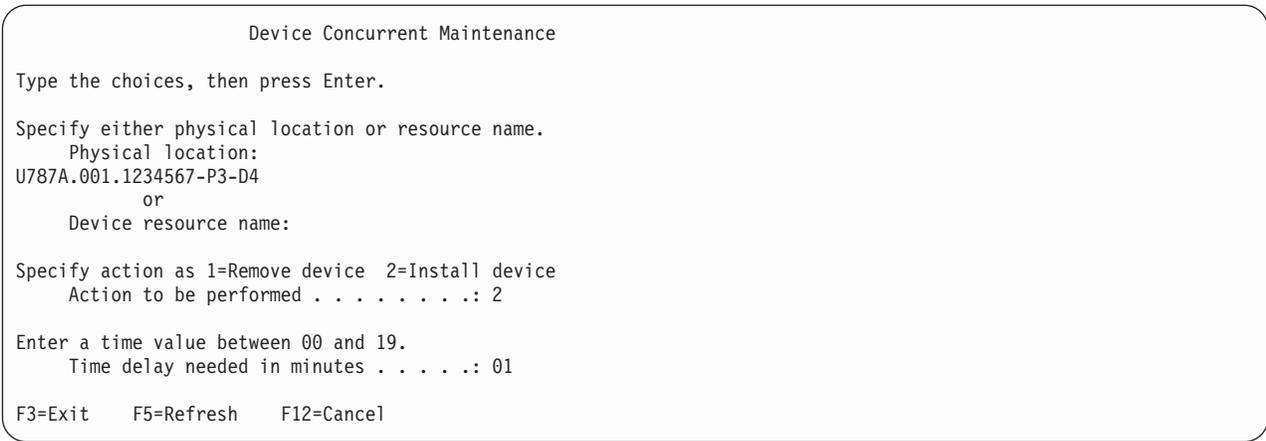


Figure 33. Example Device Concurrent Maintenance display

8. In the **Specify either physical location or resource name** field, type the physical location that you had previously recorded in this procedure, as shown in Figure 33.
9. Select option 2 (Install device) for the Action to be performed.
10. Set the time delay for one minute - 01.

Important: Do not press Enter at this time.

11. Locate the concurrent maintenance light that corresponds to the position of the disk drive that you are installing. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
 - “Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures” on page 122
 - “Disk drive locations and concurrent maintenance lights for the 5886 disk enclosure” on page 120
 - “Disk drive locations and concurrent maintenance lights for the 5802 expansion unit” on page 124
12. Press Enter on the console.

Important: When you press Enter, after a one minute delay, the light comes on and begins to blink rapidly. You then have nine seconds to slide the disk drive all the way in and then lock it in place by pushing in the disk drive handle.

13. When the concurrent maintenance light starts blinking, slide the disk drive all the way in and lock it in place by closing the latch, as shown in the following figure.

Note: The light stops blinking and remains on when you have installed the disk drive properly.

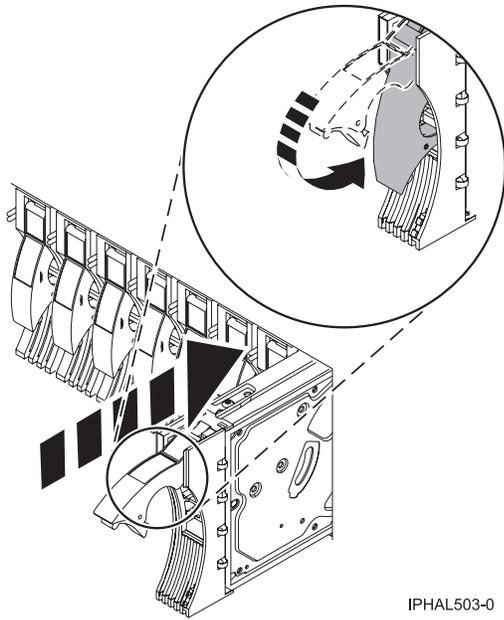


Figure 34. Sliding the disk drive in to the system unit

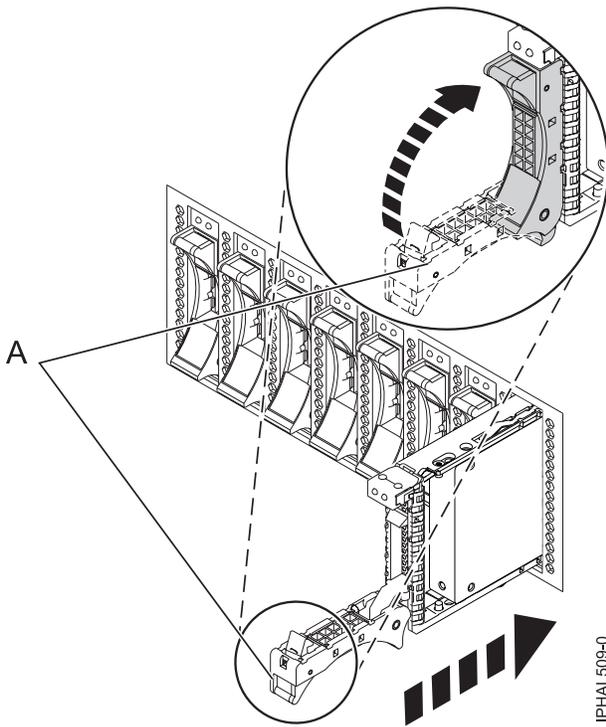


Figure 35. Installing the small-form factor disk drive into the system

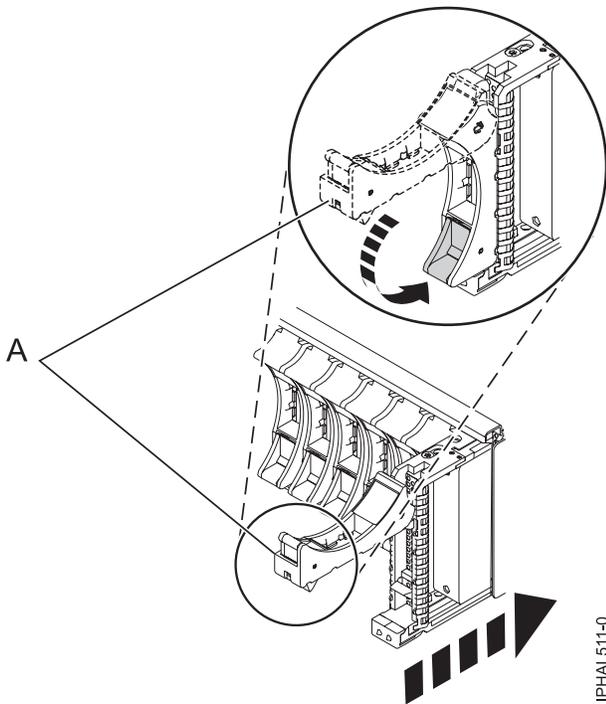


Figure 36. Installing a small-form factor disk drive in the 5803 expansion unit

14. If you are installing more than one disk drive, perform step 1 on page 39 through 13 on page 42 until all disk drives are installed.

Complete the procedure

1. Return to the console and wait until the Concurrent Maintenance Results display is shown. Press Enter.
2. When the Hardware Service Manager display is shown, press F12 twice and then press Enter.
3. To complete this procedure, go to “Configuring a disk drive in an system or logical partition.”

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Configuring a disk drive in an system or logical partition

To configure a newly installed disk drive into an existing device parity set, follow these steps:

If you want to start a new device parity set or change the protection on your disks, see Manage device parity protection or Start device parity protection in the Disk Management section of the IBM i

Information Center Web site at <http://www.ibm.com/systems/i/infocenter> .

1. If necessary, start System Service Tools (SST) by typing `strsst` on the command line of the IBM i session and pressing Enter.
2. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Restriction: The service tools password is case sensitive.

3. Select **Work with Disk Units** on the System Service Tools display. Press Enter.
4. Select **Display disk configuration** on the Work with Disk Units display. Press Enter.
5. Select **Display non-configured units** on the Display disk configuration display. Press Enter.
6. The disk drive that you installed is listed. The serial number should match the serial number you recorded (the last 4 digits).

Note: The new disk drive might take up to five minutes to appear in the list. If the disk drive is not listed, ensure that the disk drive was properly installed.

7. Press F12 twice.
8. Select **Work with disk configuration** on the Work with Disk Units display. Press Enter.
9. Are you adding a disk drive to an existing device parity set?
 - **Yes:** Continue with the next step.
 - **No:** Go to step 23 for mirroring or no protection, go to 1 on page 46 for hot spare.

Tip: Select **No** for mirroring, hot spare or no protection.

10. Select **Work with device parity protection** on the Work with Disk Configuration display. Press Enter.
11. Select **Include unit in device parity protection** on the Work with Device Parity Protection display. Press Enter.
12. Did the Include Device Parity Protection Failed display appear?
 - **Yes:** Continue with the next step.
 - **No:** Go to step 15.
13. The following conditions must be met before you can start device parity protection.
 - If there are enough disk drives available to create a new parity set, the drives are eligible for *Start Device Parity Protection* operation and not for the *Include Device Parity Protection* operation.
 - All disk drives in a parity set must be the same capacity with a minimum number of three or four disk drives and maximum of 10 or 18 disk drives in the resulting parity set, depending on the disk drive type.
 - Not all disk drives attached to an advanced function input output processor have reported to the system. Retry the operation.
 - The type or model of the disk drives cannot be used for the requested operation.When these conditions are met, press F12 to return to the Work with Disk Configuration display.
14. Select **Include unit in device parity protection** on the Work with disk configuration display. Press Enter.
15. On the Include Disk Units in Device Parity Protection display, select the disk drives to be included in Device Parity Protection. Type a **1** in the Option column. Press Enter.
16. Press Enter to confirm your choice. The configuration starts and might take 30 to 60 minutes to complete.
17. When the device parity protection is complete, the message “Selected drives have been included successfully” is shown on the Work with device parity protection display. Press F12.
18. Select **Display disk configuration** on the Work with disk configuration display. Press Enter.
19. Select **Display disk configuration status** on the Display disk configuration display.
20. If you have more than one ASP, determine the auxiliary storage pool (ASP) to which you want to add the disk drive.
21. Press F12 twice to get to the Work with Disk Units display.
22. Select **Work with disk configuration** on the Work with Disk Units display. Press Enter.
23. Select the option to add units to ASPs and balance data on the Work with disk configuration display. Press Enter.

24. Specify the number of the ASP to which you want to add the disk drive. The system ASP is **ASP 1**. Press Enter.

Notes:

- a. If ASP is mirror protected, disk drives must be added in pairs of the same size.
- b. When one or more pairs of disk drives are added to a mirrored ASP, they automatically become mirror protected.
- c. To start mirrored protection on an ASP, refer to **Recovering your system** in the IBM i Information Center.

To access the IBM i Information Center Web site, go to <http://www.ibm.com/systems/i/infocenter> and select from the following options:

- If you select V6R1, expand **IBM i 6.1 Information Center > Systems management > Backup and recovery > Recovering your system**
- If you select V5R4, expand **i5/OS Information Center > Systems management > Backup and recovery > Backing up and recovering your system > Recovering your system**

25. The Confirm Add Units display is shown showing the configuration your system will have when the add operation completes.

Note: If you have selected the wrong ASP, press F12 to change your options. Press the Enter key to continue. The add process will take several minutes to complete.

26. When the message Selected units have been added successfully is shown, press F3 three times and press Enter to return to the Main Menu display.
27. If you have a printer, print the configuration list. A service provider might refer to the configuration list in the future.
 - a. You need to sign on **with at least service level authority**
 - b. Type `strsst` on the Main Menu command line. Press Enter.
 - c. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Remember: The service tools password is case sensitive.

- d. Select **Start a service tool** on the System Service Tools (SST) display. Press Enter.
 - e. Select **Hardware service manager** on the Start a Service Tool display. Press Enter.
 - f. Press F6 (print the configuration) from the Hardware Service Manager display.
 - g. To return to the Main Menu display, press F3 (Exit) twice and then press Enter.
 - h. Place the configuration list where you can refer to it in the future.
28. If you are a service provider performing this task, return to the procedure that sent you here.
 1. Select **Work with hot spare protection** from the **Work with disk configuration** menu.
 2. Select **Start device parity protection - RAID 5 with hot spare** or **Start device parity protection - RAID 6 with hot spare** depending on the level of parity protection that is desired.
 3. Return to the procedure that sent you here.

Rebuilding data on a replacement disk drive using IBM i

Learn how to rebuild data on replacement disk.

To rebuild data on the replacement disk drive, complete the following steps:

1. If necessary, start System Service Tools (SST) by typing `strsst` on the command line of the IBM i session and pressing Enter.
2. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Note: The service tools password is case sensitive.

3. Select **Work with disk units** from the Start System Service Tools (SST) display. Press Enter.
4. Select **Work with disk unit recovery** from the Work with Disk Units display. Press Enter.
5. If you determined that the disk drive you replaced had **device parity protection (RAID)**, follow these steps to restore device parity protection (RAID) on the disk drive:
 - a. Select **Rebuild disk unit data** on the Work with Disk unit recovery display. Press Enter.
 - b. Select **1** to rebuild the disk drive displayed (the disk drive displayed is the disk drive that you **removed**) on the Rebuild Disk Unit Data display. Press Enter.
 - c. Press Enter on the Confirm Rebuild Disk Unit Data display. The rebuild process might take several minutes to complete.
 - d. Press F5 to refresh the display until the **Percent complete** shows 5%.
 - e. When the display shows at least 5% complete, you can either continue to monitor this display to completion, or press F3 (Exit) to return to the Work with disk units display.
 - f. Press F3 (Exit) to return to the System service tools display.
 - g. Press F3 (Exit) to return to the Exit SST display and press Enter.
 - h. Return to the procedure that sent you here.
6. If the disk drive that you replaced had **mirrored protection**, follow these steps:
 - a. Select **Replace configured unit** on the Work with Disk unit recovery display. Press Enter.
 - b. Select the configured disk drive that you are exchanging (suspended drive) on the Select Configured Unit to Replace display. Press Enter.
 - c. Select the disk drive that you just installed on the Select Replacement Unit display. This drive has a non-configured status.

Note: In some cases, it might take several minutes for a new disk drive to display. Repeat these steps until the new drive is shown.
Press Enter.

- d. Press Enter on the Confirm Replace of Configured Unit display to confirm your choice for replacement.

The replacement process might take several minutes to complete. When the process is complete, the Work with Disk unit recovery display is shown.

- e. Press F3 (Exit) to return to the Work with disk units display.
- f. Select **Display disk configuration** on the Work with disk units display.
- g. Select **Display disk configuration status** on the Display Disk Configuration display.

Mirrored status shows Resuming. When complete, the mirrored status shows Active. This process might take several minutes to complete. You can either monitor this display to completion, or press F3 (Exit) three times, and then press Enter to return to the IBM i main menu.

Determining the IBM i disk drive protection status

To determine the protection status of the disk drives in your IBM i system or logical partition, follow these steps from the System Service Tools (SST) display:

Tip: If you do not know the protection status of the disk drives and you cannot get to the System Service Tools display, contact your next level of support.

1. Sign on **with at least service level authority**.
2. Type `strsst` on the command line of the IBM i session and press Enter.
3. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Note: The service tools password is case-sensitive.

4. Select **Work with disk units** from the System Service Tools (SST) display. Press Enter.
5. Select **Display Disk Configuration** from the Work with Disk Units display. Press Enter.
6. Select **Display Disk Configuration Status** from the Display Disk Configuration display. Press Enter.

A list of each auxiliary storage pool (ASP) displays, showing the disk drives that are members of the ASP. The Status column shows one of the following protection statuses for the ASP:

- **Mirrored.** These ASPs are configured for mirrored protection. If the failing disk drive has mirrored protection, record the status of both disk drives in the mirrored pair. You need this information in the recovery procedure.
- **Unprotected.** An ASP with a status of Unprotected might contain disk drives that are device parity protected. Record the status of the failing disk drive as it is shown in the Status column of the Display Disk Configuration Status display.

A disk drive with one of the following statuses has device parity protection only if all other disk drives in the array are operational:

- DPY/Active
- DPY/Failed
- DPY/HDW Failure
- DPY/Degraded
- DPY/Power Loss
- DPY/Not Ready
- DPY/Unknown

A disk drive with any other status (such as DPY/Rebuild or DPY/Unprotected) does not have device parity protection.

Examples:

- Suppose one disk drive has a status of DPY/Failed while all other disk drives have a status of DPY/Unprotected. In this case, only the disk drive with the DPY/Failed status is protected. Servicing the failed disk drive does not result in data loss. Removing any of the unprotected disk drives might result in data loss.
- All disk drives have a status of DPY/Active or DPY/Degraded, therefore, all disk drives are protected. In this case, exchanging any disk drive does not result in data loss.

Tip: For more information about the meaning of a status for any disk drive, use the Help key on the display.

Installing a disk drive or solid-state drive with the system or logical partition powered off

You might need to install a disk drive in a system or logical partition that controls the disk drive location with the power off. Use the procedure in this section to perform this task.

If you are installing Solid State Drives, review the configuration rules and then return here. For more information, see “Solid-state drives” on page 5.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.

Note: Do not disconnect the power source when you stop the system or logical partition to install a disk drive or solid-state drive.

2. If applicable, remove the system unit door or expansion unit door, or open the rack.
3. If applicable, remove the front cover.
4. Determine the next available disk drive position in your system or expansion unit. For information, see Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.

Note: When you have a system with an expansion unit, you should typically fill the slot positions in the system unit first. However, you can choose a different disk drive placement depending on your data protection strategy.

5. Stop the system or the logical partition that controls the disk drive location. For instructions, see “Stopping a system or logical partition” on page 173.

Install the disk drive

1. If the slot you want to use contains a disk-drive filler, store the filler for future use, or discard it, then move on to step Insert the disk.

Note: The disk drive filler is a single piece that does not attach to the new disk drive.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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.
- a. Pull the disk-drive filler from the slot you want to use, as shown in Figure 37.

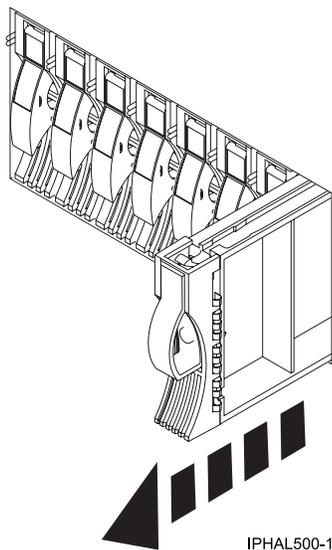
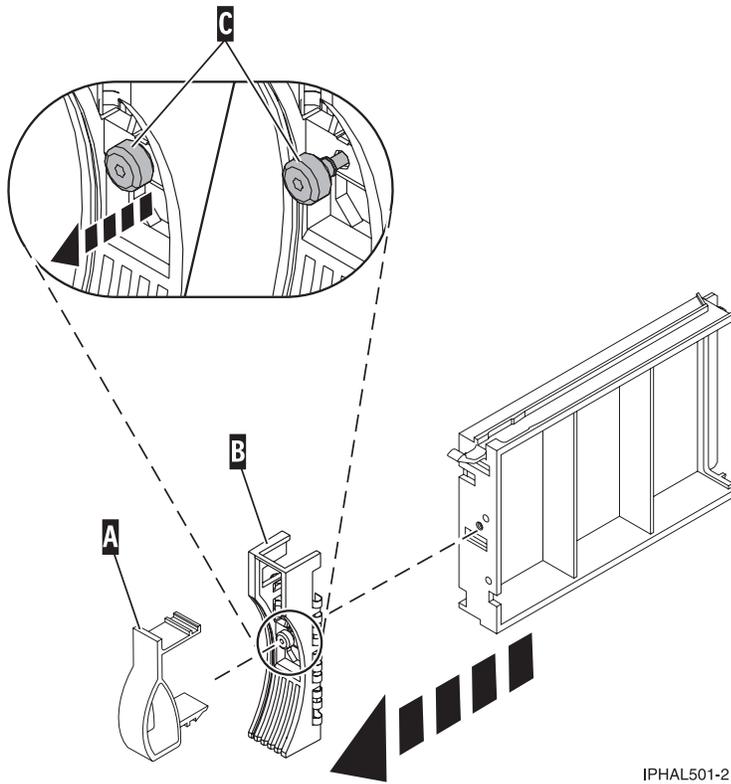


Figure 37. Removing a disk-drive filler from a model

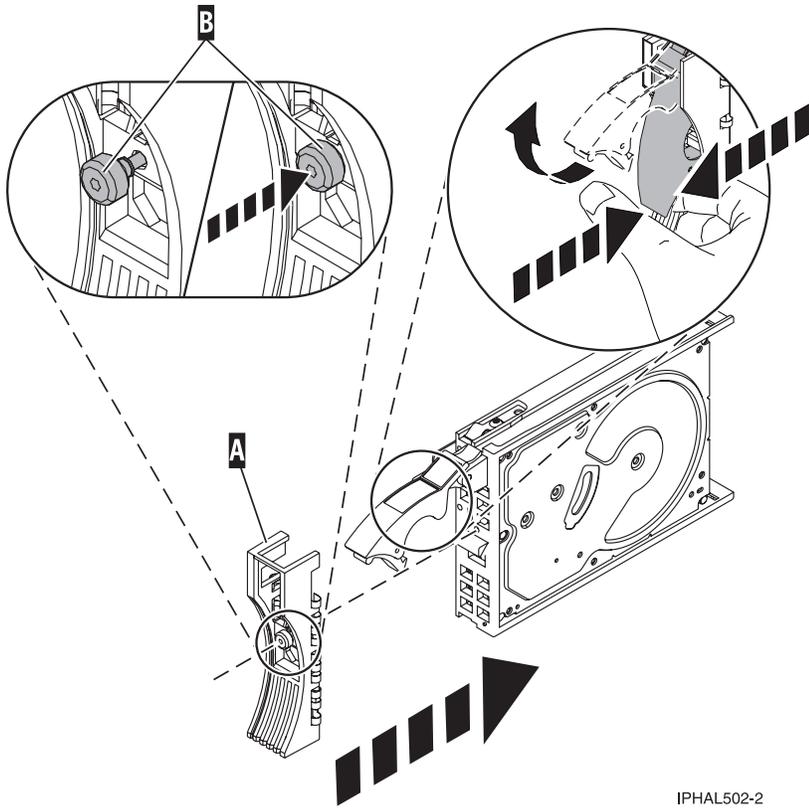
- b. Pull off the disk-drive bezel latch (A) from the front of the filler, as shown in the following figure.



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Figure 38. Removing a disk-drive bezel

- c. Loosen, and then pull out on the thumbscrew (C) to release the bezel (B) from the front edge of the filler.
2. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
3. Remove the disk drive from its protective package. Record the serial number (use the last 4 digits) of the disk drive.
4. Unlock the disk drive handle by squeezing and pulling it out toward you before you install the disk drive. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
5. If your disk drive does not have a bezel preinstalled, follow these steps to install the disk-drive bezel on the new disk drive:
 - a. Attach the bezel (A) to the disk drive, as shown in the following figure.



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Figure 39. Installing a disk-drive bezel

- b. Press in and then tighten the thumbscrew **(B)** to secure the bezel to the disk drive.
6. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
7. Slide the disk drive into the system or expansion unit until it stops.

Note: When installing a disk drive, the drive must be fully seated and all the way into the system.

8. Push the disk drive handle in until it locks, as shown in Figure 40 on page 53.

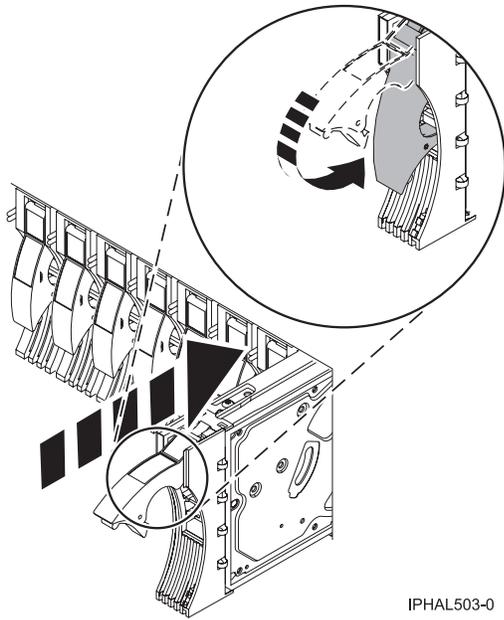


Figure 40. Installing a disk drive in a model

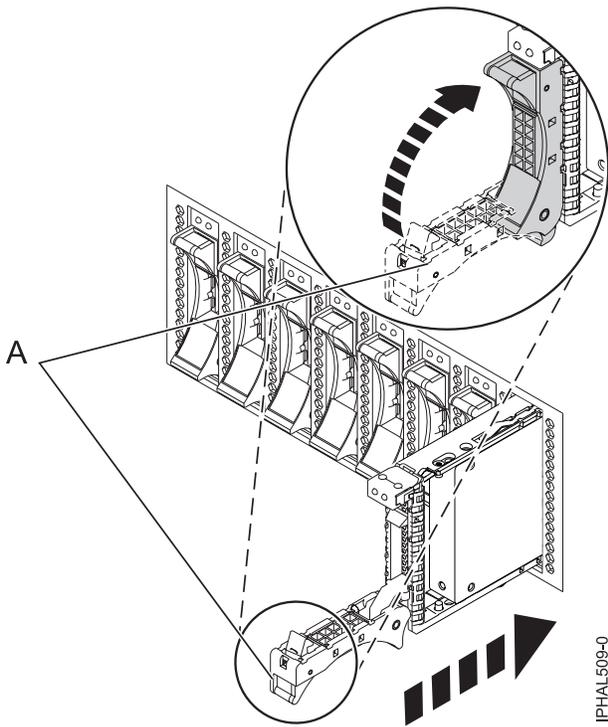


Figure 41. Installing a small-form factor disk drive

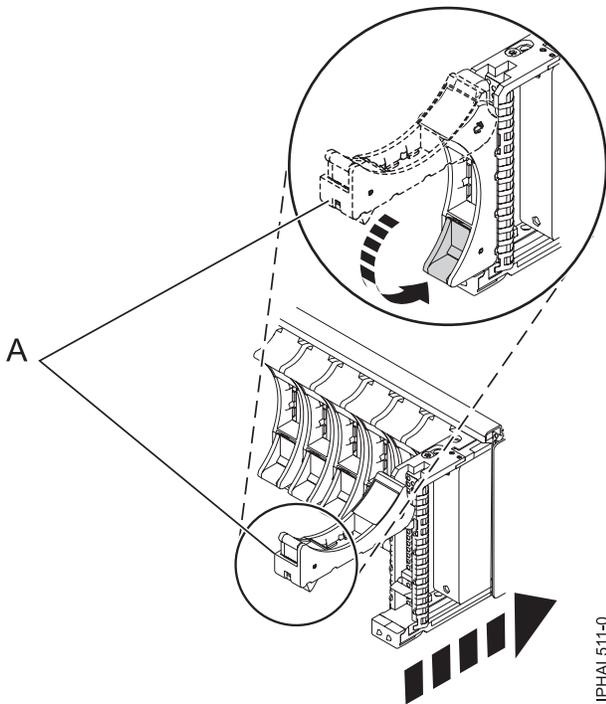


Figure 42. Installing a small-form factor disk drive in the 5803 expansion unit

9. If you are installing more than one disk drive, repeat step 1 on page 50 through step 8 on page 52 until all disk drives are installed.

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit or rack front door.
3. If the system power cables were removed, reconnect them.
4. Start the system or logical partition. For instructions, see “Starting the system or logical partition” on page 171.
5. To configure the newly installed disk drive, select the procedure for the operating system that controls the disk drive.
 - “Preparing a disk drive for use in an AIX system or logical partition” on page 125
 - For information on configuring the newly installed disk drive for a Linux environment, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Chapter 3. Removing a disk drive or solid-state drive

You might need to remove a disk drive or solid-state drive from the server or expansion unit. This section includes information about the disk-drive enclosure and procedures so that you can perform these tasks.

To remove and replace a failed disk drive, go to Chapter 4, “Replacing a disk drive,” on page 61. If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a disk drive. For instructions, see “Removing a part by using the Hardware Management Console” on page 181.

Remove a disk drive from a system or expansion unit that is controlled by different operating systems.

“Replacing a disk drive with the AIX system or logical partition powered on” on page 62

“Replacing a disk drive with the Linux system or logical partition powered on” on page 70

“Replacing a disk drive with the IBM i system or logical partition powered on” on page 87

Removing a disk drive from a system or expansion unit controlled by IBM i

You might need to remove a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) disk drive from a system or expansion unit with an IBM i operating system or a logical partition that controls the disk drive location. Use the procedure in this section to perform this task.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

1. Before removing a disk drive, back up all the data from the disk drive or the array that the drive is a part of, and then move the data from the disk drive that you want to remove. For instructions, choose one of the following options:
 - Move and remove disk units
 - **Recovering your system** in the IBM i Information Center
To access the IBM i Information Center Web site, go to <http://www.ibm.com/systems/i/infocenter> and select from the following options:
 - If you select V6R1, expand **IBM i 6.1 Information Center > Systems management > Backup and recovery > Recovering your system**

- If you select V5R4, expand **i5/OS Information Center > Systems management > Backup and recovery > Backing up and recovering your system > Recovering your system**
2. Prepare to remove the disk drive from the system configuration as described in “Preparing to remove a disk drive from a system or logical partition controlled by IBM i” on page 59.
 3. Locate the disk drive to be removed. See Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.
 4. Stop the system or logical partition that controls the disk drive location. For instructions, see “Stopping a system or logical partition” on page 173.

Prepare the system

1. If applicable, remove the system unit door, expansion unit door, or open the rack.
2. If applicable, remove the front cover.
 - If you have a front cover from any other models, remove the front cover.

Remove the disk drive

1. Unlock the disk drive handle by squeezing it and pulling it out toward you.

Attention:

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

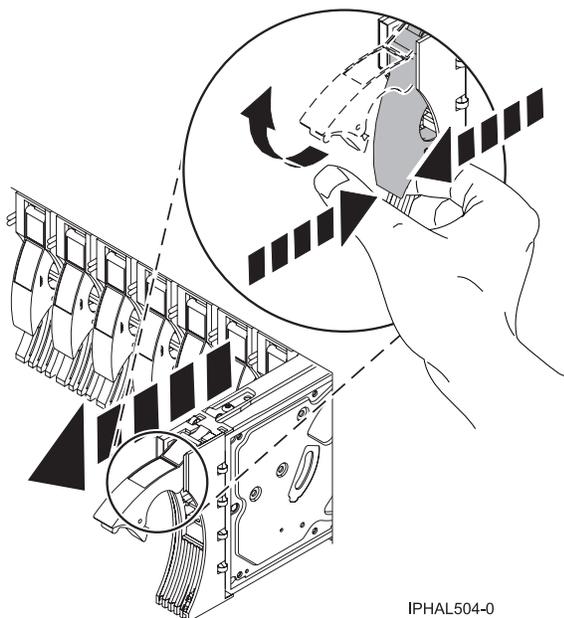


Figure 43. Removing a disk drive

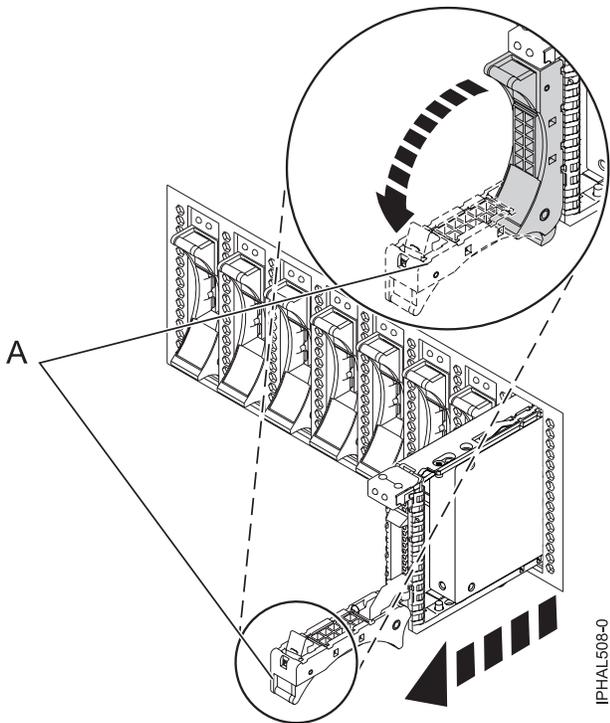


Figure 44. Removing a small-form factor disk drive

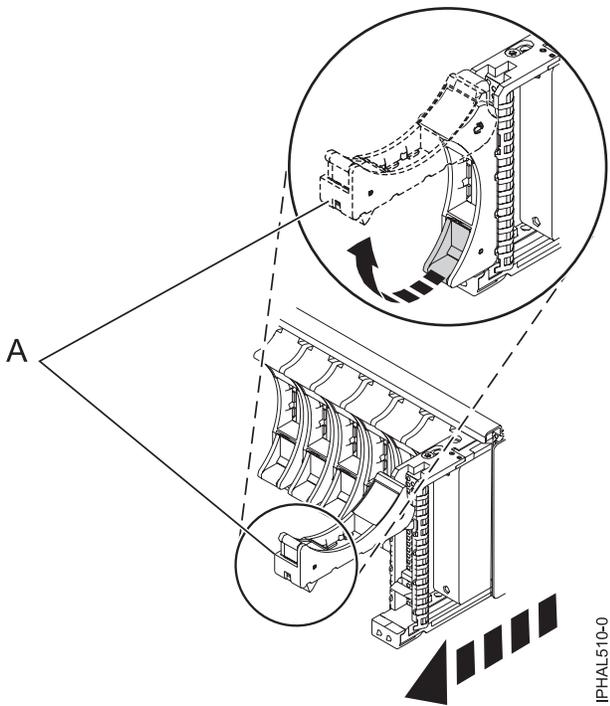


Figure 45. Removing a small-form factor disk drive from the 5803 expansion unit

2. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.
3. If a disk-drive filler is available, follow these steps:

Note: Refill the disk drive slots with either another disk drive or a disk-drive filler. Filling the disk drive slot can help ensure proper airflow for cooling and help maintain optimal EMI compliance.

- a. Attach the disk-drive bezel to the filler.
- b. Press in and then tighten the thumbscrew (**B**) to secure the bezel to the disk drive.
- c. Install the disk-drive filler in the system or expansion unit.

Complete the procedure

1. Install or close the front door of the system, expansion unit, or rack.
2. Reconnect all system power cables.
3. Reconnect the system to the power supply by plugging it into the system.
4. Start the system or logical partition. For instructions, see “Starting the system or logical partition” on page 171.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Preparing to remove a disk drive from a system or logical partition controlled by IBM i

Learn the actions you need to take to properly remove a disk drive.

Before removing a disk drive from a system or expansion unit that is controlled by IBM i, follow these steps:

1. Determine the protection status of the disk drive that you are replacing. For instructions, see “Determining the IBM i disk drive protection status” on page 47.
2. The service provider must perform one of the following tasks:
 - Save data and initialize the disk drive.
 - Initialize the disk drive and copy to disk.
3. **For mirrored disk drives** on an IBM i system or logical partition, follow these steps to verify that the disk drive you are replacing has been suspended:
 - a. Sign on with service level authority.
 - b. Type `strsst` on the command line of the IBM i session and press Enter.
 - c. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Remember: The service tools password is case sensitive.

- d. Select **Work with disk units** from the System Service Tools (SST) display. Press Enter.
- e. Select **Display Disk Configuration** from the Work with Disk Units display. Press Enter.
- f. Select **Display Disk Configuration Status** from the Display Disk Configuration display. Press Enter.
- g. Does the disk drive that is mirrored to the disk drive that you are replacing (same drive number) have a status of Active?
 - **No:** The replacement must be performed by a service provider.
 - **Yes:** Does the disk drive that you are replacing have a status of Suspended?
 - **Yes:** Continue with the next step.

- **No:** Follow these steps to suspend mirrored protection on the disk drive that you are replacing:
 - 1) Press F3 from the Display Disk Configuration display to return to the Work with Disk Units display.
 - 2) Select **Work with Disk Unit Recovery** from the Work with Disk Units display. Press Enter.
 - 3) Select **Suspend mirrored protection** from the Work with Disk Unit Recovery display. Press Enter.
 - 4) Select the option to suspend the disk drive that you are replacing from the Suspend Mirrored Protection display. Press Enter.
- h. Press F3 repeatedly to exit System Service Tools and return to the main menu.

Chapter 4. Replacing a disk drive

You might need to replace a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) disk drive in the server or expansion unit. Use the procedures in this section to perform this task.

Note: These instructions (the first 3 sections) can also be used if you are replacing an SAS disk drive.

To remove and replace a disk drive in a different enclosure, use the information for that enclosure.

Use this procedure to remove a failed disk drive and replace it with the same type of disk drive. If you plan to remove a disk drive and install a different type of disk drive, remove the existing disk drive as described in Chapter 3, “Removing a disk drive or solid-state drive,” on page 55, then install the new disk drive as described in Chapter 2, “Installing a disk drive or solid-state drive,” on page 5. If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for replacing a disk drive. For instructions, see “Exchanging a part by using the Hardware Management Console” on page 182.

Your system or logical partition can be powered off or powered on when you replace the disk drive. If the disk drive that is being replaced is in the AIX or Linux root volume group (rootvg) and does not have disk protection replace your disk with the powered-off procedure.

Replacing a disk drive with the AIX system or logical partition powered on

You might need to replace a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) disk drive in a system or expansion unit while the AIX operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention: The powered-on procedure is a complex set of steps that must be performed exactly to avoid potential data loss or system damage. You might also consider the powered-off procedure, which is a simpler task that involves less risk of data loss or system damage. If the system or logical partition that controls the disk drive you are replacing is at the AIX command line, you can use this powered-on procedure. If the disk drive that you are replacing is in the root volume group (rootvg) and it is not protected by either Redundant Array of Independent Disks (RAID) or mirroring, or to use the powered-off procedure, go to “Replacing a disk drive with the system or logical partition powered off” on page 102.

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. Prepare to remove the disk drive from the system or expansion unit as described in “Preparing to remove a disk drive from a system or expansion unit controlled by AIX” on page 125.
3. If applicable, remove the system unit door, expansion unit door, or the rack door.
4. If applicable, remove the front cover.
 - If you have a front cover from any other models, remove the front cover.

To replace a Just a Bunch of Disks (JBOD) disk drive attached to any SCSI or SCSI RAID adapter, see the procedure in “Replacing a SCSI disk drive” on page 109.

Remove a disk drive

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. Press Enter to continue.
4. On the Function Selection display, select **Task Selection**.
5. Select **Hot Plug Task**.
6. Select **SCSI and SCSI RAID Hot Plug Manager** or **RAID Hot Plug Devices**, depending on the adapter that your drive is attached to.

Tip: One or both of these options might be available, depending on the configuration of your system. If the drive you want to replace is not listed when you follow the steps for the SCSI and SCSI RAID Hot Plug Manager, go to step 7.

 - If you have a RAID disk drive attached to a 2498 PCI SCSI RAID adapter, continue with step 7.
 - If you have a JBOD disk drive attached to any SCSI or SCSI RAID adapter, go to “Replacing a SCSI disk drive” on page 109.
 - If you have RAID drives attached to any other adapter, go to the *PCI-X SCSI RAID Controller Reference Guide for AIX*. This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.
7. Select **RAID Hot Plug Devices**.
8. On the Resource Selection List, select the adapter that is connected to the array that contains the disk drive you want to replace. Press Enter.
9. Select **Commit**.
10. On the Identify and Remove Resources menu, select **Remove**. Press Enter.

A list of the disk drives that you can remove is shown. If the disk drive you want to remove does not appear in the list, ask your system administrator to put the disk drive in the Failed state before continuing with this procedure. For information, see *AIX System Management Guide: Operating System and Devices*. This guide is available at the System p[®] and AIX Information Center (<http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp>).
11. Select the drive that you want to remove and press Enter. The concurrent maintenance light for the slot will flash rapidly.

Attention: If the light does not flash rapidly, do not remove the disk drive.

To view the locations of the concurrent maintenance lights, go to Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.
12. Unlock the disk drive handle by squeezing it and pulling it out toward you as shown in Figure 46 on page 64.

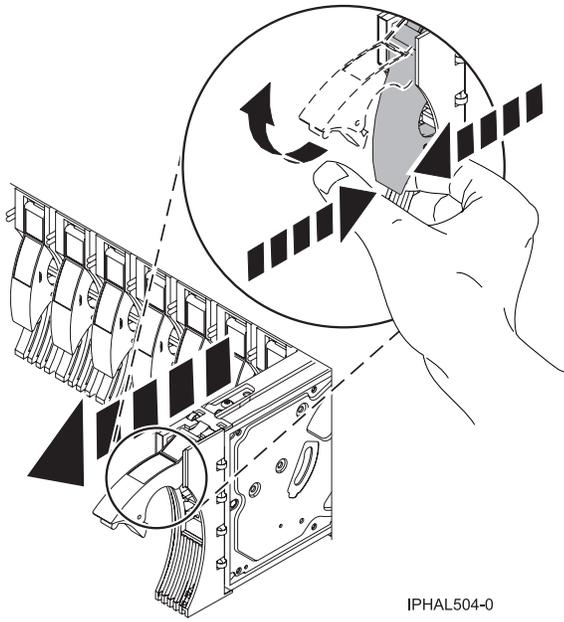


Figure 46. Removing a disk drive from a model

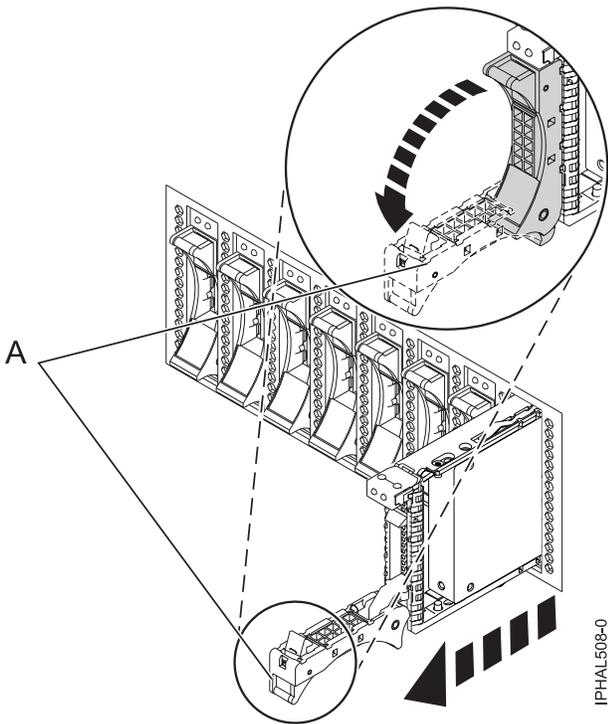


Figure 47. Removing a small-form factor disk drive

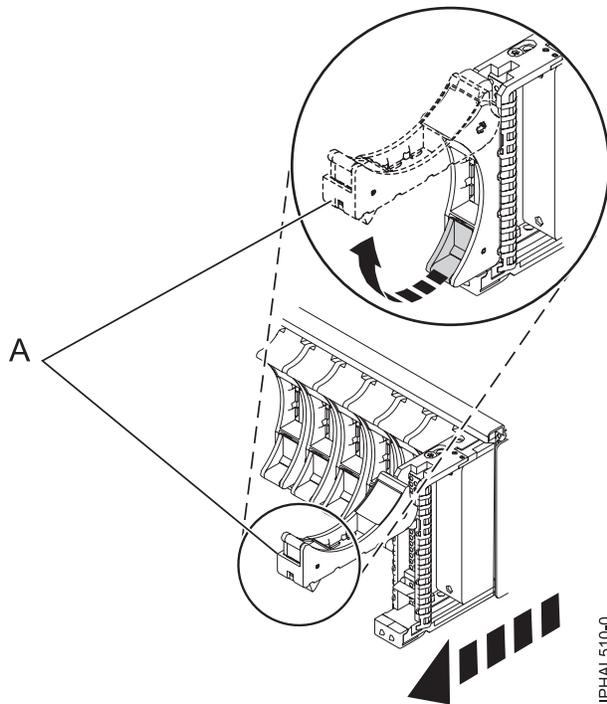
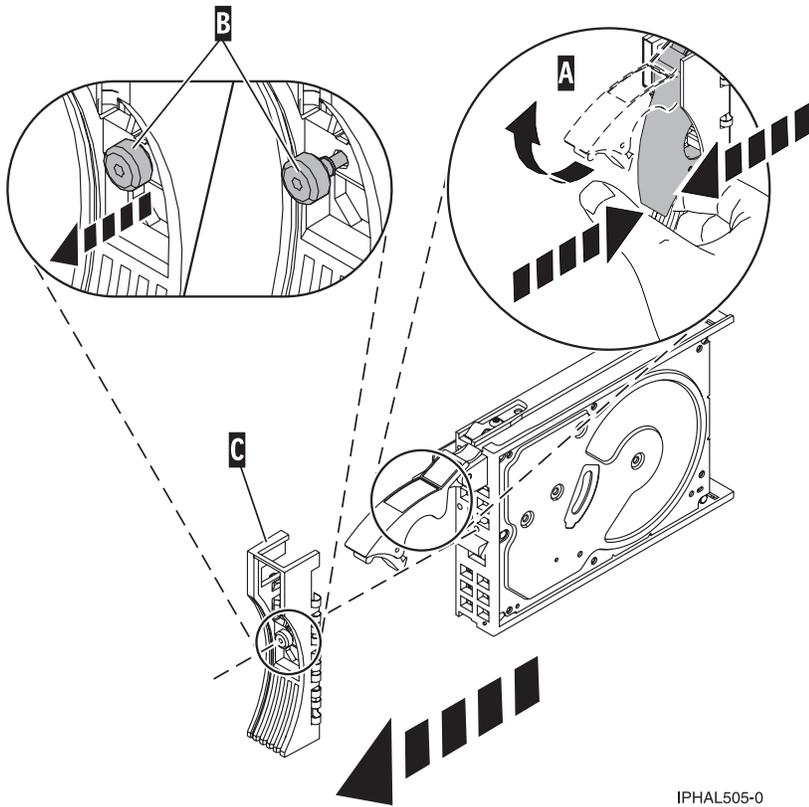


Figure 48. Removing a small-form factor disk drive from the 5803 expansion unit

13. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.
The concurrent maintenance light for the slot turns off when you remove the disk drive.
14. Does your new disk drive have a bezel preinstalled?
 - No: Continue with the procedure from here.
 - Yes: Go to step 6 on page 67 of the replacement procedure.

Important: If the disk drive bezel does not have a thumbscrew, it is not removable and is a serial-attached SCSI (SAS) disk drive. The replacement drive should come with an attached bezel.

Loosen and pull out on the thumbscrew (B) to release the bezel (C) from the disk drive, as shown in the following figure.

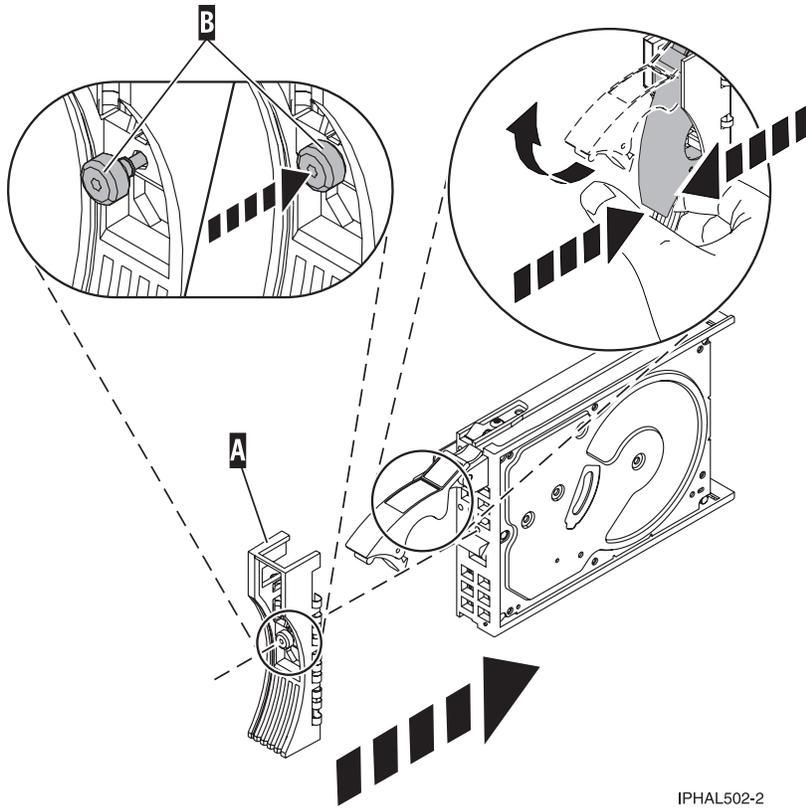


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Figure 49. Removing a disk-drive bezel

Replace a disk drive

1. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
2. Remove the disk drive from its protective package.
3. Unlock the handle of the replacement disk drive by squeezing and pulling it out toward you. If the handle is not all the way out, the disk drive cannot slide into the system.
4. If your new disk drive does not have a bezel preinstalled, then perform the following step.
 Attach the disk-drive bezel (A) to the replacement disk drive, as shown in the following figure.
5. If your new disk drive does not have a bezel preinstalled, then perform the following step.
 Press in and then tighten the thumbscrew (B) to secure the bezel to the disk drive.



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Figure 50. Installing a disk-drive bezel

6. Install the disk drive as shown in Figure 51 on page 68.
 - a. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
 - b. Slide the disk drive into the system until it stops.

Important: Ensure that when installing a disk drive, that the drive is fully seated and all the way into the system.

- c. Push the disk drive handle in until it locks.

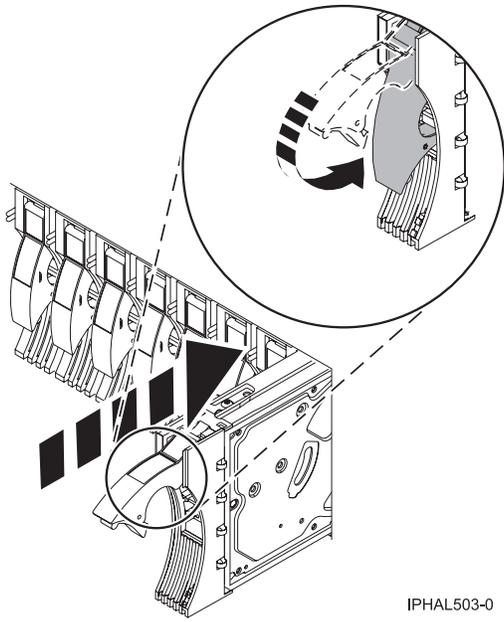


Figure 51. Installing a disk drive in a model

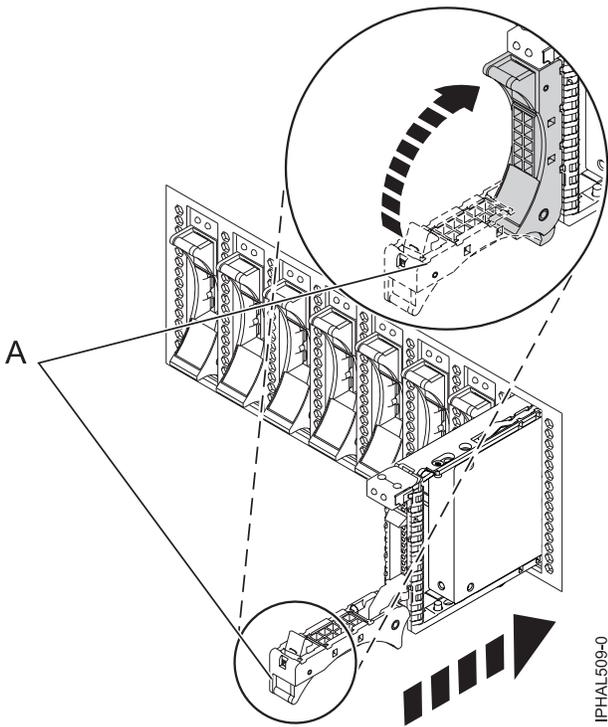


Figure 52. Installing a small-form factor disk drive

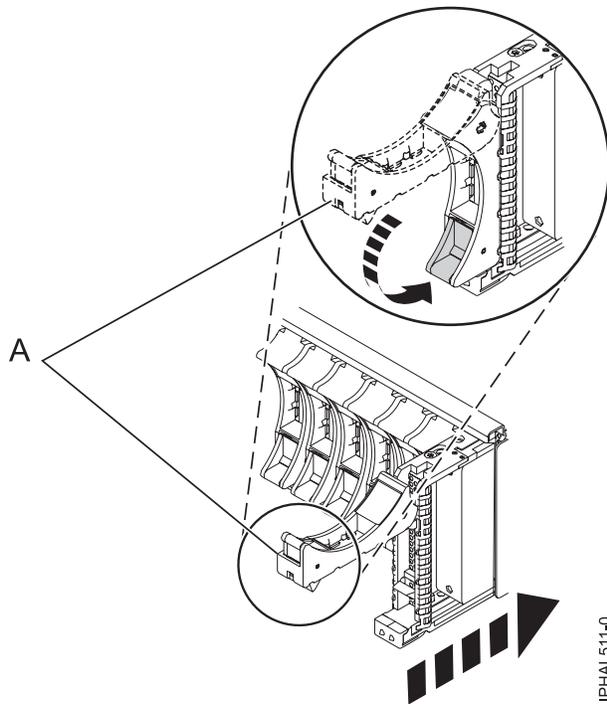


Figure 53. Installing a small-form factor disk drive in the 5803 expansion unit

7. Press Enter. The disk drive slot exits the Remove state and enters the Normal state.
8. Exit to the RAID Hot-Plug Devices menu. Press F3 to return.
9. Exit to the Task selection display.
10. Select **Log Repair Action**.
11. Select the disk drive that you replaced and then press Enter.
12. Select **Commit** after you have made your selection and then press Enter.
13. Exit to the command line.

Complete the procedure

1. Replace the front cover.
2. Install or close the front door of the system, expansion unit or rack.
3. To prepare the disk drive for use, go to "Rebuilding data on a replacement disk drive using AIX" on page 125.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Replacing a disk drive with the Linux system or logical partition powered on

You might need to replace a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) disk drive in a system or expansion unit while the Linux operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention: Read these instructions carefully and understand the complexity of the powered-on procedure before you begin. If the system or logical partition that controls the disk drive you are replacing is at the Linux command line, you can use this powered-on procedure.

Go to “Replacing a disk drive with the system or logical partition powered off” on page 102, if:

- You are installing a disk drive that will be connected with the 6203 or 6204 SCSI adapter
- You do not feel comfortable using the powered-on procedure

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. Is the disk drive you are replacing in a redundant array of independent disk (RAID) 0 array or is the disk drive you are replacing in a failed RAID level 5 or 10 array?
 - If yes, you must delete the disk array before replacing the disk. For instructions, see *PCI-X SCSI RAID Controller Reference Guide for Linux*.
This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.
 - If no, your drive is configured as Just a Bunch of Disks (JBOD) or is configured within a degraded array. Proceed to the next step.
3. If the disk drive you are replacing is in a redundant array of independent disk (RAID) Level 0 disk array or in a failed RAID Level 5 or RAID Level 10 disk array, you must delete the disk array before replacing the disk. For instructions, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.
This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.
4. If applicable, remove the system unit door or expansion unit door or open the rack front door.
5. If applicable, remove the front cover.
 - If you have a front cover from any other models, remove the front cover.

To replace a disk drive in a location with the Linux system or logical partition that controls the disk drive location powered on, select the appropriate procedure from the following list:

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Replacing the disk drive using Linux kernel 2.4

Learn how to replace a disk drive in a location that is controlled by a system or logical partition that is running Linux kernel 2.4.

Prepare to remove the disk drive

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter. The Work with Disk Units display is shown.
3. From the Work with Disk Units display, select **Analyze log**. Press Enter. The Kernel Messages Log display is shown, similar to the following display.

```

Kernel Messages Log

Select one of the following:

  1. Use vi to view most recent IBM Storage error messages
  2. Use vi to view IBM Storage error messages
  3. Use vi to view all kernel error messages
  4. Use vi to view sisconfig error messages
  5. Set root kernel message log directory
  6. Set default editor
  7. Restore defaults
  8. Use vi to view IBM Storage boot time messages

Selection:

e=Exit

```

Figure 54. Kernel Messages Log

4. From the Kernel Messages Log display, select **Use vi to view most recent IBM Storage error messages**. Press Enter.
5. Find the device error log entry for the disk drive you want to replace.
6. Record the location information for the disk drive. The location information has the form of P1-I2/Z1-A5.
7. Exit to the Work with Disk Units display.
8. Select **Display disk hardware status** from the Work with Disk Units display. Press Enter.
9. Record the hardware status of the disk drive you want to replace.
10. Type d (Display disk unit details) next to the disk drive you want to replace.
11. On the Display Disk Unit Details display, type 5 (Display hardware resource information details) next to the disk drive you want to replace.

The Disk Unit Hardware Resource Information Details display is shown, similar to the following display.

```

Disk Unit Hardware Resource Information Details

Manufacturer. . . . . : IBM
Machine Type and Model. . . : IC35L073UCDY10-0
Firmware Version. . . . . : 53323846
Model . . . . . : 020
Serial Number . . . . . : E6VKUNPD
Capacity. . . . . : 73.41 GB
Resource Name . . . . . : /dev/sda

Physical location:
Location . . . . . : U1.9-P1/Z1-A8
PCI Bus. . . . . : 257
PCI Device . . . . . : 1
SCSI Host Number . . . . . : 0
SCSI Channel. . . . . : 0
SCSI Id. . . . . : 8
SCSI Lun. . . . . : 0

Press Enter to continue.

e=Exit      q=Cancel      v=Display Extended VPD

```

Figure 55. Disk Unit Hardware Resource Information Details display

12. Record the physical location information.
13. Exit to the Work with Disk Units display.

14. If the disk drive you want to replace is unprotected or in use, move the data from the disk drive before continuing with this procedure.

For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

Remove the disk drive

1. From the Work with Disk Units display, select **Work with disk unit recovery**. Press Enter.
2. From the Work with Disk Unit Recovery display, select **Device Concurrent maintenance**. Press Enter.
A Device Concurrent Maintenance display is shown, similar to the following display.

```
Device Concurrent Maintenance

Type the choices, then press Enter.

Specify either Physical Location or PCI/SCSI location.
Physical Location: U0.1-P1-I4/Z1-A8
OR
PCI/SCSI . . . PCI Bus:      PCI Device:
                SCSI Channel:  SCSI Id:   SCSI Lun:

Specify action as  1=Remove device  2=Install device
Action to be performed . . . . . : 1

Enter a time value between 01 and 19.
Time needed in minutes . . . . . : 1

Or leave blank and press Enter to cancel
```

Figure 56. Example Device Concurrent Maintenance display

3. Enter either the physical location information or the PCI or SCSI location for the disk drive you want to replace. Press Enter.
4. Specify 1 (Remove device) for the action to be performed.
5. Enter a time value in minutes, allowing enough time for you to remove the disk drive.
The concurrent maintenance light indicates that you can remove the disk drive. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
 - “Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures” on page 122
6. Press Enter.

A Device Concurrent Maintenance Action display is shown, similar to the following display.

```
Device Concurrent Maintenance Action

Removal of device:
Location: U0.1-P1-I4/Z1-A8

You have 1 minute to perform the operation

During this time, your system can seem unresponsive

c=Confirm  q=Cancel
```

Figure 57. Example Device Concurrent Maintenance Action display

7. Enter c to confirm that you want to remove the disk drive at the specified location.

A Device Concurrent Maintenance Action In Progress display is shown, similar to the following display.



Figure 58. Example Device Concurrent Maintenance Action In Progress display

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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.
8. Squeeze or lift the handle of the disk drive out toward you before you remove the disk drive, as shown in Figure 59. If the handle is not all the way out, the disk drive can not slide out of the system or expansion unit.

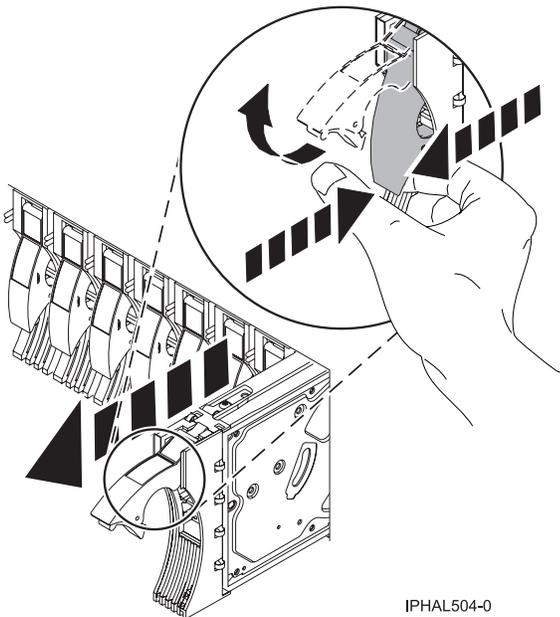


Figure 59. Removing a disk drive from a model or 7311-D20

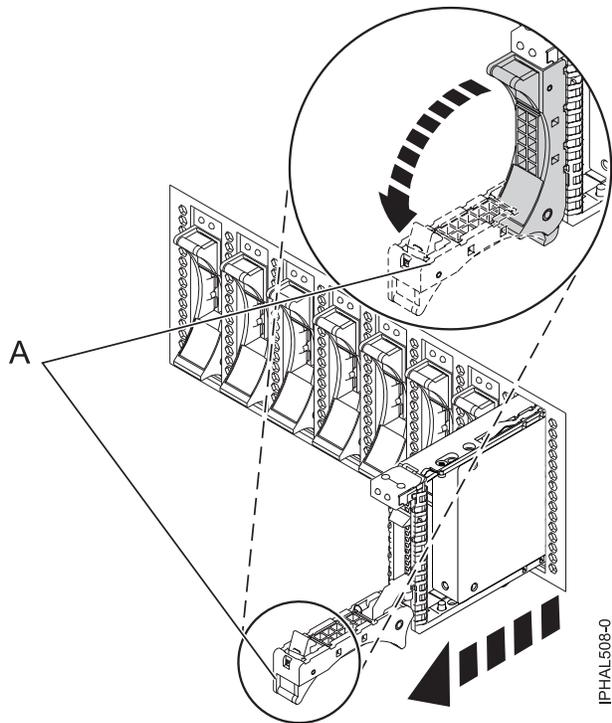


Figure 60. Removing a small-form factor disk drive

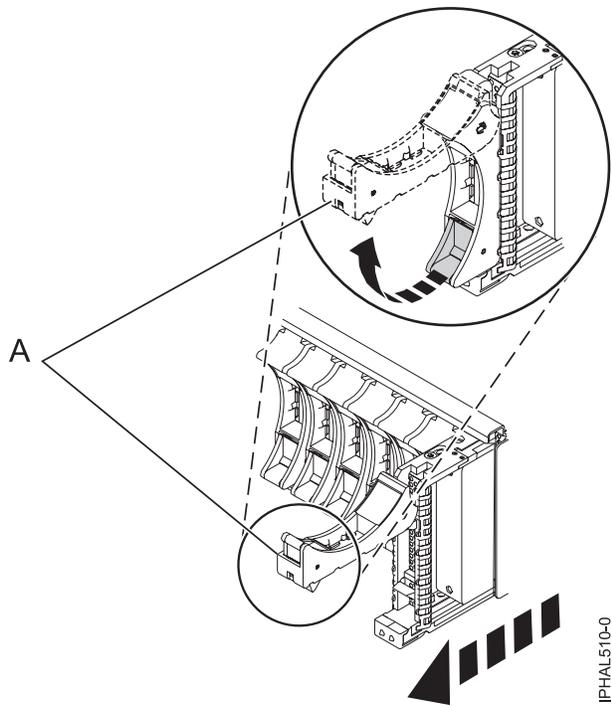


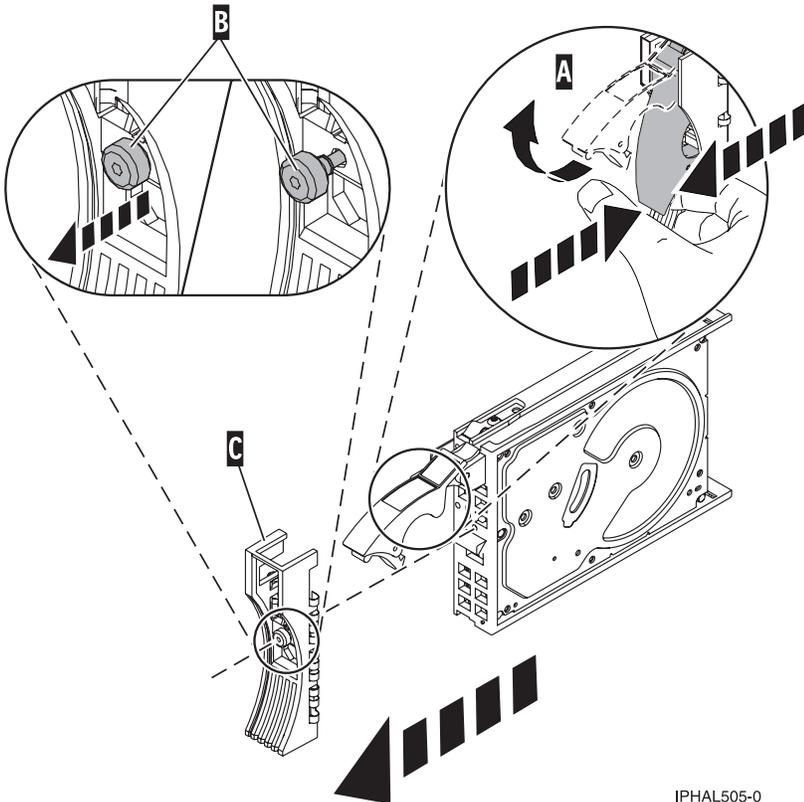
Figure 61. Removing a small-form factor disk drive from the 5803 expansion unit

9. Support the bottom of the disk drive as you slide it out of the system. Do not hold the disk drive by the handle.

Note: The concurrent maintenance light for the slot will stop blinking and remain off when you remove the disk drive.

10. Press Enter.
11. Does your disk drive have a bezel preinstalled?
 - No: Continue with the procedure from here.
 - Yes: Move on to step 5 on page 77 of the replace procedure.

Loosen and pull out on the thumbscrew (B) to release the disk-drive bezel (C) from the disk drive, as shown in the following figure.

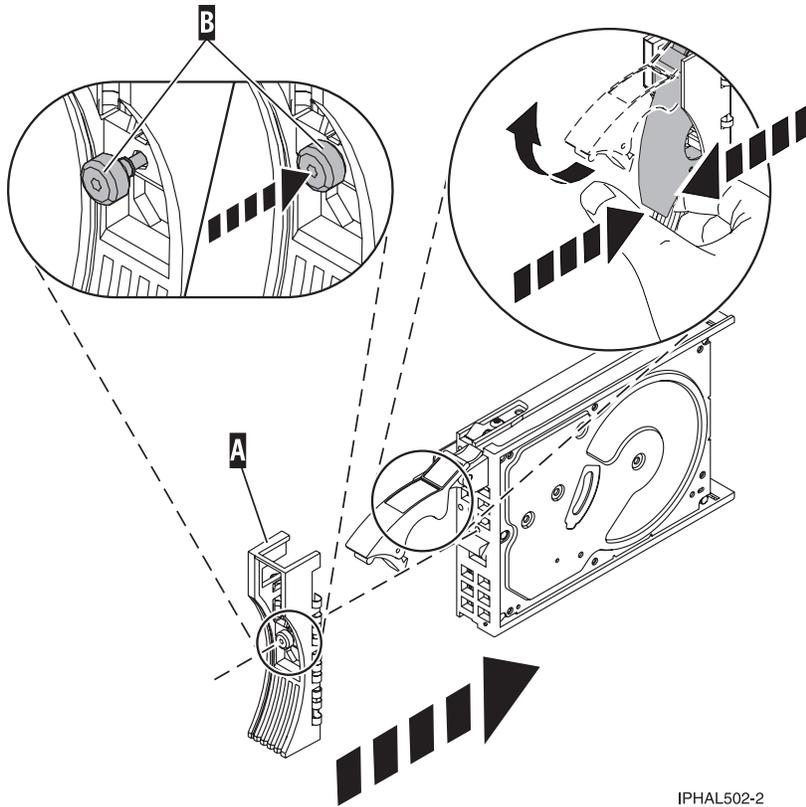


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Figure 62. Removing a disk-drive bezel

Replace the disk drive

1. Find the package that contains the new disk drive.
 - Attention:** Disk drives are fragile. Handle with care.
2. Remove the disk drive from its protective package.
3. Unlock the disk drive handle by squeezing and pulling it out toward you before you install the disk drive. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
4. If your replacement disk drive does not have a bezel preinstalled, then follow these steps to install the disk-drive bezel on the replacement disk drive:
 - a. Attach the bezel (A) to the disk drive, as shown in the following figure.



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Figure 63. Attaching a bezel to the disk drive

- b. Press in and then tighten the thumbscrew (**B**) to secure the bezel to the disk drive.
5. Select **Device Concurrent maintenance** from the Work with Disk Unit Recovery display. Press Enter.
6. Enter either the physical location code or the PCI/SCSI location from which you removed the disk drive. Press Enter.
7. Specify action as 2 (Install device).
8. Enter a time value in minutes, allowing enough time for you to install the new disk drive.
The concurrent maintenance light for the slot indicates that you can install the disk drive.
9. Press Enter. A Device Concurrent Maintenance Action display is shown, similar to the following display.

```

Device Concurrent Maintenance Action

Installation of device:
Location: U0.1-P1-I4/Z1-A8

You have 1 minute to perform the operation

During this time, your system can seem unresponsive

c=Confirm    q=Cancel
  
```

Figure 64. Example Device Concurrent Action Maintenance display

10. Enter c to confirm that you want to install the disk drive in the specified location.

A Device Concurrent Maintenance Action In Progress display similar to the following is shown.

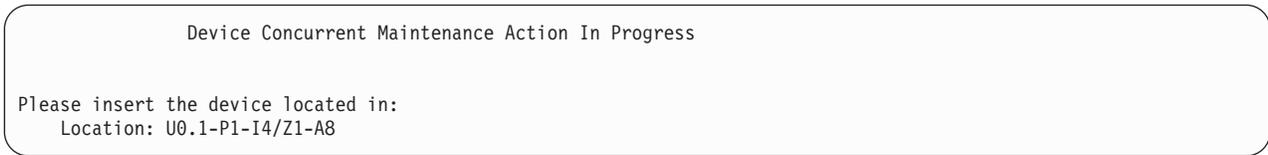


Figure 65. Example Device Concurrent Maintenance Action In Progress display

11. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
12. Slide the disk drive all the way in into the system or expansion unit and then lock it in place by pushing in the disk drive handle as shown in Figure 66.

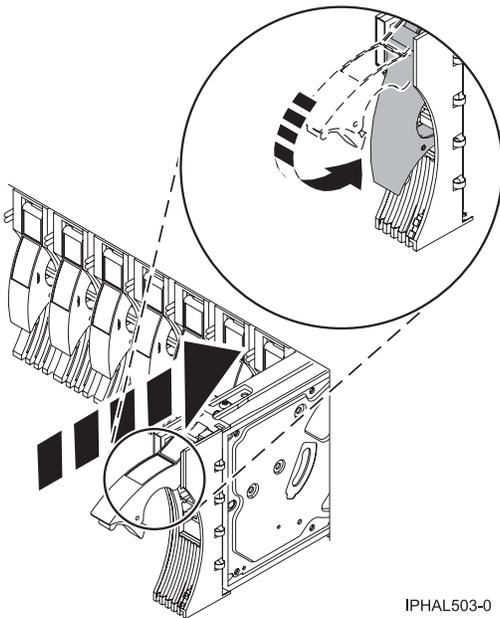


Figure 66. Installing a disk drive in a model or 7311-D20

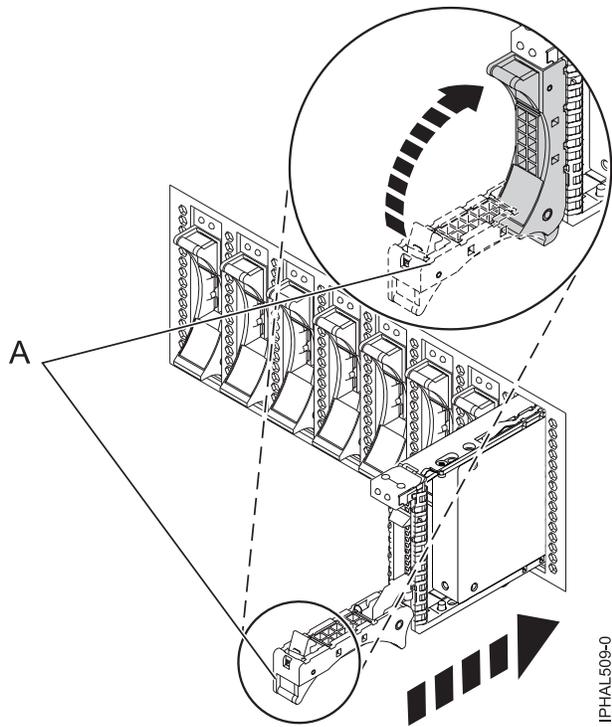


Figure 67. Installing a small-form factor disk drive

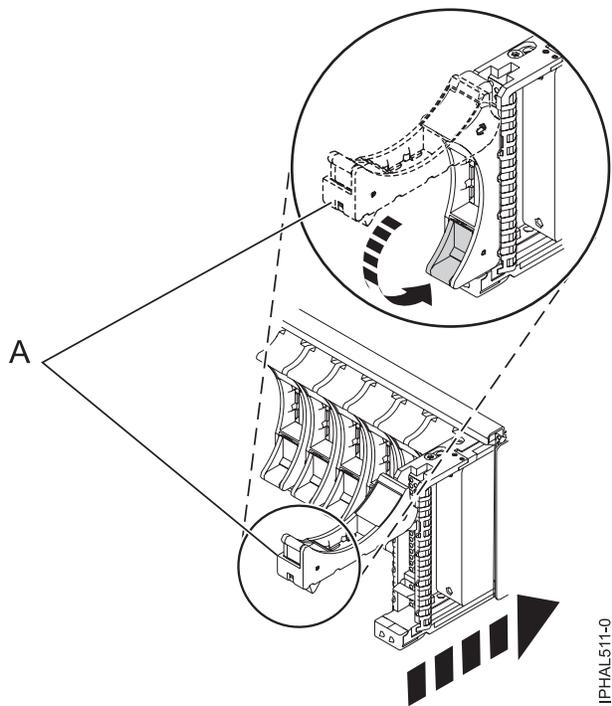


Figure 68. Installing a small-form factor disk drive in the 5803 expansion unit

The concurrent maintenance light for the slot stops blinking and remains on when you have installed the disk drive properly.

13. Rebuild the data on the replacement disk drive. For instructions, go to “Rebuilding data on a replacement disk drive using Linux” on page 125.

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit, or rack front door.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Replacing the disk drive using Linux kernel 2.6

Learn how to replace a disk drive in a location that is controlled by a system or logical partition that is running Linux kernel 2.6.

Prepare to remove the disk drive

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter.
The IBM Power RAID Configuration Utility display is shown.
3. Select **Analyze log**. Press Enter. The Kernel Messages Log display is shown.



Figure 69. Kernel Messages Log

4. Select **View most recent ipr error messages** from the Kernel Messages Log display. Press Enter.
5. Find the entry in the log for the disk drive you want to replace.
6. Record the location information for the disk drive.

Note: The location information has the form of 2:0:8:0. In this example, 2 is the SCSI host number, 0 is the SCSI bus, 8 is the SCSI target ID, and 0 is the LUN (logical unit).

7. Return to the command line.
8. Type the following:
`ls -ld /sys/class/scsi_host/host#/device`
where # is the SCSI host number. Press Enter.
9. Record the PCI location information.

Note: The PCI location information has the form of 61:01:0:2.

10. Type `iprconfig` on the command line and press Enter.
The IBM Power RAID Configuration Utility display is shown.
11. Select **Display hardware status** from the IBM Power RAID Configuration Utility display. Press Enter.
The Display Hardware Status display is shown.

```
Display Hardware Status

Type option, press Enter.
1=Display hardware resource information details

OPT Name  PCI/SCSI Location      Description      Status
-----
          0000:01:01.0.0/    PCI-X SCSI Adapter  Operational
          0000:41:01.0.1/    PCI-X SCSI Adapter  Operational
sda       0000:41:01.0.1/0:3:0    Physical Disk       Active
sdb       0000:41:01.0.1/0:4:0    Physical Disk       Active
sdc       0000:41:01.0.1/0:8:0    Physical Disk       Active
sdd       0000:41:01.0.1/1:3:0    Physical Disk       Active
sde       0000:41:01.0.1/1:4:0    Physical Disk       Active
sdf       0000:41:01.0.1/1:5:0    Physical Disk       Active
          0001:61:01.0.2/    PCI-X SCSI RAID Adapter  Operational
sdg       0001:61:01.0.2/0:3:0    Physical Disk       Active
          0001:61:01.0.2/0:6:0    Advanced Function Disk  Active
sdi       0001:61:01.0.2/0:9:0    Physical Disk       Active
sdh       0001:61:01.0.2/255:0:0  RAID 10 Disk Array   Failed
          0001:61:01.0.2/0:4:0    RAID 10 Array Member  Failed
          0001:61:01.0.2/0:5:0    RAID 10 Array Member  Failed

e=Exit  q=Cancel  r=Refresh  t=Toggle
```

Figure 70. Example Display Hardware Status

12. Look for the disk drive at the PCI location you recorded. The disk drive might have a Failed status.
13. If the disk drive you want to replace is unprotected or in use, move the data from the disk drive before continuing with this procedure.

For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

14. Type option **1** (Display hardware resource information details) next to the disk drive you want to replace. Press Enter.

A Disk Hardware Resource Information Details display similar to the following is shown.

```

Disk Unit Hardware Resource Information Details

Manufacturer . . . . . : IBM
Product ID . . . . . : ST336607LC
Firmware Version . . . . . : 43353048 (C50H)
Serial Number. . . . . : 00006719
Capacity . . . . . : 36.40 GB
Resource Name. . . . . : /dev/sdd

Physical location
PCI Address. . . . . : 0001:50:01.0
SCSI Host Number . . . . . : 2
SCSI Channel . . . . . : 0
SCSI Id. . . . . : 4
SCSI Lun . . . . . : 0

Extended Details
FRU Number . . . . . : 00P2676
More...

Press Enter to Continue

e=Exit  q=Cancel  f=PageDn  b=PageUp

```

Figure 71. Example Disk Hardware Resource Information Details display

15. Record the physical location information.
16. Return to the IBM Power RAID Configuration Utility display.

Remove the disk drive

1. From the IBM Power RAID Configuration Utility display, select **Work with disk unit recovery**. Press Enter.
2. From the Work with Disk Unit Recovery display, select **Concurrent remove device**. Press Enter. A Concurrent Device Remove display is shown, similar to the following display.

```

Concurrent Device Remove

Choose a single location for remove operations
1=Select

OPT Name  PCI/SCSI Location      Description      Status
-----
sdc       0000:41:01.0.1/0:8:0   Physical Disk   Active
          0000:41:01.0.1/0:5:   Empty
sdb       0000:41:01.0.1/0:4:0   Physical Disk   Active
sda       0000:41:01.0.1/0:3:0   Physical Disk   Active
          0000:41:01.0.1/1:8:   Empty
sdf       0000:41:01.0.1/1:5:0   Physical Disk   Active
sde       0000:41:01.0.1/1:4:0   Physical Disk   Active
sdd       0000:41:01.0.1/1:3:0   Physical Disk   Active
          0001:61:01.0.2/0:8:   Empty
sdh       0001:61:01.0.2/0:9:0   Physical Disk   Active
sdg       0001:61:01.0.2/0:3:0   Physical Disk   Active

```

Figure 72. Example Concurrent Device Remove display

3. Type option 1 (Select) next to the location for the disk drive you want to replace. Press Enter.
4. The Verify Device Concurrent Remove display is shown. The concurrent maintenance light turns on for that disk drive slot. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
 - “Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures” on page 122
5. On the Verify Device Concurrent Remove display, verify that the selected disk drive is the disk drive you want to replace, then press Enter. The identify light turns on for the disk drive.

Note: Ensure that the disk drive is not in use to prevent loss of data.

6. The Complete Device Concurrent Remove display is shown.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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.
7. Squeeze and pull the handle of the disk drive out toward you before you remove the disk drive as shown in Figure 73. If the handle is not all the way out, the disk drive will not slide out of the system or expansion unit.

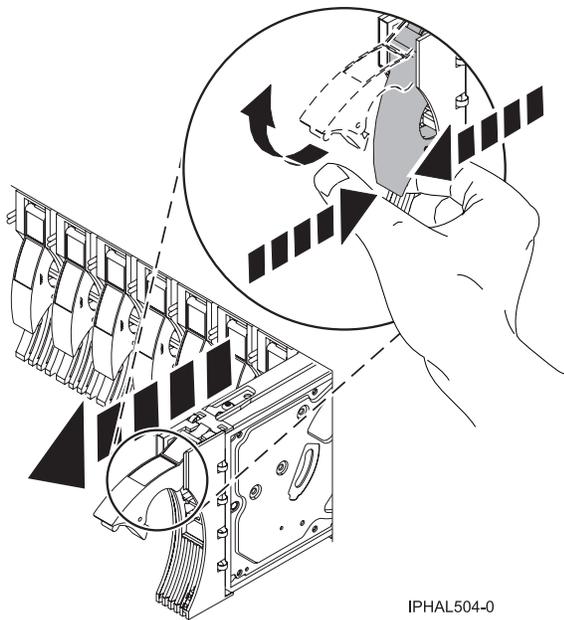
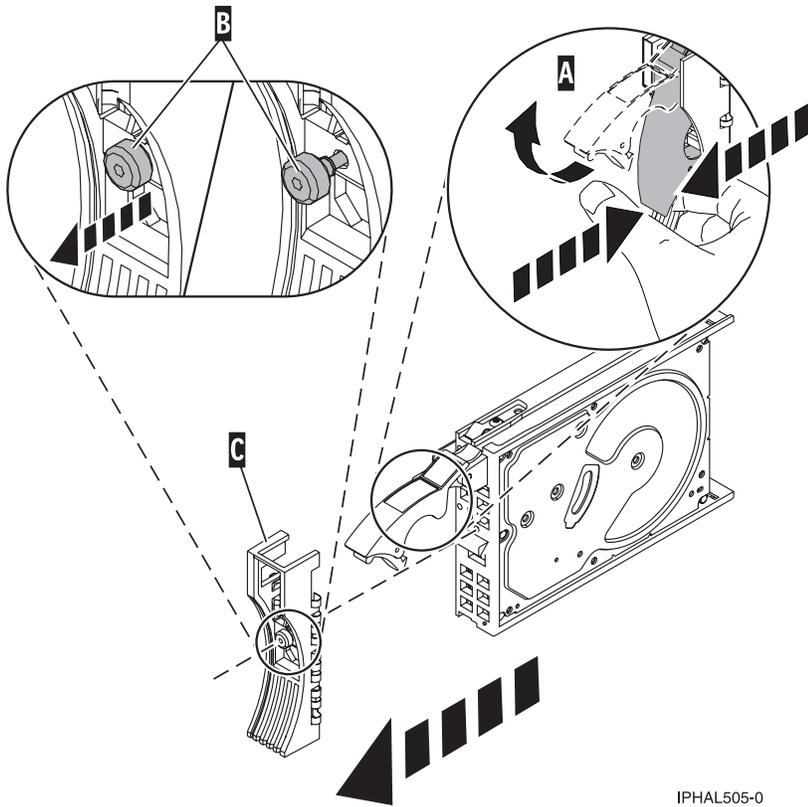


Figure 73. Removing a disk drive from a model or 7311-D20

8. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.
9. If your replacement disk drive does not have a bezel preinstalled, then perform the following step. Loosen and pull out on the thumbscrew (B) to release the disk-drive bezel (C) from the disk drive, as shown in the following figure.



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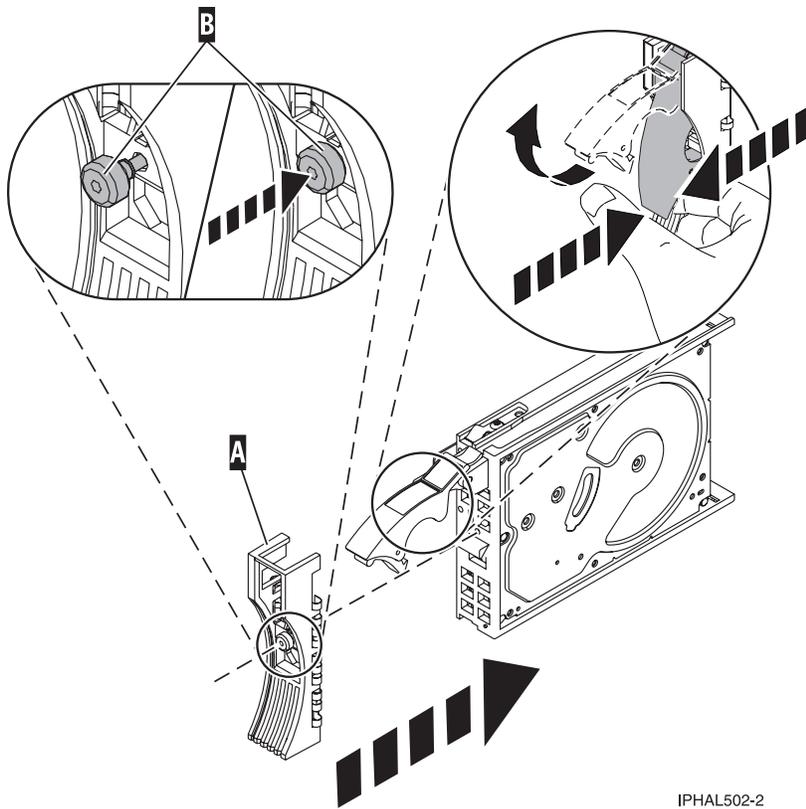
Figure 74. Removing a disk-drive bezel

10. Press Enter on the IBM Power RAID Configuration Utility to indicate that you have removed the disk drive.

Replace the disk drive

1. Find the package that contains the new disk drive.

Attention: Disk drives are fragile. Handle them with care.
2. Remove the disk drive from its protective package.
3. Unlock the disk drive handle by squeezing and pulling it out toward you before you install the disk drive. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
4. If your replacement disk drive does not have a bezel preinstalled, then follow these steps to install the disk-drive bezel on the replacement disk drive:
 - a. Attach the bezel (A) to the disk drive, as shown in the following figure.
 - b. Press in and then tighten the thumbscrew (B) to secure the bezel to the disk drive.



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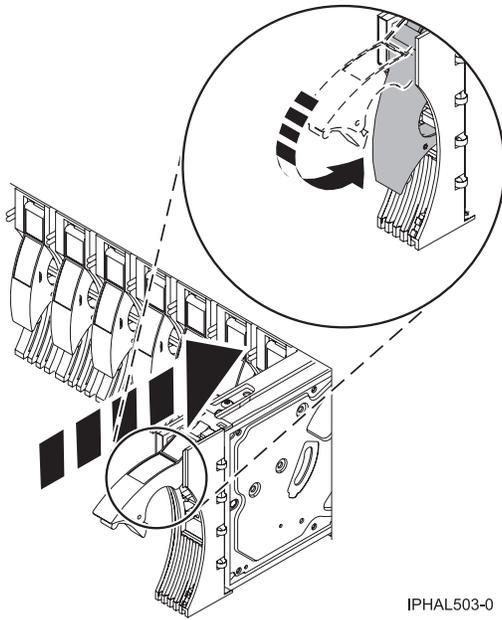
Figure 75. Attaching a bezel to the disk drive

5. From the IBM Power RAID Configuration Utility display, select **Work with disk unit recovery**. Press Enter.
6. From the Work with Disk Unit Recovery display, select **Concurrent add device**. Press Enter. A Concurrent Device Add display similar to the following is shown.

Concurrent Device Add			
Choose a single location for add operations			
1=Select			
OPT Name	PCI/SCSI Location	Description	Status
	0000:41:01.0.1/0:5:		Empty
	0000:41:01.0.1/1:8:		Empty
	0001:61:01.0.2/0:8:		Empty

Figure 76. Example Concurrent Device Add display

7. Type option1 (Select) next to the location from which you removed the disk drive. The Verify Device Concurrent Add display is shown.
8. Press Enter on the Verify Device Concurrent Add display. The Complete Device Concurrent Add display is shown.
9. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
10. Slide the disk drive all the way into the system or expansion unit and then lock it in place by pushing in the disk drive handle, as shown in Figure 77 on page 86.



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Figure 77. Installing a disk drive in a model or 7311-D20

11. Press Enter on the Complete Device Concurrent Add display to indicate that the disk drive is installed.
12. Rebuild the data on the replacement disk drive. For instructions, go to “Rebuilding data on a replacement disk drive using Linux” on page 125.

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit or rack front door.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Replacing a disk drive with the IBM i system or logical partition powered on

You might need to replace a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) disk drive in a system or expansion unit while the IBM i operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Attention: The powered-on procedure is a complex set of steps that must be performed exactly to avoid potential data loss or system damage. You might also consider the powered-off procedure, which is a simpler task that involves less risk of data loss or system damage. For instructions, see “Replacing a disk drive with the system or logical partition powered off” on page 102.

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. If applicable, remove the system unit door, expansion unit door, or the rack door.
3. If applicable, remove the front cover.
 - If you have a front cover from any other models, remove the front cover.

Remove the disk drive

1. Locate the disk drive to be replaced and record the location information, then use the location information to activate the identify light for that disk drive. For instructions, see “Identifying a failing part in an IBM i system or logical partition” on page 168.
2. Determine if the disk drive to be removed is a non-configured unit by completing the following steps:
 - a. Type `strsst` on the command line of the IBM i session and press Enter.
 - b. Type your service tools user ID and service tools password and press Enter.
 - c. Select **Work with disk units** and press Enter.
 - d. Select **Display Disk Configuration** and press Enter.
 - e. Select **Display non-configured units** and press Enter.

Is the failed drive a non-configured unit?

 - No: Continue to Verify disk is suspended.
 - Yes: Continue to next step.
 - f. Determine if the disk drive to be removed was replaced by a hot spare when it failed. A xxxx9031 error logged close to the same time of the original disk failure indicates the automatic Rebuild of the data to a hot spare device.
3. Verify that the disk drive you are replacing has been suspended before continuing with this procedure. For instructions, see “Preparing to remove a disk drive from a system or logical partition controlled by IBM i” on page 59.
4. Did you find the service action log entry related to this problem?
 - **No:** Exit the service action log and go to step 6.
 - **Yes:** Continue with the next step.
5. Choose the concurrent maintenance option. This option fills in the disk drive location on the concurrent maintenance display. Go to step 8 on page 89.
6. Select **Device Concurrent Maintenance** from the Hardware Service Manager display. Press Enter. The Device Concurrent Maintenance display is shown, as shown in the following figure.

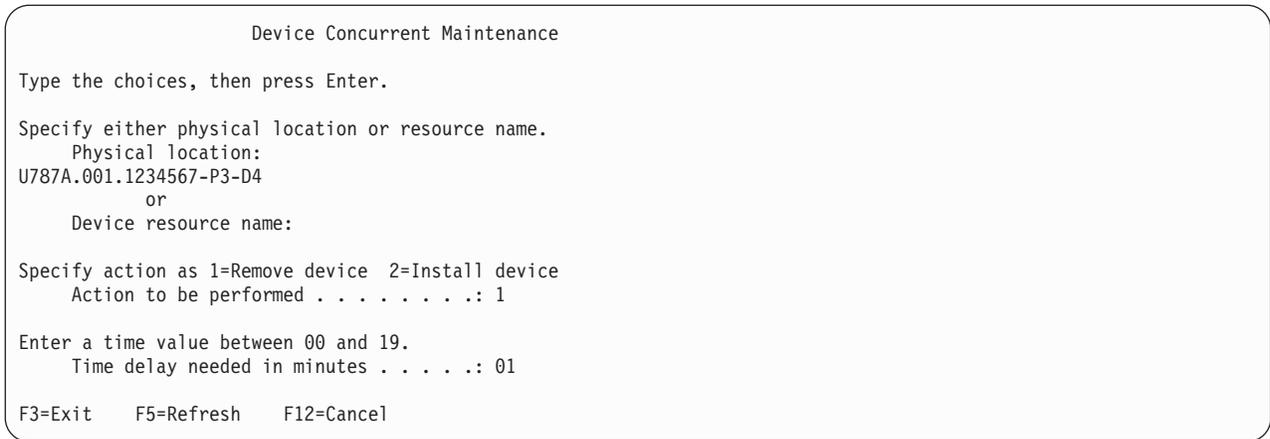


Figure 78. Example Device Concurrent Maintenance display

- If the physical location does not appear in the Device Concurrent Maintenance display, type the physical location where you will be replacing the disk drive as shown in the preceding example, Figure 78.

The physical location has the following form: U787A.001.AAAXXX-P3-D4 where P3-D4 is the position of the disk drive in the system unit or expansion unit. You can get the U787A.001.AAAXXX location information from the control panel display on the system unit or expansion unit.

If you cannot get the information from the control panel, find the feature code (FC) and sequence number (SN or SEQ) on the label that appears on the front of the system unit or expansion unit as shown in the following figure.



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Figure 79. Example system or expansion unit label

In this example, U787A.001.AAAXXX-P3-D4, U787A.001 comes from the feature code (FC) on the label, AAAXXX comes from the last seven digits of the sequence number (SN or SEQ) on the label, and P3-D4 is the slot where you are replacing the disk drive as shown in Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.

In the example, U5074.001.AAAXXX-DB3-D32, you would replace a disk drive in the expansion unit with type 5074, model 001, sequence number AAAXXX, and disk drive position DB3-D32.

- Select option 1 (Remove device) for the **Action to be performed**.
- Set the time delay for one minute: 01.

Important: Do not press Enter at this time.

- Locate the concurrent maintenance light that corresponds to the position of the disk drive that you are replacing. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
 - “Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures” on page 122

Important: When you press Enter, after a 1-minute delay, this light comes on and begins to blink rapidly. You then have 9 seconds to remove the disk drive.

11. Press Enter on the console.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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.
12. When the concurrent maintenance light starts blinking, squeeze and pull the handle of the disk drive out toward you before you remove the disk drive, as shown in the following figure. If the handle is not all the way out, the disk drive cannot slide out of the system or expansion unit.

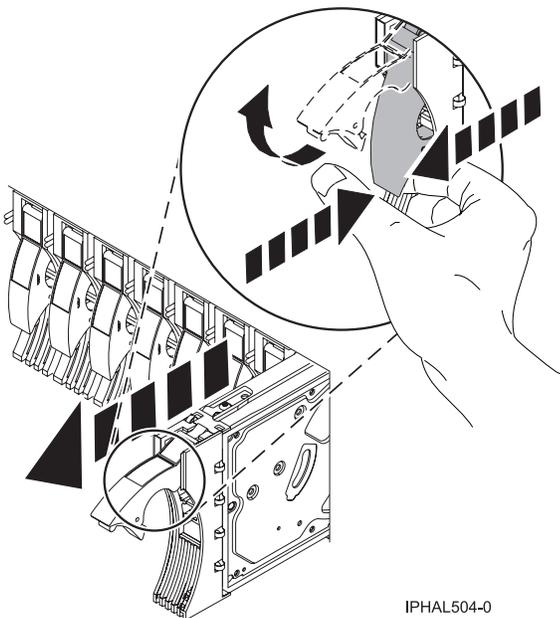


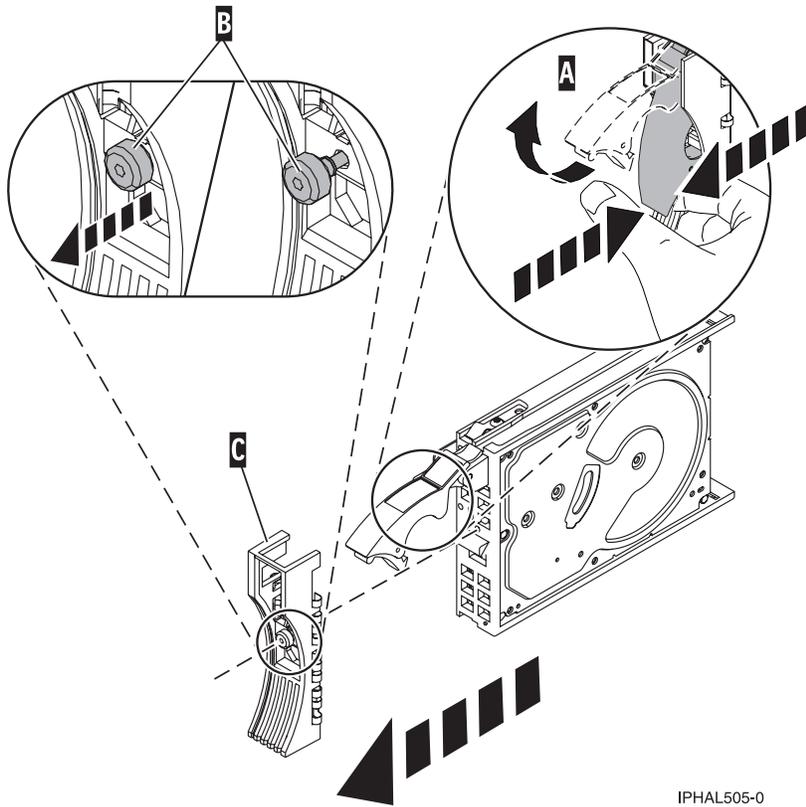
Figure 80. Removing a disk drive

13. Support the bottom of the disk drive as you slide it out of the system. Do not hold the disk drive by the handle.

Note: The concurrent maintenance light will stop blinking and remain off when the disk drive is removed.

14. Loosen and pull out on the thumbscrew **B** to release the disk-drive bezel **C** from the disk drive, as shown in the following figure.

Important: If the disk drive bezel does not have a thumbscrew it is not removable and is a SAS disk drive. The replacement drive should come with an attached bezel.



IPHAL505-0

Figure 81. Removing a disk-drive bezel

Replace the disk drive

1. Return to the console and wait until the Concurrent Maintenance Results display is shown. Press F12.
2. The physical locations you entered in step 7 on page 89 of this procedure might still appear on the display. If not, retype the physical location where you will be installing the new disk drive.
In the example, U787A.001.1234567-P3-D4, you would install a disk drive in the system unit with type 9406, Model 520, sequence number 1234567, and disk drive position P3-D4.
In the example, U5074.001.1234567-DB3-D32, you would install a disk drive in the expansion unit with type 5074, model 001, sequence number 1234567, and disk drive position DB3-D32.
3. Select option 2 (Install device) for the Action to be performed.
4. Set the time delay for one minute:01.

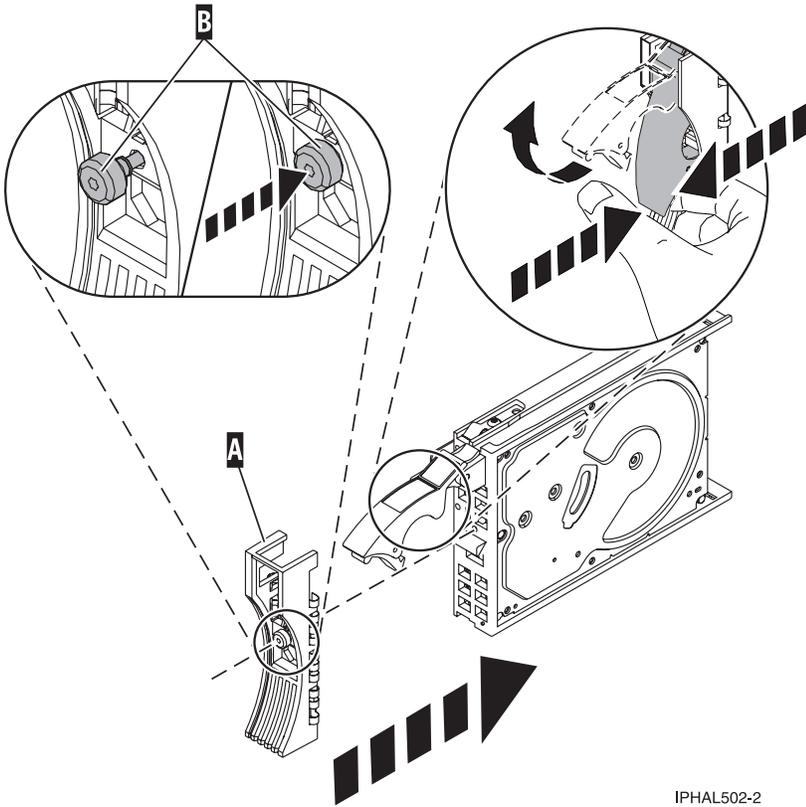
Important: Do not press Enter at this time.

5. Locate the concurrent maintenance light that corresponds to the position of the disk drive that you are replacing.

Important: When you press Enter, after a one minute delay, this light comes on and begins to blink rapidly. You then have nine seconds to slide the disk drive all the way in and then lock it in place by pushing in the disk drive handle.

6. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
7. Remove the disk drive from its protective package.

8. Unlock the disk drive handle by squeezing and pulling it out toward you before you install the disk drive. If the handle is not all the way out, the disk drive can not slide into the system or expansion unit.
9. Follow these steps to install the disk-drive bezel on the replacement disk drive:
 - a. Attach the bezel **A** to the disk drive, as shown in the following figure.
 - b. Press in and then tighten the thumbscrew **B** to secure the bezel to the disk drive.

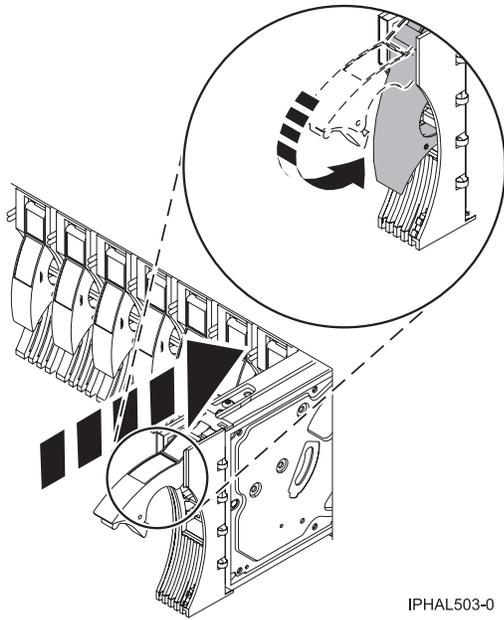


IPHAL502-2

Figure 82. Installing a disk-drive bezel

10. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
11. Slide the disk drive halfway into the system or expansion unit.
12. Press Enter on the console.
13. When the light starts blinking, slide the disk drive all the way in. Then, lock the disk drive in place by pushing in the disk drive handle, as shown in the following figure.

Note: The light stops blinking and remains on when you have installed the disk drive properly.



IPHAL503-0

Figure 83. Installing a disk drive

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Return to the console and wait until the Concurrent Maintenance Results display is shown. Press Enter.
4. If you return to the Service Action Log display, exit the service action log.
5. When the Hardware Service Manager display is shown, press F3.
6. To complete this procedure, go to “Rebuilding data on a replacement disk drive using IBM i” on page 46.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Replacing a disk drive using hot spare in an IBM i system or logical partition

You can use the hot spare function to replace a disk drive in a system or expansion unit while the IBM i operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Note: Some of the figures in these procedures might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.
2. Remove the front cover and door, if you need to, to access the disk drives. For instructions on removing the cover, see “Removing and replacing covers and doors” on page 177.
3. Locate the disk drive to be replaced and record the location information, then use the location information to activate the identify light for that disk drive. For instructions, see “Identifying a failing part in an IBM i system or logical partition” on page 168

Remove the disk drive

1. Type `strsst` on the command line of the IBM i session and press Enter.
2. Type your service tools user ID and service tools password on the **Start Service Tools (STRSST) Sign On** display, and press Enter.
3. Select **Work with disk units** from the System Service Tools display, press Enter.
4. Select **Display Disk Configuration** from the Work with Disk Units display, and press Enter.
5. Select **Display non-configured units** from the Display Disk Configuration display, and press Enter.
6. Is the failed drive a non-configured unit?
 - No: Go to “Replacing a disk drive with the IBM i system or logical partition powered on” on page 87.
 - Yes: Determine if the disk drive to be removed was replaced by a hot spare when it failed. A `xxxx9031` error logged close to the same time of the original disk failure indicates the automatic Rebuild of the data to a hot spare device, then go on to the next step.
7. Is the disk drive to be removed controlled by the load source adapter?
 - No: Go to step 10.
 - Yes: Go to the next step.
8. Is the disk drive to be removed located in a valid load source position?
 - No: Go to “Configuring a disk drive on a load source adapter for hot spare using the IBM i operating system” on page 133.
 - Yes: Go to step 10.
9. Choose the concurrent maintenance option. This option fills in the disk drive location on the concurrent maintenance display. Go to step 12 on page 96.
10. Select **Device Concurrent Maintenance** from the Hardware Service Manager display. Press Enter. The Device Concurrent Maintenance display is shown, as shown in the following figure.

```
Device Concurrent Maintenance

Type the choices, then press Enter.

Specify either physical location or resource name.
Physical location:
U787A.001.1234567-P3-D4
or
Device resource name:

Specify action as 1=Remove device 2=Install device
Action to be performed . . . . . : 1

Enter a time value between 00 and 19.
Time delay needed in minutes . . . . . : 01

F3=Exit  F5=Refresh  F12=Cancel
```

Figure 84. Example Device Concurrent Maintenance display

11. If the physical location does not appear in the Device Concurrent Maintenance display, type the physical location where you will be replacing the disk drive as shown in the preceding example, Figure 84 on page 95.

The physical location has the following form: U787A.001.AAAXXXX-P3-D4 where P3-D4 is the position of the disk drive in the system unit or expansion unit. You can get the U787A.001.AAAXXXX location information from the control panel display on the system unit or expansion unit.

If you cannot get the information from the control panel, find the feature code (FC) and sequence number (SN or SEQ) on the label that appears on the front of the system unit or expansion unit as shown in the following figure.

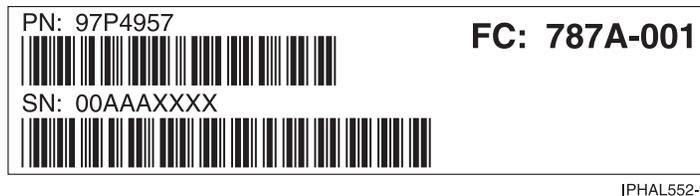


Figure 85. Example system or expansion unit label

In this example, U787A.001.AAAXXXX-P3-D4, U787A.001 comes from the feature code (FC) on the label, AAAXXXX comes from the last seven digits of the sequence number (SN or SEQ) on the label, and P3-D4 is the slot where you are replacing the disk drive as shown in Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.

In the example, U5074.001.AAAXXXX-DB3-D32, you would replace a disk drive in the expansion unit with type 5074, model 001, sequence number AAAXXXX, and disk drive position DB3-D32.

12. Select option 1 (Remove device) for the **Action to be performed**.
13. Set the time delay for one minute: 01.

Important: Do not press Enter at this time.

14. Locate the concurrent maintenance light that corresponds to the position of the disk drive that you are replacing. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
 - “Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures” on page 122

Important: When you press Enter, after a one minute delay, this light comes on and begins to blink rapidly. You then have nine seconds to remove the disk drive.

15. Press Enter on the console.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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.
16. When the concurrent maintenance light starts blinking, squeeze and pull the handle of the disk drive out toward you before you remove the disk drive, as shown in the following figure. If the handle is not all the way out, the disk drive cannot slide out of the system or expansion unit.

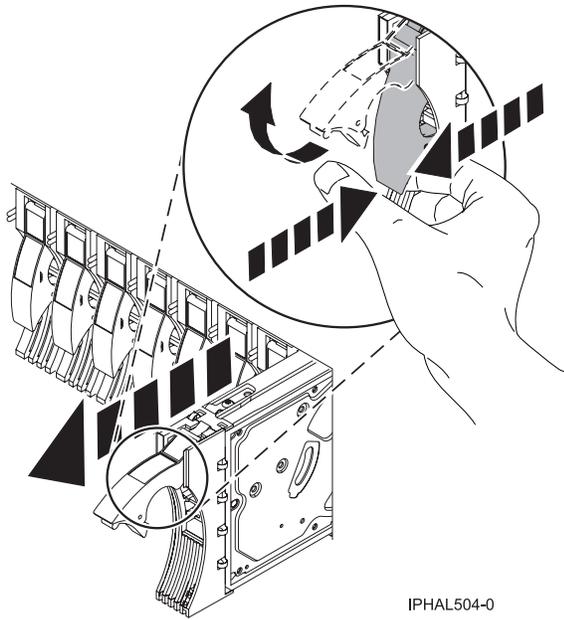


Figure 86. Removing a disk drive

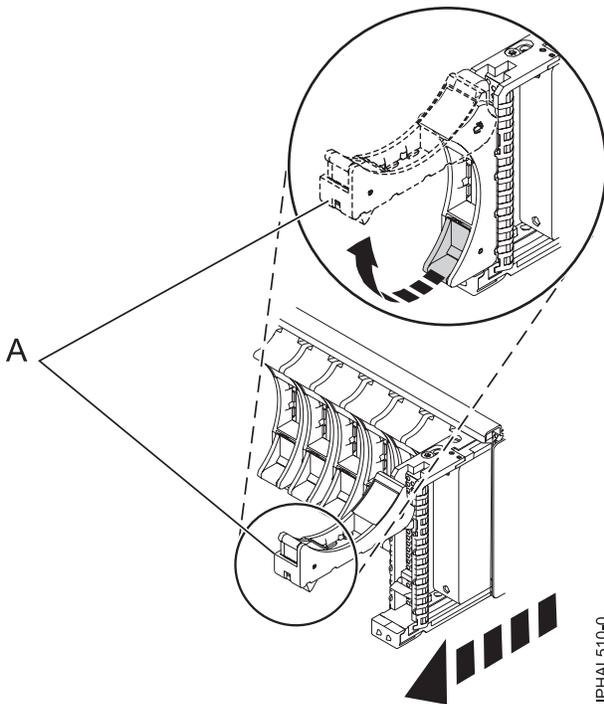


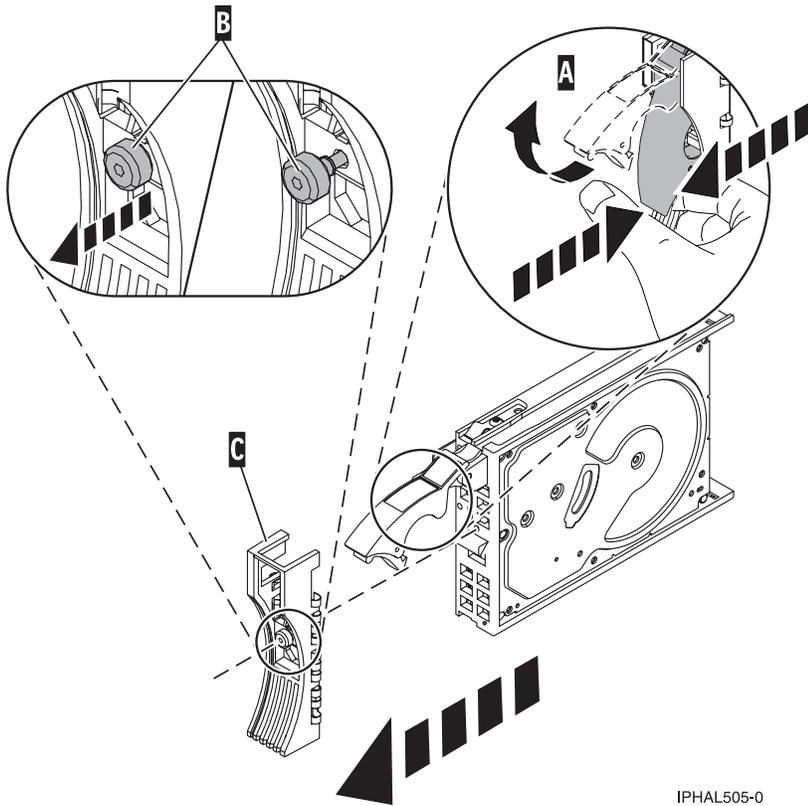
Figure 87. Removing a small-form factor disk drive from the 5803 expansion unit

17. Support the bottom of the disk drive as you slide it out of the system. Do not hold the disk drive by the handle.

Note: The concurrent maintenance light will stop blinking and remain off when the disk drive is removed.

18. Loosen and pull out on the thumbscrew **B** to release the disk-drive bezel **C** from the disk drive, as shown in the following figure.

Important: If the disk drive bezel does not have a thumbscrew it is not removable and is a SAS disk drive. The replacement drive should come with an attached bezel.



IPHAL505-0

Figure 88. Removing a disk-drive bezel

Replace the disk drive

1. Return to the console and wait until the Concurrent Maintenance Results display is shown. Press F12.
2. The physical locations you entered in step 11 on page 96 of this procedure might still appear on the display. If not, retype the physical location where you will be installing the new disk drive.
In the example, U787A.001.1234567-P3-D4, you would install a disk drive in the system unit with type 9406, Model 520, sequence number 1234567, and disk drive position P3-D4.
In the example, U5074.001.1234567-DB3-D32, you would install a disk drive in the expansion unit with type 5074, model 001, sequence number 1234567, and disk drive position DB3-D32.
3. Select option 2 (Install device) for the Action to be performed.
4. Set the time delay for one minute:01.

Important: Do not press Enter at this time.

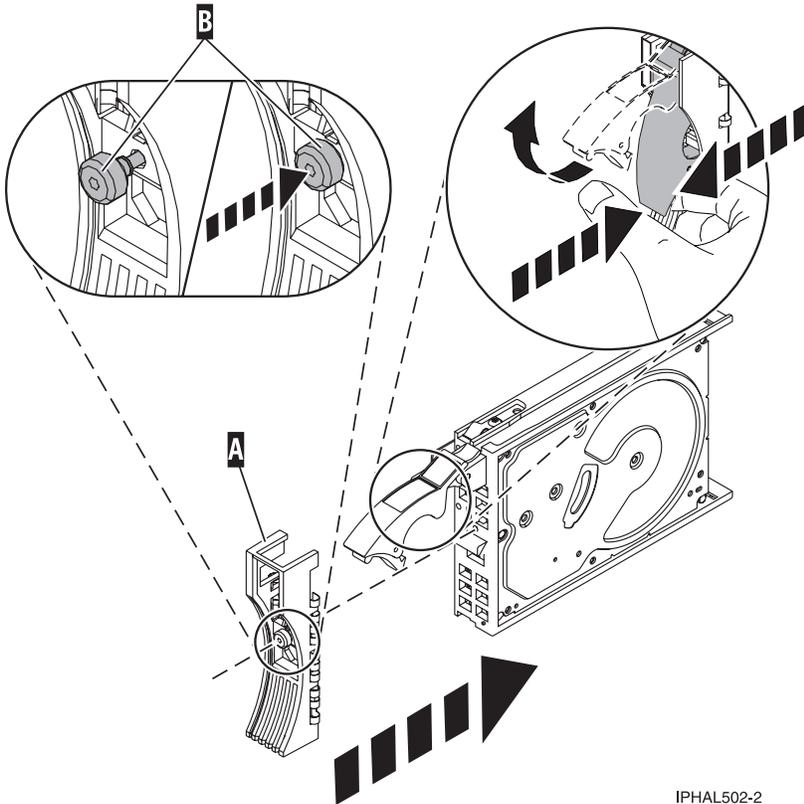
5. Locate the concurrent maintenance light that corresponds to the position of the disk drive that you are replacing.

Important: When you press Enter, after a one minute delay, this light comes on and begins to blink rapidly. You then have nine seconds to slide the disk drive all the way in and then lock it in place by pushing in the disk drive handle.

6. Find the package that contains the new disk drive.

Attention: Disk drives are fragile. Handle with care.

7. Remove the disk drive from its protective package.
8. Unlock the disk drive handle by squeezing and pulling it out toward you before you install the disk drive. If the handle is not all the way out, the disk drive can not slide into the system or expansion unit.
9. Follow these steps to install the disk-drive bezel on the replacement disk drive:
 - a. Attach the bezel **A** to the disk drive, as shown in the following figure.
 - b. Press in and then tighten the thumbscrew **B** to secure the bezel to the disk drive.



IPHAL502-2

Figure 89. Installing a disk-drive bezel

10. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
11. Slide the disk drive halfway into the system or expansion unit.
12. Press Enter on the console.
13. When the light starts blinking, slide the disk drive all the way in. Then, lock the disk drive in place by pushing in the disk drive handle, as shown in the following figure.

Note: The light stops blinking and remains on when you have installed the disk drive properly.

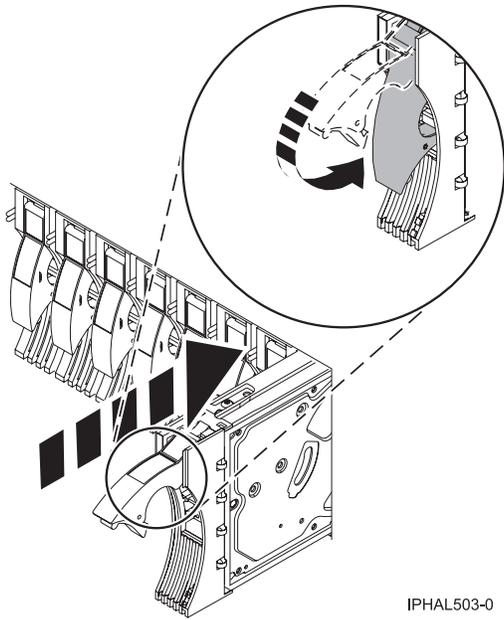


Figure 90. Installing a disk drive

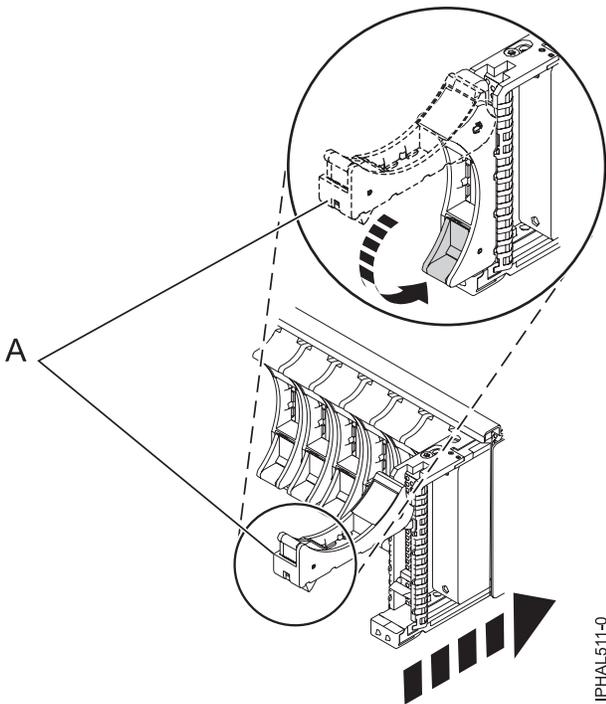


Figure 91. Installing a small-form factor disk drive in the 5803 expansion unit

Complete the procedure

1. When the Hardware Service Manager display is shown, press F3.
2. Select **Non-configured disk units** from the Work with Disk Units display, and press Enter.
3. Replace the front cover.
4. Install or close the system, expansion unit or rack front door.

5. Return to the console and wait until the Concurrent Maintenance Results display is shown, and press Enter.
6. If you return to the Hardware Service Manager (HSM), exit the HSM.
7. Select **Work with disk units** from the Start System Service Tools display.
8. Select **Non-configured disk units** from the Work with Disk Units display, and press Enter.
9. Is the new disk unit displayed with a status of non-configured?

Note: It may take several minutes for the new disk drive to display.

- No: Contact your next level of support.
- Yes: Continue with the next step.

10. Press **F3** to return to the Work with Disk Units display.
11. Select **Work with disk unit recovery** from the Work with Disk Units display, and press Enter.
12. Select **Disk unit problem recovery procedure**, and press Enter.
13. Select **Initialize and format disk unit**, and press Enter.
14. Select the new disk and press Enter.

Note: This will take several minutes to complete.

15. When the disk drive is initialized and formatted, press **F3** to return to the Work with Disk Units display.
16. Select **Start hot spare**, and press Enter.
17. Select the IOA with the new disk, then press Enter and press Enter again.
18. Does the new hot spare disk drive have a smaller capacity than previous hot spare disk drive? Refer to the resource name identified in the xxxx9031 error which was logged close to the same time of the original disk failure.
 - No: The procedure is complete. Press **F3** to return to the System service tools display.
 - Yes: Go to the next step.
19. Select **Display Device Parity Status**, and press Enter. If the new disk drive is not active and hot spare protected, do not continue. Call your next level of support.

Restriction: You must complete the following steps to ensure your data is protected. The following steps will allow you to exchange the two disk drives so that the larger disk drive will become the hot spare, and the smaller disk drive will become a parity set member.

20. Fail the previous hot spare disk drive by unlocking the disk drive handle by squeezing it and pulling it out toward you.
21. Pull the drive out about one inch and wait ten seconds.
22. Push the disk drive back into the slot and close the handle.
23. Return to step 5 and start hot spare on the larger drive.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Replacing a disk drive with the system or logical partition powered off

You might need to install a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) disk drive in a system or logical partition that controls the disk drive location with the power off. Use the procedure in this section to perform this task.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

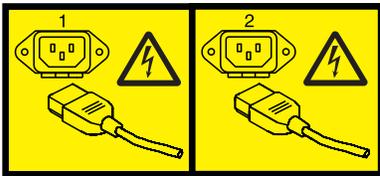
Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 165.

2. If you cannot start the system or logical partition that controls the disk drive location, or if the system or logical partition are not powered on, go to step 6.
3. Identify the disk drive to be replaced and record the location information. For information, see “Identifying a failing part” on page 167.
4. Prepare to remove the disk drive from the system or expansion unit as follows:
 - If the system or logical partition that controls the disk drive location is running AIX, follow the steps in “Preparing to remove a disk drive from a system or expansion unit controlled by AIX” on page 125.
 - If the system or logical partition that controls the disk drive location is running IBM i, follow the steps in “Preparing to remove a disk drive from a system or logical partition controlled by IBM i” on page 59.
 - If the system or logical partition that controls the disk drive location is running Linux and the disk drive you want to replace is unprotected or in use, move the data from the disk drive before continuing with this procedure. For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.
 This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.
5. Stop the system or logical partition that controls the disk drive location. For instructions, see “Stopping a system or logical partition” on page 173.
6. If you stopped the logical partition, do not disconnect the power source. If you stopped the system, disconnect the power source from the system by unplugging the system.

Note: This system might be equipped with a second power supply. Before continuing with this procedure, ensure that all power sources to the system have been completely disconnected.

(L003)



or



7. Remove the system unit door or expansion unit door or open the rack front door. For instructions, select the appropriate procedure from the following list:
 - “Removing and replacing the expansion unit cover or door” on page 175
8. Remove the front cover.

Remove the disk drive

1. Unlock the disk drive handle by squeezing it and pulling it out toward you, as shown in Figure 92.

Attention:

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

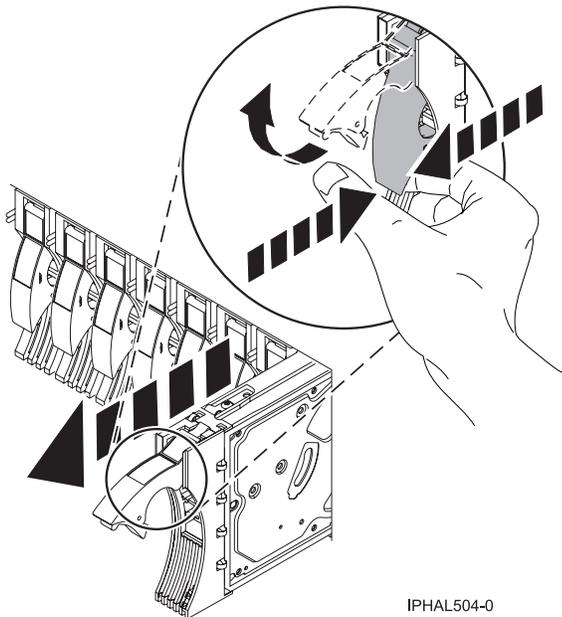


Figure 92. Removing a disk drive from a model or 7311-D20

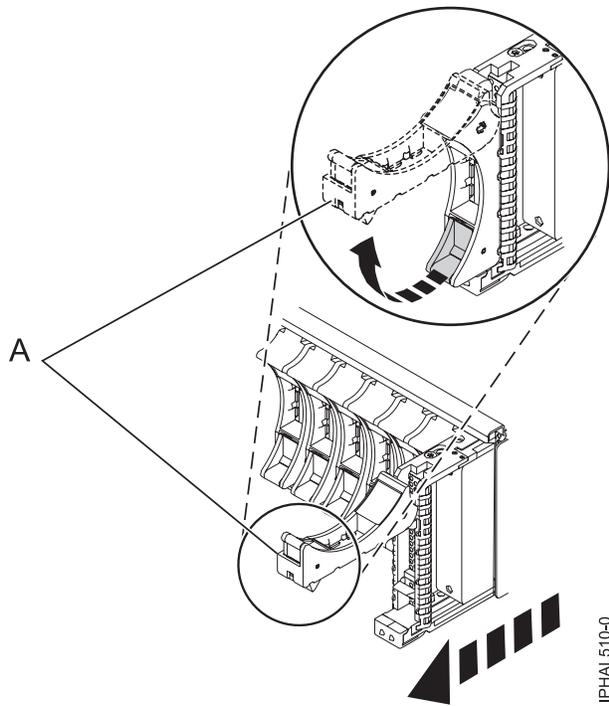
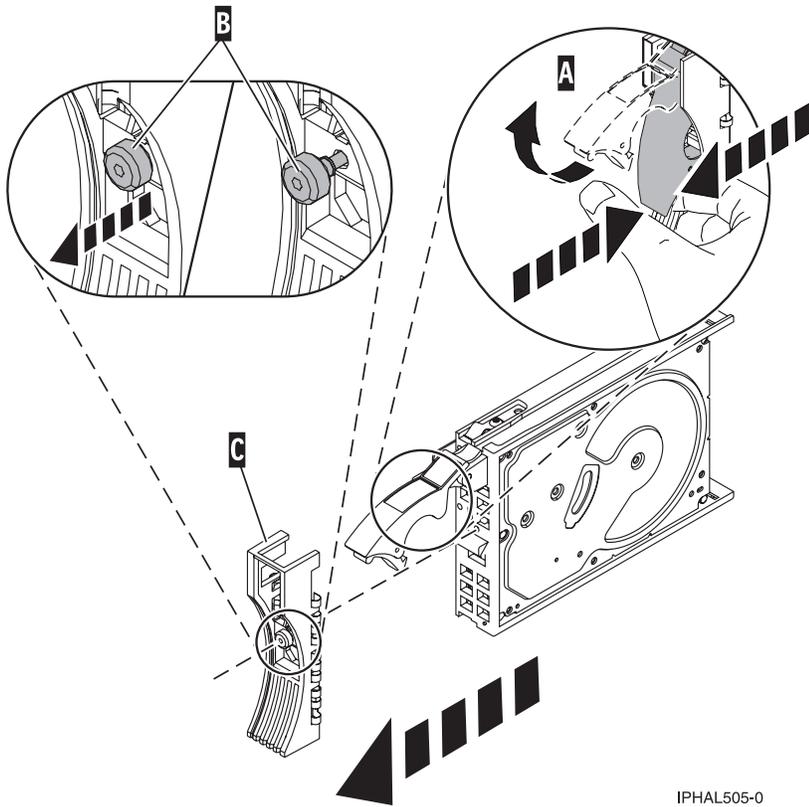


Figure 93. Removing a small-form factor disk drive from the 5803 expansion unit

2. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.
3. If your replacement disk drive does not have a bezel preinstalled, then perform the following step. Loosen and then pull out on the thumbscrew (B) to release the disk-drive bezel (C) from the disk drive, as shown in the following figure.

Important: If the disk drive bezel does not have a thumbscrew it is not removable and is a SAS disk drive. The replacement drive should come with an attached bezel.

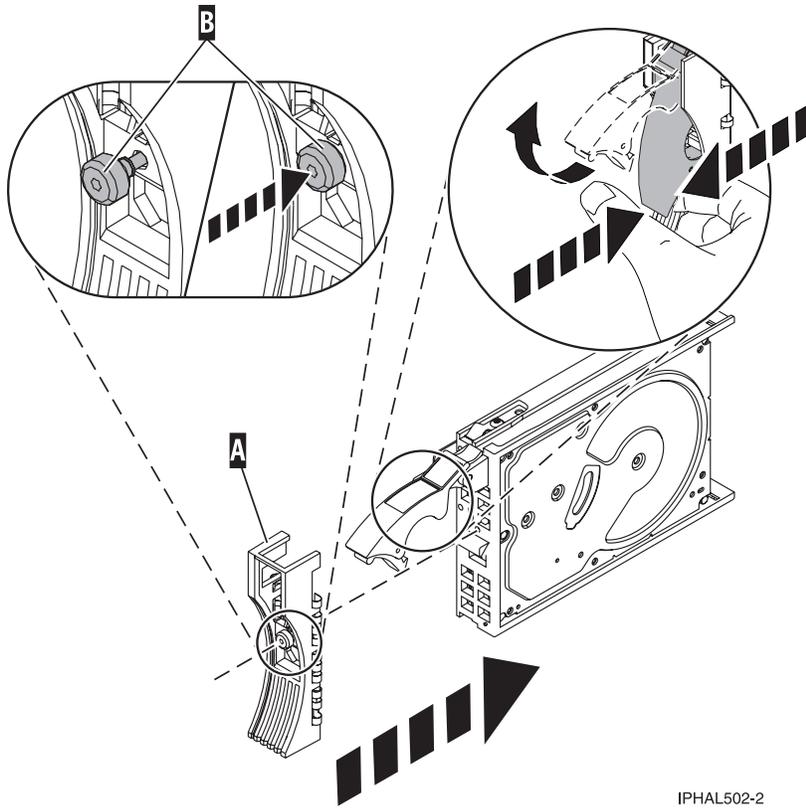


IPHAL505-0

Figure 94. Removing a disk-drive bezel

Replace the disk drive

1. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
2. Remove the disk drive from its protective package.
3. Unlock the disk drive handle by squeezing and pulling it out toward you before you install the disk drive. If the handle is not all the way out, the disk drive will not slide into the system or expansion unit.
4. If your replacement disk drive does not have a bezel preinstalled, then follow these steps to install the disk-drive bezel on the replacement disk drive:
 - a. Attach the bezel (A) to the disk drive, as shown in the following figure.
 - b. Press in and then tighten the thumbscrew (B) to secure the bezel to the disk drive.



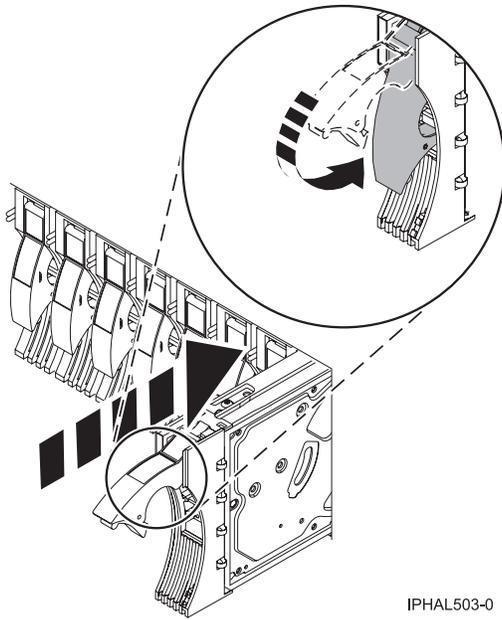
IPHAL502-2

Figure 95. Attaching a disk-drive bezel

5. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
6. Slide the disk drive into the system or expansion unit until it stops.

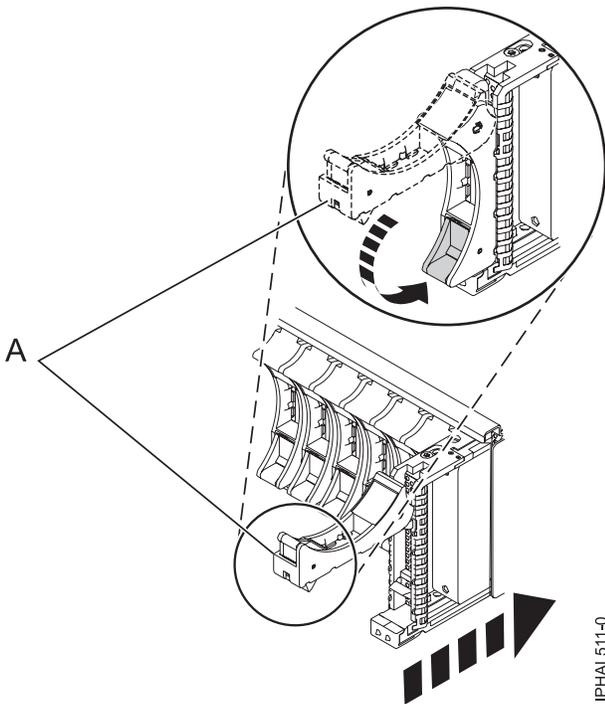
Note: It is important to ensure that when installing a disk drive, that the drive is fully seated and all the way into the system.

7. Push the disk drive handle in until it locks, as shown in Figure 96 on page 108.



IPHAL503-0

Figure 96. Installing a disk drive in a model or 7311-D20



IPHAL511-0

Figure 97. Installing a small-form factor disk drive in the 5803 expansion unit

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Reconnect all system power cables.
4. Reconnect the system to the power supply by plugging it in.

5. Start the system or logical partition. For instructions, see “Starting the system or logical partition” on page 171.
6. If the system or logical partition that controls the disk drive you replaced is running AIX, verify that the disk drive is working as described in “Verifying an installed feature or replaced part in an AIX system or logical partition” on page 182. If it is not possible to run online diagnostics, for example if you replaced the root volume group (rootvg) disk drive, use standalone diagnostics as described in “Verifying an installed part by using stand-alone diagnostics” on page 186.
7. To rebuild the data on the replacement disk drive, select the operating system for the system or logical partition that controls the disk drive:
 - “Rebuilding data on a replacement disk drive using AIX” on page 125
 - “Rebuilding data on a replacement disk drive using IBM i” on page 46
 - “Rebuilding data on a replacement disk drive using Linux” on page 125

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

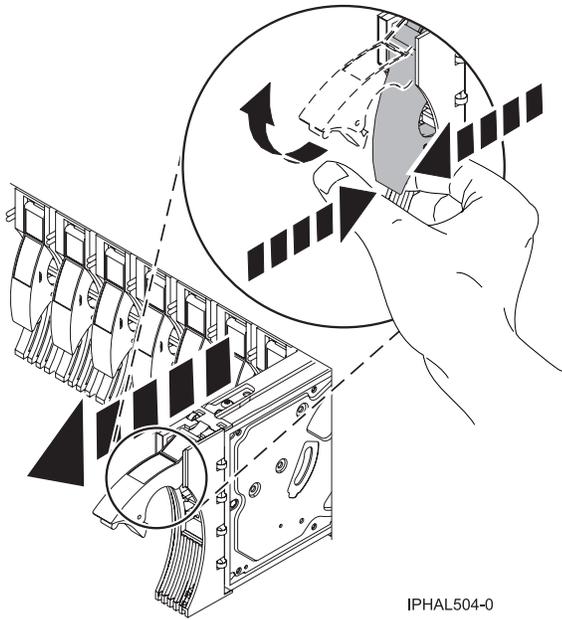
Replacing a SCSI disk drive

You might need to replace a Small Computer System Interface (SCSI) disk drive in a system or expansion unit. Use the procedure in this section to perform this task.

Remove the disk drive

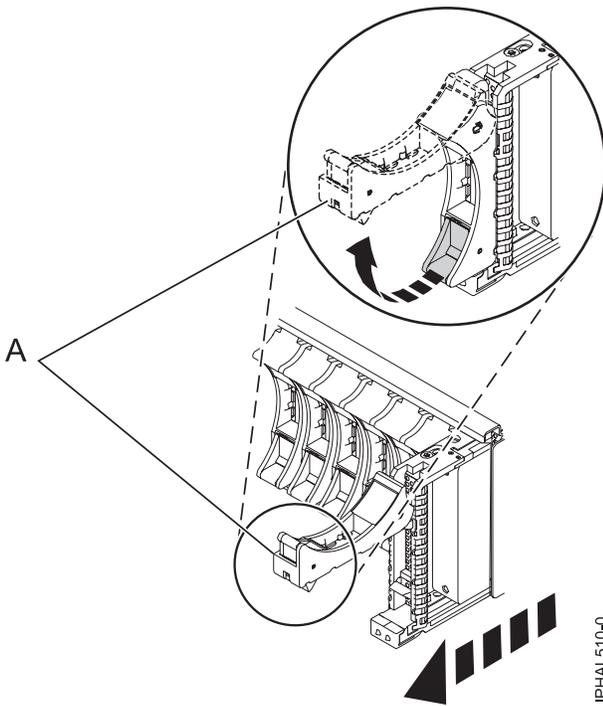
1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. Press Enter to continue.
4. On the Function Selection display, select **Task Selection**.
5. On the Task Selection display, select **Hot Plug Task**.
6. Select **SCSI and SCSI RAID Hot Plug Manager**.
7. Select **Identify a Device Attached to a SCSI Hot Swap Enclosure Device**.
8. Select the disk drive you want to replace and press Enter.

The disk drive slot enters the Identify state, indicated by the flashing concurrent maintenance light. To view the locations of the concurrent maintenance lights, go to Chapter 6, “Disk drive locations and concurrent maintenance lights,” on page 119.
9. Exit to the SCSI and SCSI RAID Hot Plug Manager display.
10. On the SCSI and SCSI RAID Hot Plug Manager display, select **Replace/Remove a Device Attached to a SCSI Hot Swap Enclosure Device**. A list of all slots from which you can remove a disk drive is shown.
11. Select the slot that contains the disk drive you want to remove. The disk drive slot enters the Remove state and power is removed from the slot. The concurrent maintenance light for the slot begins flashing rapidly.
12. Unlock the disk drive. Unlock the disk drive handle by squeezing it and pulling it out toward you as shown in the following figures.



IPHAL504-0

Figure 98. Removing a disk drive from a model or 7311-D20



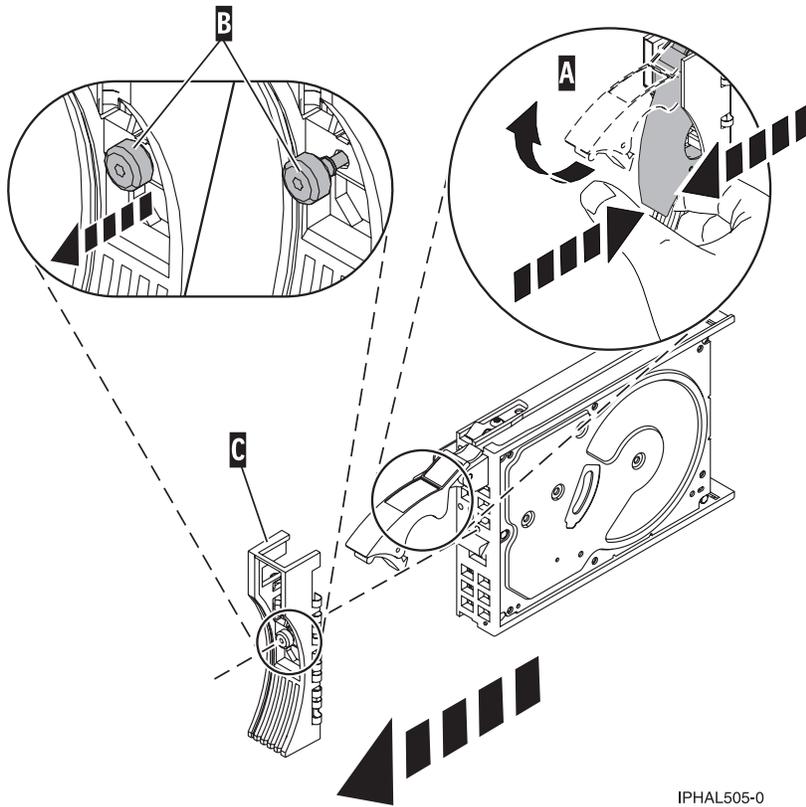
IPHAL510-0

Figure 99. Removing a small-form factor disk drive from the 5803 expansion unit

13. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.

Note: The concurrent maintenance light for the slot turns off when you remove the disk drive.

14. Loosen and pull out on the thumbscrew **B** to release the bezel **C** from the disk drive.

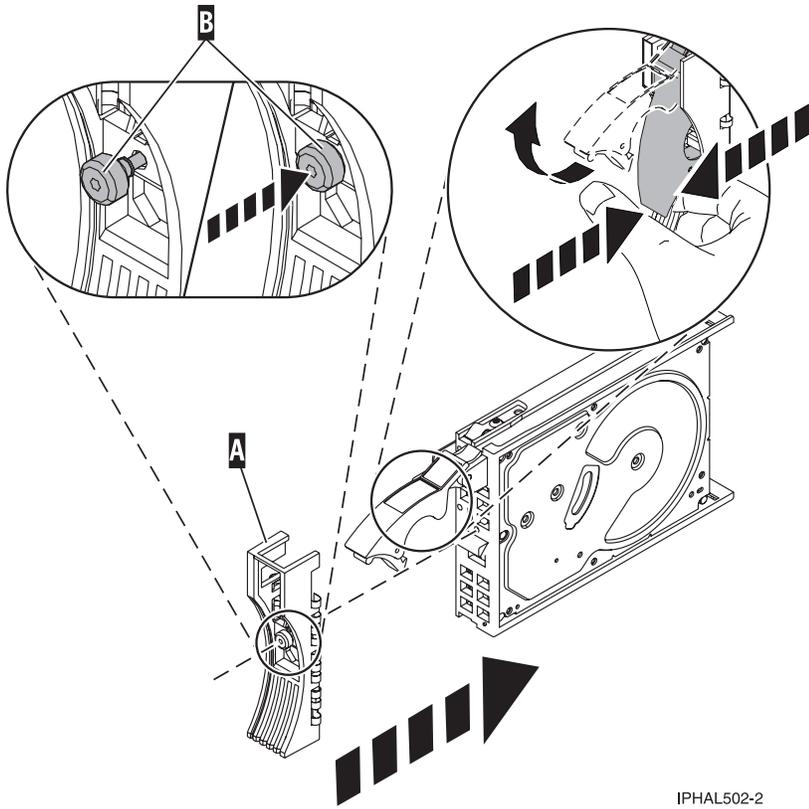


IPHAL505-0

Figure 100. Removing a disk-drive bezel

Replace the disk drive

1. Find the package that contains the new disk drive.
Attention: Disk drives are fragile. Handle with care.
2. Remove the disk drive from its protective package.
3. Unlock the handle of the replacement disk drive by squeezing and pulling it out toward you. If the handle is not all the way out, the disk drive can not slide into the system.
4. Attach disk-drive bezel **A** to the replacement disk drive, as shown in the following figure.



IPHAL502-2

Figure 101. Attaching a disk-drive bezel

5. Press in and then tighten thumbscrew **B** to secure bezel **A** to the disk drive.
6. Install the disk drive as follows:
 - a. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
 - b. Slide the disk drive into the system until it stops.

Note: It is important to ensure that when installing a disk drive, that the drive is fully seated and all the way into the system.

- c. Push the disk drive handle in until it locks, as shown in Figure 102 on page 113.

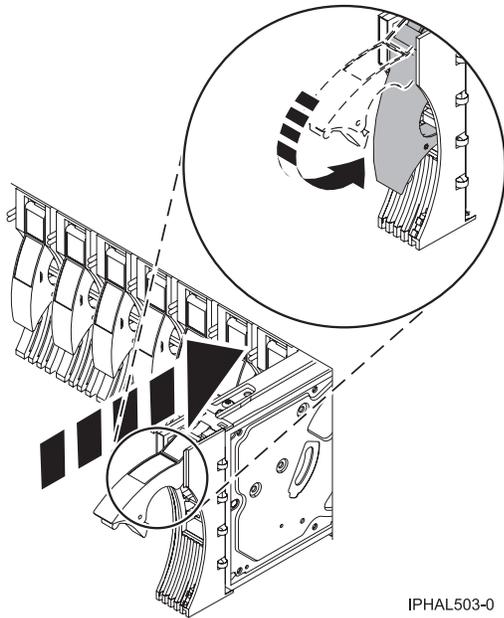


Figure 102. Installing a disk drive in a model a model or 7311-D20

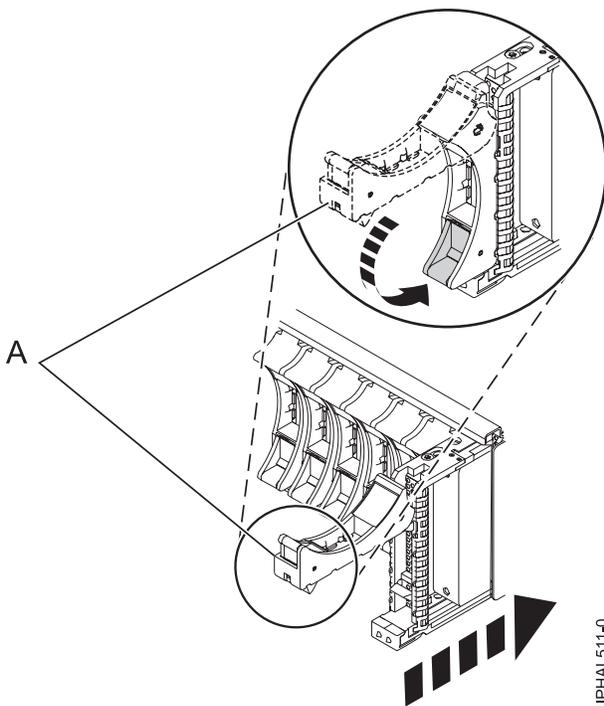


Figure 103. Installing a small-form factor disk drive in the 5803 expansion unit

7. Press Enter.
8. Exit to the SCSI and SCSI RAID Hot-Plug Manager menu.
9. Select **Configure Added/Replaced Devices**. Press Enter.
10. Select the disk drive that you replaced and then press Enter.
The disk drive is now configured.
11. Exit to the Task Selection display.

12. Select **Log Repair Action**.
13. Select the disk drive that you replaced and then press Enter.
14. Select **Commit** after you have made your selection and then press Enter.
15. Exit to the command line.

Complete the procedure

1. Replace the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Verify that the disk drive is working. For instructions, see “Verifying an installed feature or replaced part in an AIX system or logical partition” on page 182. If it is not possible to run online AIX diagnostics, for example if you replaced the root volume group (rootvg) disk drive, use standalone diagnostics as described in “Verifying an installed part by using stand-alone diagnostics” on page 186.
4. To prepare the disk drive for use, go to “Rebuilding data on a replacement disk drive using AIX” on page 125.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Chapter 5. Removing or installing a disk-drive filler

You might need to remove or install a Small Computer System Interface (SCSI) disk-drive filler in the server or expansion unit. This section includes procedures so that you can perform these tasks.

Note: Refill the disk drive slots with either another disk drive or a disk-drive filler. Filling the disk drive slot will help ensure proper air flow for cooling and help maintain optimal EMI compliance.

Removing a disk-drive filler

You might need to remove a Small Computer System Interface (SCSI) disk-drive filler from the server or expansion unit. Use the procedure in this section to perform this task.

Note: Some of the figures in this procedure might not look exactly like the system or expansion unit that you have. However, the steps to perform the task are the same.

1. Remove the system unit door, expansion unit door, or open the rack front door. For instructions, select the appropriate procedure from the following list:
 - “Removing and replacing the expansion unit cover or door” on page 175
2. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - “Removing and replacing covers and doors” on page 177

If you have a front cover from any other models, remove the front cover.

3. Identify the disk-drive filler you want to remove.
4. Pull the disk-drive filler from the slot. Pull the disk-drive filler from the slot that you want to use, as shown in Figure 104 on page 116.

Attention:

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

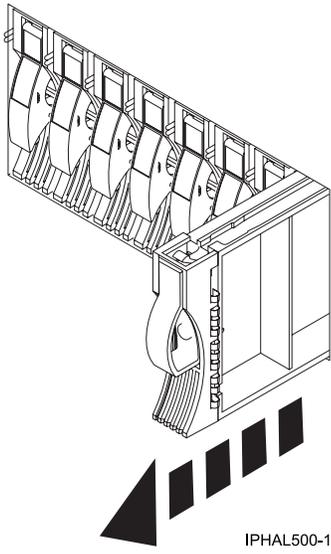


Figure 104. Removing a disk-drive filler from a model or 7311-D20

5. Gently pull off the disk-drive bezel latch (A) from the front of the filler, as shown in the following figure.

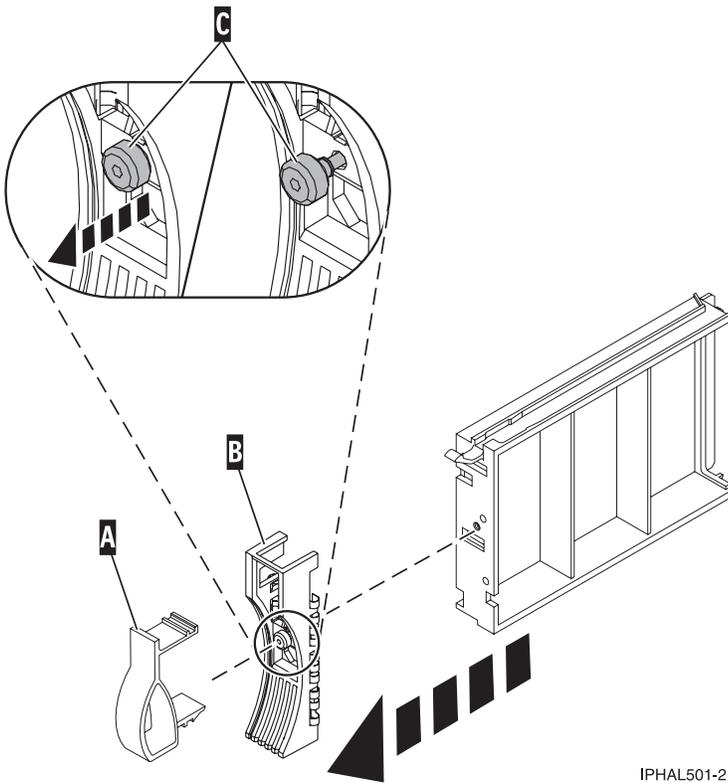


Figure 105. Removing a disk-drive bezel

6. Loosen and then pull out on the thumbscrew (C) to release the bezel (B) from the front edge of the filler.

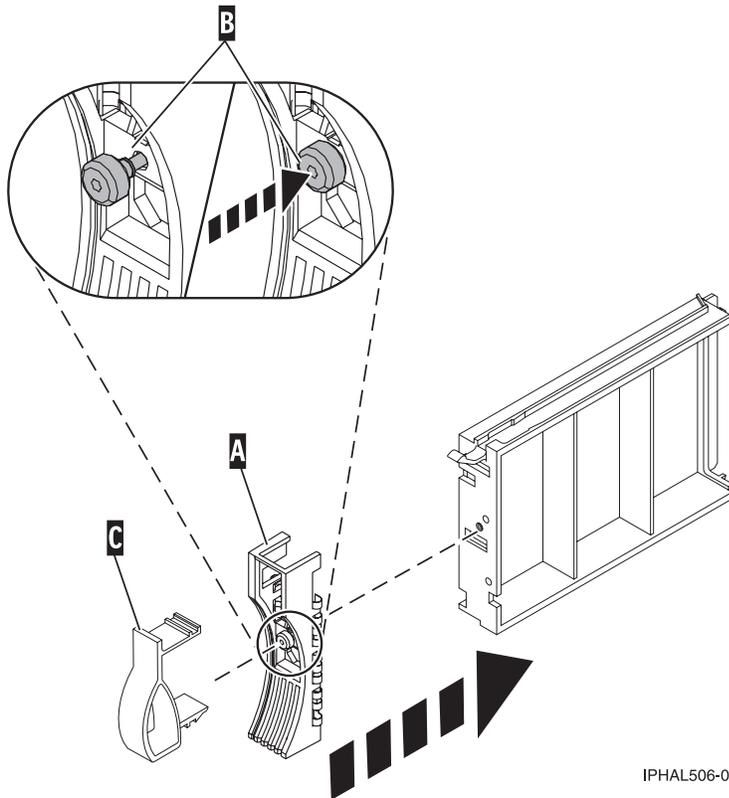
Installing a disk-drive filler

You might need to install a Small Computer System Interface (SCSI) disk-drive filler in the server or expansion unit. Use the procedure in this section to perform this task.

1. Attach the disk drive bezel (A) to the filler.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a 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. Press in and then tighten the thumbscrew (B) to secure the bezel to the disk drive.
 3. Install the disk-drive bezel latch (C) onto the front of the filler, as shown in the figure.



IPHAL506-0

Figure 106. Attaching a bezel to a disk-drive filler

4. Install the disk-drive filler in the system or expansion unit, as shown in the following figure.

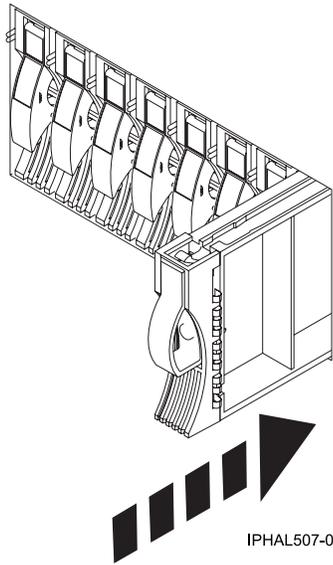


Figure 107. Installing a disk-drive filler

5. Replace the front cover.
6. Install or close the system, expansion unit or rack front door.

Related tasks

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

Related reference

“Removing and replacing the expansion unit cover or door” on page 175

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Chapter 6. Disk drive locations and concurrent maintenance lights

Find out where the disk drives and concurrent maintenance lights are located on different models.

Locate your system or expansion unit to find the disk drive locations and where the concurrent maintenance lights are located.

Disk drive locations and concurrent maintenance lights for 8233-E8B and 8236-E8C

Learn the disk drive locations and where the concurrent maintenance lights are located for your system.

The following figures show the disk drive locations and concurrent maintenance lights for the 8233-E8B and 8236-E8C. Concurrent maintenance lights are located above the latch handle on the disk drives.

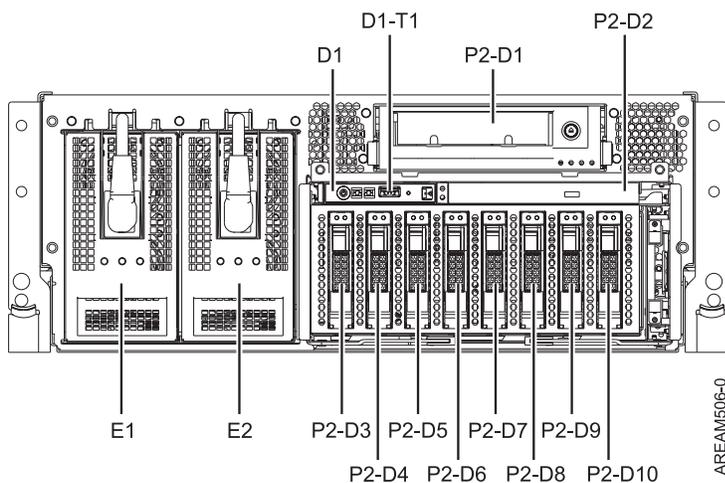


Figure 108. Disk drive locations

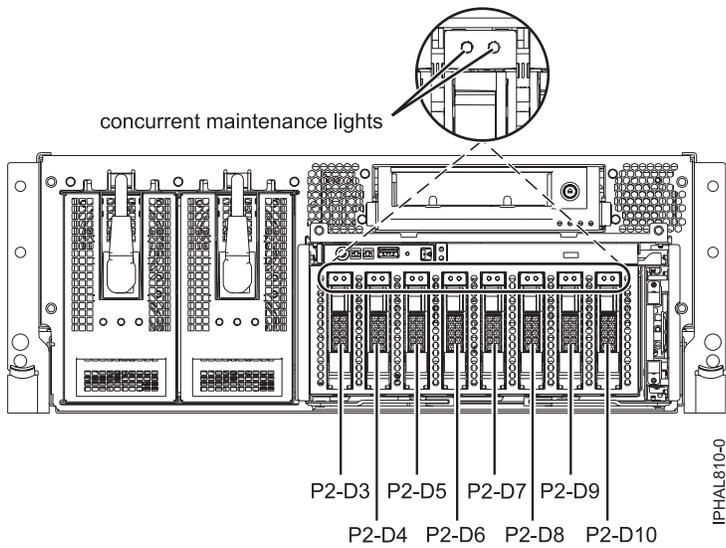


Figure 109. Concurrent maintenance light locations

Disk drive locations and concurrent maintenance lights for the 5886 disk enclosure

Learn the disk drive locations and where the concurrent maintenance lights are located for your disk enclosure.

The following figure shows the disk drive locations for the 5886 disk enclosure.

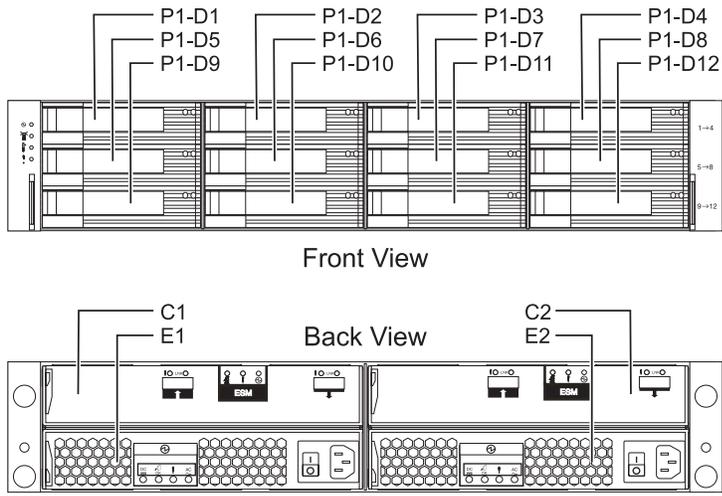


Figure 110. Disk drive locations for the 5886 disk enclosure

The following figure shows the locations of the disk-drive concurrent maintenance lights for the 5886 disk-drive enclosure.

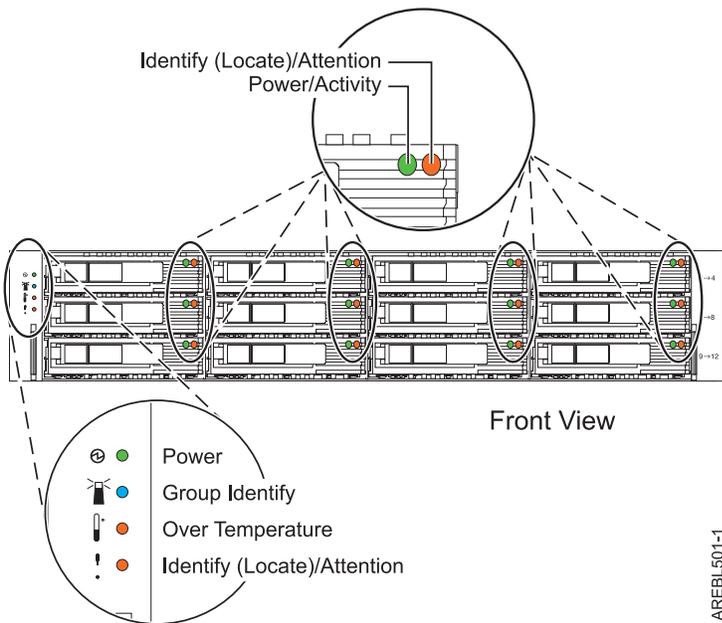


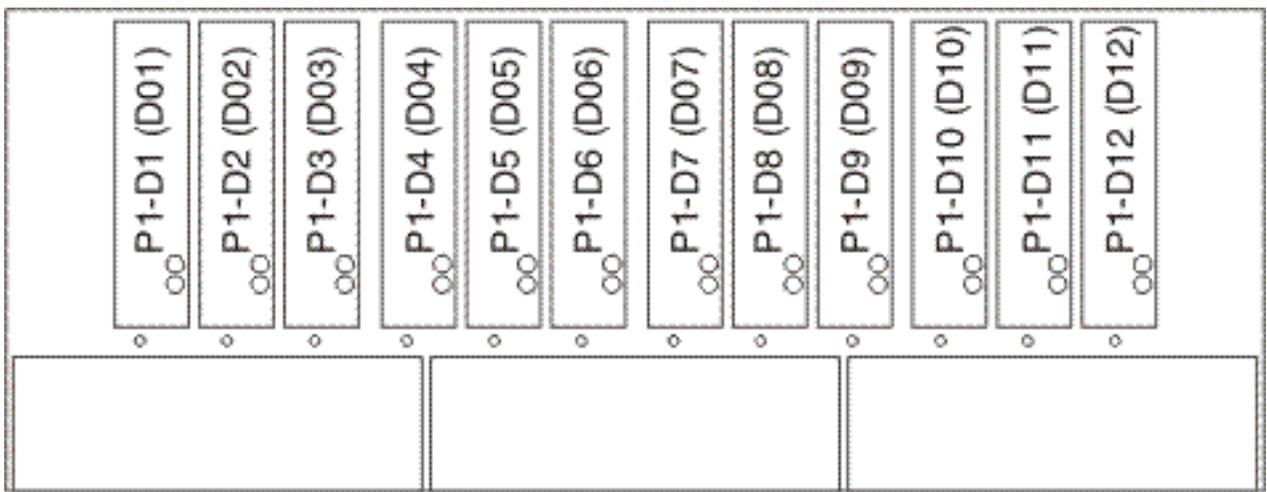
Figure 111. Front view of disk-drive enclosure concurrent maintenance lights for model 5886

Disk drive locations and concurrent maintenance lights for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures

Learn the disk drive locations and where the concurrent maintenance lights are located for your disk-drive enclosure.

The availability of disk drive locations depends on the number of SCSI interface cards installed in the SCSI disk-drive enclosure. If the next available disk drive position is the first slot in a disk-drive enclosure, such as D21, D26, or D46, look at the disk-drive controller to verify that the enclosure is connected to a SCSI bus port. The controller end of the cable is clearly labeled with the disk-drive enclosure to which it connects. If the enclosure is not connected to a disk-drive controller, you must either install the disk drive in a different disk-drive enclosure or connect the enclosure to a SCSI bus port on a disk-drive controller. You might need to add a disk-drive controller before you can add disk drives to the expansion unit.

The following figures show the disk drive locations for the front and back of the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures.



IPHAL975-0

Figure 112. Front view of 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures

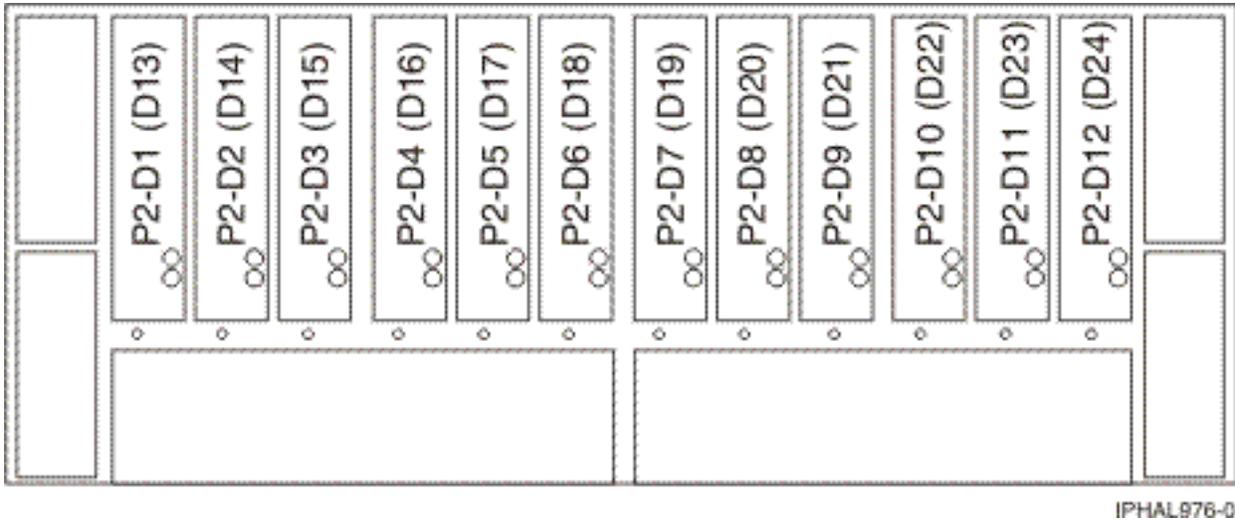


Figure 113. Back view of 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures

The following figures show the locations of the disk-drive concurrent maintenance light **A** for the models 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures.

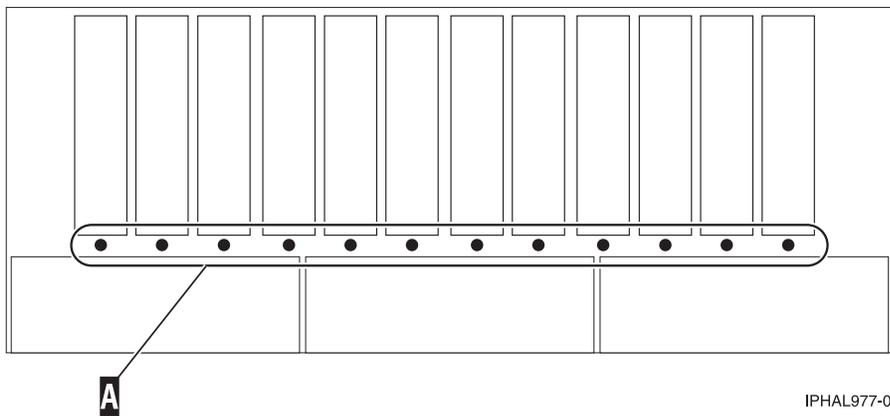


Figure 114. Front view of SCSI disk-drive enclosure concurrent maintenance lights for model 5786, 5787, 7031-D24, and 7031-T24

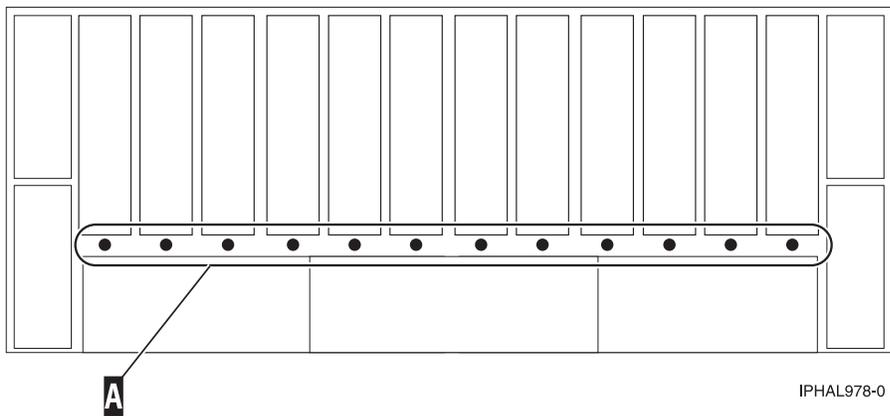


Figure 115. Back view of SCSI disk-drive enclosure concurrent maintenance lights for model 5786, 5787, 7031-D24, and 7031-T24

Disk drive locations and concurrent maintenance lights for the 5802 expansion unit

Learn the disk drive locations and where the concurrent maintenance lights are located for your expansion unit.

The following figure shows the disk drive locations for the 5802.

Concurrent maintenance lights are located at the bottom of the latch handle on each disk drive.

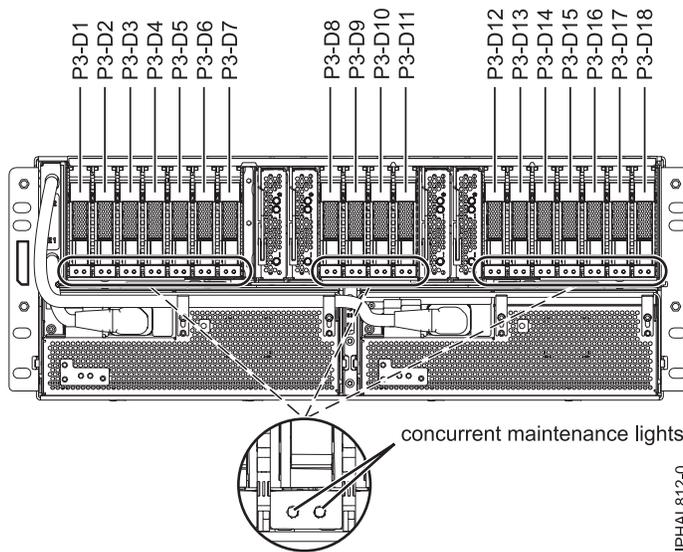


Figure 116. Disk drive locations

Related information

Cabling the 5802 disk subsystem

Chapter 7. Related information

Locate additional disk-drive related information and instructions you might need.

Preparing a disk drive for use in an AIX system or logical partition

Configure the newly installed disk drive for your environment.

If the disk drive is attached to a PCI-X SCSI RAID controller, see the *PCI-X SCSI RAID Controller Reference Guide for AIX*. If the disk drive is attached to another controller, see the *AIX System Management Guide: Operating System and Devices*. These guides are available at the System p and AIX Information Center. (<http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp>)

Preparing to remove a disk drive from a system or expansion unit controlled by AIX

Learn the actions you need to take to properly remove a disk drive.

Before removing a disk drive from a system or expansion unit that is controlled by AIX, ensure that all data on that disk drive or the array that contains the drive is backed up and removed from the disk drive and that the disk drive is in the Defined state.

If the disk drive is attached to a PCI-X SCSI RAID controller, see the *PCI-X SCSI RAID Controller Reference Guide for AIX*. If the disk drive is attached to another controller, see the information for that controller or the *AIX System Management Guide: Operating System and Devices*. These guides are available at the System p and AIX Information Center. (<http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp>)

Rebuilding data on a replacement disk drive using AIX

To rebuild data on the replacement disk drive, refer to the information for the controller to which the disk drive is attached.

- If the disk drive is attached to a PCI-X SCSI RAID controller, see the *PCI-X SCSI RAID Controller Reference Guide for AIX*.
- If the disk drive is attached to a PCI SCSI RAID adapter (feature code 2498), see the *PCI 4-Channel Ultra3 SCSI RAID Adapter Reference Guide*.

For more information, see the *AIX System Management Guide: Operating System and Devices*. These guides are available at the System p and AIX Information Center. (<http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp>)

Rebuilding data on a replacement disk drive using Linux

Use this procedure to rebuild data on the replacement disk drive.

To rebuild data on the replacement disk drive, complete the steps below.

For an unprotected disk drive

If the disk drive you are replacing is in a RAID Level 0 disk array or in a failed RAID Level 5 or RAID Level 10 disk array, perform these tasks:

1. Re-create the disk array.

2. Re-create the file systems on the disk array.
3. Copy the data back to the restored disk array from your backup media.

For information on these tasks, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*. This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

For a disk drive in a RAID Level 5 or RAID Level 10 disk array, select the appropriate procedure:

Rebuilding data on a disk drive using Linux kernel 2.4

Complete the steps listed here to rebuild your data.

If a hot-spare disk drive was available and protected the disk array throughout the disk drive failure, you can configure the newly installed disk drive as a hot spare. For instructions, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

If a hot spare rebuild was not initiated by the controller, you need to initiate a rebuild on the newly installed disk drive. To initiate the rebuild, follow these steps:

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter. The Work with Disk Units display is shown.
3. From the Work with Disk Units display, select **Work with disk unit recovery**. The Work with Disk Unit Recovery display is shown.
4. From the Work with Disk Unit Recovery display, select **Rebuild disk unit data**. A Rebuild Disk Unit Data display similar to the following figure is shown below.

```

Rebuild Disk Unit Data

Select the units to be rebuilt

Type choice, press Enter.
1=Rebuild

Option      Vendor   Product          Serial   PCI   PCI   SCSI   SCSI   SCSI
            ID     ID              Number  Bus   Dev   Bus   ID    Lun
            IBM   IC35L036UCDY10-0 E3V0J55B 353    01    0     5     0

e=Exit  q=Cancel  f=PageDn  b=PageUp

```

Figure 117. Example Rebuild Disk Unit Data display

5. Type option 1 (Rebuild) next to the disk drive you want to rebuild and press Enter.

Note: Performing a rebuild on a disk drive overwrites the data currently on the disk drive. A Confirm Rebuild Disk Unit Data display similar to the following figure shown below.

```

Confirm Rebuild Disk Unit Data

Rebuilding the disk unit data could take several minutes for
each unit selected.

Press Enter to confirm having the data rebuilt.
Press q=Cancel to return and change your choice.

Option  Vendor      Product          Serial          PCI   PCI   SCSI  SCSI  SCSI
        ID          ID              Number         Bus   Dev   Bus   ID    Lun
        1  IBM          IC35L036UCDY10-0 E3V0J55B      353   01    0    5    0

q=Cancel  f=PageDn  b=PageUp

```

Figure 118. Example Confirm Rebuild Disk Unit Data display

6. To confirm that you want to rebuild the data on the disk drive, press Enter. The message that the rebuild has begun is shown at the bottom of the Work with Disk Unit Recovery display. The rebuild process might take several minutes to complete.

Rebuilding data on a disk drive using Linux kernel 2.6

Learn the steps to rebuild your data on a disk drive.

If a hot-spare disk drive was available and protected the disk array throughout the disk drive failure, you can configure the newly installed disk drive as a hot spare. For instructions, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

This guide is available from the SCSI PCI Adapters Web page at http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm.

If a hot-spare rebuild was not initiated by the controller, you need to initiate a rebuild on the newly installed disk drive. To initiate the rebuild, follow these steps:

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter. The IBM Power RAID Configuration Utility display is shown.
3. Select **Work with disk unit recovery** from the IBM Power RAID Configuration Utility display. Press Enter. The Work with Disk Unit Recovery display is shown.
4. From the Work with Disk Unit Recovery display, select **Rebuild disk unit data**. A Rebuild Disk Unit Data display similar to the following is shown.

```

Rebuild Disk Unit Data

Select the disks to be rebuilt

Type choice, press Enter.
1=Rebuild

OPT Name  PCI/SCSI Location      Description      Status
-----
1         0000:58:01.0.0/0:4:0      RAID Array Member  Failed

e=Exit  q=Cancel  t=Toggle

```

Figure 119. Example Rebuild Disk Unit Data display

5. Type option 1 (Rebuild) next to the disk drive you want to rebuild and press Enter.

Note: Performing a rebuild on a disk drive overwrites the data currently on the disk drive. A Confirm Rebuild Disk Unit Data display similar to the following is shown.

```

Confirm Rebuild Disk Unit Data

Rebuilding the disk unit data might take several minutes for each disk
selected.

Press Enter to confirm having the data rebuilt.
q=Cancel to return and change your choice.

OPT Name  PCI/SCSI Location      Description      Status
-----
1         0000:58:01.0.0/0:4:0      RAID Array Member  Failed

q=Cancel  t=Toggle

```

Figure 120. Example Confirm Rebuild Disk Unit Data display

6. To confirm that you want to rebuild the data on the disk drive, press Enter.

The message that the rebuild has begun is shown at the bottom of the Work with Disk Unit Recovery display. The rebuild process might take several minutes to complete.

Rebuilding data on a replacement disk drive using IBM i

Learn how to rebuild data on replacement disk.

To rebuild data on the replacement disk drive, complete the following steps:

1. If necessary, start System Service Tools (SST) by typing `strsst` on the command line of the IBM i session and pressing Enter.
2. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Note: The service tools password is case sensitive.

3. Select **Work with disk units** from the Start System Service Tools (SST) display. Press Enter.
4. Select **Work with disk unit recovery** from the Work with Disk Units display. Press Enter.

5. If you determined that the disk drive you replaced had **device parity protection (RAID)**, follow these steps to restore device parity protection (RAID) on the disk drive:
 - a. Select **Rebuild disk unit data** on the Work with Disk unit recovery display. Press Enter.
 - b. Select **1** to rebuild the disk drive displayed (the disk drive displayed is the disk drive that you **removed**) on the Rebuild Disk Unit Data display. Press Enter.
 - c. Press Enter on the Confirm Rebuild Disk Unit Data display. The rebuild process might take several minutes to complete.
 - d. Press F5 to refresh the display until the **Percent complete** shows 5%.
 - e. When the display shows at least 5% complete, you can either continue to monitor this display to completion, or press F3 (Exit) to return to the Work with disk units display.
 - f. Press F3 (Exit) to return to the System service tools display.
 - g. Press F3 (Exit) to return to the Exit SST display and press Enter.
 - h. Return to the procedure that sent you here.
6. If the disk drive that you replaced had **mirrored protection**, follow these steps:
 - a. Select **Replace configured unit** on the Work with Disk unit recovery display. Press Enter.
 - b. Select the configured disk drive that you are exchanging (suspended drive) on the Select Configured Unit to Replace display. Press Enter.
 - c. Select the disk drive that you just installed on the Select Replacement Unit display. This drive has a non-configured status.

Note: In some cases, it might take several minutes for a new disk drive to display. Repeat these steps until the new drive is shown.
Press Enter.

- d. Press Enter on the Confirm Replace of Configured Unit display to confirm your choice for replacement.
The replacement process might take several minutes to complete. When the process is complete, the Work with Disk unit recovery display is shown.
- e. Press F3 (Exit) to return to the Work with disk units display.
- f. Select **Display disk configuration** on the Work with disk units display.
- g. Select **Display disk configuration status** on the Display Disk Configuration display.
Mirrored status shows Resuming. When complete, the mirrored status shows Active. This process might take several minutes to complete. You can either monitor this display to completion, or press F3 (Exit) three times, and then press Enter to return to the IBM i main menu.

Configuring a disk drive in an system or logical partition

To configure a newly installed disk drive into an existing device parity set, follow these steps:

If you want to start a new device parity set or change the protection on your disks, see Manage device parity protection or Start device parity protection in the Disk Management section of the IBM i

Information Center Web site at <http://www.ibm.com/systems/i/infocenter> .

1. If necessary, start System Service Tools (SST) by typing `strsst` on the command line of the IBM i session and pressing Enter.
2. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Restriction: The service tools password is case sensitive.

3. Select **Work with Disk Units** on the System Service Tools display. Press Enter.
4. Select **Display disk configuration** on the Work with Disk Units display. Press Enter.
5. Select **Display non-configured units** on the Display disk configuration display. Press Enter.

6. The disk drive that you installed is listed. The serial number should match the serial number you recorded (the last 4 digits).

Note: The new disk drive might take up to five minutes to appear in the list. If the disk drive is not listed, ensure that the disk drive was properly installed.

7. Press F12 twice.
8. Select **Work with disk configuration** on the Work with Disk Units display. Press Enter.
9. Are you adding a disk drive to an existing device parity set?
 - **Yes:** Continue with the next step.
 - **No:** Go to step 23 on page 45 for mirroring or no protection, go to 1 on page 46 for hot spare.

Tip: Select **No** for mirroring, hot spare or no protection.

10. Select **Work with device parity protection** on the Work with Disk Configuration display. Press Enter.
11. Select **Include unit in device parity protection** on the Work with Device Parity Protection display. Press Enter.
12. Did the Include Device Parity Protection Failed display appear?
 - **Yes:** Continue with the next step.
 - **No:** Go to step 15 on page 45.
13. The following conditions must be met before you can start device parity protection.
 - If there are enough disk drives available to create a new parity set, the drives are eligible for *Start Device Parity Protection* operation and not for the *Include Device Parity Protection* operation.
 - All disk drives in a parity set must be the same capacity with a minimum number of three or four disk drives and maximum of 10 or 18 disk drives in the resulting parity set, depending on the disk drive type.
 - Not all disk drives attached to an advanced function input output processor have reported to the system. Retry the operation.
 - The type or model of the disk drives cannot be used for the requested operation.

When these conditions are met, press F12 to return to the Work with Disk Configuration display.

14. Select **Include unit in device parity protection** on the Work with disk configuration display. Press Enter.
15. On the Include Disk Units in Device Parity Protection display, select the disk drives to be included in Device Parity Protection. Type a **1** in the Option column. Press Enter.
16. Press Enter to confirm your choice. The configuration starts and might take 30 to 60 minutes to complete.
17. When the device parity protection is complete, the message "Selected drives have been included successfully" is shown on the Work with device parity protection display. Press F12.
18. Select **Display disk configuration** on the Work with disk configuration display. Press Enter.
19. Select **Display disk configuration status** on the Display disk configuration display.
20. If you have more than one ASP, determine the auxiliary storage pool (ASP) to which you want to add the disk drive.
21. Press F12 twice to get to the Work with Disk Units display.
22. Select **Work with disk configuration** on the Work with Disk Units display. Press Enter.
23. Select the option to add units to ASPs and balance data on the Work with disk configuration display. Press Enter.
24. Specify the number of the ASP to which you want to add the disk drive. The system ASP is **ASP 1**. Press Enter.

Notes:

- a. If ASP is mirror protected, disk drives must be added in pairs of the same size.

- b. When one or more pairs of disk drives are added to a mirrored ASP, they automatically become mirror protected.
- c. To start mirrored protection on an ASP, refer to **Recovering your system** in the IBM i Information Center.

To access the IBM i Information Center Web site, go to <http://www.ibm.com/systems/i/infocenter> and select from the following options:

- If you select V6R1, expand **IBM i 6.1 Information Center > Systems management > Backup and recovery > Recovering your system**
- If you select V5R4, expand **i5/OS Information Center > Systems management > Backup and recovery > Backing up and recovering your system > Recovering your system**

25. The Confirm Add Units display is shown showing the configuration your system will have when the add operation completes.

Note: If you have selected the wrong ASP, press F12 to change your options. Press the Enter key to continue. The add process will take several minutes to complete.

26. When the message Selected units have been added successfully is shown, press F3 three times and press Enter to return to the Main Menu display.
27. If you have a printer, print the configuration list. A service provider might refer to the configuration list in the future.
 - a. You need to sign on **with at least service level authority**
 - b. Type `strsst` on the Main Menu command line. Press Enter.
 - c. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Remember: The service tools password is case sensitive.

- d. Select **Start a service tool** on the System Service Tools (SST) display. Press Enter.
 - e. Select **Hardware service manager** on the Start a Service Tool display. Press Enter.
 - f. Press F6 (print the configuration) from the Hardware Service Manager display.
 - g. To return to the Main Menu display, press F3 (Exit) twice and then press Enter.
 - h. Place the configuration list where you can refer to it in the future.
28. If you are a service provider performing this task, return to the procedure that sent you here.
 1. Select **Work with hot spare protection** from the **Work with disk configuration** menu.
 2. Select **Start device parity protection - RAID 5 with hot spare** or **Start device parity protection - RAID 6 with hot spare** depending on the level of parity protection that is desired.
 3. Return to the procedure that sent you here.

Preparing to remove a disk drive from a system or logical partition controlled by IBM i

Learn the actions you need to take to properly remove a disk drive.

Before removing a disk drive from a system or expansion unit that is controlled by IBM i, follow these steps:

1. Determine the protection status of the disk drive that you are replacing. For instructions, see "Determining the IBM i disk drive protection status" on page 47.
2. The service provider must perform one of the following tasks:
 - Save data and initialize the disk drive.
 - Initialize the disk drive and copy to disk.
3. **For mirrored disk drives** on an IBM i system or logical partition, follow these steps to verify that the disk drive you are replacing has been suspended:

- a. Sign on with service level authority.
- b. Type `strsst` on the command line of the IBM i session and press Enter.
- c. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Remember: The service tools password is case sensitive.

- d. Select **Work with disk units** from the System Service Tools (SST) display. Press Enter.
- e. Select **Display Disk Configuration** from the Work with Disk Units display. Press Enter.
- f. Select **Display Disk Configuration Status** from the Display Disk Configuration display. Press Enter.
- g. Does the disk drive that is mirrored to the disk drive that you are replacing (same drive number) have a status of Active?
 - **No:** The replacement must be performed by a service provider.
 - **Yes:** Does the disk drive that you are replacing have a status of Suspended?
 - **Yes:** Continue with the next step.
 - **No:** Follow these steps to suspend mirrored protection on the disk drive that you are replacing:
 - 1) Press F3 from the Display Disk Configuration display to return to the Work with Disk Units display.
 - 2) Select **Work with Disk Unit Recovery** from the Work with Disk Units display. Press Enter.
 - 3) Select **Suspend mirrored protection** from the Work with Disk Unit Recovery display. Press Enter.
 - 4) Select the option to suspend the disk drive that you are replacing from the Suspend Mirrored Protection display. Press Enter.
- h. Press F3 repeatedly to exit System Service Tools and return to the main menu.

Determining the IBM i disk drive protection status

To determine the protection status of the disk drives in your IBM i system or logical partition, follow these steps from the System Service Tools (SST) display:

Tip: If you do not know the protection status of the disk drives and you cannot get to the System Service Tools display, contact your next level of support.

1. Sign on **with at least service level authority**.
2. Type `strsst` on the command line of the IBM i session and press Enter.
3. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Note: The service tools password is case-sensitive.

4. Select **Work with disk units** from the System Service Tools (SST) display. Press Enter.
5. Select **Display Disk Configuration** from the Work with Disk Units display. Press Enter.
6. Select **Display Disk Configuration Status** from the Display Disk Configuration display. Press Enter.

A list of each auxiliary storage pool (ASP) displays, showing the disk drives that are members of the ASP. The Status column shows one of the following protection statuses for the ASP:

- **Mirrored.** These ASPs are configured for mirrored protection. If the failing disk drive has mirrored protection, record the status of both disk drives in the mirrored pair. You need this information in the recovery procedure.

- **Unprotected.** An ASP with a status of Unprotected might contain disk drives that are device parity protected. Record the status of the failing disk drive as it is shown in the Status column of the Display Disk Configuration Status display.

A disk drive with one of the following statuses has device parity protection only if all other disk drives in the array are operational:

- DPY/Active
- DPY/Failed
- DPY/HDW Failure
- DPY/Degraded
- DPY/Power Loss
- DPY/Not Ready
- DPY/Unknown

A disk drive with any other status (such as DPY/Rebuild or DPY/Unprotected) does not have device parity protection.

Examples:

- Suppose one disk drive has a status of DPY/Failed while all other disk drives have a status of DPY/Unprotected. In this case, only the disk drive with the DPY/Failed status is protected. Servicing the failed disk drive does not result in data loss. Removing any of the unprotected disk drives might result in data loss.
- All disk drives have a status of DPY/Active or DPY/Degraded, therefore, all disk drives are protected. In this case, exchanging any disk drive does not result in data loss.

Tip: For more information about the meaning of a status for any disk drive, use the Help key on the display.

Configuring a disk drive on a load source adapter for hot spare using the IBM i operating system

To start hot spare protection on your load source adapter you will need to determine the status of the disk drive in the load source slot and configure or exchange that disk drive, which might require you to power down the system.

1. If necessary, start System Service Tools (SST) by typing `strsst` on the command line of the IBM i session and pressing Enter.
2. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.

Note: The service tools password is case sensitive.

3. Determine the protection status of all disks controlled by the load source adapter. Do all disk drives that are a member of a parity sets or mirror sets have a status of active?
 - No: Replace the disk using the following procedure in, “Replacing a disk drive with the IBM i system or logical partition powered on” on page 87.
 - Yes: Continue to the next step.

Restriction: There must be a disk drive of the same or larger capacity located in a load source capable slot to act as a hot spare for the active load source disk drive. The next steps will have you change the disk drive in the desired slot if needed.

Attention: If the disk drive acting as hot spare for the load source is of smaller capacity you can suffer data loss.

4. Determine whether a non-configured disk drive of the same or larger capacity is located in a load source capable slot but is not the active load source. Only parallel SCSI places a restriction on the location of the load source. Any SAS, Fibre Channel, or virtual disk drive does not have this restriction.

- No non-configured drive is located in a load source capable slot. Continue with the next step
 - Yes a non-configured drive is located in a load source capable slot. Return to the procedure that sent you here, and continue to the next step of that procedure.
5. Choose the disk drive to be installed or exchanged with the drive in the load source slot by doing the following:
 - a. Select a disk drive in a parity set located in a load source capable slot, but is not the active load source drive, and record the location of this disk drive.
 - b. Select a non-configured disk drive of the same or larger capacity from either a non-load source slot or a failed drive you are replacing with a non-configured disk drive.
 6. Stop the system. For instructions, see “Stopping a system or logical partition” on page 173.
 7. Exchange the disk drives from the two locations you recorded in step 5 by removing both disk drives and placing them into the other disk drives slot.
 8. Start the system. For instructions, see “Starting the system or logical partition” on page 171.
 9. Return to the procedure that sent you here and continue with the next step in that procedure.

Chapter 8. Internal disk drive sharing on an 8233-E8B or 8236-E8C

You might need to cable and understand the function of this feature. Use the following information to complete these tasks.

The following information is for use after the adapter is installed. Instal the adapter and then return here. See the PCI adapters topic for more information, PCI adapters.

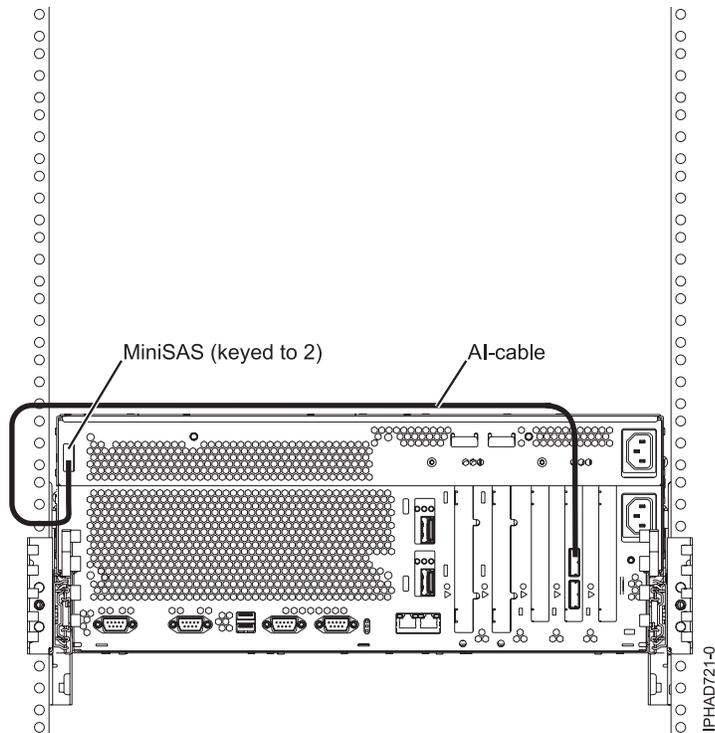
You should also review the tasks in “Before you begin” on page 165 if you have not already done so.

Note: Internal cable FC3669 for model 8233-E8B or 8236-E8C must be installed to enable this configuration. For installation instructions, see Installing the external SAS port on a model 8233-E8B or 8236-E8C

This feature allows you to split the internal disks in the system unit enclosure into groups which you can manage separately.

1. Stop and power off the system if it is not already, see “Stopping a system or logical partition” on page 173.
2. Cable the system by connecting the SAS cable to the adapter and then to the internal SAS connection, as shown in the following graphic.

Important: This configuration is not supported with backplane feature code 8341.



Notes:

- The second connector on the adapter can be used to attach a disk expansion or media expansion drawer.

Figure 121. SAS adapter to internal SAS disk slots through the system external SAS port

3. Start the system, see “Starting the system or logical partition” on page 171.
4. Verify the feature is installed and working, see “Verifying the installed part” on page 182.

Once you have completed the procedure three of the disks in the system enclosure will be managed by the SAS Storage Controller adapter and three will be managed by the internal system.

Now, you can manage the disks as you would manage any other disks.

Chapter 9. Installing the external SAS port on an 8233-E8B or 8236-E8C

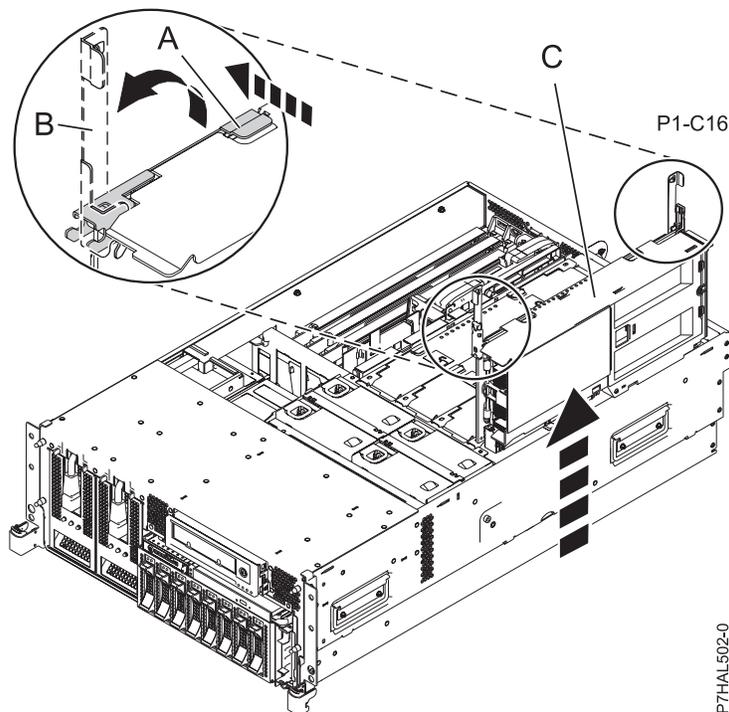
You might need to install an external SAS port as a part of upgrading your disk-drive backplane, or to enable internal disk sharing. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps to install the SAS feature 3699 into the server. For instructions, see “Removing a part by using the Hardware Management Console” on page 181.

If you do not have an HMC, complete the following steps to install SAS feature 3699 into the server:

1. Perform the prerequisite tasks described in “Before you begin” on page 165.
2. Stop the system. For instructions, see “Stopping a system or logical partition” on page 173.
3. If the system is rack-mounted, place the system into the service position. For instructions, see 8204serviceposition.dita#hwip2serpos.
4. Remove the service access cover. For instructions, see “Removing the service access cover from an 8233-E8B or 8236-E8C system” on page 177.
5. Remove the system processor assembly or filler in position P1-C16 by lifting the handle (A) and lifting the assembly out of the system, as shown in the following figure.

Note: You only need to remove the one assembly or filler in P1-C16. To remove a filler, grasp the filler in the center and lift the filler out of the system.



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6. Remove the fans and fan cage from the system by doing the following steps:
 - a. To remove the fans, squeeze the tab (A) and lift the fan out of the fan cage as shown in the following figure.

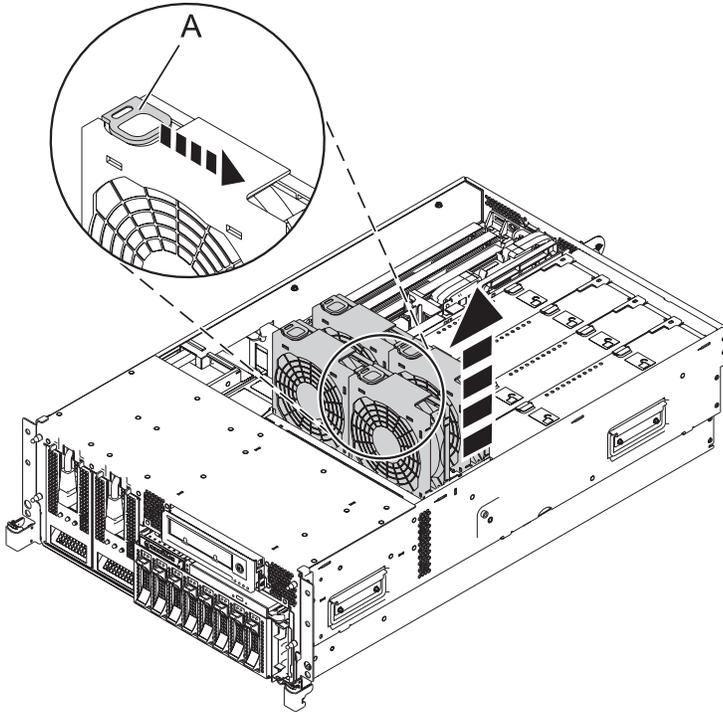


Figure 122. Removing the fan from the 8233-E8B or 8236-E8C fan cage

- b. To remove the air baffles, grasp and pull the air baffle out of the fan cage, as shown in the following figure.

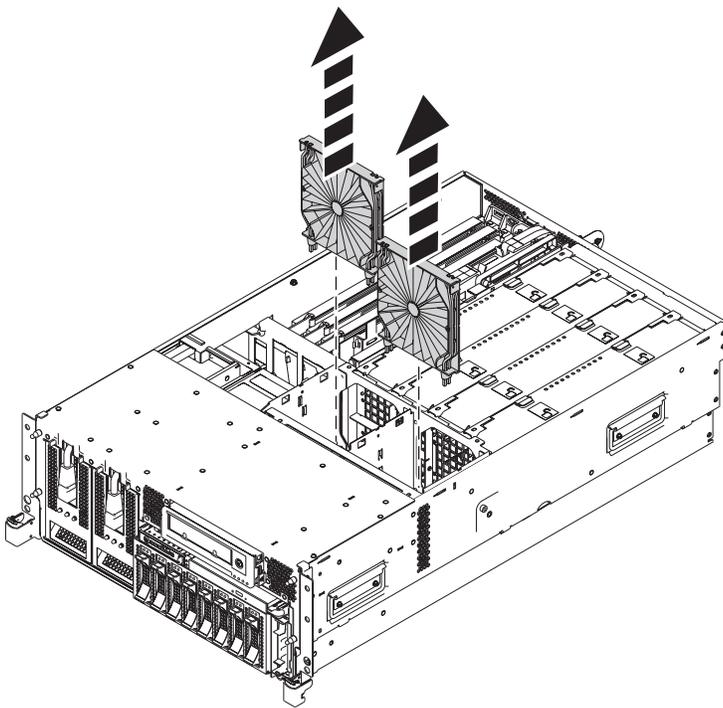


Figure 123. Removing the air baffles from the 8233-E8B or 8236-E8C fan cage

- c. To remove the fan cage, loosen the two thumbscrews (A) and lift the fan cage (B) out of the system as shown in the following figure.

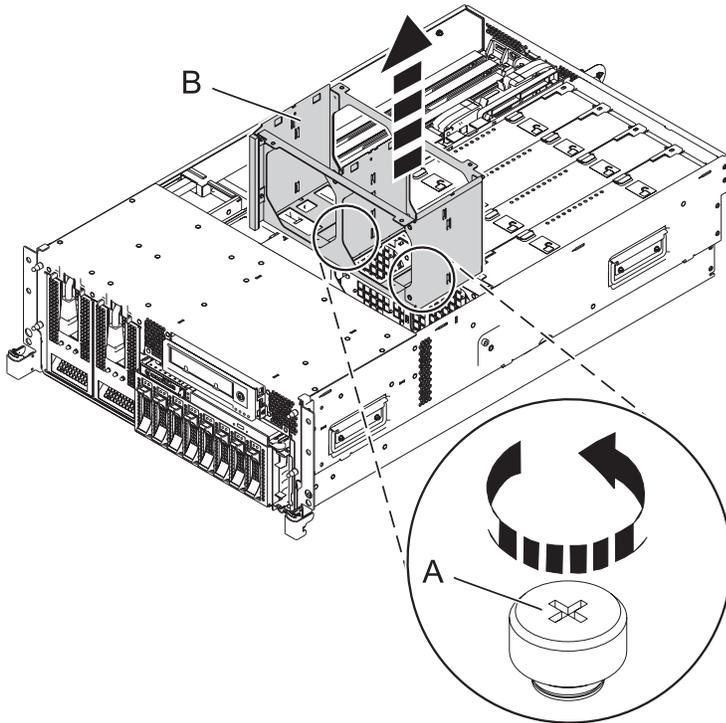


Figure 124. Removing the fan cage from the 8233-E8B or 8236-E8C system

7. Slide the front of the cable, with the male connector, through the opening between the processor cage and the side of the system.

Tip: Refer to Figure 125 on page 140 to complete the next few steps.

8. Insert the pins (A) on the side of the system into the slots (B) on the SAS cable assembly.
9. Slide the cable assembly back until the pins (A) are seated and the latch (C) snaps in place.

Tip: The port on the back of the cable assembly should be seated in the slot at the back of the system.

10. Attach the cable bracket (H) by placing the notch on the bracket over the post on the side of the system, aligning the screw hole (I) with the hole on the side of the system, and securing the cable bracket with the screw.

Note: The bracket should fit snugly over the SAS cable assembly.

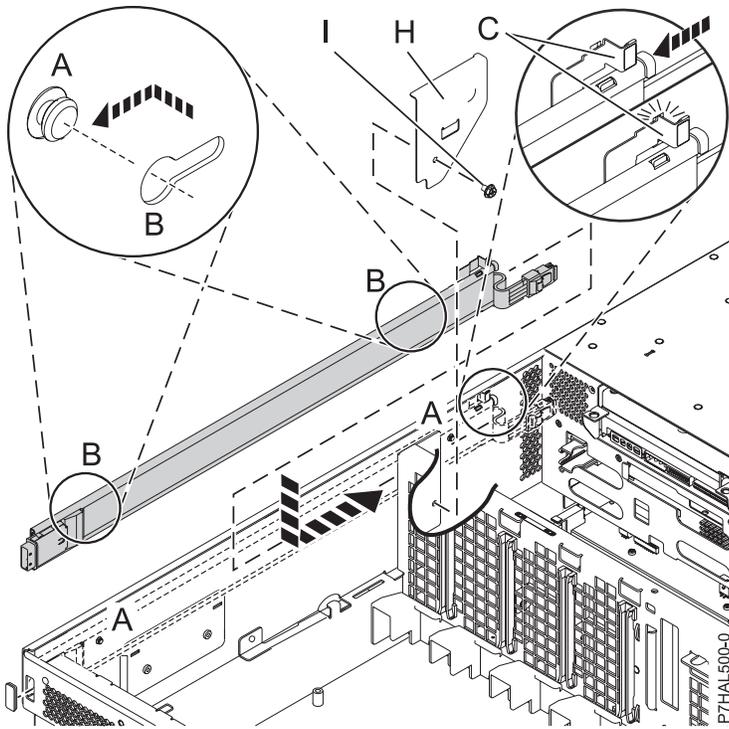


Figure 125. Attaching the SAS cable

11. Depending on the disk-drive backplane you have, complete one of the following choices:

Tip: Refer to Figure 126 on page 141 to complete this step.

- If you can see the SAS connection in the center of the disk-drive backplane (**D**), attach the cable to the connection and continue to step 12 on page 141.
- If you can see the SAS cable shroud (**E**) extending from the disk-drive backplane, continue to step 11a.

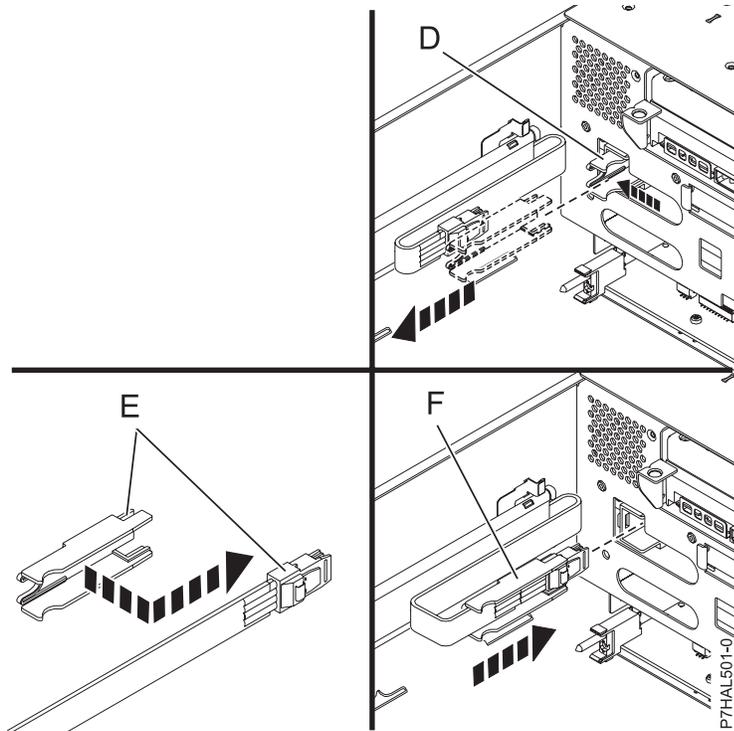


Figure 126. SAS cable connections

- a. Locate the SAS cable shroud (E) on the disk-drive backplane and pull the back of the shroud away from the side of the system to unseat the shroud.
 - b. Pull the shroud out of the SAS port.
 - c. Attach the shroud to the male SAS connector (F) on the cable assembly by sliding the shroud over the top of the cable connector (F) from behind. The SAS connector on the cable should fit into the two slots at the front of the shroud, and the connector should extend away from the shroud so it can be seated in the port.
 - d. Slide the cable and shroud (G) into the SAS port until it is firmly seated in place.
12. Replace the fans and the fan cage, by doing the following steps:
- a. To install the fan cage (A) into the system, align the locator pins through the holes, and tighten the two thumbscrews (B), as shown in the following figure.

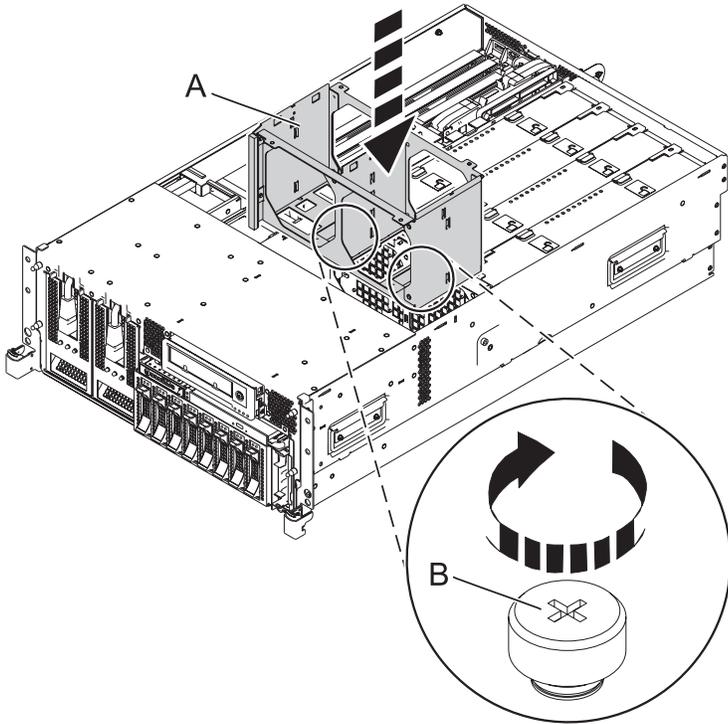


Figure 127. Installing the fan cage in the 8233-E8B or 8236-E8C system

- b. To install the air baffles, insert the air baffles into their location in the fan cage, and push down until they lock into place, as shown in the following figure.

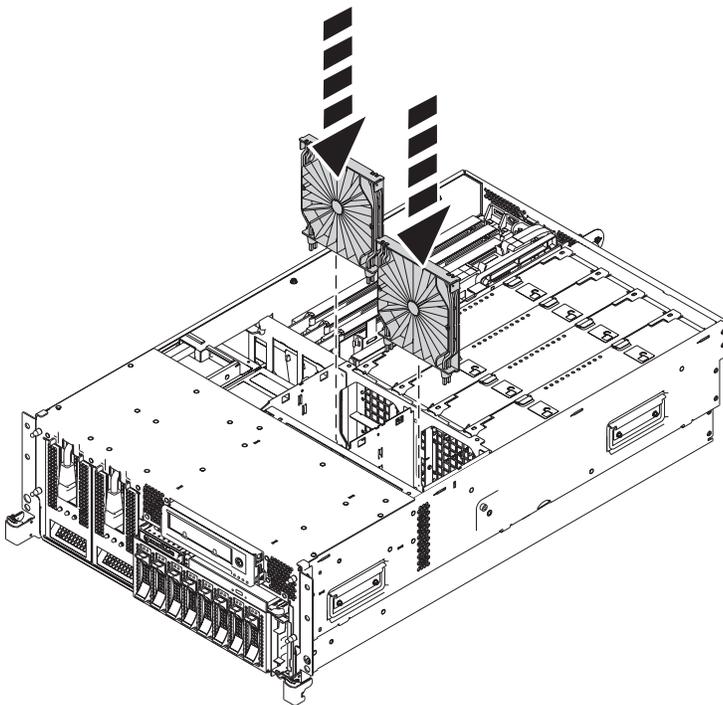


Figure 128. Installing the air baffles in the 8233-E8B or 8236-E8C fan cage

- c. To install the fans, insert the fans into their location in the fan cage, and push down on the fan until it locks into place, as shown in the following figure.

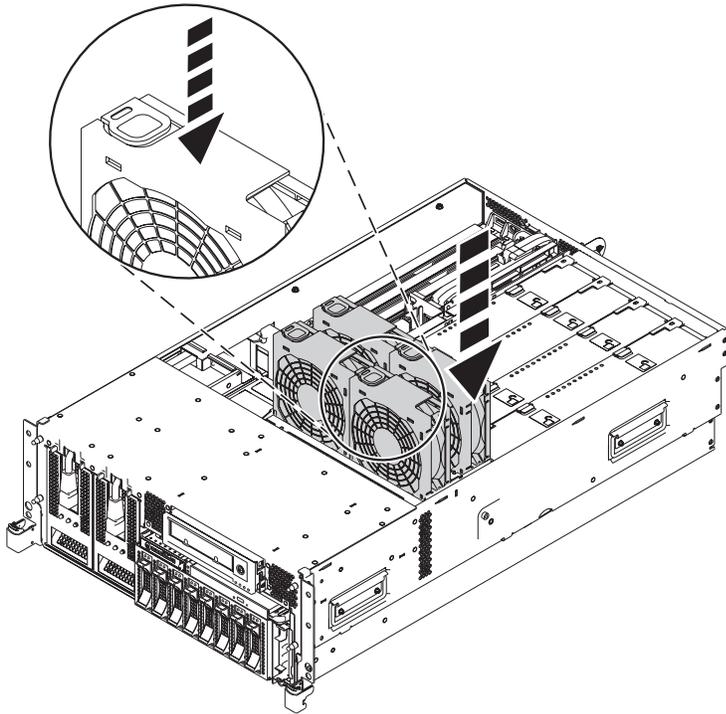
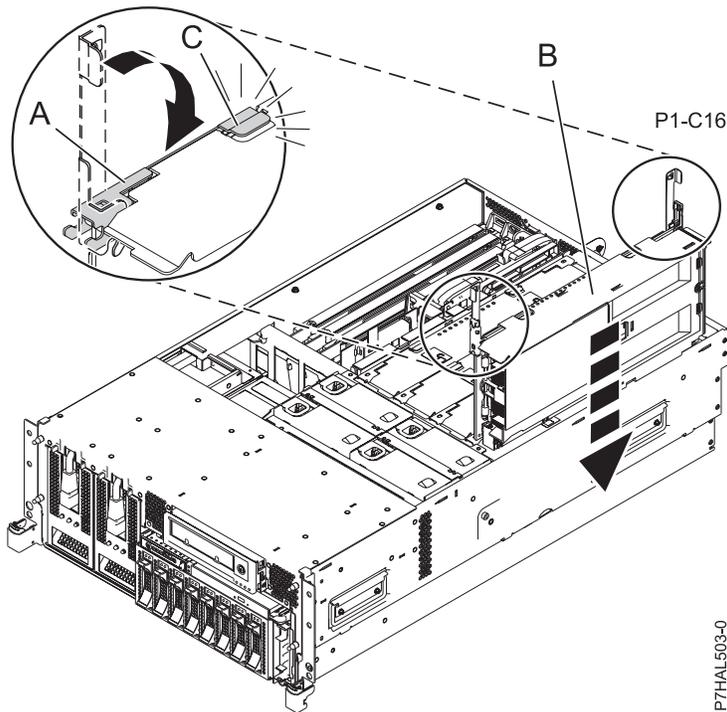


Figure 129. Installing the fans in the 8233-E8B or 8236-E8C fan cage

13. Install the system processor (B) and secure both latches (C), as shown in the following figure.



14. Replace the service access cover. For instructions, see “Installing the service access cover on an 8233-E8B or 8236-E8C system” on page 178.

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15. Place the system back into the operating position. For instructions, see [8204operatingposition.dita#operatingposition8204](#).

You may now attach supported SAS features to your system. Return to the instructions that sent you here or start your system. For instructions, see “Starting the system or logical partition” on page 171.

Chapter 10. Replacing a SAS conduit card in a 5802 expansion unit with power off

Learn how to replace a SAS conduit card in a 5802 expansion unit with power off.

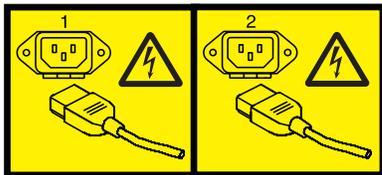
Review the requirements in “Before you begin” on page 165.

If your system is managed by the Hardware Management Console (HMC), use the HMC to replace the card. For instructions see, “Removing a part by using the Hardware Management Console” on page 181

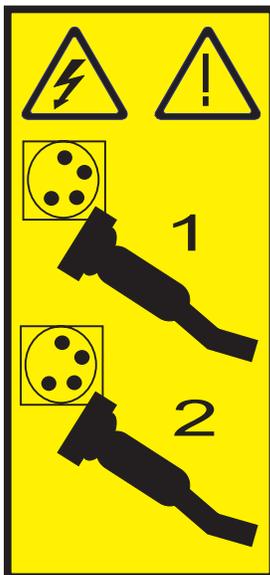
1. Stop the system if it is running. For instructions see, “Stopping a system or logical partition” on page 173.
2. Disconnect the power source from the system by unplugging the system.

Attention: This system might be equipped with a second power supply. You must disconnect the power source from the system by disconnecting all power cords to prevent system damage during this procedure.

(L003)



or



3. Place the card connector (C) onto the on the midplane connection (D) using the guide track (B) to ensure a good connection. Then lift the handle (A) to seat and secure the SAS conduit card to the midplane as shown in the following figure.

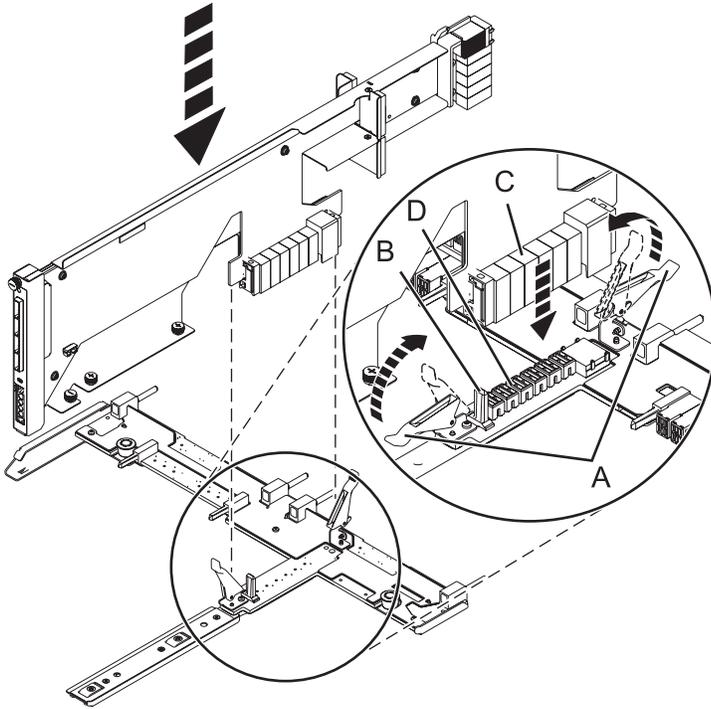


Figure 130. Installing the SAS conduit card into the midplane

4. Place the midplane and SAS conduit card back into the system by doing the following steps:
 - a. Align the midplane with the track and ensure the slot **(A)** on the midplane attaches to the post **(B)** in the system.
 - b. Secure the thumbscrews **(C)** and **(D)** on the SAS conduit card.
 - c. Secure the thumbscrews **(E)** on the sides of the midplane.

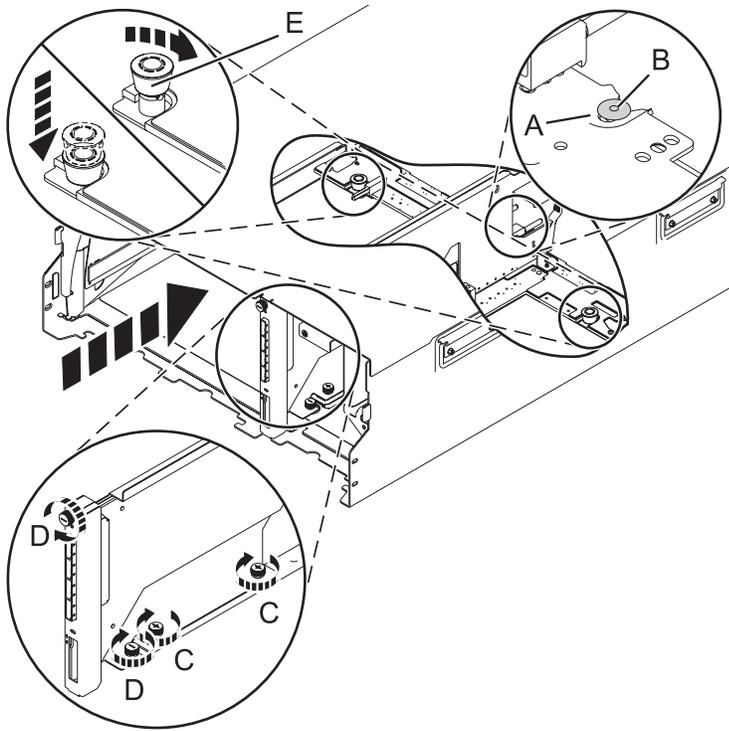


Figure 131. Installing the SAS conduit card and the midplane

5. Attach the power cord cover and secure the thumbscrew (A) to the system.

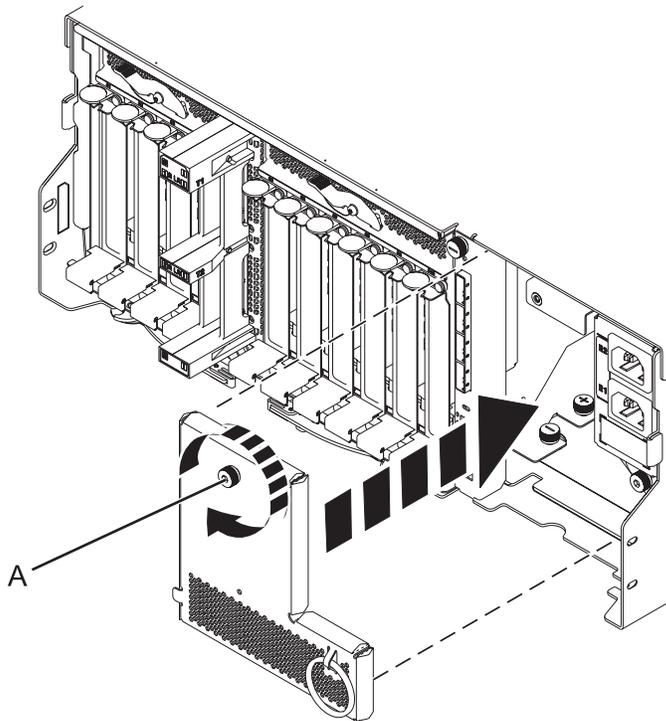


Figure 132. Installing the power cord plate

- Carefully slide the enclosure management controller into the system and close the latch (A) as shown in the following figure.

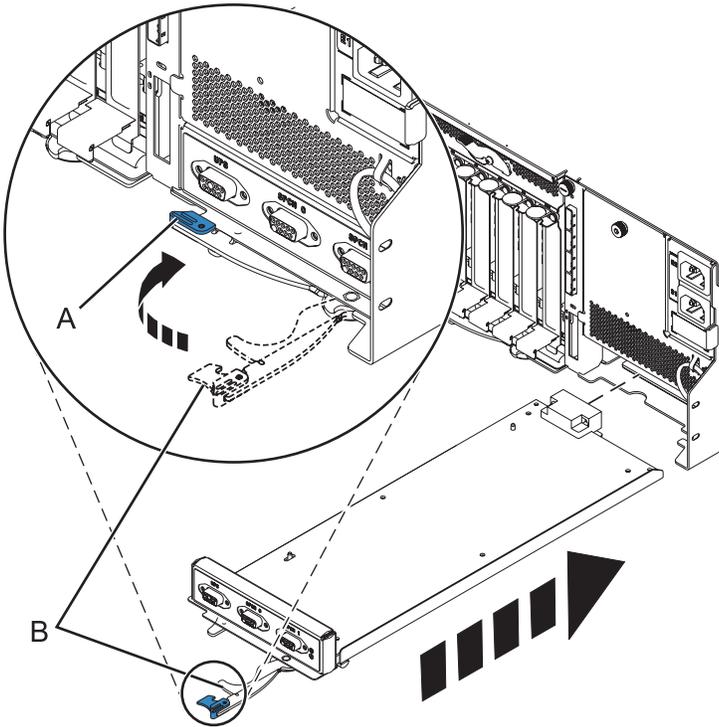


Figure 133. Replacing the enclosure management controller

- Carefully lift and align the I/O planar with the slot at the back of the expansion unit.
- Insert the I/O planar firmly into the server, as shown in the following figure.
- Secure the I/O planar with the locking tabs (A) as shown in the following figure.

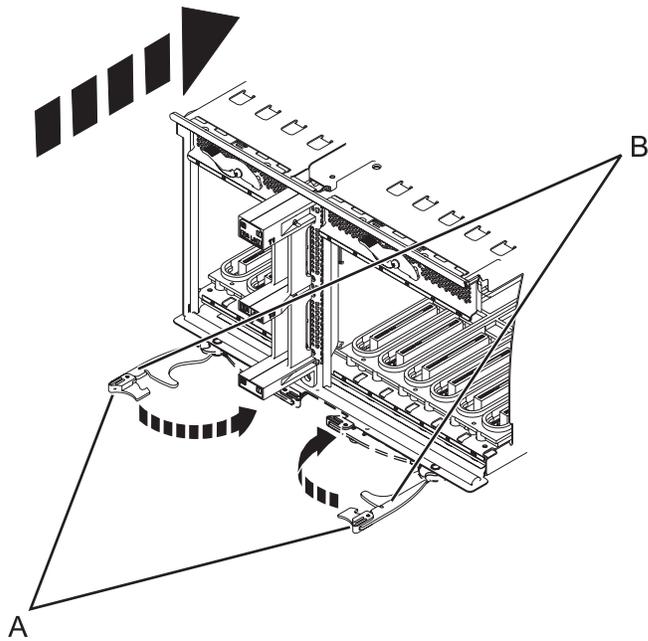


Figure 134. Install the I/O planar on a rack mounted model

10. To replace the power supply, with the locking handle **(A)** in the open position, push the power supply into the expansion unit as shown in the following figure.
11. Close the locking handle **(A)** until the power supply locks into position.

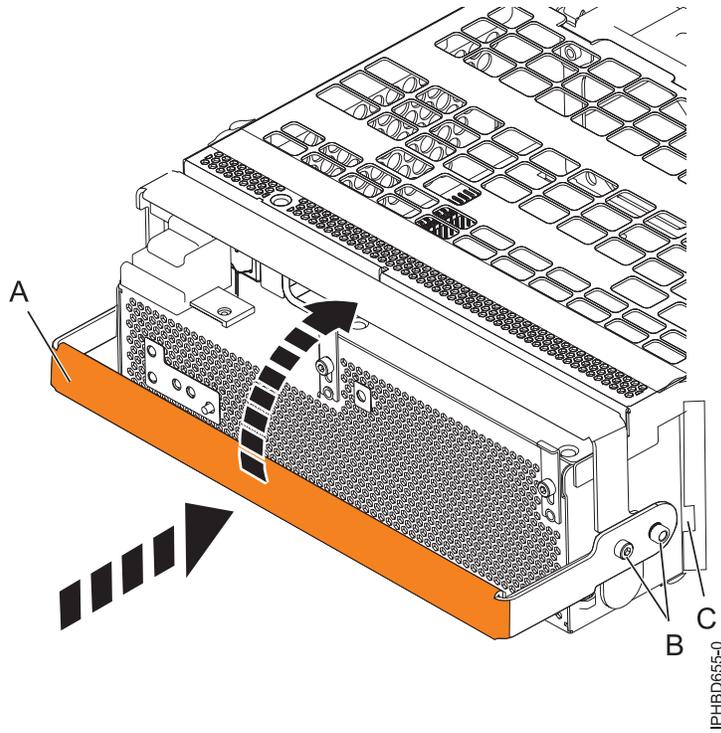


Figure 135. Replacing a power supply

12. To replace the disk drive backplane, lift the backplane along the two sides and align with the guide rails in the expansion unit.

CAUTION:

The backplane may be heavy. Ensure that you can safely perform this task before you begin.

13. Using your hand to support the bottom of the backplane, slide it into the expansion unit as shown in the following figure.
14. Secure the backplane in place by moving the locking tabs from the open position (B) to the locked position (A).

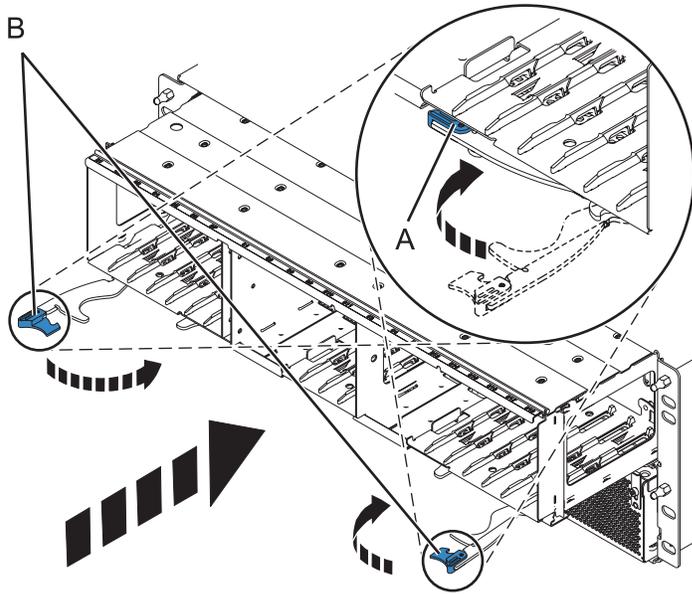
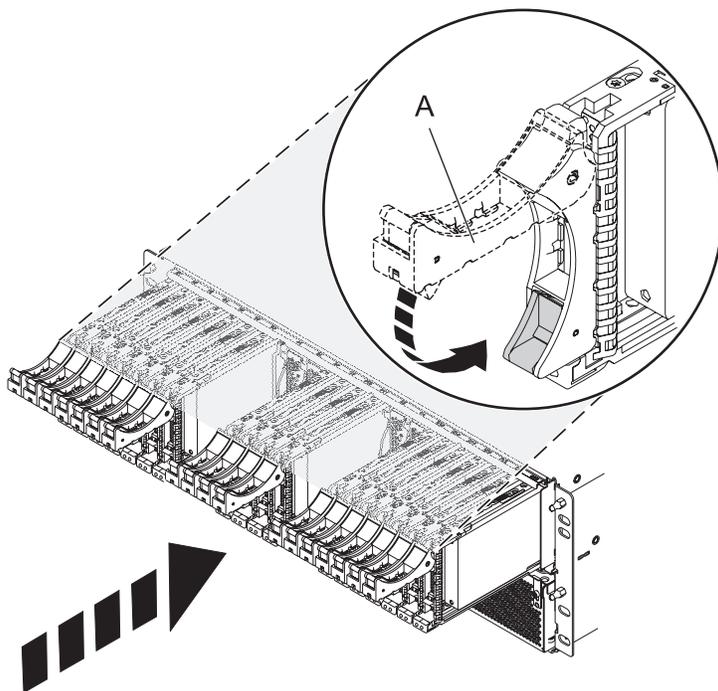
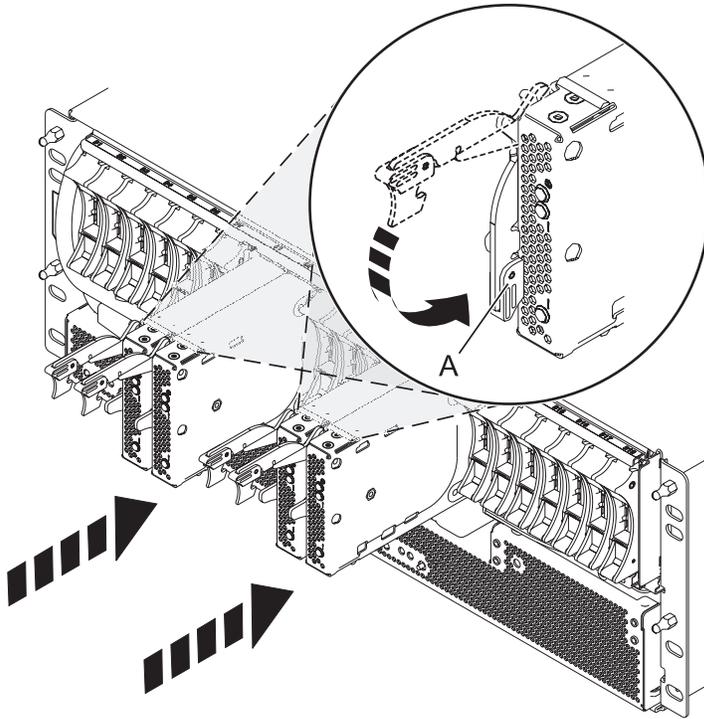


Figure 136. Installing the backplane on a rack-mounted model

15. Replace all disk drive units and fillers, if you removed them earlier.
 - a. Support the bottom of the disk drive unit as you align it with the guide rails in the backplane.
 - b. Slide the disk drive unit all the way into the backplane.
 - c. Push the handle (A) toward the disk drive unit to lock it into place.



16. Replace all expander cards and fillers, if you removed them earlier.
 - a. Supporting the bottom of the expander card with your hand, align it with the guide rails in the backplane.
 - b. Slide the expander card all the way into the backplane.
 - c. Push the handle (A) toward the card to lock it into place.



17. Start the system. For instructions see, "Starting the system or logical partition" on page 171.

Continue with any other service actions you need to perform.

- For information on connecting the system see Connecting your expansion units
- For information on installing the PCI adapters into the planar, see Model 5802 and 5877 expansion units, PCI adapters, and cassettes.

Chapter 11. Removing a SAS conduit card from a 5802 expansion unit with power off

Learn how to remove a SAS conduit card from a 5802 (rack-mounted) expansion unit if you need to replace a failing part with power off.

If your system is managed by the Hardware Management Console (HMC) use the HMC to remove the SAS conduit card. For instructions see, “Removing a part by using the Hardware Management Console” on page 181.

1. Perform the prerequisite tasks as described in “Before you begin” on page 165.
2. Identify the card you are going to remove. For instructions see, “Identifying a failing part” on page 167.
3. Stop the system. For instructions see, “Stopping a system or logical partition” on page 173.
4. Remove the disk drives and fillers as shown in the following figure.
 - a. Squeeze the latch of the disk drive and pull the handle (A) toward you to release the drives.
 - b. Supporting the bottom of the disk drive with your hand, slide it out of the backplane.

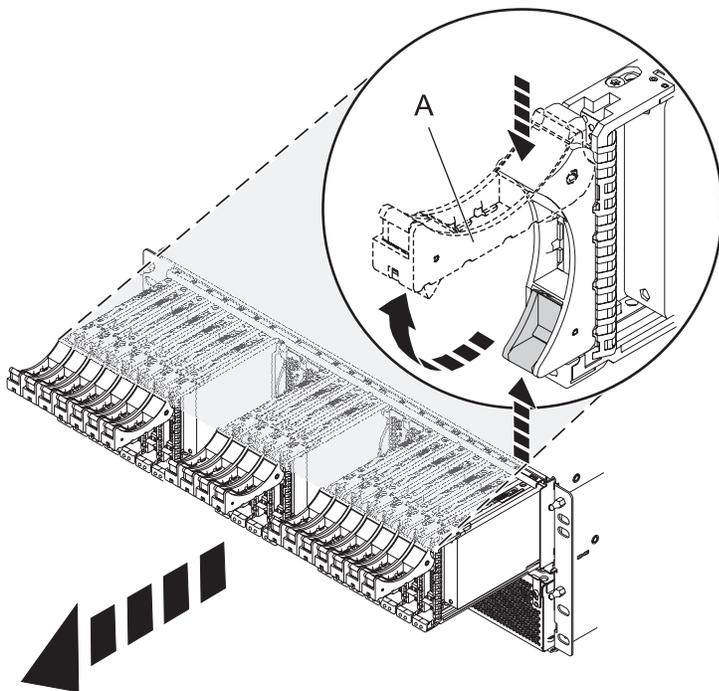


Figure 137. Removing the disk drives from the backplane

5. Remove the port cards and fillers as shown in the following figure.
 - a. Grasp the end of the latching handle (A) and pull it upward to unlock the port card.
 - b. Using your hand to support the bottom of the port card, slide it out of the backplane.
 - c. Place the port card on an electrostatic discharge (ESD) surface.

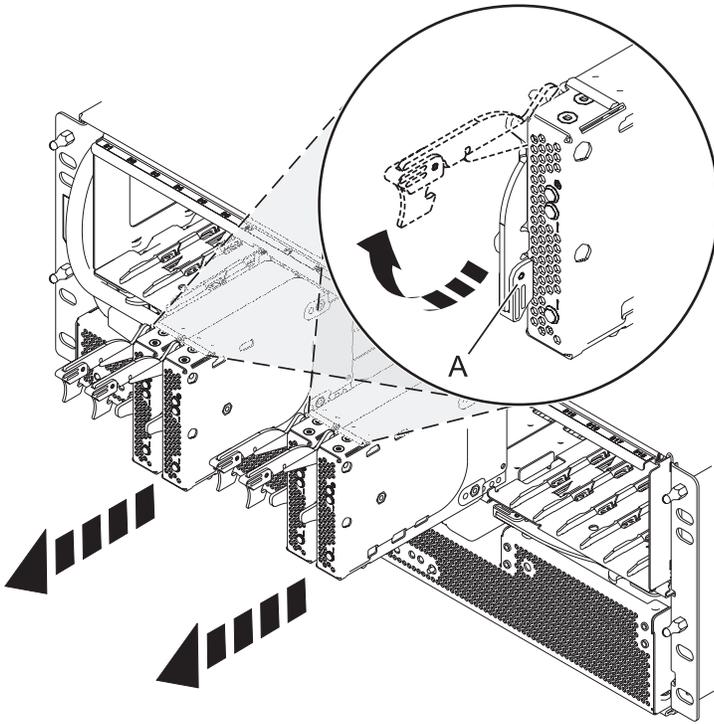


Figure 138. Removing the port card from the backplane

6. Remove the backplane as shown in the following figure.

CAUTION:

The backplane might be heavy. Ensure that you can safely complete the procedure.

- a. Squeeze the blue latches (**A**) to unlock the handles.
- b. Pull the handles (**B**) outward in the direction shown to release the backplane.
- c. Slide the backplane out of the enclosure, using your hand to support the bottom of the backplane.

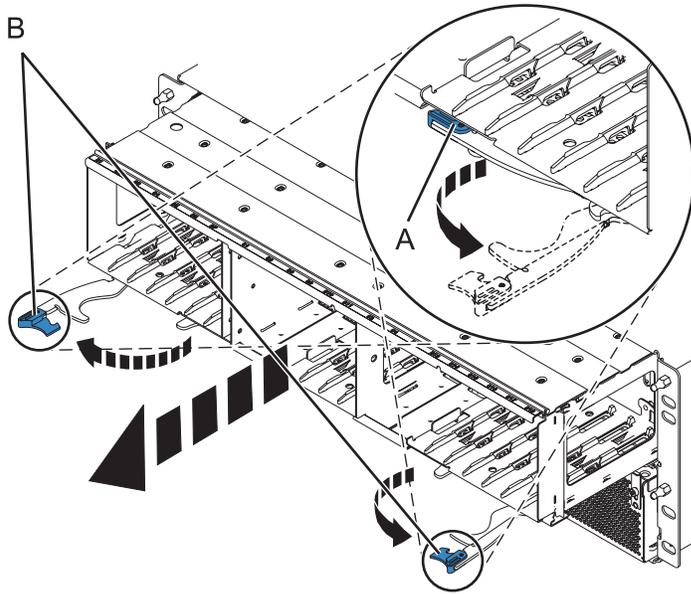


Figure 139. Removing the backplane from the enclosure

7. Disconnect both offline converter assembly (OCA) power cords by doing the following:
 - a. On the front of both OCAs, slide the power cord holders **(A)** to the left.
 - b. Label and disconnect both OCA power cords **(B)** from each OCA.

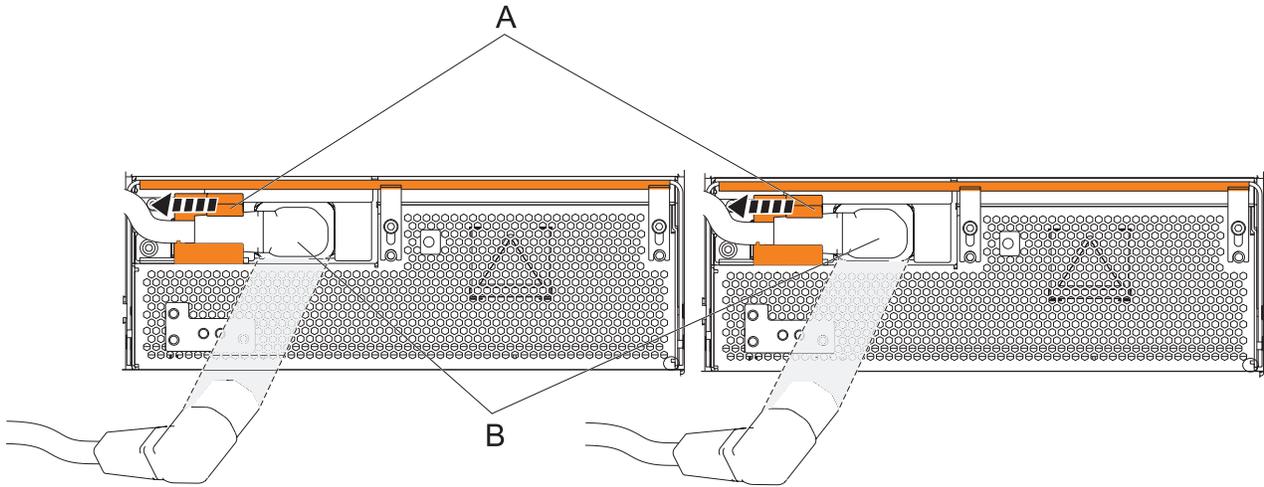


Figure 140. Disconnecting the OCA power cords

8. Remove the offline converter assemblies by doing the following steps:
 - a. Pull the OCA handle (A) all the way down in the direction shown to unseat the OCA.
 - b. Grasp both sides of the OCA and pull it out of the enclosure.

Note: Use 2 hands to support the OCA as it is pulled out of the enclosure.

- c. Repeat these steps to remove both OCAs.

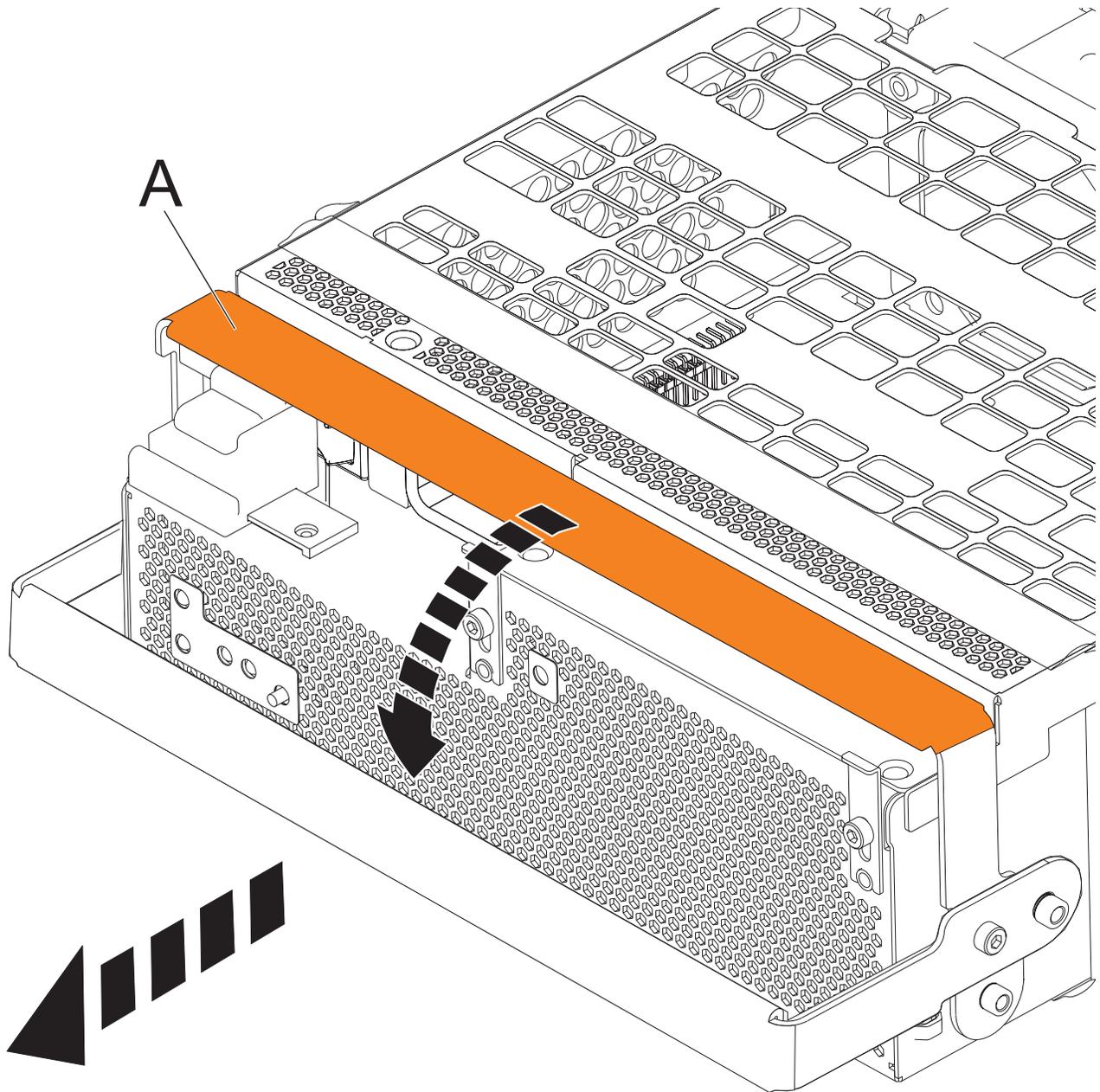


Figure 141. Remove the offline converter assemblies

9. Remove the enclosure management controller by doing the following steps:
 - a. Label and disconnect any cables connected to the enclosure management controller card.
 - b. Pinch the latch (**A**) to unlock the handle (**B**).
 - c. Pull the handle outward in the direction shown to unseat the EMC card.
 - d. Slide the enclosure management controller card straight out of the enclosure.

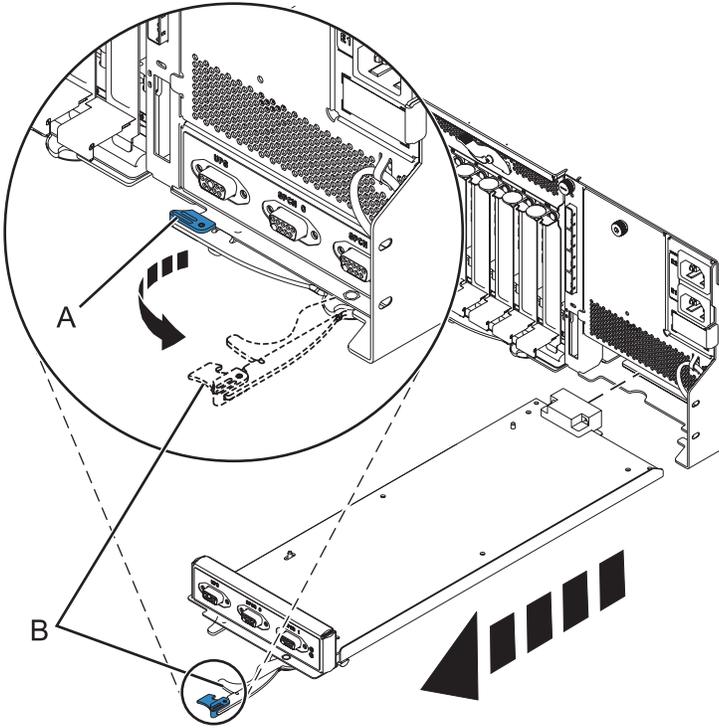


Figure 142. Remove the enclosure management controller

10. Remove the power cord plate by turning the thumbscrew (A) and pulling the plate away from the system.

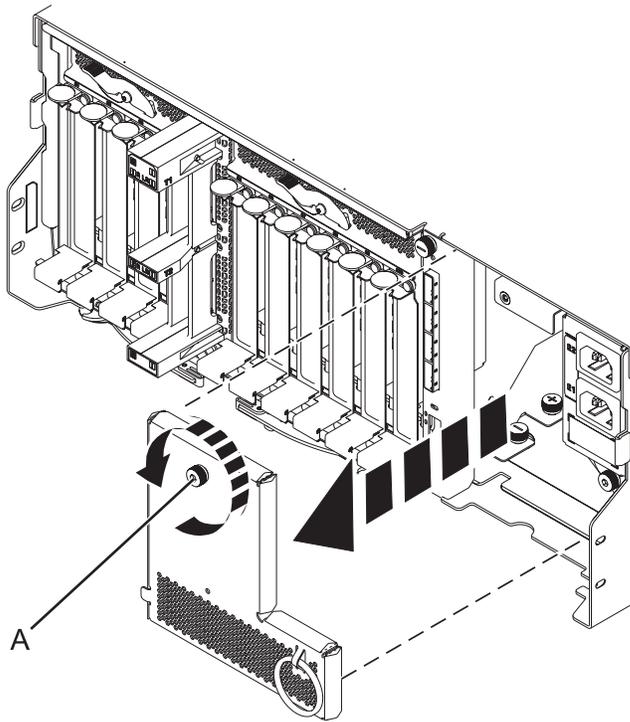


Figure 143. Removing the power cord plate

11. Disconnect the cables from the back of the I/O planar.

12. Squeeze the release latches (**A**) and pull the levers (**B**) out away from the system, as shown in the following figure.

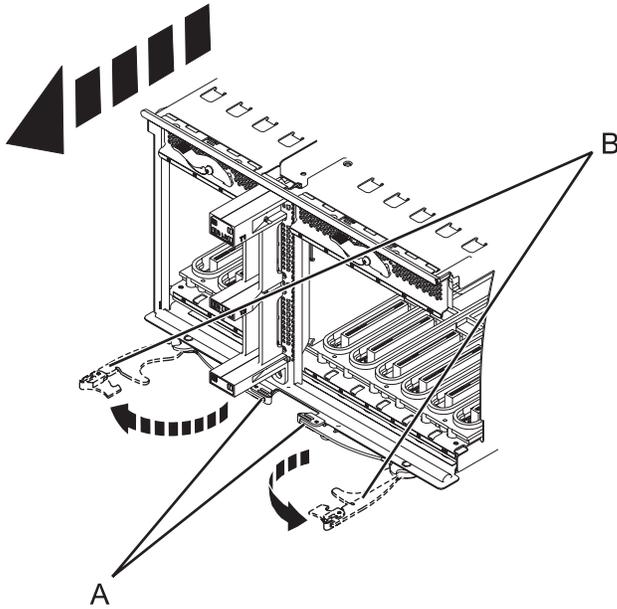


Figure 144. Removing the I/O planar

13. Slide the planar out of the system.
14. Remove the SAS conduit card and midplane from the enclosure by doing the following steps:
 - a. Pull the spring plungers (**A**) up and turn them one quarter to the left.
 - b. Turn the captive screws (**B**) and (**C**) counterclockwise until they are completely loosened.
 - c. Pull the SAS conduit and midplane component out of the enclosure.

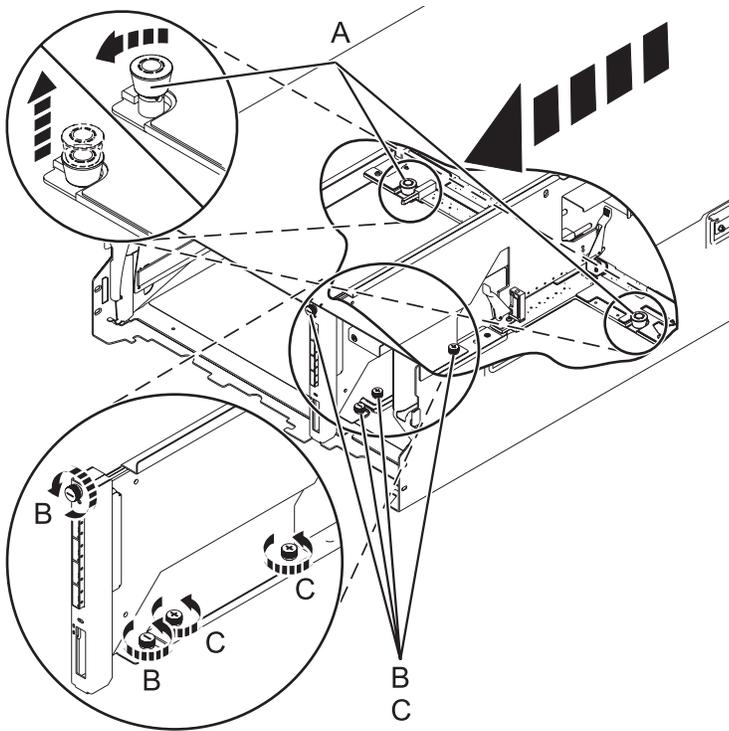


Figure 145. Removing the SAS conduit card and midplane

15. Push the handles (A) on the conduit card down to disengage the card from the midplane, and remove the card.

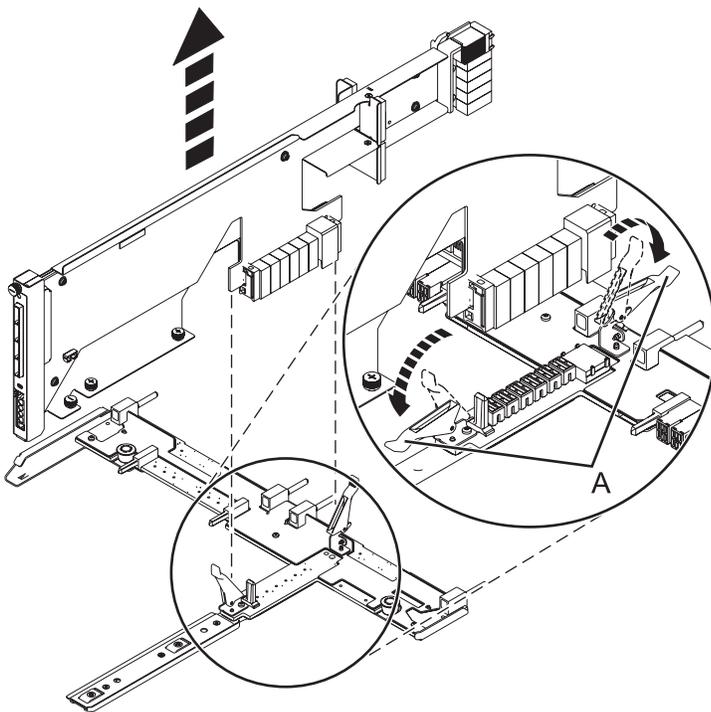


Figure 146. Removing the SAS conduit card from the midplane

Continue with replacing the SAS expander card or return to the procedure that sent you here.

Chapter 12. Replacing a SAS expander card in a 5802 expansion unit with power off

Learn how to replace a SAS expander card in a 5802 expansion unit with power off.

Review the requirements in “Before you begin” on page 165.

If your system is managed by the Hardware Management Console (HMC) use the HMC to replace the card. For instructions see, “Removing a part by using the Hardware Management Console” on page 181

1. Before installing or reinstalling a SAS expander card, inspect the signal connector pins to ensure that the pins are not bent or damaged.

Attention: Bent pins damage the backplane receptacle. Be careful not to touch or damage the signal connector pins.

2. Slide the card completely into the slot and push the lever (**A**) down to secure the card as shown in the following figure.

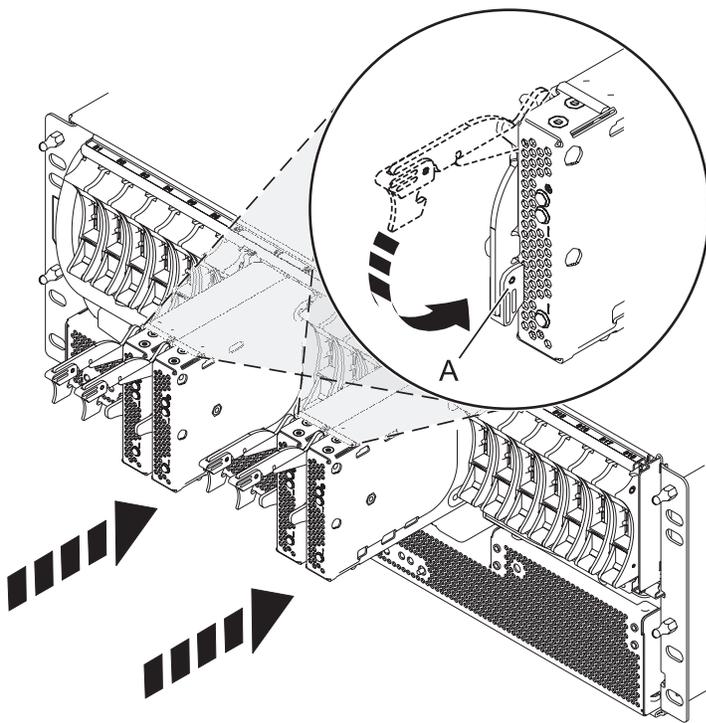


Figure 147. Installing the SAS expander card

3. Start the system. For instructions see, “Starting the system or logical partition” on page 171.
4. Verify the presence of the newly installed card. For instructions see, “Verifying the installed part” on page 182.

Continue with any other service actions you need to perform.

Chapter 13. Removing a SAS expander card from a 5802 expansion unit with power off

Learn how to remove a SAS expander card from a 5802 (rack-mounted) expansion unit if you need to replace a failing part with power off.

If your system is managed by the Hardware Management Console (HMC) use the HMC to remove the SAS expander card. For instructions see, "Removing a part by using the Hardware Management Console" on page 181.

1. Perform the prerequisite tasks as described in "Before you begin" on page 165.
2. Identify the card you are going to remove. For instructions see, "Identifying a failing part" on page 167.
3. Lift the handle (A) and pull the card out of the system, as shown in the following figure.

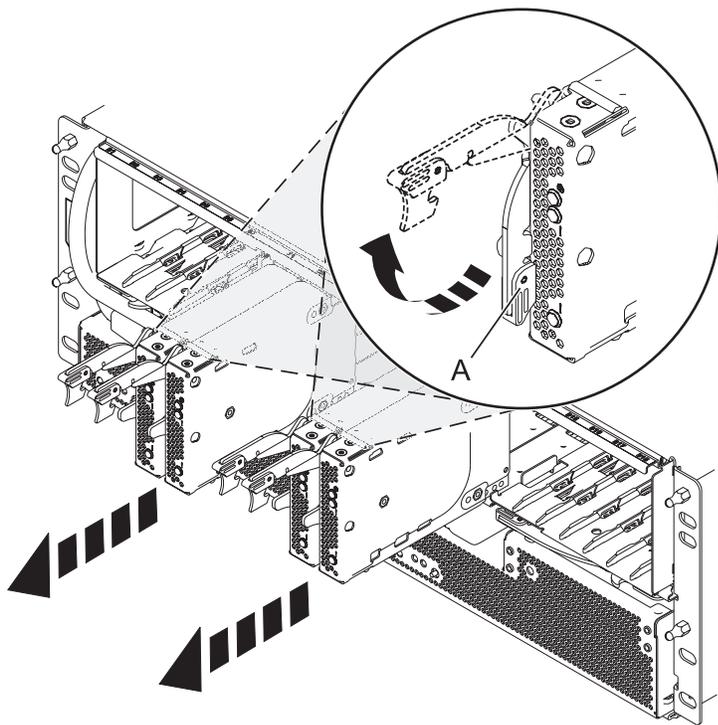


Figure 148. Removing the SAS expander card.

Continue with replacing the SAS expander card or return to the procedure that sent you here.

Chapter 14. Common procedures for installable features

This section contains all the common procedures that are related to installing, removing, and replacing features.

Before you begin

Understand prerequisites for installing, removing, or replacing features and parts.

Use the following safety precautions, unless instructed otherwise.

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:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

DANGER

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

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.



- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

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.

(R001)

Before you begin a replacement or installation procedure, perform these tasks:

1. If you are installing a new feature, ensure that you have the software required to support the new feature.
To do this, go to the following Web site: IBM Prerequisite
2. If you are performing an installation or replacement procedure 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, open or close a latch, and so on. Terra-cotta might also indicate that the part can be removed and replaced with the system or logical partition power 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:
 - 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 Web site 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. 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 a failing part

Use these instructions to learn how to locate and identify a failing part on your system or expansion unit using the appropriate method for your system.

For IBM Power Systems servers that contain the POWER7 processor, the light-emitting diodes (LEDs) can be used to identify or verify a part that you are servicing. The fault (amber) LED indicates an error and corresponds to the location code in the system reference code (SRC). The LED is activated and deactivated automatically.

If you need to use the identify function, use the following procedures.

Identifying a failing part in an AIX system or logical partition

Use these instructions to learn how to locate a failing part, and then activate the indicator light for that part on a system or logical partition running the AIX operating system.

Locating a failing part in an AIX system or logical partition

You might need to use AIX tools, before activating the indicator light, to locate a part that is failing.

1. Log in as root user or `celogin-`.
2. At the command line, type `diag` and press Enter.
3. From the Function Selection menu, select **Task Selection** and press Enter.
4. Select **Display Previous Diagnostic Results** and press Enter.
5. From the Display Previous Diagnostic Results display, select **Display Diagnostic Log Summary**. The Display Diagnostic Log display shows a chronological list of events.
6. Look in the **T** column for the most recent **S** entry. Select this row in the table and press Enter.
7. Select **Commit**. The details of this log entry are shown.
8. Record the location information and the SRN value shown near the end of the entry.
9. Exit to the command line.

Use the location information for the failing part to activate the indicator light that identifies the failing part. "Activating the indicator light for the failing part" on page 168.

Activating the indicator light for the failing part

Use these instructions to help physically identify the location of a part you are servicing.

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. From the Function Selection menu, select **Task Selection** and press Enter.
4. From the Task Selection menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter.
6. Select **Commit**. This turns on the system attention and indicator light for the failing part.
7. Exit to the command line.

Deactivating the failing-part indicator light

Use this procedure to turn off any indicator light that you turned on as a part of a service action.

To deactivate the indicator light, follow these steps:

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. From the Function Selection menu, select **Task Selection** and press Enter.
4. From the Task Selection menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter. When a light is activated for a failing part, an I character precedes the location code.
6. Select **Commit**. This turns off the system attention and indicator light for the failing part.
7. Exit to the command line.

Identifying a failing part in an IBM i system or logical partition

You can activate or deactivate the indicator light by using IBM i to assist in locating a failing part.

Activating the failing-part indicator light

You can search the service action log for an entry that matches the time, reference code, or resource of a problem, and then activate the indicator light for a failing part.

1. Sign on to an IBM i session, **with at least service level authority**.
2. On the command line of the session, type `strsst` and press Enter.

Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by a Hardware Management Console (HMC), use the Service Focal Point™ utilities to get to the Dedicated Service Tools (DST) display.

3. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.

Remember: The service tools password is case-sensitive.

4. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
5. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
6. Select **Work with service action log** from the Hardware Service Manager display and press Enter.
7. On the Select Timeframe display, change the **From: Date and Time** field to a date and time prior to when the problem occurred.
8. Search for an entry that matches one or more conditions of the problem:
 - System Reference code
 - Resource
 - Date and time
 - Failing item list

9. Select option 2 (Display failing item information) to display the service action log entry.
10. Select option 2 (Display details) to display location information for the failing part to be replaced. The information displayed in the date and time fields is the date and time for the first occurrence of the specific System reference code for the resource displayed during the time range selected.
11. If location information is available, select option 6 (Indicator on) to turn on the failing part's indicator light.

Tip: If the failing part does not contain a physical indicator light, a higher-level indicator light is activated. For example, the indicator light for the backplane or unit that contains the failing part might be lit. In this case, use the location information to locate the actual failing part.

12. Look for the enclosure indicator light to locate the enclosure that contains the failing part.

Deactivating the failing-part indicator light

Use this procedure to turn off any indicator light that you turned on as a part of a service action.

To deactivate the indicator light, follow these steps:

1. Sign on to an IBM i session, **with at least service level authority**.
2. On the command line of the session, type `strsst` and press Enter.

Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by a Hardware Management Console (HMC), use the Service Focal Point utilities to get to the Dedicated Service Tools (DST) display.

3. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.

Remember: The service tools password is case-sensitive.

4. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
5. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
6. Select **Work with service action log** from the Hardware Service Manager display and press Enter.
7. On the Select Timeframe display, change the **From: Date and Time** field to a date and time prior to when the problem occurred.
8. Search for an entry that matches one or more conditions of the problem:
 - System Reference code
 - Resource
 - Date and time
 - Failing item list
9. Select option 2 (Display failing item information) to display the service action log entry.
10. Select option 2 (Display details) to display location information for the failing part to be replaced. The information displayed in the date and time fields is the date and time for the first occurrence of the specific System reference code for the resource displayed during the time range selected.
11. Select option 7 (Indicator off) to turn off the indicator light.
12. Select the **Acknowledge all errors** function at the bottom of the Service Action Log display, if all problems have been resolved.
13. Close the log entry by selecting option 8 (Close new entry) on the Service Action Log Report display.

Identifying a failing part in a Linux system or logical partition

If the service aids have been installed on a system or logical partition, you can activate or deactivate the indicator lights to locate a part or complete a service action.

Locating a failing part in a Linux system or logical partition

If the service aids have been installed on a system or logical partition, you need to activate the indicator lights to locate a part.

To activate the indicator light, follow these steps:

1. Log in as root user.
2. At the command line, type `/usr/sbin/usysident -s identify -l<location code>` and press Enter.
3. Look for the system attention light to identify the enclosure that contains the failing part.

Related information

 Service and productivity tools for Linux on POWER systems

IBM provides hardware diagnostic aids and productivity tools, as well as installation aids for Linux operating systems on IBM Power systems.

Finding the location code of a failing part in a Linux system or logical partition

To retrieve the location code of the failing part, if you do not know the location code, use the procedure in this topic.

To locate the failing part in a system or logical partition follow these steps:

1. Log in as root user.
2. At the command line, type `grep diagela /var/log/platform` and press Enter.
3. Look for the most recent entry that contains a system reference code (SRC).
4. Record the location information.

Note: IBM provides hardware diagnostic aids and productivity tools, as well as installation aids for Linux operating systems on IBM Power systems. See Service and productivity tools for Linux on POWER® systems

Activating the indicator light for the failing part

If you know the location code of the failing part, activate the indicator light to help you locate which part to replace.

To activate the indicator light, follow these steps:

1. Log in as root user.
2. At the command line, type `/usr/sbin/usysident -s identify -l<location code>` and press Enter.
3. Look for the system attention light to identify the enclosure that contains the failing part.

Note: IBM provides hardware diagnostic aids and productivity tools, as well as installation aids for Linux operating systems on IBM Power systems. See Service and productivity tools for Linux on POWER systems

Deactivating the failing-part indicator light

After you complete a removal and replacement procedure, you must deactivate the failing-part indicator light.

To deactivate the indicator light, follow these steps:

1. Log in as root user.
2. At the command line, type `/usr/sbin/usysident -s normal -l<location code>` and press Enter.

Note: IBM provides hardware diagnostic aids and productivity tools, as well as installation aids for Linux operating systems on IBM Power systems. See Service and productivity tools for Linux on POWER systems

Locating a failing part in a Virtual I/O Server system or logical partition

You can use Virtual I/O Server (VIOS) tools, before activating the indicator light, to locate a part that is failing.

1. Log in as root user or celogin-.
2. At the command line, type `diagmenu` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. Select **Display Previous Diagnostic Results** and press Enter.
5. From the **Display Previous Diagnostic Results** display, select **Display Diagnostic Log Summary**. A **Display Diagnostic Log** display appears. This display contains a chronological list of events.
6. Look in the T column for the most recent S entry. Select this row in the table and press Enter.
7. Choose **Commit**. The details of this log entry are shown.
8. Record the location information and the SRN value shown near the end of the entry.
9. Exit to the command line.

Use the location information for the failing part to activate the indicator light that identifies the failing part. For instructions, see “Identifying a part by using the Virtual I/O Server.”

Identifying a part by using the Virtual I/O Server

Use these instructions to turn on the indicator light to help you physically locate a part by using the Virtual I/O Server (VIOS).

1. Log in as root user.
2. At the command line, type `diagmenu` and press Enter.
3. From the Function Selection menu, select **Task Selection**. Press Enter.
4. From the Task Selection menu, select **Identify and Attention Indicators**. Press Enter.
5. From the list of lights, select the location code for the failing part and press Enter.
6. Select **Commit**. This turns on the system attention and indicator light for the failing part.
7. Exit to the command line.

Starting the system or logical partition

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

Starting a system that is not managed by a Hardware Management Console

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

To start a system that is not managed by a Hardware Management Console (HMC), follow these steps:

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

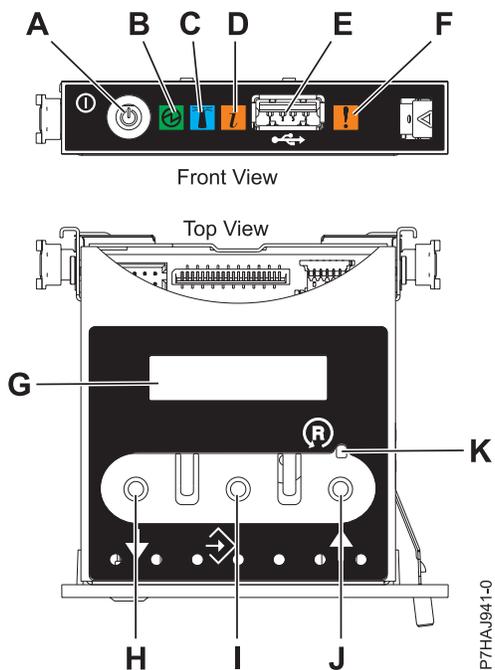


Figure 149. Control panel

- **A:** Power-on button
- **B:** Power LED
 - A constant light indicates full system power to the unit.
 - A blinking light indicates standby power to the unit.
- Note:** There is approximately a 30-second transition period from the time the power-on button is pressed to when the power LED goes from blinking to solid. During the transition period, the LED might blink faster.
- **C:** Enclosure identify light
 - A constant light indicates the identify state, which is used to identify a part.
 - No light indicates that the system is operating normally.
- **D:** Attention light
 - No light indicates that the system is operating normally.
 - A blinking light indicates that the system requires attention.
- **E:** USB port
- **F:** Enclosure fault roll-up light
 - A constant light indicates a fault in the system.
 - No light indicates that the system is operating normally.
- **G:** Function/Data display
- **H:** Decrement button
- **I:** Enter button
- **J:** Increment button
- **K:** Pinhole reset button

4. Observe the following after pressing the power button:

- The power-on light begins to blink faster.
- The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.

- Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops blinking and remains on, indicating that system power is on.

Tip: If pressing the power button does not start the system, do the following steps to start the system using the Advanced System Management Interface (ASMI):

1. Access the ASMI. For instructions, see [Accessing the ASMI](#).
2. Start the system using the ASMI. For instructions, see [Powering the system on and off](#).

Starting a system or logical partition by using the Hardware Management Console

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

For instructions on working with the HMC, see [Managing the Hardware Management Console](#). For instructions on starting a logical partition, see [Logical partitioning](#). For instructions on starting the system, see [Powering on the managed system](#).

Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. When the power-on light on the control panel stops blinking and remains on, the system power is on.

Stopping a system or logical partition

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

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

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

Related tasks

Shutting down logical partitions using the Integrated Virtualization Manager

Use this procedure to shut down a logical partition or the entire managed system that is managed using the Integrated Virtualization Manager.

Stopping a system that is not managed by a Hardware Management Console

You might need to stop the system to perform another task. Use these instructions to stop the system using the power button or Advanced System Management Interface.

Before you stop the system, follow these steps:

1. If an Integrated xSeries® Adapter (IXA) is present on the system, shut it down using IBM i options.
2. Ensure that all jobs are completed and end all applications.
3. Ensure that the operating system is stopped.

Attention: Failure to do so can result in the loss of data.

4. If a Virtual I/O Server (VIOS) logical partition is running, ensure that all clients are shut down or that the clients have access to their devices using an alternate method.

The following procedure describes how to stop a system that is not managed by a Hardware Management Console (HMC).

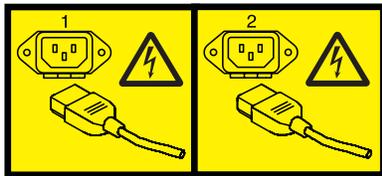
1. Log in to the system as a user with the authority to run the shutdown or pwrdownsys (Power Down System) command.
2. At the command line, enter one of the following commands:
 - If your system is running the AIX operating system, type **shutdown**.
 - If your system is running the Linux operating system,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

The command stops the operating system. The system power turns off, the power-on light begins to slowly flash, and the system goes into a standby state.

3. Record the IPL type and the IPL mode from the control panel display to help you return the system to this state when the installation or replacement procedure is completed.
4. Set the power switches of any devices connected to the system to off.
5. Unplug any power cables that are attached to the unit from electrical outlets. Ensure that you unplug power cables from peripheral devices, such as printers and expansion units.

Important: The system is equipped with a second power supply. Before continuing with this procedure, ensure that all power sources to the system have been disconnected.

(L003)



or



Stopping a system by using the Hardware Management Console

You can use the Hardware Management Console (HMC) user interface to stop the system or a logical partition. Use the following steps to accomplish this task.

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

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

To power off a managed system, you must be a member of one of the following roles:

- Super administrator
 - Service representative
 - Operator
 - Product engineer
1. In the Navigation area, expand the **Systems Management** folder.
 2. Click the **Servers** icon.
 3. In the Contents area, select the managed system.
 4. Select **Tasks**, then **Operations**, and then **Power Off**
 5. Select the appropriate power-off mode and click **OK**.

Related information

 Shutting down and restarting logical partitions

Removing and replacing the expansion unit cover or door

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or performing a service action.

Removing the front cover on the 7314-G30 or 5796

You might need to remove the front cover to perform service to the system.

To remove the front cover, follow these steps:

1. Remove the two thumbscrews (**B**) located on the left and right of the cover.

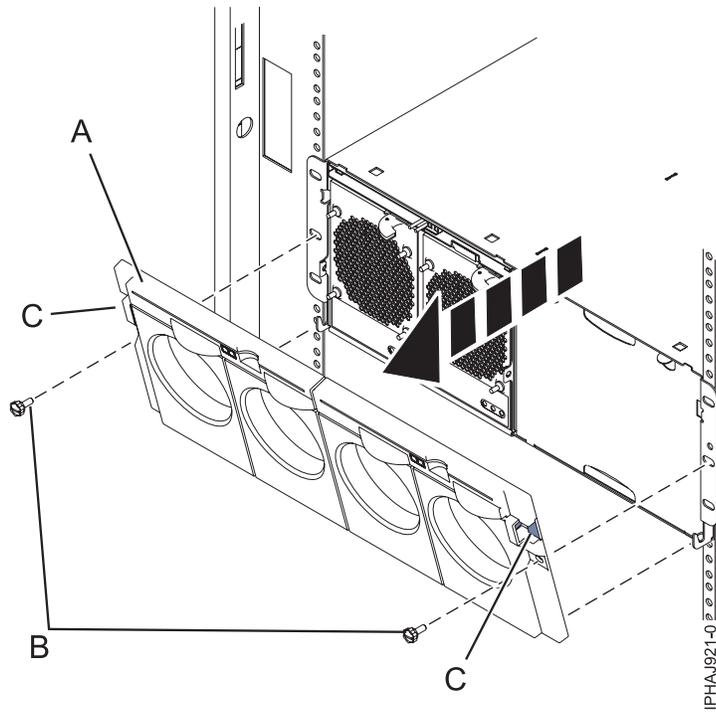


Figure 150. Remove the front cover for model 7314-G30 or 5796

2. Press in on the two latches (C) located left and right of the cover to release the cover.
3. Lift out the cover (A) and away from the chassis.

Tip: If an airflow block is present on an unpopulated side of the chassis do not remove it unless you are populating that side of the chassis.

Installing the front cover on the 7314-G30 or 5796

Use this procedure to install the front cover after installing the system or performing a service action.

If you only have one side of the chassis populated, ensure that the airflow block is present on the unpopulated side.

1. Insert the posts on the bottom of the cover (A) into the hooks on the chassis of the enclosure.
2. Press in on the two latches (C) on the right and left of the front cover.

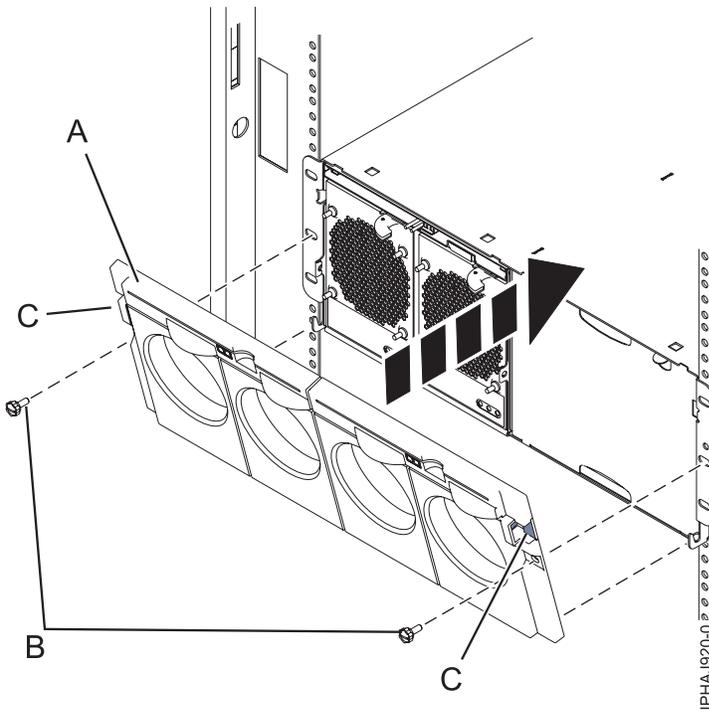


Figure 151. Front cover on a model 7314-G30 or 5796

3. Press the cover onto the chassis and release the latches. The cover securely snaps into place.
4. Replace the two thumbscrews **(B)** into the slots on the left and right of the front cover.

Removing and replacing covers and doors

Use these instructions to remove, replace, or install covers to access components or perform service.

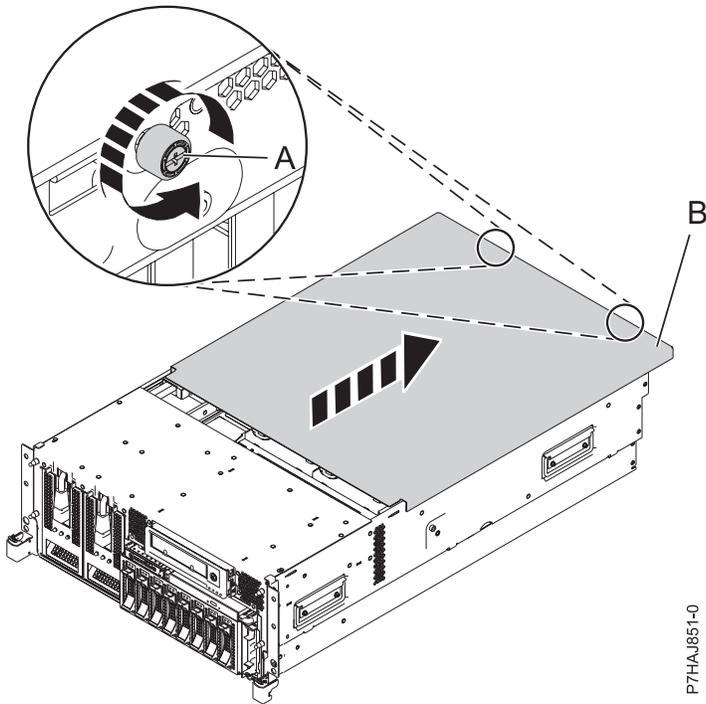
Removing the service access cover from an 8233-E8B or 8236-E8C system

Use this procedure to remove the service access cover to perform service or to gain access to internal components.

To remove the service access cover, follow these steps:

1. Place the system into the service position. For instructions, see Placing a 8233-E8B or 8236-E8C in the service position.
2. Loosen the two thumbscrews **(A)** located at the back of the cover.
3. Slide the cover **(B)** toward the back of the system unit. When the front of the service access cover clears the upper frame ledge, lift the cover up and off the system unit.

Attention: For proper cooling and airflow, install the cover before starting the system. Operating the system without the cover for more than 30 minutes could damage the system components.



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Figure 152. Removing the service access cover

Installing the service access cover on an 8233-E8B or 8236-E8C system

Use this procedure to install the service access cover after performing service or accessing internal components.

To install the service access cover, follow these steps:

1. Place the service access cover (**A**) on the top of the system unit, approximately 25 mm (1 in.) from the front of the system unit.
2. Hold the service access cover against the system unit, and slide it toward the front of the system. The tabs on the service access cover slide beneath the upper chassis ledge, and the two screws align with the screw holes at the back of the system unit.

Important: Ensure that the fan LED cables do not get caught on the front edge of the service access cover as you move it forward.

3. Tighten the screws (**B**) located at the back of the cover.

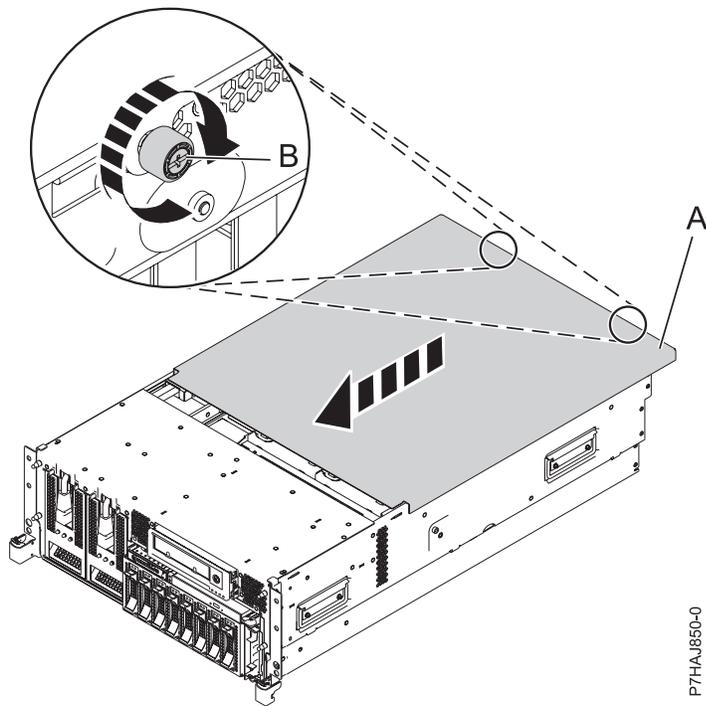


Figure 153. Installing the service access cover

Removing the front cover from an 8233-E8B or 8236-E8C system

Use this procedure to remove the cover to access components or perform service.

To remove the front cover, follow these steps:

1. Remove the two screws (A) that secure the system to the rack (B) as shown in the following figure.
2. Push in the release latches (C) and pull the cover away from the system.

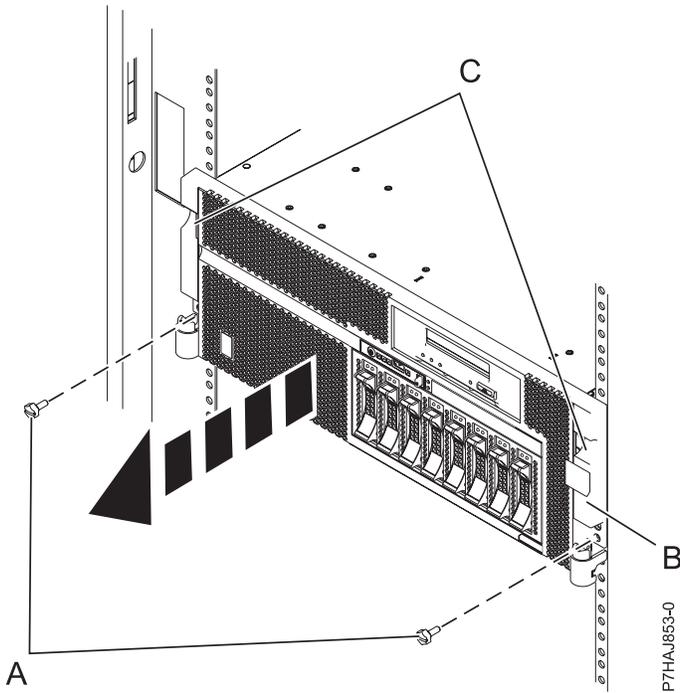


Figure 154. Removing the front cover

Installing the front cover on an 8233-E8B or 8236-E8C system

Use this procedure to install the cover after accessing components or performing service.

To install the service access cover, follow these steps:

1. Push in the release latches (**B**) and push the cover onto the system.
2. Gently push the cover in until the two cover-release latches (**B**) are seated in their respective slots as shown in the following figure.
3. Replace the two screws (**C**) that secure the system to the rack (**A**).

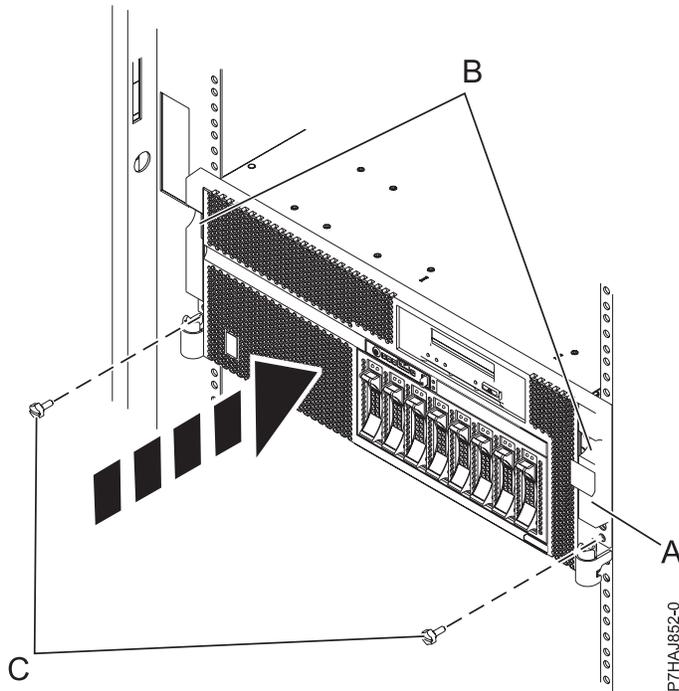


Figure 155. Installing the front cover

Installing a feature by using the Hardware Management Console

You can use the Hardware Management Console to perform many service actions, including the installation of a new feature or part.

To use the Hardware Management Console user interface to install a feature or part into a system or expansion unit that is managed by an HMC, follow these steps:

1. In the navigation area, expand **Systems Management** → **Servers**.
2. Select the managed system you will install the part in.
3. In the Tasks area expand **Serviceability** → **Hardware**.
4. Select **Add FRU** (field replaceable unit).
5. In the Add/Install/Remove Hardware window select the system or enclosure into which you are installing the feature.
6. Select the type of feature you are installing from the menu and click **Next**
7. Select the location code for where you will install the feature, and click **Add**.
8. After the FRU is placed in the **pending actions** category click **Launch Procedure** and follow the instructions to install the feature.

Note: The HMC might open external instructions for installing the feature. If so, follow those instructions to install the feature.

Removing a part by using the Hardware Management Console

You can use the Hardware Management Console (HMC) to perform many service actions, including the removal of a field replaceable unit (FRU) or part.

To use the Hardware Management Console user interface to remove a part in a system or expansion unit that is managed by an HMC, follow these steps:

1. In the navigation area, expand **Systems Management** → **Servers**.
2. Select the managed system from which you are removing a part.
3. In the Tasks area, expand **Serviceability** → **Hardware**.
4. Select **Remove FRU**.
5. In the Add/Install/Remove Hardware - Remove FRU, Select FRU Type window, select the system or enclosure from which you are removing the part.
6. Select the type of part you are removing from the menu and click **Next**.
7. Select the location of the part you are removing and click **Add**.
8. After the part is listed in the **Pending Actions** display click **Launch Procedure** and follow the instructions to remove the part.

Note: The HMC might open the information center instructions for removing the part. If so, follow those instructions to remove the part.

Exchanging a part by using the Hardware Management Console

You can use the Hardware Management Console (HMC) to perform many service actions, including exchanging a field replaceable unit (FRU) or part.

If you are exchanging a part to repair a serviceable event follow those instructions. If you are exchanging a part as a part of any other procedure using HMC Version 7 or later use these steps:

1. In the navigation area, expand **Systems Management** → **Servers**.
2. Select the managed system in which you are exchanging a part.
3. In the Tasks area expand **Serviceability** → **Hardware**.
4. Select **Exchange FRU**.
5. In the Replace Hardware - Replace FRU, Select FRU Type window select the system or enclosure in which you will exchange a part from the list.
6. Select the type of part you will exchange from the menu and click **Next**.
7. Select the location code of the part you will exchange from the menu and click **Add**.
8. After the FRU is placed in the **pending actions** category click **Launch Procedure** and follow the instructions to exchange the feature.

Note: The HMC might open external instructions for replacing the part. If so, follow those instructions to replace the part.

Verifying the installed part

You can verify a newly installed or replaced part on your system, logical partition, or expansion unit using the operating system, stand-alone diagnostics, or the Hardware Management Console (HMC).

Verifying an installed feature or replaced part in an AIX system or logical partition

If you installed feature or replaced a part, you might want to use the tools in AIX to verify that the feature or part is recognized by the system or logical partition.

To verify the operation of a newly installed feature or replacement part, select the appropriate procedure:

- Verify the installed feature using AIX
- Verifying the replaced part using AIX

Verify the installed feature by using AIX:

1. Log in as root user.

2. At the command line, type `diag` and press Enter.
3. Select **Advanced Diagnostics Routines** and press Enter.
4. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
5. When the **Advanced Diagnostic Selection** menu appears, do one of the following:
 - To test a single resource, select the resource that you just installed from the list of resources and press Enter.
 - To test all the resources available to the operating system, select **All Resources** and press Enter.
6. Select **Commit**, and wait until the diagnostic programs run to completion, responding to any prompts that appear.
7. Did the diagnostics run to completion and display the message No trouble was found?
 - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the installation procedures to ensure that the new feature is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system is running in logical partitioning (LPAR) mode, note the logical partition in which you installed the feature. Contact your service provider for assistance.
 - **Yes:** The new device is installed correctly. Exit the diagnostic programs and return the system to normal operations.

Verify the replacement part by using AIX:

To verify the operation of a newly installed feature or replacement part, follow these steps:

1. Did you use either the AIX operating system or the online diagnostics service aid concurrent (hot-swap) service to replace the part?
 - No:** Go to step 2.
 - Yes:** Go to step 5 on page 184.
2. Is the system powered off?
 - No:** Go to step 4.
 - Yes:** If the system supports slow boot, set the system to perform a slow boot. For information, see *Performing a slow boot*.
3. Start the system and wait until the AIX operating system login prompt is displayed or until apparent system activity on the operator panel or display has stopped.

Did the AIX login prompt display?

 - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the procedures for the part that you replaced to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system does not start or you have no login prompt, see: *Problems with loading and starting the operating system*.
If the system is partitioned, note the logical partition in which you replaced the part. Contact your service provider for assistance.
 - **Yes:** Go to step 4.
4. At the command prompt, type `diag -a` and press Enter to check for missing resources. If you see a command prompt, go to step 5 on page 184.

If the **Diagnostic selection** menu is shown with **M** appearing next to any resource, follow these steps:

 - a. Select the resource and press Enter.
 - b. Select **Commit**.
 - c. Follow any instructions that are shown.
 - d. If the *Do you want to review the previously displayed error?* message is shown, select **Yes** and press Enter.

- e. If an SRN is shown, suspect a loose card or connection. If no obvious problem is shown, record the SRN and contact your service provider for assistance..
 - f. If no SRN is shown, go to step 5.
5. Test the part by doing the following steps:
 - a. At the command line, type `diag` and press Enter.
 - b. From the **Function Selection** menu, select **Advanced Diagnostics Routines** and press Enter.
 - c. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
 - d. Select **All Resources**, or select the diagnostics for the individual part to test only the part you replaced and any devices that are attached to the part you replaced and press Enter.
Did the **Resource Repair Action** menu appear?
No: Go to step 6.
Yes: Go to step 7.
 6. Did the *Testing Complete, No trouble was found* message appear?
 - **No:** There is still a problem. Contact your service provider. **This ends the procedure.**
 - **Yes:** Select **Log Repair Action**, if not previously logged, from the **Task Selection** menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the resource list, select `sysplanar0` and press Enter.

Tip: This action changes the indicator light for the part from the fault state to the normal state. Go to step 9 on page 185.
 7. Select the resource for the replaced part from the **Resource Repair Action** menu. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

Note: On systems with an indicator light for the failing part, this action changes the indicator light to the normal state.
 - a. Select the resource that has been replaced from the **Resource Repair Action** menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select `sysplanar0` and press Enter.
 - b. Select **Commit** after you make your selections. Did another **Resource Repair Action** display appear?
No: If the **No Trouble Found** display appears, go to step 9 on page 185
Yes: Go to step 8.
 8. Select the parent or child of the resource for the replaced part from the **Resource Repair Action** menu if necessary. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

Note: This action changes the indicator light for the part from the fault state to the normal state.
 - a. From the **Resource Repair Action** menu, select the parent or child of the resource that has been replaced. If the repair action was to reseat a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select `sysplanar0` and press Enter.
 - b. Select **Commit** after you make your selections.
 - c. If the **No Trouble Found** display appears, go to step 9 on page 185.

9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the values they had prior to servicing the system.
10. Did you do any hot-plug procedures before doing this procedure?
 - No:** Go to step 11.
 - Yes:** Go to step 12.
11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?
 - No:** Contact your service provider. **This ends the procedure.**
 - Yes:** Go to step 12.
12. Are the indicator lights still on?
 - **No. This ends the procedure.**
 - **Yes.** Turn off the lights. See the following for instructions: Changing service indicators.

Verifying the installed part in an IBM i system or logical partition

If you have installed a new feature or part, verify that the system recognizes the feature or part by using the IBM i system service tools.

To verify the installed part, follow these steps:

1. Deactivate the failing item indicator light. For instructions, see “Deactivating the failing-part indicator light” on page 169.
2. Sign on **with at least service level authority**.
3. On the command line of the IBM i session, type `strsst` and press Enter.

Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by Hardware Management Console (HMC), use the Service Focal Point Utilities to get to the Dedicated Service Tools (DST) display.

4. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display and press Enter.

Note: The service tools password is case-sensitive.

5. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
6. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
7. Select **Logical hardware resources (buses, IOPs, controllers)** from the Hardware Service Manager display and press Enter. This option allows you to display and work with logical resources. Logical hardware resources are the functional resources of the system used by the operating system.

With the Logical Hardware Resources display, you can show logical hardware resource status or information, and associated packaging hardware resources. Use the online Help information to better understand specific functions, fields, or symbols.

Deactivating the failing-part indicator light

Use this procedure to turn off any indicator light that you turned on as a part of a service action.

To deactivate the indicator light, follow these steps:

1. Sign on to an IBM i session, **with at least service level authority**.
2. On the command line of the session, type `strsst` and press Enter.

Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by a Hardware Management Console (HMC), use the Service Focal Point utilities to get to the Dedicated Service Tools (DST) display.

3. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.

Remember: The service tools password is case-sensitive.

4. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
5. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
6. Select **Work with service action log** from the Hardware Service Manager display and press Enter.
7. On the Select Timeframe display, change the **From: Date and Time** field to a date and time prior to when the problem occurred.
8. Search for an entry that matches one or more conditions of the problem:
 - System Reference code
 - Resource
 - Date and time
 - Failing item list
9. Select option 2 (Display failing item information) to display the service action log entry.
10. Select option 2 (Display details) to display location information for the failing part to be replaced. The information displayed in the date and time fields is the date and time for the first occurrence of the specific System reference code for the resource displayed during the time range selected.
11. Select option 7 (Indicator off) to turn off the indicator light.
12. Select the **Acknowledge all errors** function at the bottom of the Service Action Log display, if all problems have been resolved.
13. Close the log entry by selecting option 8 (Close new entry) on the Service Action Log Report display.

Verifying the installed part in a Linux system or logical partition

If you have installed a new part, learn how to verify that the system recognizes the part.

To verify the newly installed or replaced part, continue with “Verifying an installed part by using stand-alone diagnostics.”

Verifying an installed part by using stand-alone diagnostics

If you have installed or replaced a part, verify that the system recognizes the new part. You can use stand-alone diagnostics to verify an installed part in a Linux system, expansion unit, or logical partition.

- If this server is directly attached to another server or attached to a network, ensure communications with the other servers have stopped.
- The stand-alone diagnostics require use of all of the logical partition resources. No other activity can be running on the logical partition.
- The stand-alone diagnostics require access to the system console.

You access these diagnostics from a CD-ROM or from the Network Installation Management (NIM) server. This procedure describes how to use the diagnostics from a CD-ROM. For information on running diagnostics from the Network Installation Management (NIM) server, see Running stand-alone diagnostics from a Network Installation Management server.

To use stand-alone diagnostics, follow these steps:

1. Stop all jobs and applications and then stop the operating system on the system or logical partition.
2. Remove all tapes, diskettes, and CD-ROM.
3. Turn off the system unit power. The next step boots the server or logical partition from the stand-alone diagnostics CD-ROM. If the optical drive is not available as the boot device on the server or logical partition on which you are working, follow these steps:
 - a. Access the ASMI. See Accessing the ASMI for information on using the ASMI.

- b. On the ASMI main menu, click on **Power/Restart Control**.
 - c. Click Power On/Off System.
 - d. Select the **Service mode boot from default boot list** option in the AIX or Linux logical partition mode boot drop-down menu.
 - e. Click **Save settings and power on**. As soon as the optical drive has power, insert the standalone diagnostic CD-ROM.
 - f. Go to step 5.
4. Turn on the system unit power and immediately insert the diagnostics CD-ROM into the optical drive.
 5. After the **keyboard** POST indicator displays on the system console and before the last POST indicator (**speaker**) displays, press the numeric 5 key on the system console to indicate that a service mode boot should be initiated using the default-service mode boot list.
 6. Enter any requested password.
 7. At the **Diagnostic Operating Instructions** display, press Enter.

Tip: If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection.

Note: If you received an SRN or any other reference code when you attempted to start the system, contact your service provider for assistance..

8. If the terminal type is requested, select the **Initialize Terminal** option on the Function Selection menu to initialize the operating system.
9. From the Function Selection menu, select **Advanced Diagnostics Routines** and press Enter.
10. From the Diagnostic Mode Selection menu, select **System Verification** and press Enter.
11. When the Advanced Diagnostic Selection menu appears, select **All Resources**, or test only the part you replaced, and any devices that are attached to the part you replaced, by selecting the diagnostics for the individual part and press Enter.
12. Did the Testing Complete, No trouble was found message appear?
 - **No:** There is still a problem. Contact your service provider.
 - **Yes:** Go to step 13.
13. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the value they had prior to servicing the system.
14. If the indicator lights are still on, follow these steps:
 - a. Select **Identify and Attention Indicators** from the Task Selection menu to turn off the system attention and indicator lights and press Enter.
 - b. Select **Set System Attention Indicator to NORMAL** and press Enter.
 - c. Select **Set All Identify Indicators to NORMAL** and press Enter.
 - d. Choose **Commit**.

Note: This changes the system attention and identify indicators from the *Fault* state to the *Normal* state.

- e. Exit to the command line.

Verifying the installed part by using Hardware Management Console

If you have installed or replaced a part, use the Hardware Management Console (HMC) to update your HMC records after you have completed a service action on your server. If you have reference codes, symptoms, or location codes that you used during the service action, locate the records for use during this procedure.

To verify the installed part, complete these steps:

1. At the HMC, examine the service action event log for any open service action events. See “Viewing serviceable events” on page 189 for details.
2. Are there any service action events that are open?
 - No:** If the system attention LED is still on, use the HMC to turn off the LED. See “Activating and deactivating LEDs.” **This ends the procedure.**
 - Yes:** Continue with the next step.
3. Record the list of open service action events.
4. Examine the details of the open service action event. Is the error code associated with this service action event the same as you gathered earlier.
 - **No:** Select one of the following options:
 - Review the other serviceable events, find one that does match, and continue with the next step.
 - If the log does not match what you had gathered earlier, contact your service provider.
 - **Yes:** Continue with the next step.
5. Select and highlight the service action event from the Error Associated With This Serviceable Event window.
6. Click **Close Event**.
7. Add comments for the serviceable event. Include any unique additional information. Click **OK**.
8. Did you replace, add, or modify a field replaceable unit (FRU) of the open service action event?
 - **No:** Select the **No FRU Replaced for this Serviceable Event** option, and click **OK** to close the service action event.
 - **Yes:** Perform the following steps:
 - a. From the FRU list, select a FRU that you need to update.
 - b. Double-click the FRU and update the FRU information.
 - c. Click **OK** to close the service action event.
9. If you continue to have problems, contact your service provider.

Activating and deactivating LEDs

Use this procedure to activate or deactivate LEDs using Service Focal Point for the HMC.

Choose from the following:

- “Deactivating a system attention LED or partition LED”
- “Activating or deactivating identify LED” on page 189

Deactivating a system attention LED or partition LED:

You can deactivate a system attention LED or a logical partition LED. For example, you might determine that a problem is not a high priority and decide to repair the problem at a later time. However, you want to be alerted if another problem occurs, so you must deactivate the system attention LED so that it can be activated again if another problem occurs.

1. In the navigation area, open **Systems Management**.
2. Open **Servers** and select the appropriate system.
3. In the content area, check the box for the appropriate Partition.
4. Select **Tasks**, then **Operations**, and then **Manage Attention LED**.
5. Select the appropriate Partition.
6. Select **Deactivate System Attention LED** from the **Action** menu. A confirmation window is displayed that provides the following information:
 - A verification that the system attention LED was deactivated.
 - An indication that there still might be open problems within the system.
 - An indication that you cannot activate the system attention LED.

7. Select one of the logical partitions in the lower table, and select **Deactivate partition LED** from the **Partition Operations** menu. A confirmation window is displayed that provides the following information:
 - A verification that the logical partition LED was deactivated.
 - An indication that there still might be open problems within the logical partition.
 - An indication that you cannot activate the logical partition LED.

Activating or deactivating identify LED:

The system provides several LEDs that help identify various components, such as enclosures or field replaceable units (FRUs), in the system. For this reason, they are called *identify LEDs*.

You can activate or deactivate the following types of identify LEDs:

- **Identify LED for an enclosure** If you want to add an adapter to a specific drawer (enclosure), you need to know the machine type, model, and serial number (MTMS) of the drawer. To determine whether you have the correct MTMS for the drawer that needs the new adapter, you can activate the LED for a drawer and verify that the MTMS corresponds to the drawer that requires the new adapter.
- **Identify LED for a FRU associated with a specified enclosure** If you want to hook up a cable to a specific I/O adapter, you can activate the LED for the adapter which is a field replaceable unit (FRU), and then physically check to see where you should hook up the cable. This is especially useful when you have several adapters with open ports.

To activate or deactivate an identify LED for an enclosure or FRU, follow these steps:

1. In the navigation area, open **Systems Management**.
2. Select **Servers**.
3. In the content area, check the box for the appropriate System.
4. Select **Tasks**, then **Operations**, then **LED Status**, and then **Identify LED**.
5. To activate or deactivate an identify LED for an enclosure, select an enclosure from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
6. To activate or deactivate an identify LED for a FRU, select an enclosure from the table, select **Selected** → **List FRUs**.
7. Select one or more FRUs from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Viewing serviceable events

Use this procedure to view a serviceable event, including details, comments, and service history.

To view serviceable events and other information about the events, you must be a member of one of the following roles:

- Super administrator
- Service representative
- Operator
- Product engineer
- Viewer

To view serviceable events, follow these steps:

1. In the navigation area, select **Service Management**.
2. Select **Manage Serviceable Events**.
3. Select the criteria for the serviceable events that you want to view, and click **OK**. The Serviceable Event Overview window opens. The list shows all serviceable events that match your selection criteria. You can use the menu options to perform actions on the serviceable events.

4. Select a line in the Serviceable Event Overview window, and select **Selected** → **View Details**. The Serviceable Event Details window opens, showing detailed information about the serviceable event. The upper table shows information, such as problem number and reference code. The lower table shows the field replaceable units (FRUs) associated with this event.
5. Select the error for which you want to view comments and history, and follow these steps:
 - a. Select **Actions** → **View Comments**.
 - b. When you are finished viewing the comments, click **Close**.
 - c. Select **Actions** → **View Service History**. The Service History window opens, showing service history associated with the selected error.
 - d. When you are finished viewing the service history, click **Close**.
6. When you are finished, click **Cancel** twice to close the Serviceable Event Details window and the Serviceable Event Overview window.

Verifying an installed feature or replaced part on a system or logical partition by using Virtual I/O Server tools

If you installed feature or replaced a part, you might want to use the tools in Virtual I/O Server (VIOS) to verify that the feature or part is recognized by the system or logical partition.

To verify the operation of a newly installed feature or replacement part, select the appropriate procedure:

- Verify the installed feature using VIOS
- Verifying the replaced part using VIOS

Verify the installed feature by using VIOS:

1. Log in as root user.
2. At the command line, type `diagmenu` and press Enter.
3. Select **Advanced Diagnostics Routines** and press Enter.
4. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
5. When the **Advanced Diagnostic Selection** menu appears, do one of the following:
 - To test a single resource, select the resource that you just installed from the list of resources and press Enter.
 - To test all the resources available to the operating system, select **All Resources** and press Enter.
6. Select **Commit**, and wait until the diagnostic programs run to completion, responding to any prompts that appear.
7. Did the diagnostics run to completion and display the message No trouble was found?
 - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the installation procedures to ensure that the new feature is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system is running in LPAR mode, note the logical partition in which you installed the feature. Contact your service provider for assistance.
 - **Yes:** The new device is installed correctly. Exit the diagnostic programs and return the system to normal operations.

Verify the replacement part by using VIOS:

To verify the operation of a newly installed feature or replacement part, follow these steps:

1. Did you replace the part by using either VIOS or the online diagnostics service aid's concurrent (hot-swap) service operation?
 - No:** Go to step 2 on page 191.
 - Yes:** Go to step 5 on page 191.

2. Is the system powered off?
 - No:** Go to step 4.
 - Yes:** If the system supports slow boot, set the system to perform a slow boot. For information, see *Performing a slow boot*.
3. Start the system and wait until the VIOS operating system login prompt displays or until apparent system activity on the operator panel or display has stopped.

Did the VIOS login prompt display?

 - **No:** If an SRN or other reference code is displayed, suspect a loose adapter or cable connection. Review the procedures for the part that you replaced to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system does not start or you have no login prompt, see: *Problems with loading and starting the operating system*.
If the system is partitioned, note the logical partition in which you replaced the part. Contact your service provider for assistance.
 - **Yes:** Go to step 4
4. At the command prompt, type `diag -a` and press Enter to check for missing resources. If you see a command prompt, go to step 5.

If the **Diagnostic selection** menu is shown with **M** appearing next to any resource, follow these steps:

 - a. Select the resource and press Enter.
 - b. Select **Commit**.
 - c. Follow any instructions that are shown.
 - d. If a *Do you want to review the previously displayed error?* message is shown, select **Yes** and press Enter.
 - e. If an SRN is shown, suspect a loose card or connection. If no obvious problem is shown, record the SRN and contact your service provider for assistance..
 - f. If no SRN is shown, go to 5.
5. Test the part by doing the following:
 - a. At the command line, type `diagmenu` and press Enter.
 - b. From the **Function Selection** menu, select **Advanced Diagnostics Routines** and press Enter.
 - c. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
 - d. Select **All Resources**, or select the diagnostics for the individual part to test only the part you replaced, and any devices that are attached to the part you replaced and press Enter.

Did the **Resource Repair Action** menu appear?

 - No:** Go to step 6.
 - Yes:** Go to step 7.
6. Did the *Testing Complete, No trouble was found* message appear?
 - **No:** There is still a problem. Contact your service provider. **This ends the procedure.**
 - **Yes:** Select **Log Repair Action**, if not previously logged, from the **Task Selection** menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the Resource List, select `sysplanar0` and press Enter.

Tip: This action changes the indicator light for the part from the fault state to the normal state. Go to step 9 on page 192
7. Select the resource for the replaced part from the **Resource Repair Action** menu. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the

test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

Note: On systems with a indicator light for the failing part, this changes the indicator light to the normal state.

- a. Select the resource that has been replaced from the **Resource Repair Action** menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**. Press Enter.
- b. Select **Commit** after you make your selections. Did another **Resource Repair Action** display appear?

No: If the **No Trouble Found** display appears, go to step 9

Yes: Go to step 8.

8. Select the parent or child of the resource for the replaced part from the **Resource Repair Action** menu if necessary. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

Note: This changes the indicator light for the part from the fault state to the normal state.

- a. From the **Resource Repair Action** menu, select the parent or child of the resource that has been replaced. If the repair action was to reseat a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**. Press Enter.
- b. Select **Commit** after you make your selections.
- c. If the **No Trouble Found** display appears, go to step 9.

9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the values they had prior to servicing the system.

10. Did you do any hot-plug procedures before doing this procedure?

No: Go to step 11.

Yes: Go to step 12.

11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?

No: Contact your service provider. **This ends the procedure.**

Yes: Go to step 12.

12. Are the indicator lights still on?

- **No. This ends the procedure.**
- **Yes.** Turn off the lights. See one of the following for instructions: Changing service indicators

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Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A respecte est conforme à la norme NMB-003 du Canada.

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European Community contact:
IBM Technical Regulations
Pascalstr. 100, Stuttgart, Germany 70569
Tele: 0049 (0)711 785 1176
Fax: 0049 (0)711 785 1283
E-mail: tjahn@de.ibm.com

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高調波ガイドライン適合品

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高調波ガイドライン準用品

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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
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Verantwortlich für die Konformitätserklärung nach des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

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