Power Systems

Disk drives or solid-state drives for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

IBM

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Disk drives or solid-state drives for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

IBM

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Safety notices

Safety notices may be printed throughout this guide:

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

World Trade safety information

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

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

German safety information

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

Laser safety information

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

Laser compliance

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

DANGER

> **When working on or around the system, observe the following precautions:**
>
> **Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:**
> - **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)

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

Do Not:
- ___ **Throw or immerse into water**
- ___ **Heat to more than 100°C (212°F)**
- ___ **Repair or disassemble**

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

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 or solid-state drives for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to install, remove, and replace disk drives or solid-state drives (SSDs) for the IBM Power® 710 Express (8231-E2B, 8231-E1C, 8231-E1D, or 8268-E1D) and the IBM Power 730 Express (8231-E2B, 8231-E2C, or 8231-E2D) systems and for the supported drive enclosures or expansion units.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to install a Small Computer System Interface (SCSI) drive, serial-attached SCSI (SAS) drive, or solid-state drive (SSD) in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system, drive enclosure, or an expansion unit.

Solid-state drive configuration rules for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Before you install and configure solid-state drives (SSDs), you must review the supported machine type model, the supported expansion unit or enclosure, adapter, and configuration details.

SSD drive rules for a system, enclosure, or expansion unit

Solid-state drives, also known as flash drives, follow similar 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 are specific to the SSD. The following tables helps you determine the operating system, adapter, machine type model, and disk drive configuration rules that apply to your system or expansion unit.

After you review the configuration rules, you can install the drive as you would any other disk drive. For more information about installing disk drives or solid-state drives, see the topic collection for your system or expansion unit.

Restriction: Solid-state drives must be part of a RAID array or system mirroring in the system or logical partition that is controlled by IBM i.

See Table 1 on page 2 for the system or partition or the enclosure or expansion unit where you want to install drives.

Attention: Before you install SSD in your system, ensure that both the SSD and the adapters have all the prerequisite updates. To check for the prerequisites, go to the IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf).

Table 1. Solid-state drive rules for the IBM AIX, IBM i, or Linux operating system for a system, enclosure, or expansion unit

System, enclosure, or expansion unit	Adapter	Mixing rules
8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D	• FC 2053 (3 Gbps SAS RAID Controller with 4X SSD Sockets) • FC 5278 (SAS Controller) • FC ESA1 (PCIe2 RAID SAS Adapter Dual-port 6 Gb) • FC ESA1 (PCIe2 LP RAID SAS Adapter Dual-port 6 Gb)	• SSD and HDD cannot be mixed in the same RAID array or mirroring group. • SSDs and HDDs cannot be split. • SSDs and HDDs can be connected to the 5886 from the external SAS port.
5802 and 5877	FC 5903 (PCIe 380 MB Cache Dual x4 3 Gb SAS RAID Adapter)	• SSD and HDD cannot be mixed on a pair of 5903 adapters. • A maximum of 9 SSDs are supported on a pair of 5903 adapters.
5886	• FC 5904 (PCI-X DDR 1.5 GB Cache SAS RAID Adapter) • FC 5906 and FC 5908 (PCI-X DDR 1.5 GB Cache SAS RAID Adapter) • FC 5903 (PCIe 380 MB Cache Dual - x4 3 Gb SAS RAID Adapter)	• SSDs and HDDs can be mixed in this drive enclosure. • A maximum of 24 drives are supported in this enclosure. • SSDs and HDDs can be attached to the SAS Controller PCI or PCI-X adapters. Also, can be attached to the embedded SAS controller in a system with an embedded SAS port.

Table 1. Solid-state drive rules for the IBM AIX, IBM i, or Linux operating system for a system, enclosure, or expansion unit (continued)

System, enclosure, or expansion unit	Adapter	Mixing rules

5887 disk drive enclosure	• FC 5805 (PCIe 380 MB Cache Dual - x4 3 Gb SAS RAID Adapter)
	 • FC 5901 (PCIe Dual x4 SAS Adapter)
	 • FC 5908 (PCI-X DDR 1.5 GB Cache SAS RAID Adapter)
	 • FC ESA1 (PCIe2 RAID SAS Adapter Dual-port 6 Gb)
	 • FC ESA1 (PCIe2 LP RAID SAS Adapter Dual-port 6 Gb)
	 • PCIe2 (3.1 GB Cache RAID SAS Enclosure 6 Gb x8)
		• A maximum of 24 drives are supported in this enclosure.
		 • The EXP24S can be configured as one set of 24 bays (mode 1), two sets of 12 bays (mode 2), or four sets of 6 bays (mode 4).
		 • The EXP24S serial-attached SCSI (SAS) ports are attached to SAS controllers, which can be a SAS Peripheral Component Interconnect-X (PCI-X) adapter, PCI Express (PCIe) adapter, or a pair of adapters. The EXP24S can also be attached to an embedded SAS controller in a system with an embedded SAS port.
		 • The mixing of the SSDs and HDDs is as follows:
		  – SSDs and HDDs cannot be mixed in a logical group when configured as in mode 1.
		  – SSDs and HDDs can be mixed when configured as in mode 2: one set can be SSDs and the other set can be HDDs.
		  – SSDs and HDDs cannot be mixed when configured as in mode 4 because the SSDs are not supported by the adapter that is required to configure the 5887 for mode 4.

Table 1. Solid-state drive rules for the IBM AIX, IBM i, or Linux operating system for a system, enclosure, or expansion unit (continued)

System, enclosure, or expansion unit	Adapter	Mixing rules
5888 PCIe storage enclosure	PCIe2 (3.1 GB Cache RAID SAS Enclosure 6 Gb x8)	- This enclosure is a 1-unit (1U) high I/O drawer that provides 30 hot-swap SSD bays and a pair of integrated SAS controllers. The SAS controllers provide large write cache and enhanced performance. - The EXP30 does not support HDDs. - A maximum of 30 SSDs are supported in this disk drive enclosure. - The EXP30 can be configured as follows: – One set of 30 bays and the set is owned by both controllers that are working together. – Two logical sets and each of the two controllers owns one of the logical sets. - The EXP30 is attached to the system by a PCIe x8 cable that is installed at the GX ++ slot in the system. - The system supports connection of the 5887 disk drive enclosure through the external SAS ports by using FC 5913, ESA1, or ESA2. - The system supports only the HDD in the 5887 disk drive enclosure when this enclosure is configured as one set of 24 bays (mode 1).

Table 1. Solid-state drive rules for the IBM AIX, IBM i, or Linux operating system for a system, enclosure, or expansion unit (continued)

System, enclosure, or expansion unit	Adapter	Mixing rules

EDR1 PCIe storage enclosure	PCIe2 (3.1 GB Cache RAID SAS Enclosure 6 Gb x8)	• This enclosure is a 1-unit (1U) high I/O drawer that provides 30 hot-swap SSD bays and a pair of integrated SAS controllers. The SAS controllers provide large write cache and enhanced performance.
		• The EXP30 does not support HDDs.
		• A maximum of 30 SSDs are supported in this disk drive enclosure.
		• The EXP30 can be configured as follows:
		  – One set of 30 bays and the set is owned by both controllers that are working together.
		  – Two logical sets and each of the two controllers owns one of the logical sets.
		• The EXP30 is attached to the system by a PCIe x8 cable that is installed at the GX ++ slot in the system.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the AIX system or logical partition power turned on

Learn how to install a disk drive or solid-state drive in a system or expansion unit with the AIX® operating system or logical partition that controls the drive location is powered on.

If you are servicing a failing part, see the service procedures for "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the AIX system or logical partition power turned on" on page 62.

Before installing or replacing a feature, ensure that the software required to support the feature is installed on the system. For information about software prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, go to Fix Central (www.ibm.com/support/fixcentral) to download it, and install it before continuing.

If you are installing solid-state drives, review the configuration rules and then return here. For more information, see "Solid-state drive configuration rules for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 1.

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.

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 complete the task are the same.

Complete the following tasks to install a disk drive or solid-state drive:
- "Preparing to install a disk drive or solid-state drive"
- "Preparing to install a disk drive or solid-state drive by using the diagnostic command" on page 7
- Choose from the following options:
  - "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 7
  - "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 8
  - "Installing a solid-state drive in the 5888 PCIe storage enclosure" on page 9 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  - "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 10 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)
- "Completing the disk drive or solid-state drive installation by using the diagnostic command" on page 11
- "Completing the procedure" on page 11

Preparing to install a disk drive or solid-state drive

Complete the following steps before installing a disk drive or solid-state drive in a system or in an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Identify the system for performing the installation or upgrading by turning on the system identify (blue) LED. For instructions, see Control panel LEDs and Enabling enclosure indicators.
3. If applicable, remove the system unit door, remove the expansion unit door, or open the rack.
4. Determine the next available disk drive or solid-state drive position in the system or expansion unit. For information, see "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.

   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 or solid-state drive placement depending on your data protection strategy.

5. Record the position where the new disk drive or solid-state drive must be installed. For example, the next available disk drive or solid-state drive slot might be P3-D4.
6. Find the package that contains the new drive.
   Attention: Drives are fragile. Handle with care.
7. Remove the drive from the static-protective package.
8. Proceed to preparing to install a disk drive or solid-state drive by using the diagnostic command.

Preparing to install a disk drive or solid-state drive by using the diagnostic command

Complete the following steps before installing a disk drive or solid-state drive in a system or in an expansion unit:

1. Log in as root user.
2. At the command line, type diag and press Enter.
3. On the Diagnostic Operating Instructions display, press Enter to continue.
4. On the Function Selection display, select **Task Selection**.
5. Select **RAID Array Manager**.
6. Depending on the adapter that your drive is attached to, select **IBM SAS Disk Array Manager**, **PCI SCSI Disk Array Manager**, or **PCI-X SCSI Disk Array Manager**.
7. Select **Diagnostics and Recovery Options**.
8. Select **SCSI and SCSI RAID Hot Plug Manager**.
9. 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.

Choose from the following options:

- If you are installing a drive in a system or an expansion unit, proceed to "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."
- If you are installing a drive in the 5887 disk drive enclosure, proceed to "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 8.
- If you are installing a drive in the 5888 PCIe storage enclosure, proceed to "Installing a solid-state drive in the 5888 PCIe storage enclosure" on page 9.
- If you are installing a drive in the EDR1 PCIe storage enclosure, proceed to "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 10.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to install a disk drive or solid-state drive in a system or in an expansion unit:

1. If the slot you want to use contains a disk drive filler, remove the disk drive filler from the slot. For instructions, see "Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 89.
2. Unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.
3. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.
4. Slide the drive halfway into the system or expansion unit.
5. On the console, select the drive that you want to install, and then press Enter.
6. When the identify LED turns on solid, slide the drive all the way into the system or an expansion unit, and push the drive handle **(A)** in until it locks. See Figure 1 on page 8.

Figure 1. Installing the disk drive in the system

7. On the console, press Enter to indicate that you have installed the drive.
8. If you are installing more than one drive, repeat the steps in this procedure until all drives are installed.

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the disk drive or solid-state drive installation by using the diagnostic command" on page 11.

Installing a disk drive or solid-state drive in the 5887 disk drive enclosure

Complete the following steps to install a disk drive or solid-state drive in the 5887 disk drive enclosure:

1. With the handle in the unlocked position, see Figure 2 on page 9, support the bottom of the drive as you align it with the guide rails in the expansion unit.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.
2. Slide the drive halfway into the 5887 disk drive enclosure.
3. Select the drive that you want to install and press Enter on the console.
4. When the identify LED turns on solid, slide the drive into the 5887 disk drive enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the enclosure.
5. Rotate the handle to the locked position.

Figure 2. Installing the disk drive in the 5887 disk drive enclosure

6. On the console, press Enter to indicate that you have installed the drive.

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the disk drive or solid-state drive installation by using the diagnostic command" on page 11.

Installing a solid-state drive in the 5888 PCIe storage enclosure

Complete the following steps to install a solid-state drive in the 5888 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 3 on page 10.

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the drive halfway into the 5888 PCIe storage enclosure.

3. Select the drive that you want to install and press Enter on the console.

4. When the identify LED turns on solid, slide the solid-state drive into the 5888 PCIe storage enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the 5888 PCIe storage enclosure.

5. Rotate the handle **(A)** to the locked position.

6. Install the bezel **(B)**.

Figure 3. Installing a solid-state drive in the 5888 PCIe storage enclosure

7. On the console, press Enter to indicate that you have installed the drive.

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the disk drive or solid-state drive installation by using the diagnostic command" on page 11.

Installing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to install a solid-state drive in the EDR1 PCIe storage enclosure:

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 4 on page 11.

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the drive halfway into the EDR1 PCIe storage enclosure.

3. Select the drive that you want to install and press Enter on the console.

4. When the identify LED turns on solid, slide the solid-state drive into the EDR1 PCIe storage enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the EDR1 PCIe storage enclosure.

5. Rotate the handle **(A)** to the locked position.

6. Install the bezel **(B)**.

Figure 4. Installing a solid-state drive in the EDR1 PCIe storage enclosure

7. On the console, press Enter to indicate that you have installed the drive.

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the disk drive or solid-state drive installation by using the diagnostic command."

Completing the disk drive or solid-state drive installation by using the diagnostic command

Complete the following steps after you install or replace the disk drive or solid-state drive in a system or in an expansion unit:

1. Complete the following steps by using the diagnostic command:
   a. Press Enter.
   b. Exit to the command line.
   c. If you are installing more than one disk drive or solid-state drive, repeat this procedure until all disk drives or solid-state drives are installed.
   d. Press Cancel. The SCSI and SCSI RAID Hot Plug Manager menu is displayed.
   e. Select **Configure Added/Replaced Devices**.
2. Proceed to completing the procedure.

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. Verify the installed part:
   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.
2. To configure the newly installed disk drive or solid-state drive, see "Preparing a disk drive or solid-state drive for use in an AIX system or logical partition" on page 101.

3. To rebuild the data on the replacement disk drive or solid-state drive, see "Rebuilding data on a replacement disk drive or solid-state drive by using AIX" on page 102.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on

Learn how to install a disk drive or solid-state drive in a system or expansion unit with the Linux operating system or logical partition that controls the drive location is powered on.

Attention: Review the following information to determine if your situation requires a different procedure to be completed instead of this one:

- If you do not feel comfortable using the procedure with the power turned on, go to "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 26.
- If you are servicing a failing part, see the service procedures for "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 67.

This procedure is intended for installing a new or upgraded drive.

Complete the following tasks to install a disk drive or solid-state drive:

- "Preparing to install a disk drive or solid-state drive"
- "Preparing to install a disk drive or solid-state drive by using the iprconfig command" on page 13
- Select from the following options:
  - "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 14
  - "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 15
  - "Installing a solid-state drive in the 5888 PCIe storage enclosure" on page 16 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  - "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 17 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)
- "Verifying that the new disk drive or solid-state drive is installed and operational" on page 18
- "Completing the procedure" on page 19

Before installing or replacing a feature, ensure that the software required to support the feature is installed on the system. For information about software prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, go to Fix Central (www.ibm.com/support/fixcentral) to download it, and install it before continuing.

If you are installing solid-state drives, review the configuration rules and then return here. For more information, see "Solid-state drive configuration rules for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 1.

Preparing to install a disk drive or solid-state drive

Complete the following steps before installing a disk drive or solid-state drive in a system or in an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Identify the system for performing the installation or upgrading by turning on the system identify (blue) LED. For instructions, see Control panel LEDs and Enabling enclosure indicators.
3. If applicable, remove the system unit door, remove the expansion unit door, or open the rack.

4. Determine the next available disk drive or solid-state drive position in the system or an expansion unit. For information, see "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.

   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 or solid-state drive placement depending on your data protection strategy.

5. Record the position where the new disk drive or solid-state drive must be installed. For example, the next available disk drive or solid-state drive slot might be P3-D4.

6. Find the package that contains the new drive.

   Attention: Drives are fragile. Handle with care.

7. Remove the drive from the static-protective package.

8. Proceed to installing the disk drive or solid-state drive in the system or disk drive enclosure by using the iprconfig command.

Preparing to install a disk drive or solid-state drive by using the iprconfig command

Complete the following steps before installing a disk drive or solid-state drive in a system or in an expansion unit:

1. Log in as root user.

2. Type iprconfig on the command line of the Linux session, and then 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.

4. 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

 --- ------ -------------------------- ------------------------ -----------------

         U5887.001.Z065075-P1-D1                                Empty

         U5887.001.Z065075-P1-D6                                Empty

         U5887.001.Z065075-P1-D7                                Empty

         U5887.001.Z065075-P1-D8                                Empty

         U5887.001.Z065075-P1-D9                                Empty




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

Figure 5. Example Concurrent Device Add display

5. Type t if you want to toggle through different location code representations.

6. Type 1 next to the location into which you want to install the disk drive or solid-state drive and press Enter.

   The Verify Device Concurrent Add display is shown.

   A service indicator flashes for the slot where the disk drive or solid-state drive can be installed.

Choose from the following options:

- If you are installing a drive in a system or an expansion unit, proceed to "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."
- If you are installing a drive in the 5887 disk drive enclosure, proceed to "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 15.
- If you are installing a drive in the 5888 PCIe storage enclosure, proceed to "Installing a solid-state drive in the 5888 PCIe storage enclosure" on page 16.
- If you are installing a drive in the EDR1 PCIe storage enclosure, proceed to "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 17.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to install a disk drive or solid-state drive in a system or in an expansion unit:

1. If the slot you want to use contains a disk drive filler, remove the disk drive filler from the slot. For instructions, see "Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 89.
2. Unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.
3. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit. Do not hold the drive by the handle.
4. Slide the drive halfway into the system or expansion unit.
5. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to install, then press Enter.
6. When the identify LED flashes, slide the drive all the way into the system or an expansion unit, and push the drive handle **(A)** in until it locks, as shown in Figure 6 on page 15.
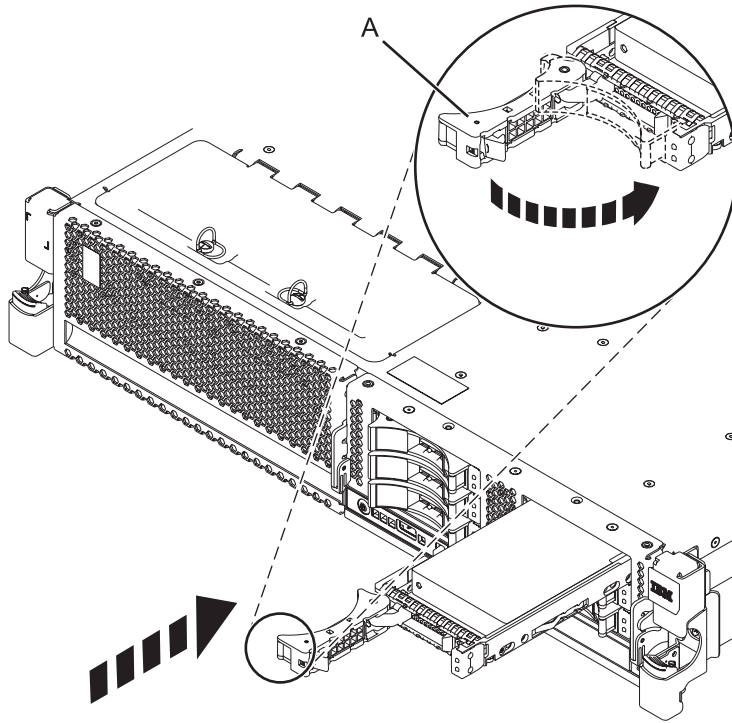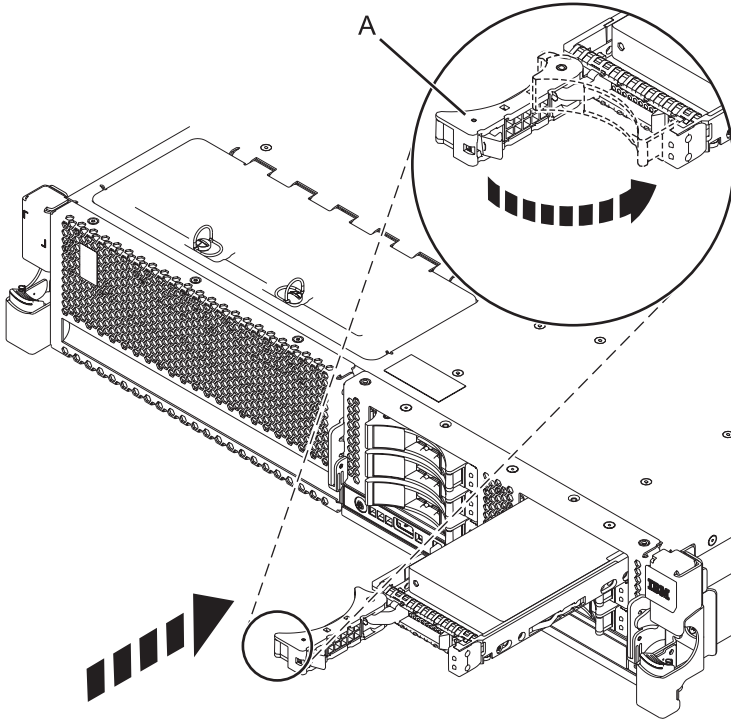
Figure 6. Installing the disk drive in the system

7. On the console, press Enter to indicate that you have installed the drive.
8. If you are installing more than one drive, repeat the steps in this procedure until all drives are installed.

Proceed to the procedure for verifying the drive installation. For instructions, go to "Verifying that the new disk drive or solid-state drive is installed and operational" on page 18.

Installing a disk drive or solid-state drive in the 5887 disk drive enclosure

Complete the following steps to install a disk drive or solid-state drive in the 5887 disk drive enclosure:

1. With the handle in the unlocked position, see Figure 7 on page 16, support the bottom of the drive as you align it with the guide rails in the expansion unit.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.
2. Slide the drive halfway into the 5887 disk drive enclosure.
3. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, then press Enter.
4. When the identify LED flashes, slide the drive into the 5887 disk drive enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the enclosure.
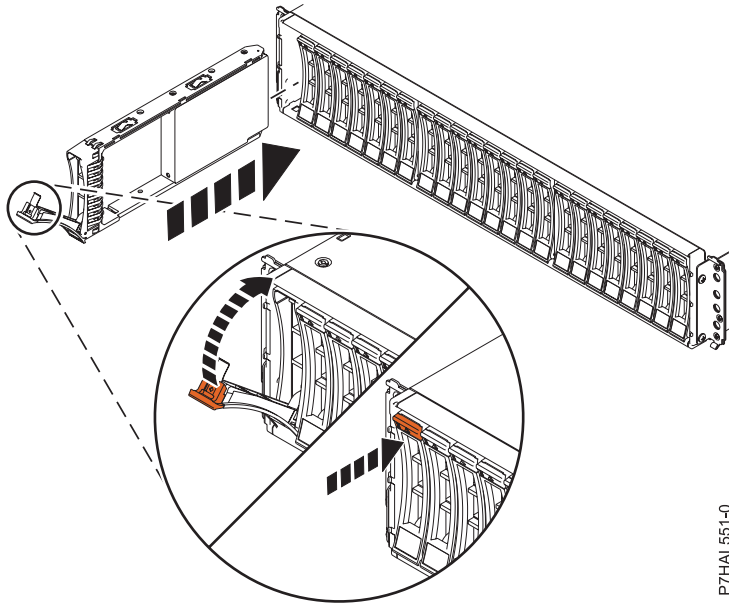5. Rotate the handle to the locked position.

Figure 7. Installing the disk drive in the 5887 disk drive enclosure

6. On the console, press Enter to indicate that you have installed the drive.

Proceed to the procedure for verifying the drive installation. For instructions, go to "Verifying that the new disk drive or solid-state drive is installed and operational" on page 18.

Installing a solid-state drive in the 5888 PCIe storage enclosure

Complete the following steps to install a solid-state drive in the 5888 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 8 on page 17.

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the drive halfway into the 5888 PCIe storage enclosure.

3. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, then press Enter.

4. When the identify LED flashes, slide the solid-state drive into the 5888 PCIe storage enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the 5888 PCIe storage enclosure.

5. Rotate the handle **(A)** to the locked position.
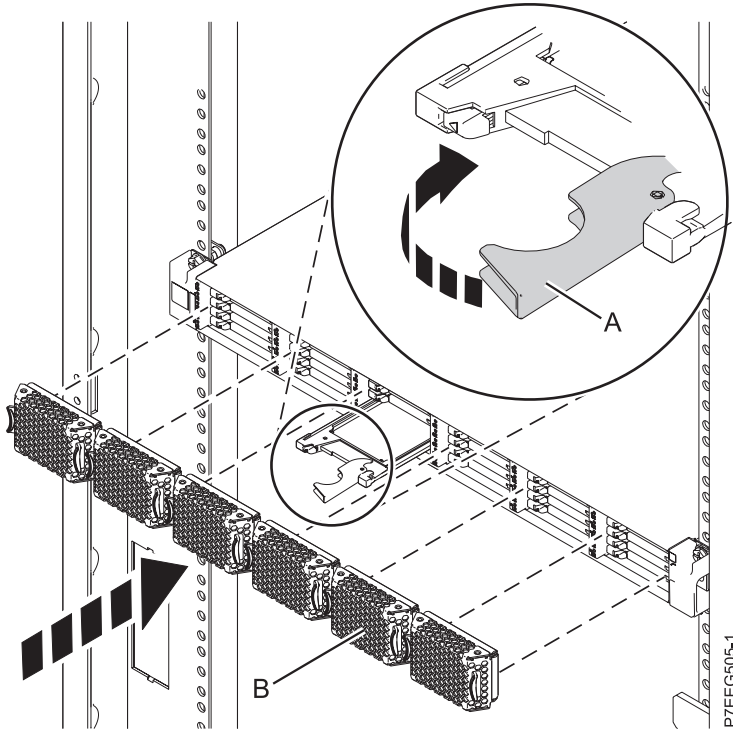
6. Install the bezel **(B)**.
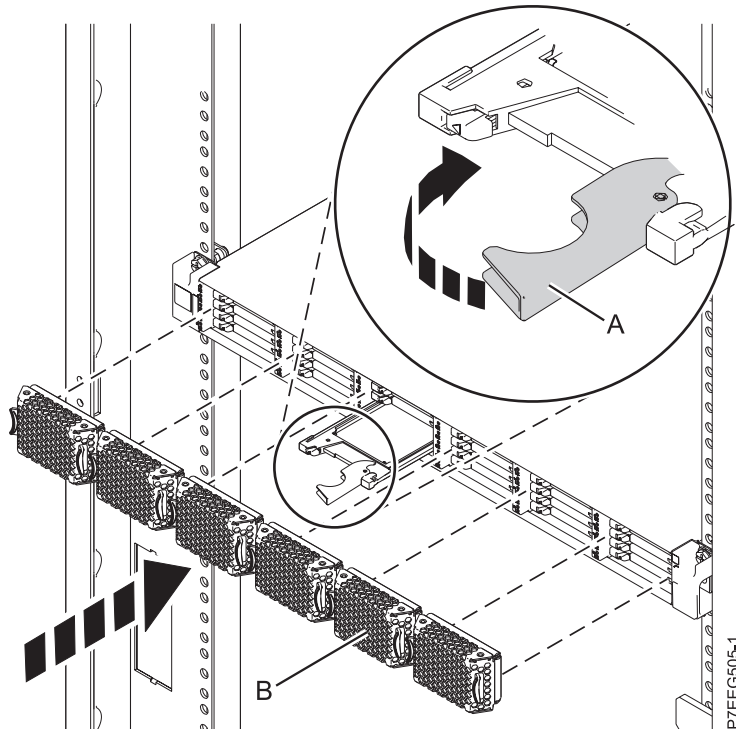
Figure 8. Installing a solid-state drive in the 5888 PCIe storage enclosure

Proceed to the procedure for verifying the drive installation. For instructions, go to "Verifying that the new disk drive or solid-state drive is installed and operational" on page 18.

Installing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to install a solid-state drive in the EDR1 PCIe storage enclosure:

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 9 on page 18.

    Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the drive halfway into the EDR1 PCIe storage enclosure.
3. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, then press Enter.
4. When the identify LED flashes, slide the solid-state drive into the EDR1 PCIe storage enclosure until the drive stops.

    Important: When installing a drive, ensure that the drive is fully seated and is all the way into the EDR1 PCIe storage enclosure.

5. Rotate the handle **(A)** to the locked position.
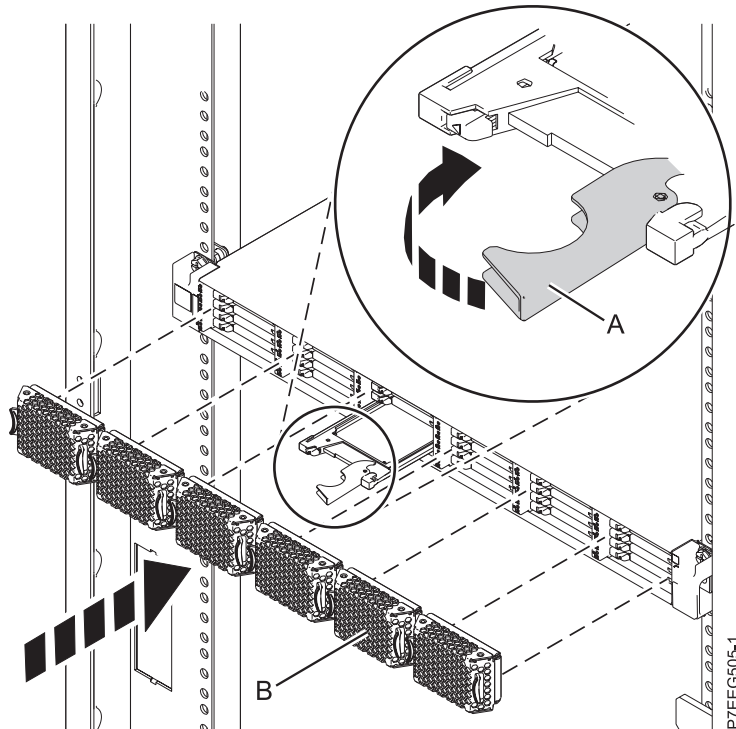6. Install the bezel **(B)**.

Figure 9. Installing a solid-state drive in the EDR1 PCIe storage enclosure

7. On the console, press Enter to indicate that you have installed the drive.

Proceed to the procedure for verifying the drive installation. For instructions, go to "Verifying that the new disk drive or solid-state drive is installed and operational."

Verifying that the new disk drive or solid-state drive is installed and operational

Press Enter on the Complete Device Concurrent Add display to indicate that the disk drive or solid-state drive is installed. The identify LED turns off.

Complete the following steps to verify that the new disk drive or solid-state drive is operational:

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.

  1=Display hardware resource information details


OPT Name    PCI/SCSI Location          Description             Status

--- ------  -------------------------  ------------------------ ----------------
        0000:01:00.0/0:          PCI-E SAS RAID Adapter  Operational
        0000:01:00.0/0:0:0:0     Advanced Function SSD   Active
        0000:01:00.0/0:0:1:0     Advanced Function SSD   Active
        0000:01:00.0/0:0:2:0     Advanced Function SSD   Active
        0000:01:00.0/0:0:3:0     Advanced Function SSD   Active
        0000:01:00.0/0:0:4:0     Advanced Function SSD   Active
        0000:01:00.0/0:0:5:0     Advanced Function SSD   Active
        0000:01:00.0/0:0:6:0     Advanced Function SSD   Active
        0000:01:00.0/0:0:8:0     Enclosure               Active
        0000:01:00.0/0:0:9:0     Enclosure               Active
        0001:01:00.0/1:          PCI-E SAS RAID Adapter  Operational
        0001:01:00.0/1:0:3:0     Advanced Function SSD   Remote
        0001:01:00.0/1:0:4:0     Advanced Function SSD   Remote
        0001:01:00.0/1:0:5:0     Advanced Function SSD   Remote
        More...


e=Exit   q=Cancel   r=Refresh   t=Toggle   f=PageDn   b=PageUp
```

Figure 10. Example Display Hardware Status

4. Verify that the disk drive or solid-state drive that you installed is shown on this display.

Proceed to completing the procedure.

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. Verify the installed part:
   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.
2. To rebuild data on the newly installed or replaced disk drive or solid-state drive, see "Rebuilding data on a replacement disk drive or solid-state drive in a system or logical partition running Linux" on page 105.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on

Learn how to install a disk drive or solid-state drive in a system or expansion unit with the IBM i operating system or logical partition that controls the drive location is powered on.

If you are servicing a failing part, see the service procedure for "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on" on page 72.

This procedure is intended for installing a new or upgraded drive.

Before installing or replacing a feature, ensure that the software required to support the feature is installed on the system. For information about software prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, go to Fix Central (www.ibm.com/support/fixcentral) to download it, and install it before continuing.

If you are installing solid-state drives, review the configuration rules and then return here. For more information, see "Solid-state drive configuration rules for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 1.

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 complete the task are the same.

Complete the following tasks to install a disk drive or solid-state drive:
- "Preparing to install a disk drive or solid-state drive"
- "Preparing to install a disk drive or solid-state drive by using the HSM" on page 21
- Choose from the following options:
  - "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 22
  - "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 23
  - "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 24 (This drive enclosure is supported for the 8231-E2D system.)
- "Completing the disk drive or solid-state drive installation" on page 25
- "Completing the procedure" on page 25

Preparing to install a disk drive or solid-state drive

Complete the following steps before installing a disk drive or solid-state drive in a system or in an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Identify the system for performing the installation or upgrading by turning on the system identify (blue) LED. For instructions, see Control panel LEDs and Enabling enclosure indicators.
3. If applicable, remove the system unit door, remove the expansion unit door, or open the rack.
4. Determine the next available disk drive or solid-state drive position in the system or an expansion unit. For information, see "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.

   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 or solid-state drive placement depending on your data protection strategy.
5. Record the position where the new disk drive or solid-state drive must be installed. For example, the next available disk drive or solid-state drive slot might be P3-D4.

6. Find the package that contains the new drive.

   Attention: Drives are fragile. Handle with care.

7. Remove the drive from the static-protective package.

8. Proceed to installing the disk drive or solid-state drive in the system or disk drive enclosure by using the Hardware Service Manager (HSM).

Preparing to install a disk drive or solid-state drive by using the HSM

Complete the following steps before installing a disk drive or solid-state drive in a system or in an expansion unit:

1. Record the physical location where the new disk drive or solid-state drive can be installed.

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

   b. In this example, U787A.001.*AAAXXXX*-P3-D4, U787A.001 comes from the feature code (FC) on the label, *AAAXXXX* comes from the last 7 digits of the sequence number (SN or SEQ) on the label, and P3–D4 is the slot where you are installing the disk drive or solid-state drive.

   c. 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 is shown on the front of the system unit or an expansion unit, as shown in Figure 11. In the example, U5074.001.*AAAXXXX*-DB3-D32, you would install a disk drive or solid-state drive in the expansion unit with type 5074, model 001, sequence number *AAAXXXX*, and disk drive or solid-state drive position DB3–D32.

IPHAL552-0

Figure 11. Example of a system or an expansion unit label

2. Sign on to service level authority.

3. Type strsst in the command line of the IBM i session and then press Enter.

4. Type your service tools user ID and service tools password in the Start Service Tools Sign On display, and then press Enter.

   Note: The service tools password is case-sensitive.

5. Select **Start a service tool** from the System Service Tools (SST) display, and then press Enter.

6. Select **Hardware service manager** from the Start a Service Tool display, and then press Enter.

7. If the slot you want to use contains a disk drive filler, do not remove the disk drive filler yet.

8. Select **Device Concurrent Maintenance** from the Hardware Service Manager display, and then press Enter.

   The Device Concurrent Maintenance is displayed, 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 . . . . . . . .: 2



Enter a time value between 00 and 19.

     Time delay needed in minutes . . . . .: 01



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

Figure 12. Example Device Concurrent Maintenance display

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

    Note: You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.
12. Do not press Enter yet, first complete installing the disk drive or solid-state drive.

Choose from the following options:

• If you are installing a drive in a system or an expansion unit, proceed to "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."

• If you are installing a drive in the 5887 disk drive enclosure, proceed to "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 23.

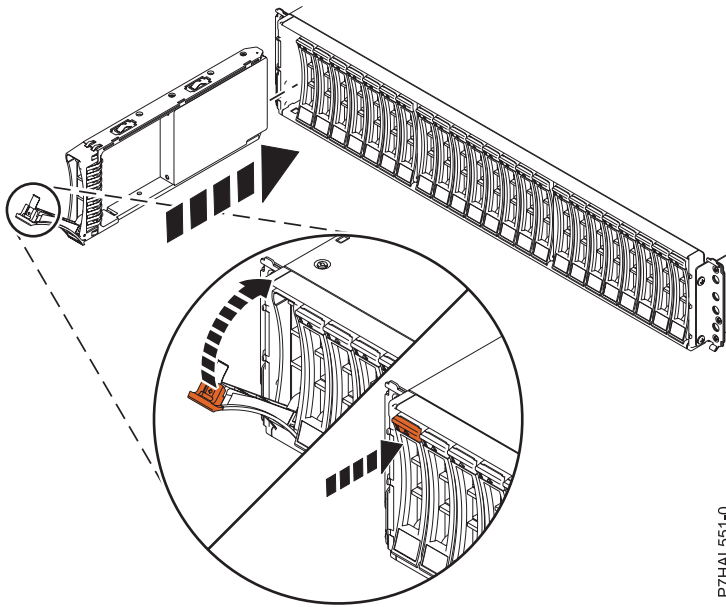• If you are installing a drive in the EDR1 PCIe storage enclosure, proceed to "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 24.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to install a disk drive or solid-state drive in a system or in an expansion unit:

1. If the slot you want to use contains a disk drive filler, remove the disk drive filler from the slot. For instructions, see "Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 89.

2. On the system, unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.

3. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit. Do not hold the drive only by the handle.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

4. Slide the drive halfway into the system or expansion unit.

5. In the HSM display, select the drive that you want to install.

6. Press Enter on the console.

   Important: When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to slide the drive all the way in and then lock it in place by pushing in the drive handle. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

7. When the identify LED turns on solid, slide the drive all the way into the system or an expansion unit, and push the drive handle **(A)** in until it locks, as shown in Figure 13.

8. On the console, press Enter to indicate that you have installed the drive.
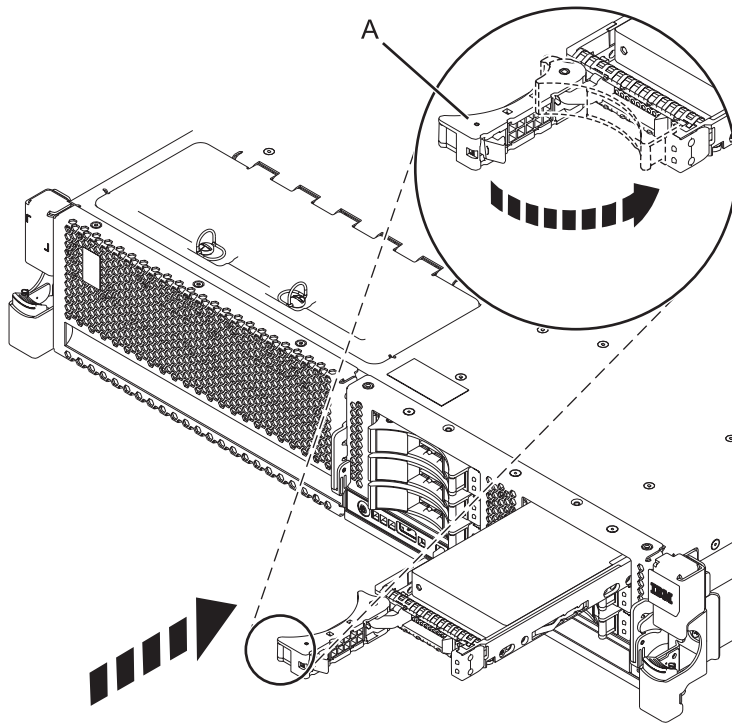
Figure 13. Installing the disk drive in the system

9. If you are installing more than one drive, repeat the steps in this procedure until all drives are installed.

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the disk drive or solid-state drive installation" on page 25.

Installing a disk drive or solid-state drive in the 5887 disk drive enclosure

Complete the following steps to install a disk drive or solid-state drive in the 5887 disk drive enclosure:

1. With the handle in the unlocked position, see Figure 14 on page 24, support the bottom of the drive as you align it with the guide rails in the expansion unit.

Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the drive halfway into the 5887 disk drive enclosure.

3. Select the drive that you want to install and press Enter on the console.

4. When the identify LED turns on solid, slide the drive into the 5887 disk drive enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the enclosure.

5. Rotate the handle to the locked position.
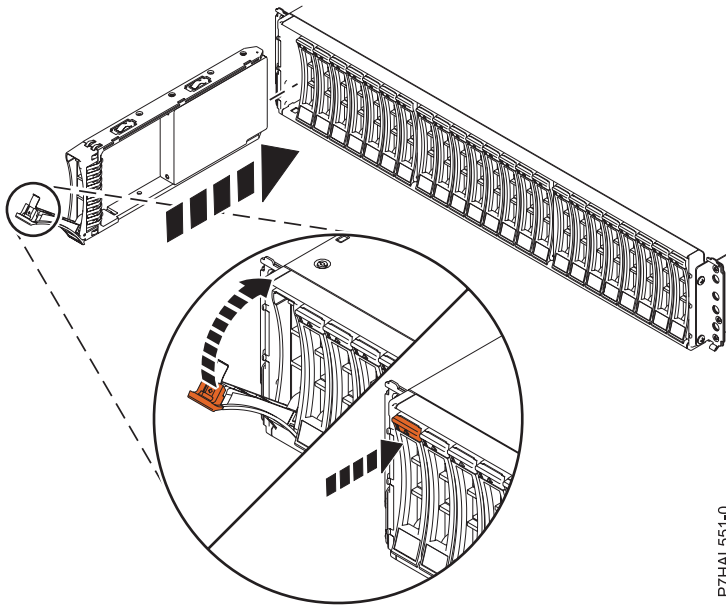
Figure 14. Installing the disk drive in the 5887 disk drive enclosure

6. On the console, press Enter to indicate that you have installed the drive.

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the disk drive or solid-state drive installation" on page 25.

Installing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to install a solid-state drive in the EDR1 PCIe storage enclosure:

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 15 on page 25.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the drive halfway into the EDR1 PCIe storage enclosure.

3. Select the drive that you want to install and press Enter on the console.

4. When the identify LED turns on solid, slide the solid-state drive into the EDR1 PCIe storage enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the EDR1 PCIe storage enclosure.

5. Rotate the handle **(A)** to the locked position.
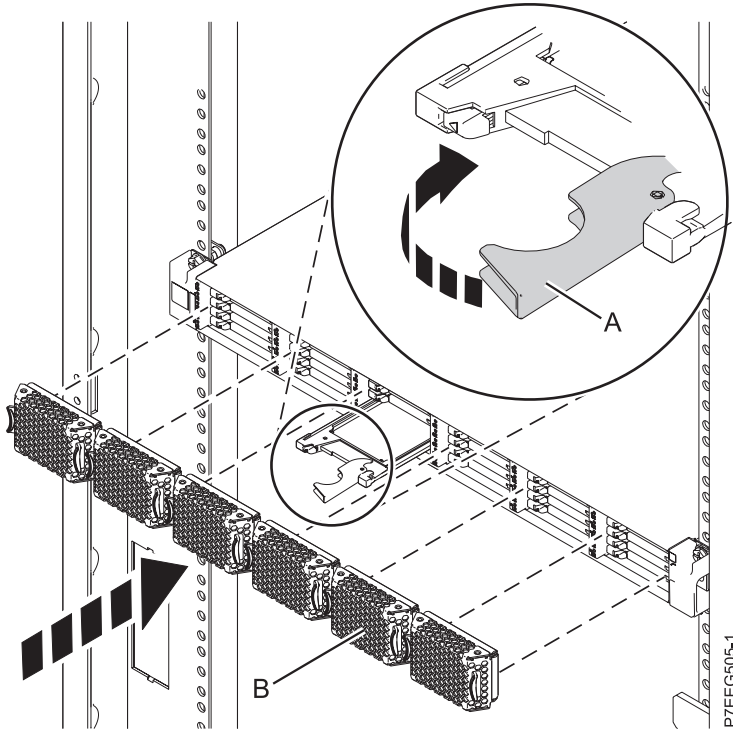
6. Install the bezel **(B)**.

Figure 15. Installing a solid-state drive in the EDR1 PCIe storage enclosure

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the disk drive or solid-state drive installation."

Completing the disk drive or solid-state drive installation

1. Return to the console and wait until the Concurrent Maintenance Results display is shown, and then press Enter.
2. When the HSM display is shown, press F12 twice and then press Enter.

Proceed to completing the procedure.

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. Verify the installed part:
   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.
2. To configure the newly installed disk drive or solid-state drive, see "Configuring a disk drive or solid-state drive in an IBM i system or logical partition" on page 109.
3. To rebuild the data on the replacement disk drive or solid-state drive, see "Rebuilding data on a replacement disk drive or solid-state drive by using IBM i" on page 112.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off

Learn how to install a disk drive or solid-state drive in a system or logical partition that controls the drive location with the power turned off.

If you are servicing a failing part, see the service procedures for "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 79.

Before installing or replacing a feature, ensure that the software required to support the feature is installed on the system. For information about software prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, go to Fix Central (www.ibm.com/support/fixcentral) to download it, and install it before continuing.

If you are installing solid-state drives, review the configuration rules and then return here. For more information, see "Solid-state drive configuration rules for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 1.

Complete the following tasks to install a disk drive or solid-state drive:
- "Preparing to install a disk drive or solid-state drive"
- Select from the following options:
  - "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 28
  - "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 29
  - "Installing a solid-state drive in the 5888 PCIe storage enclosure" on page 29 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  - "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 30 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)
- "Completing the procedure" on page 31

Preparing to install a disk drive or solid-state drive

Complete the following steps before installing a disk drive or solid-state drive in a system or in an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Identify the system for performing the installation or upgrading by turning on the system identify (blue) LED. For instructions, see Control panel LEDs and Enabling enclosure indicators.
3. If applicable, remove the system unit door, remove the expansion unit door, or open the rack.
4. Determine the next available disk drive or solid-state drive position in the system or an expansion unit. For information, see "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.

   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 or solid-state drive placement depending on your data protection strategy.

5. Record the position where the new disk drive or solid-state drive must be installed. For example, the next available disk drive or solid-state drive slot might be P3-D4.
6. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 141.

7. Disconnect the power source from the system by unplugging the system. For instructions, see "Disconnecting the power cords from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

   Note: This system can be equipped with a second power supply. Disconnect it before continuing with this procedure. Ensure that the power source to the system has been disconnected.
   (L003)
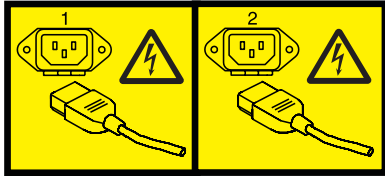
   or

8. Attach a wrist strap.
   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.
9. Find the package that contains the new drive.
   Attention: Drives are fragile. Handle with care.
10. Remove the drive from the static-protective package.

Choose from the following options:
- If you are installing a drive in a system or an expansion unit, proceed to "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 28.
- If you are installing a drive in the 5887 disk drive enclosure, proceed to "Installing a disk drive or solid-state drive in the 5887 disk drive enclosure" on page 29.

- If you are installing a drive in the 5888 PCIe storage enclosure, proceed to "Installing a solid-state drive in the 5888 PCIe storage enclosure" on page 29.
- If you are installing a drive in the EDR1 PCIe storage enclosure, proceed to "Installing a solid-state drive in the EDR1 PCIe storage enclosure" on page 30.

Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to install a disk drive or solid-state drive in a system or in an expansion unit:

1. If the slot you want to use contains a disk drive filler, remove the disk drive filler from the slot. For instructions, see "Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 89.
2. Unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.
3. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system. Do not hold the drive by the handle.
4. Slide the drive all the way into the system or expansion unit, and push the drive handle **(A)** in until it locks, as shown in Figure 16.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the system.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.
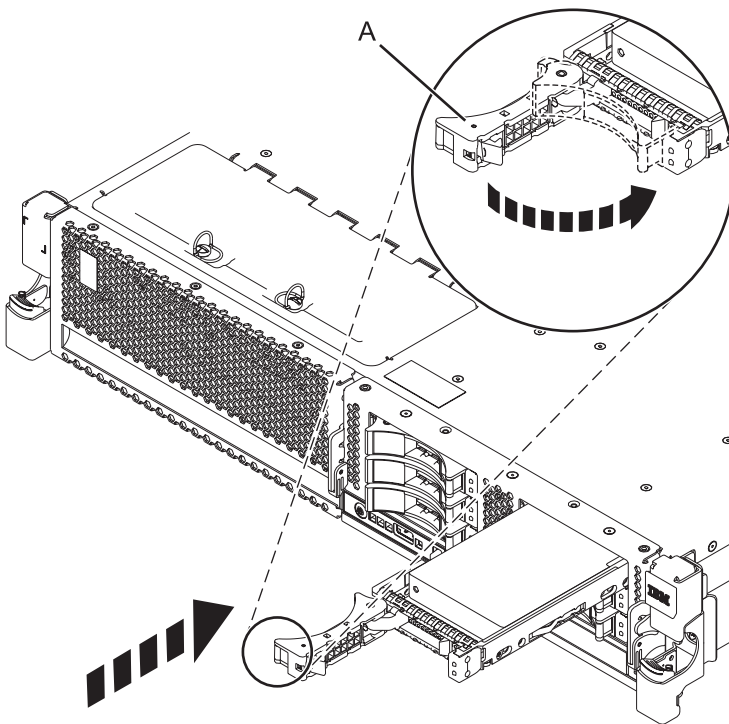
Figure 16. Installing the drive in the system

5. If you are installing more than one drive, repeat the steps in this procedure until all drives are installed.

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the procedure" on page 31.

Installing a disk drive or solid-state drive in the 5887 disk drive enclosure

Complete the following steps to install a disk drive or solid-state drive in the 5887 disk drive enclosure:

1. With the handle in the unlocked position, as shown in Figure 17, support the bottom of the drive as you align it with the guide rails in the expansion unit.

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the drive into the 5887 disk drive enclosure until the drive stops.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the enclosure.

3. Rotate the handle to the locked position.
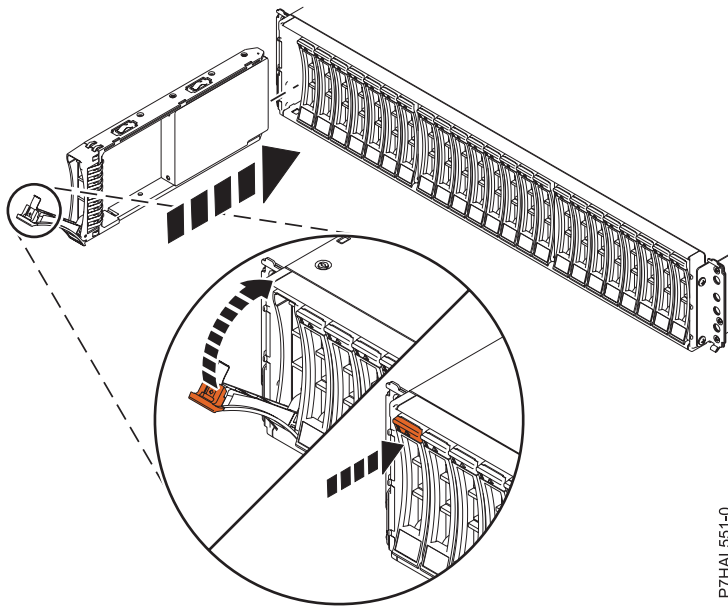
Figure 17. Installing the disk drive in the 5887 disk drive enclosure

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the procedure" on page 31.

Installing a solid-state drive in the 5888 PCIe storage enclosure

Complete the following steps to install a solid-state drive in the 5888 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 18 on page 30,

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive into the 5888 PCIe storage enclosure until the drive stops.

3. Rotate the handle **(A)** to the locked position, as shown in Figure 18 on page 30.

4. Install the bezel **(B)**.

Figure 18. Installing a solid-state drive in the 5888 PCIe storage enclosure

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the procedure" on page 31.

Installing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to install a solid-state drive in the EDR1 PCIe storage enclosure:

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 19 on page 31,

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive into the EDR1 PCIe storage enclosure until the drive stops.

3. Rotate the handle **(A)** to the locked position, as shown in Figure 19 on page 31.

4. Install the bezel **(B)**.
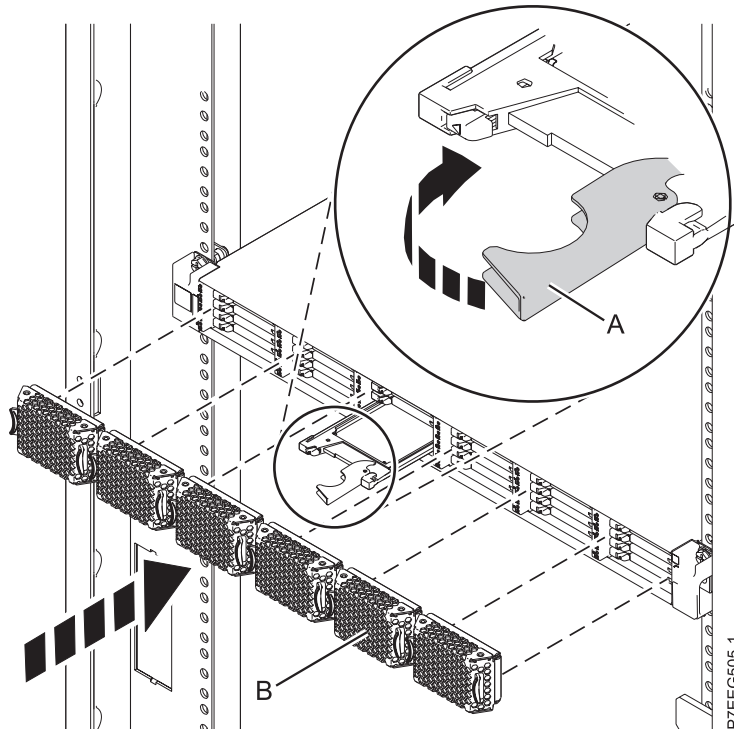
Figure 19. Installing a solid-state drive in the EDR1 PCIe storage enclosure

Proceed to the procedure for completing the disk drive or solid-state drive installation. For instructions, go to "Completing the procedure."

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. If the power cords were disconnected from the system, reconnect them to the system. For instructions, see "Connecting the power cords to the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

2. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 139.

3. Verify the installed part:

   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.

   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.

4. To configure the newly installed disk drive or solid-state drive, see the following procedures for the applicable operating system that controls the disk drive or solid-state drive:

   - "Preparing a disk drive or solid-state drive for use in an AIX system or logical partition" on page 101.

   - "Configuring a disk drive or solid-state drive in an IBM i system or logical partition" on page 109.

   Note: There is no equivalent procedure for a system or logical partition that is running the Linux operating system.

5. To rebuild the data on the replacement disk drive or solid-state drive, see the following procedures for the applicable operating system that controls the disk drive or solid-state drive:

- "Rebuilding data on a replacement disk drive or solid-state drive by using AIX" on page 102.
- "Rebuilding data on a replacement disk drive or solid-state drive by using IBM i" on page 112.
- "Rebuilding data on a replacement disk drive or solid-state drive in a system or logical partition running Linux" on page 105.

Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to remove a failed disk drive or solid-state drive from the system, drive enclosure, or an expansion unit with the system or logical partition power turned on or turned off.

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the AIX system or logical partition power turned on

Learn how to remove a disk drive or solid-state drive from a system or expansion unit with the AIX operating system or logical partition that controls the drive location is powered on.

If you are installing a new or upgraded drive, see "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the AIX system or logical partition power turned on" on page 5. If you are removing a drive as part of a service procedure, continue to use the following procedure.

If the drive that you are removing 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 "Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 56.

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 complete the task are the same.

Complete the following tasks to remove a disk drive or solid-state drive:
- "Preparing to remove a disk drive or solid-state drive"
- "Preparing to remove a disk drive or solid-state drive by using the diagnostic command" on page 33
- Choose from the following options:
  - "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit " on page 33
  - "Removing a solid-state drive from the 5888 PCIe storage enclosure" on page 34 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  - "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 35 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing to remove a disk drive or solid-state drive

Complete the following steps before removing a disk drive or solid-state drive from a system or from an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Prepare to remove the disk drive or solid-state drive from the system or an expansion unit. For instructions, see "Preparing to remove a disk drive or solid-state drive from a system or an expansion unit controlled by AIX" on page 101.

Preparing to remove a disk drive or solid-state drive by using the diagnostic command

Complete the following steps before removing a disk drive or solid-state drive from a system or from an expansion unit:

1. If you are removing a solid-state device located on a PCIe RAID and SSD SAS adapter, go to Removing and replacing the PCIe RAID and SSD SAS adapter, and complete that procedure.
2. Log in as root user.
3. At the command line, type diag and press Enter.
4. On the Diagnostic Operating Instructions display, press Enter to continue.
5. On the Function Selection display, select **Task Selection**.
6. Select **RAID Array Manager**.
7. Depending on the adapter that your drive is attached to, select **IBM SAS Disk Array Manager**, **PCI SCSI Disk Array Manager**, or **PCI-X SCSI Disk Array Manager**.
8. Select **Diagnostics and Recovery Options**.
9. Select **SCSI and SCSI RAID Hot Plug Manager**.
10. To identify the location of the drive to be removed, select **Identify a Device Attached to an SCSI Hot Swap Enclosure Device**.
11. Choose the slot corresponding to the disk and press Enter. The identify LED for that slot will flash rapidly.
12. Verify that the identify LED for that slot is flashing rapidly, and record the location of the slot.
13. Press Enter to stop the LED from flashing and continue.
14. To prepare to remove the drive, press F3 to return to the SCSI and SCSI RAID Hot Plug Manager display.

Choose from the following options:
- If you are removing a drive from a system or expansion unit, proceed to "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit ."
- If you are removing a drive from the 5888 PCIe storage enclosure, proceed to "Removing a solid-state drive from the 5888 PCIe storage enclosure" on page 34.
- If you are removing a drive from the EDR1 PCIe storage enclosure, proceed to "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 35.

Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to remove a disk drive or solid-state drive from a system or from an expansion unit:

1. Select **Replace/Remove a Device Attached to an SCSI Hot Swap Enclosure Device**.
2. Select the drive that you want to remove and press Enter. To view the locations of the service indicators, see "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.
3. When the identify LED turns on solid, unlock the drive handle by squeezing it and pulling it out toward you, as shown in Figure 20 on page 34. If the handle is not all the way out, the disk drive or solid-state drive cannot slide out of the system or out of the expansion unit.

4. Support the bottom of the drive as you slide it out of the system or an expansion unit. Do not hold the disk drive or solid-state drive by the handle.
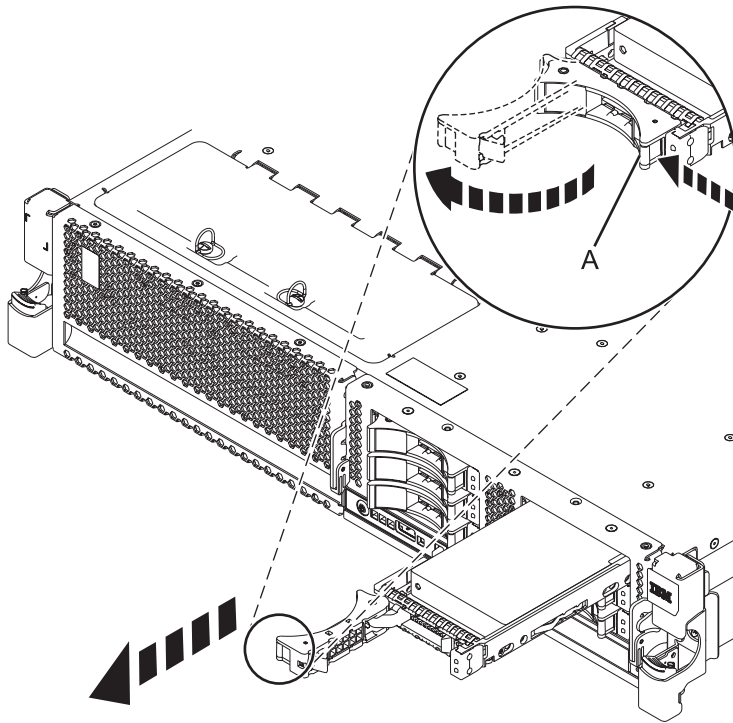
Figure 20. Removing a disk drive from the system

5. On the console, press Enter to indicate that you have removed the drive.

If you are installing a replacement drive as a replacement for the failed disk drive or solid-state drive, go to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the AIX system or logical partition power turned on" on page 62.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the 5888 PCIe storage enclosure

Complete the following steps to remove a solid-state drive from the 5888 PCIe storage enclosure.

1. Select **Replace/Remove a Device Attached to an SCSI Hot Swap Enclosure Device**.
2. Select the solid-state drive that you want to remove. To view the locations of the service indicators, go to "Solid-state drive locations and service indicators for the 5888 PCIe storage enclosure" on page 99.
3. Press Enter.
4. Pull off the bezel **(A)** that covers the slot that contains the solid-state drive.
5. When the solid-state drive identify LED turns on solid, slide the release latch **(B)** over gently to unlock the drive handle. See Figure 21 on page 35.
6. Grasp the handle **(C)** and pull the drive partially out of the slot.
7. Grasp the solid-state drive and pull it out from the slot.
8. Press Enter on the console to indicate that you have removed the solid-state drive.
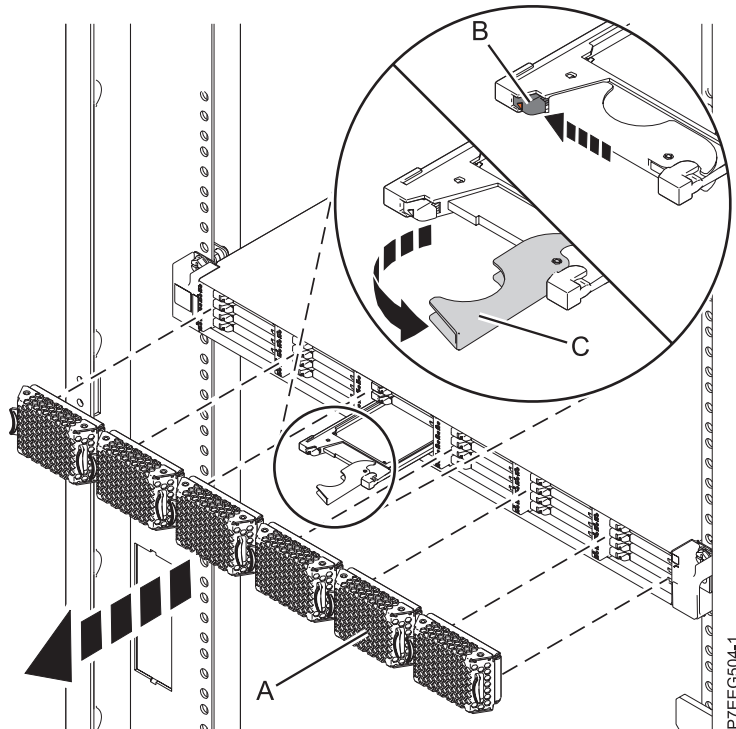
Figure 21. Removing the solid-state drive from the 5888 PCIe storage enclosure

If you are installing a replacement solid-state drive, proceed to the procedure for replacing the solid-state drive in the 5888 PCIe storage enclosure. For instructions, see "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 64.

If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the EDR1 PCIe storage enclosure

Complete the following steps to remove a solid-state drive from the EDR1 PCIe storage enclosure.

1. Select **Replace/Remove a Device Attached to an SCSI Hot Swap Enclosure Device**.
2. Select the solid-state drive that you want to remove. To view the locations of the service indicators, go to "Solid-state drive locations and service indicators for the EDR1 PCIe storage enclosure" on page 100.
3. Press Enter.
4. Pull off the bezel **(A)** that covers the slot that contains the solid-state drive.
5. When the solid-state drive identify LED turns on solid, slide the release latch **(B)** over gently to unlock the drive handle. See Figure 22 on page 36.
6. Grasp the handle **(C)** and pull the drive partially out of the slot.
7. Grasp the solid-state drive and pull it out from the slot.
8. Press Enter on the console to indicate that you have removed the solid-state drive.
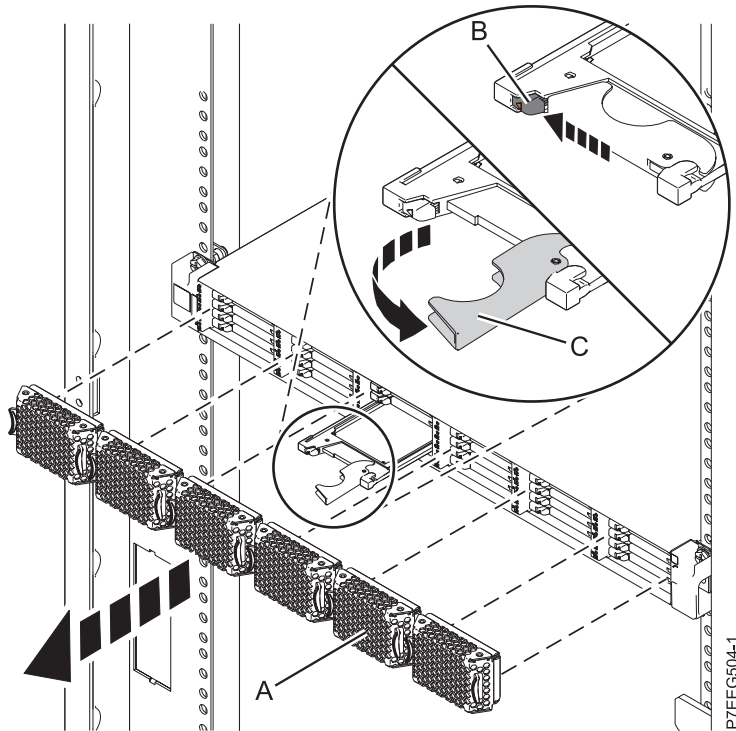
Figure 22. Removing the solid-state drive from the EDR1 PCIe storage enclosure

If you are installing a replacement solid-state drive, proceed to the procedure for replacing the solid-state drive in the EDR1 PCIe storage enclosure. For instructions, see "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 65.

If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on

Learn how to remove a disk drive or solid-state drive from a system or expansion unit with the Linux operating system or logical partition that controls the drive location is powered on.

Attention: Review the following information to determine whether your situation requires that a different procedure be performed instead of this one:

- If you are not comfortable using the procedure with the power turned on, go to "Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 56.
- If you are installing a new or upgraded drive, see "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 12.

If the system or logical partition that controls the drive you are replacing is at the Linux command line, you can use this powered-on procedure.

If you are removing a drive as part of a service procedure, continue to use the following 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 complete the task are the same.

Complete the following tasks to remove a disk drive or solid-state drive:
- "Preparing to remove a disk drive or solid-state drive"
- "Preparing to remove the disk drive or solid-state drive by using the iprconfig command"
- Choose from the following options:
  - "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 36
  - "Removing a solid-state drive from the 5888 PCIe storage enclosure" on page 43 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  - "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 44 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing to remove a disk drive or solid-state drive

Complete the following steps before removing a disk drive or solid-state drive from a system or from an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. If applicable, remove the system unit door or expansion unit door or open the rack front door.

Proceed to the procedure for removing the disk drive or solid-state drive by using the iprconfig command.

Preparing to remove the disk drive or solid-state drive by using the iprconfig command

Complete the following steps to remove a disk drive or solid-state drive from a system or from an expansion unit by using the iprconfig command:

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.

```
                              Kernel Messages Log


Select one of the following:


    1. View most recent ipr error messages

    2. View ipr error messages

    3. View all kernel error messages

    4. View iprconfig error messages

    5. Set root kernel message log directory

    6. Set default editor

    7. Restore defaults

    8. View ipr boot time messages



Selection:

e=Exit
```

Figure 23. 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 drive you want to replace.

6. Record the location information for the drive.

   Note: The location information is in either of these forms:

   0:0:5:0 In this example, 0 is the SCSI host number, 0 is the SCSI bus, 5 is the SCSI target ID, and 0 is the logical unit number (LUN).

   0/00-0E-02
   In this example, 0 is the SCSI host number, 00 is the I/O adapter (IOA) SAS port, 0E is the expander port, and 02 is the device port.

7. If the drive you want to replace is unprotected or in use, move the data from the drive before continuing with this procedure. If the drive is in a RAID 0 (non-redundant RAID array), after you have moved the data, delete the RAID 0 before proceeding.

   For PCI-X controller information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux PDF*. This PDF is available from the SCSI PCI Adapters web page.

   For SAS RAID controller information, see the SAS RAID controllers for Linux

8. Type `iprconfig` on the command line and press Enter.

   The IBM Power RAID Configuration Utility display is shown.

9. Select **Display hardware status** from the IBM Power RAID Configuration Utility display. Press Enter.

   The Display Hardware Status screen displays as shown in Figure 24 on page 39 and Figure 25 on page 40.

```
                       Display Hardware Status
Type option, press Enter.

  1=Display hardware resource information details

OPT Name   PCI/SCSI Location         Description              Status
--- ------ ------------------------- ------------------------ ----------------
         0000:01:00.0/0:           PCI-E SAS RAID Adapter   Operational
         0000:01:00.0/0:0:0:0      Advanced Function SSD    Active
         0000:01:00.0/0:0:1:0      Advanced Function SSD    Active
         0000:01:00.0/0:0:2:0      Advanced Function SSD    Active
         0000:01:00.0/0:0:3:0      Advanced Function SSD    Active
         0000:01:00.0/0:0:4:0      Advanced Function SSD    Active
         0000:01:00.0/0:0:5:0      Advanced Function SSD    Failed
         0000:01:00.0/0:0:6:0      Advanced Function SSD    Active
         0000:01:00.0/0:0:8:0      Enclosure              Active
         0000:01:00.0/0:0:9:0      Enclosure              Active
         0001:01:00.0/1:           PCI-E SAS RAID Adapter   Operational
         0001:01:00.0/1:0:3:0      Advanced Function SSD    Remote
         0001:01:00.0/1:0:4:0      Advanced Function SSD    Remote
         0001:01:00.0/1:0:5:0      Advanced Function SSD    Remote
                                   More...
e=Exit   q=Cancel   r=Refresh   t=Toggle   f=PageDn   b=PageUp
```

Figure 24. Example Display Hardware Status

```
          Display Hardware Status

Type option, press Enter.

  1=Display hardware resource information details

OPT Name    Resource Path/Address              Vendor    Product ID        Status

--- ------  -------------------------  --------  ---------------   ----------------

    sg23    FE                                   IBM       57CE001SISIOA     Operational

    sg0     00-0E-01                             IBM       SG9XCA2E200GEIBM  Active

    sg1     00-0E-0A                             IBM       SG9XCA2E200GEIBM  Active

    sg2     00-0E-0B                             IBM       SG9XCA2E200GEIBM  Active

    sg3     00-0E-03                             IBM       SG9XCA2E200GEIBM  Active

    sg4     00-0E-09                             IBM       SG9XCA2E200GEIBM  Active

    sg5     00-0E-02                             IBM       SG9XCA2E200GEIBM  Failed

    sg6     00-0E-04                             IBM       SG9XCA2E200GEIBM  Active

    sg7     00-0C-26                             IBM       5887              Active

    sg8     00-0E-26                             IBM       5887              Active

    sg47    FE                                   IBM       57CE001SISIOA     Operational

    sg26    00-0E-01                             IBM       SG9XCA2E200GEIBM  Remote

    sg27    00-0E-0A                             IBM       SG9XCA2E200GEIBM  Remote

    sg28    00-0E-0B                             IBM       SG9XCA2E200GEIBM  Remote

                                       More...

e=Exit   q=Cancel   r=Refresh   t=Toggle   f=PageDn   b=PageUp
```

Figure 25. Example Display Hardware Status

10. Look for the drive at the SCSI location you recorded. The drive might have a Failed status.
11. Return to the IBM Power RAID Configuration Utility display.
12. If you are removing a solid-state device located on a PCIe RAID and SSD SAS adapter, go to Removing and replacing the SAS RAID adapter, and complete that procedure.
13. From the IBM Power RAID Configuration Utility display, select **Work with disk unit recovery**. Press Enter.
14. From the Work with Disk Unit Recovery display, select **Concurrent remove device**, and press Enter. A Concurrent Device Remove display is shown, similar to the following examples shown in Figure 26 on page 41 and Figure 27 on page 42.

```
                          Concurrent Device Remove


Choose a single location for remove operations

   1=Select


OPT Name    PCI/SCSI Location          Description              Status

--- ------  -------------------------  ------------------------ -----------------

            U5887.001.Z065075-P1-D1                             Empty

 sg0        U5887.001.Z065075-P1-D2    Advanced Function SSD    Active

 sg5        U5887.001.Z065075-P1-D3    Advanced Function SSD    Failed

 sg3        U5887.001.Z065075-P1-D4    Advanced Function SSD    Active

 sg6        U5887.001.Z065075-P1-D5    Advanced Function SSD    Active

            U5887.001.Z065075-P1-D6                             Empty

            U5887.001.Z065075-P1-D7                             Empty

            U5887.001.Z065075-P1-D8                             Empty

            U5887.001.Z065075-P1-D9                             Empty

 sg4        U5887.001.Z065075-P1-D10   Advanced Function SSD    Active

 sg1        U5887.001.Z065075-P1-D11   Advanced Function SSD    Active

 sg2        U5887.001.Z065075-P1-D12   Advanced Function SSD    Active
```

Figure 26. Example Concurrent Device Remove display

```
                        Concurrent Device Remove

Choose a single location for remove operations

   1=Select

OPT Name    SCSI Host/Resource Path        Vendor    Product ID        Status

--- ------  --------------------------- --------  --------------- --------------

            0/00-0E-00                                               Empty

 sg0        0/00-0E-01                    IBM       SG9XCA2E200GEIBM   Active

 sg5        0/00-0E-02                    IBM       SG9XCA2E200GEIBM   Failed

 sg3        0/00-0E-03                    IBM       SG9XCA2E200GEIBM   Active

 sg6        0/00-0E-04                    IBM       SG9XCA2E200GEIBM   Active

            0/00-0E-05                                               Empty

            0/00-0E-06                                               Empty

            0/00-0E-07                                               Empty

            0/00-0E-08                                               Empty

 sg4        0/00-0E-09                    IBM       SG9XCA2E200GEIBM   Active

 sg1        0/00-0E-0A                    IBM       SG9XCA2E200GEIBM   Active

 sg2        0/00-0E-0B                    IBM       SG9XCA2E200GEIBM   Active

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

Figure 27. Example Concurrent Device Remove display

15. Press T to toggle between the Concurrent Device Remove panels.
16. Type 1 (Select) next to the location for this drive (0:0:5:0 or 0/00-0E-02).

    The Verify Device Concurrent Remove display is shown. The service indicator flashes for that drive slot.

Choose from the following options:

- If you are removing a drive from a system or expansion unit, proceed to "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit ."
- If you are removing a drive from the 5888 PCIe storage enclosure, proceed to "Removing a solid-state drive from the 5888 PCIe storage enclosure" on page 43.
- If you are removing a drive from the EDR1 PCIe storage enclosure, proceed to "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 44.

Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to remove a disk drive or solid-state drive from a system or from an expansion unit:

1. On the Verify Device Concurrent Remove display, verify that the selected drive is the drive you want to replace, and then press Enter.

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

2. Complete the following steps:
   a. When the identify LED flashes, unlock the drive handle by squeezing it and pulling it out toward you, as shown in Figure 28 on page 43.

b. Pull the handle of the drive out toward you before you remove the disk drive or solid-state drive. If the handle is not all the way out, the disk drive or solid-state drive cannot slide out of the system or out of the expansion unit.

3. Support the bottom of the drive as you slide it out of the system or expansion unit.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.
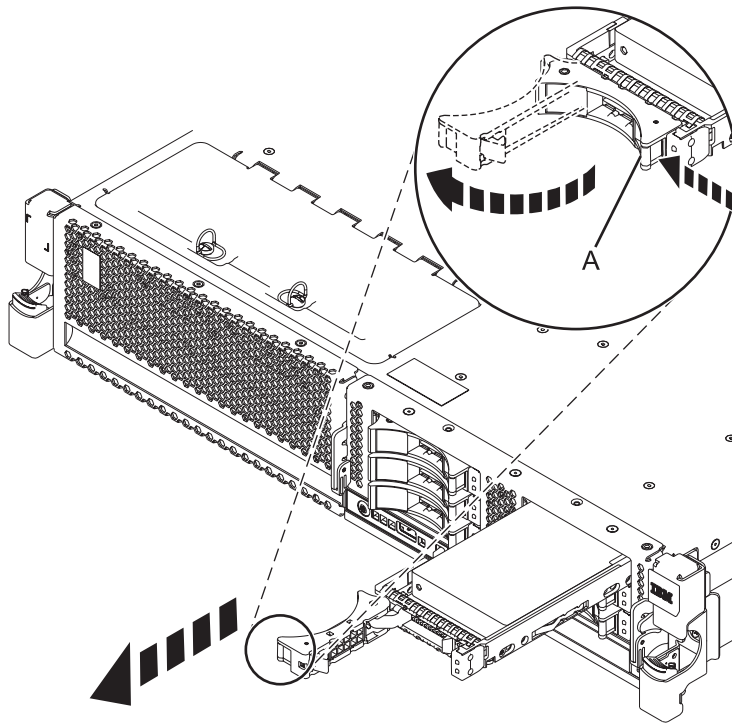
Figure 28. Removing a disk drive from the system

4. On the console, press Enter to indicate that you have removed the drive.

If you are installing a replacement drive, go to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 67.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the 5888 PCIe storage enclosure

Complete the following steps to remove a solid-state drive from the 5888 PCIe storage enclosure.

1. Pull off the bezel **(A)** that covers the slot containing the solid-state drive.
2. Slide the release latch **(B)** over gently to unlock the drive handle, see Figure 29 on page 44.
3. On the Verify Device Concurrent Remove display, verify that the selected drive is the drive you want to replace, then press Enter.

   Note: Ensure that the drive is not in use to prevent loss of data.
4. When the solid-state drive identify LED flashes, grasp the handle **(C)** and pull the drive partially out of the slot.

5. Grasp the solid-state drive and pull it out from the slot. Press Enter on the console to indicate that you have removed the solid-state drive. The identify LED turns off.
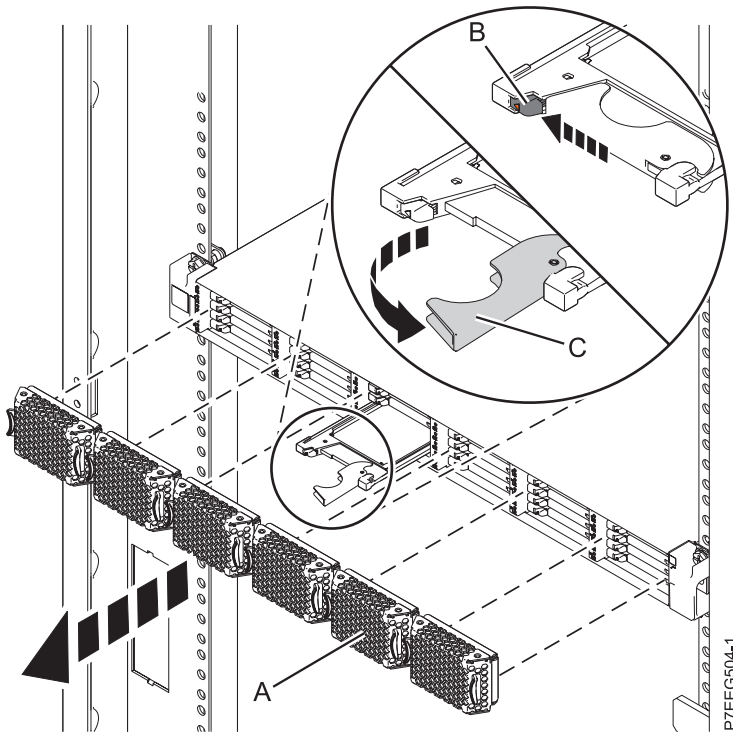
Figure 29. Removing the solid-state drive from the 5888 PCIe storage enclosure

6. If you are not installing a replacement solid-state drive, install a filler in the empty slot. Filling the solid-state drive slot ensures proper air flow for cooling.

You can proceed to the procedure for installing a disk drive or solid-state drive as a replacement for the failed disk drive or solid-state drive. For instructions, see "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 69.

You can proceed to the procedure for installing a disk drive filler into the slot from where you removed the disk drive or solid-state drive. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

If you are installing a replacement solid-state drive, proceed to the procedure for replacing the solid-state drive in the 5888 PCIe storage enclosure. For instructions, see "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 69.

If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the EDR1 PCIe storage enclosure
Complete the following steps to remove a solid-state drive from the EDR1 PCIe storage enclosure.
1. Pull off the bezel **(A)** that covers the slot containing the solid-state drive.
2. Slide the release latch **(B)** over gently to unlock the drive handle. See Figure 30 on page 45.
3. On the Verify Device Concurrent Remove display, verify that the selected drive is the drive you want to replace, and then press Enter.

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

4. When the solid-state drive identify LED flashes, grasp the handle **(C)**, and pull the drive partially out of the slot.
5. Grasp the solid-state drive and pull it out from the slot. Press Enter on the console to indicate that you have removed the solid-state drive. The identify LED turns off.
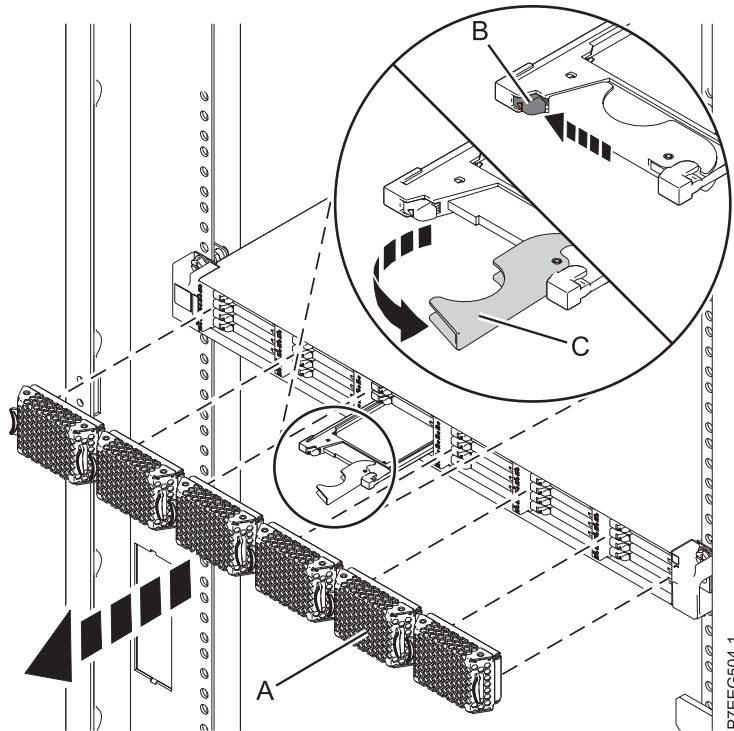
Figure 30. Removing the solid-state drive from the EDR1 PCIe storage enclosure

If you are installing a replacement solid-state drive, proceed to the procedure for replacing the solid-state drive in the EDR1 PCIe storage enclosure. For instructions, see "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 70.

If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or an expansion unit controlled by IBM i

Learn how to remove a disk drive or solid-state drive from a system or expansion unit with the IBM i operating system or logical partition that controls the drive location is powered on.

If you are removing a drive as part of a service procedure, continue to use the following procedure.

Complete the following tasks to remove a disk drive or solid-state drive:
- "Preparing the system" on page 46
- "Preparing to remove a disk drive or solid-state drive" on page 46
- Choose from the following options:
  - "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 49

- "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 50 (This drive enclosure is supported for the 8231-E2D system.)

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing the system

Complete the following steps before you remove a disk drive or solid-state drive from a system or from an expansion unit:

1. Verify that the disk drive or solid-state drive you are replacing has been suspended before continuing with this procedure. For instructions, see "Preparing to remove a disk drive or solid-state drive from a system or logical partition controlled by IBM i" on page 107 and complete that procedure before you continue with the steps in this procedure.

2. If you are replacing a mirrored, RAID 5, or RAID 6 protected disk unit, proceed to 4.

3. Before removing a disk drive or solid-state drive, ensure to back up all the data from the drive or the array that the drive is a part of, and then move the data from the drive that you want to remove. For instructions, choose one of the following options:

   - **Moving and removing disk units** in the IBM i Information Center

     Go to IBM i Information Center website (www.ibm.com/systems/i/infocenter) and select from the following options:
     - If you select i 7.1, expand **IBM i 7.1 Information Center** > **Systems management** > **Disk management** > **Disk pools** > **Managing disk pools** > **Removing a disk unit from a disk pool** or **Moving a disk unit from a disk pool**
     - If you select i 6.1, expand **IBM i 6.1 Information Center** > **Systems management** > **Disk management** > **Disk pools** > **Managing disk pools** > **Moving or removing a disk unit from a disk pool**
     - If you select V5R4, expand **i5/OS Information Center** > **Systems management** > **Disk management** > **Disk pools** > **Managing disk pools** > **Moving and removing disk units**

   - **Recovering the system** in the IBM i Information Center

     Go to IBM i Information Center website (www.ibm.com/systems/i/infocenter) and select from the following options:
     - If you select i 7.1, expand **IBM i 7.1 Information Center** > **Systems management** > **Backup and recovery** > **Recovering the system**
     - If you select i 6.1, expand **IBM i 6.1 Information Center** > **Systems management** > **Backup and recovery** > **Recovering the system**
     - If you select V5R4, expand **i5/OS Information Center** > **Systems management** > **Backup and recovery** > **Backing up and recovering the system** > **Recovering the system**

4. Proceed to preparing to remove a disk drive or solid-state drive.

Preparing to remove a disk drive or solid-state drive

Complete the following steps before you remove a disk drive or solid-state drive from a system or from an expansion unit:

1. If you are removing a solid-state device located on a PCIe RAID and SSD SAS adapter, go to Removing and replacing the PCIe RAID and SSD SAS adapter, and complete that procedure. Ensure to verify if whether the other SSDs in the PCIe RAID and SSD SAS adapter are suspended before you proceed with removing the SSD. For instructions to verify if the SSDs are suspended and suspend the SSDs, see "Preparing to remove a disk drive or solid-state drive from a system or logical partition controlled by IBM i" on page 107.

2. Locate the disk drive or solid-state drive to be replaced and record the location information. Then, use the location information to activate the identify light for that drive. For instructions, see "Activating the failing-part indicator light" on page 136.

3. Determine if the disk drive or solid-state drive to be removed is a non-configured unit by performing the following steps:

   a. Type `strsst` on the command line of the IBM i session, and then press Enter.

   b. Type your service tools user ID and service tools password, and then press Enter.

   c. Select **Work with disk units**, and then press Enter.

   d. Select **Display Disk Configuration**, and then press Enter.

   e. Select **Display non-configured units**, and then press Enter. Is the failed drive a non-configured unit?

      - No: Continue to 6

      - Yes: Continue to 4.

   f. Determine whether the disk drive or solid-state drive to be removed was replaced by a hot-spare drive when it failed. An xxxx9031 error that was logged close to the same time as the original disk failure indicates that the data to the hot-spare drive was automatically rebuilt.

4. Determine whether the disk drive or solid-state drive to be removed was replaced by a hot-spare drive when it failed. Complete the following steps:

   a. Go to the service action log. For instructions to access the service action log, see "Activating the failing-part indicator light" on page 136

   b. Determine whether an xxxx9031 error was logged close to the same time as the original disk failure. This error indicates that the data to the hot-spare drive was automatically rebuilt.

   c. Determine whether an error was logged for the field-replaceable unit (FRU) by using concurrent maintenance. If yes, continue with the next step.

5. Did you find the service action log entry related to this problem?

   - **No**: Exit the service action log and go to step 7

   - **Yes**: Continue with the next step.

6. Within the service action log, select the concurrent maintenance option. This option displays the drive location on the concurrent maintenance display. Go to step 9 on page 49

7. From the Hardware Service Manager, navigate to **Select Device Concurrent Maintenance** option. 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
```
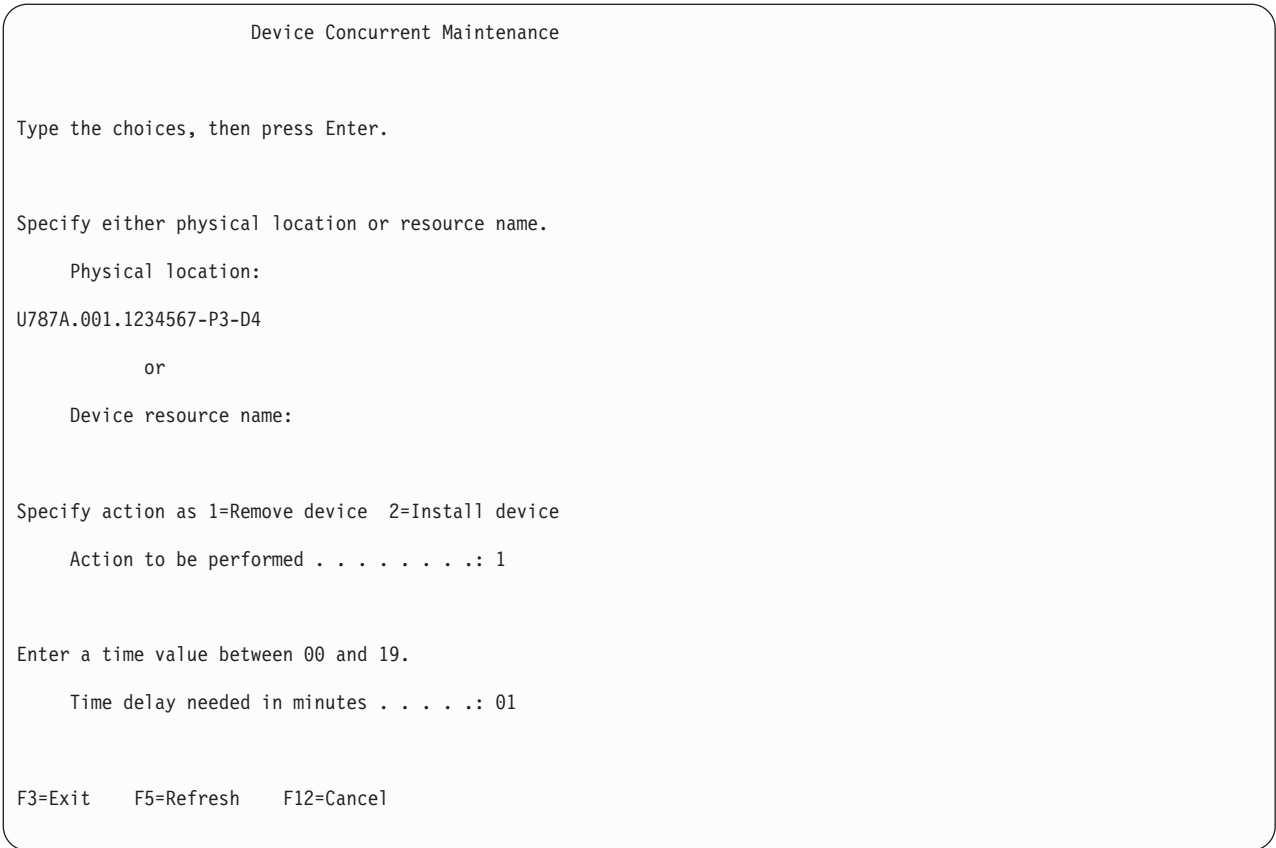
Figure 31. Example Device Concurrent Maintenance display

8. If the physical location does not show in the Device Concurrent Maintenance display, type the physical location where you are replacing the disk drive or solid-state drive as shown in the following example:

   The physical location has the following form: U787A.001.*AAAXXXX*-P3-D4 where P3-D4 is the position of the disk drive or solid-state drive in the system unit or an 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 is on the front of the system unit or an expansion unit as shown in the following figure.

Figure 32. 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 7 digits of the sequence number (SN or SEQ) on the label, and P3–D4 is the slot where you are replacing the disk drive or solid-state drive.

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

9. Select 1 (Remove device) for the **Action to be performed**.
10. Set the time delay, for example, for one minute: 01.

    Note: You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

    Important: Do not press Enter at this time.
11. Locate the service indicator that corresponds to the position of the drive that you are removing from a system or from an expansion unit.

Choose from the following options:

- If you are removing a drive from a system or expansion unit, proceed to "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."
- If you are removing a drive from the EDR1 PCIe storage enclosure, proceed to "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 50.

Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to remove a disk drive or solid-state drive from a system or from an expansion unit:

1. On the system, unlock the drive handle by squeezing it and pulling it out toward you, as shown in Figure 33 on page 50.
2. On the console, select the drive that you want to remove, and then press Enter. To view the locations of the service indicators, see "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.

    Important:

    - When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to unlock and remove the drive. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.
    - If you are removing a disk drive or solid-state drive on the 5887 disk drive enclosure the service indicator is solid (on) and does not flash during this procedure.
3. When the identify LED turns on solid, squeeze and pull the handle of the drive out toward you before you remove the disk drive or solid-state drive. If the handle is not all the way out, the disk drive or solid-state drive cannot slide out of the system or out of the expansion unit.
4. Support the bottom of the drive as you slide it out of the system or an expansion unit.

    Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

Figure 33. Removing a disk drive from the system

5. Press Enter on the console to indicate that you have removed the drive. The identify LED turns off.

If you are installing a replacement drive as a replacement for the failed disk drive or solid-state drive, go to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on" on page 72.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the EDR1 PCIe storage enclosure

Complete the following steps to remove a solid-state drive from the EDR1 PCIe storage enclosure.

1. Pull off the bezel **(A)** that covers the slot that contains the solid-state drive.
2. On the console, select the solid-state drive that you want to remove. To view the locations of the service indicators, go to "Solid-state drive locations and service indicators for the EDR1 PCIe storage enclosure" on page 100.
3. Press Enter.

    Important: When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to unlock and remove the drive. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

4. When the solid-state drive identify LED turns on solid, slide the release latch **(B)** over gently to unlock the drive handle. See Figure 34 on page 51.
5. Grasp the handle **(C)** and pull the drive partially out of the slot.
6. Grasp the solid-state drive and pull it out from the slot.
7. Press Enter on the console to indicate that you have removed the solid-state drive.

Figure 34. Removing the solid-state drive from the EDR1 PCIe storage enclosure

If you are installing a replacement solid-state drive, proceed to the procedure for replacing the solid-state drive in the EDR1 PCIe storage enclosure. For instructions, see "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 74.

If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a disk drive or solid-state drive using the hot-spare function in an IBM i system or logical partition from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

You can use the hot-spare function to replace a disk drive or solid-state drive in a system or expansion unit while the power to the IBM i operating system or logical partition that controls the drive location is turned on.

Complete the following tasks to remove a disk drive or solid-state drive using hot-spare:
* "Preparing the system" on page 52
* "Preparing to remove a disk drive or solid-state drive by using the HSM" on page 52
* Select from the following options:
  - "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 54
  - "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 55 (This drive enclosure is supported for the 8231-E2D system.)

Related information:

↪ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing the system

If you are removing a drive in order to install a new or upgraded drive, see "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on" on page 20. If you are removing a drive as part of a service procedure, continue to use the following procedure.

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Remove the front cover and door, if you need to, to access the drives. For instructions on removing the cover, see Removing and replacing covers and doors.
3. Locate the drive to be replaced, and record the location information. Then, use the location information to activate the identify light for that drive. For instructions, see Identifying a failing part in an IBM i system or logical partition.

Preparing to remove a disk drive or solid-state drive by using the HSM

Complete the following tasks to remove a disk drive or solid-state drive by using the Hardware Service Manager (HSM):

1. If you are removing a solid state device located on a PCIe RAID and SSD SAS adapter, go to Removing and replacing the PCIe RAID and SSD SAS adapter and complete that procedure, then return here and complete the following steps.
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, and press Enter.
4. Select **Work with disk units** from the System Service Tools display, press Enter.
5. Select **Display Disk Configuration** from the Work with Disk Units display, and press Enter.
6. Select **Display non-configured units** from the Display Disk Configuration display, and press Enter.
7. Is the failed drive a non-configured unit?
   - No: Go to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on" on page 72.
   - Yes: Determine if the 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.
8. Is the drive to be removed controlled by the load source adapter?
   - No: Go to step 11.
   - Yes: Go to the next step.
9. Is the drive to be removed located in a valid load source position?
   - No: Go to "Configuring a disk drive or solid-state drive on a load source adapter for hot spare by using the IBM i operating system" on page 111.
   - Yes: Go to step 11.
10. Choose the concurrent maintenance option. This option fills in the disk drive location on the concurrent maintenance display. Go to step 13 on page 54.
11. 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
```
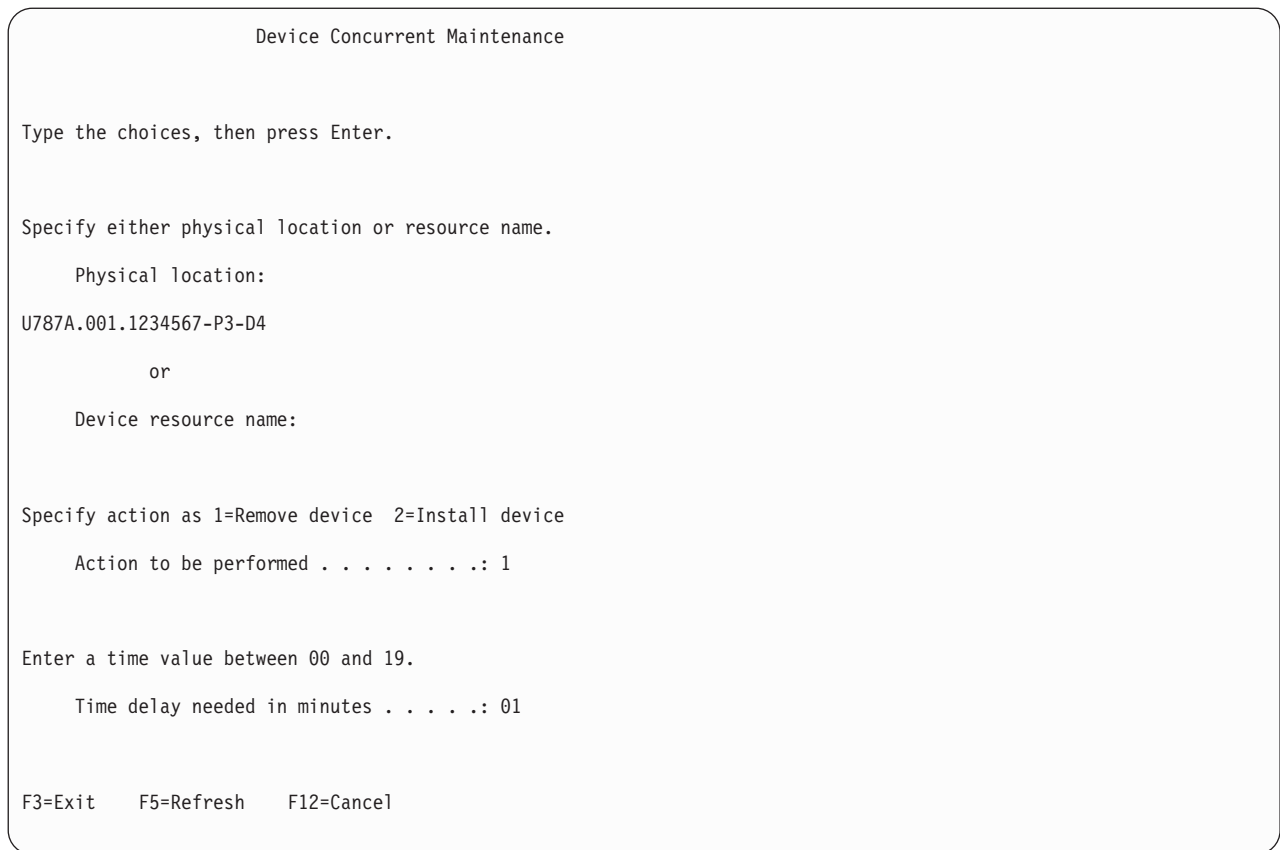
Figure 35. Example Device Concurrent Maintenance display

12. If the physical location does not appear in the Device Concurrent Maintenance display, type the physical location where you will be replacing the drive as shown in the preceding example, Figure 35.

    The physical location has the following form: U787A.001.*AAAXXXX*-P3-D4 where P3-D4 is the position of the 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.

PN: 97P4957   **FC: 787A-001**

SN: 00AAAXXXX

IPHAL552-0

Figure 36. 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 drive as shown in "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.

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

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

   Important: Do not press Enter at this time.

Choose from the following options:

* If you are removing a drive from a system or expansion unit, proceed to "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."
* If you are removing a drive from the EDR1 PCIe storage enclosure, proceed to "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 55.

Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to remove a disk drive or solid-state drive from a system or from an expansion unit:

1. On the system, unlock the drive handle by squeezing it and pulling it out toward you, as shown in Figure 37 on page 55.
2. On the console, select the drive that you want to remove, and then press Enter. To view the locations of the service indicators, see "Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 92.

   Important:

   * When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to unlock and remove the drive. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.
   * If you are removing a disk drive or solid-state drive on the 5887 disk drive enclosure the service indicator is solid (on) and does not flash during this procedure.

3. When the identify LED turns on solid, squeeze and pull the handle of the drive out toward you before you remove the disk drive or solid-state drive. If the handle is not all the way out, the disk drive or solid-state drive cannot slide out of the system or out of the expansion unit.
4. Support the bottom of the drive as you slide it out of the system or an expansion unit.

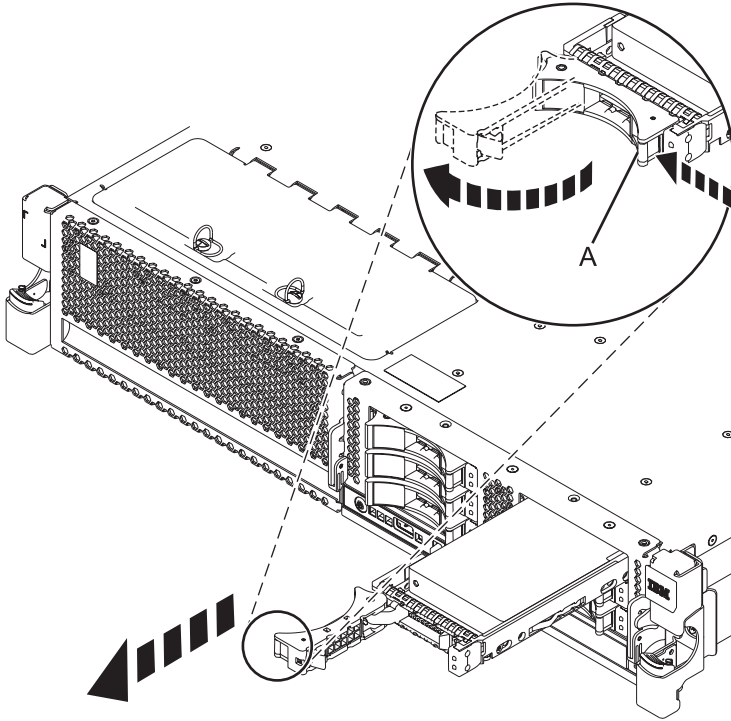   **Note:** Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

Figure 37. Removing a disk drive from the system

5. Press Enter on the console to indicate that you have removed the drive. The identify LED turns off.

If you are installing a replacement drive as a replacement for the failed disk drive or solid-state drive, go to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D by using the hot-spare function in an IBM i system or logical partition" on page 75.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the EDR1 PCIe storage enclosure

Complete the following steps to remove a solid-state drive from the EDR1 PCIe storage enclosure.

1. Pull off the bezel **(A)** that covers the slot that contains the solid-state drive.
2. On the console, select the solid-state drive that you want to remove. To view the locations of the service indicators, go to "Solid-state drive locations and service indicators for the EDR1 PCIe storage enclosure" on page 100.
3. Press Enter.

   Important: When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to unlock and remove the drive. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.
4. When the solid-state drive identify LED turns on solid, slide the release latch **(B)** over gently to unlock the drive handle. See Figure 38 on page 56.
5. Grasp the handle **(C)** and pull the drive partially out of the slot.
6. Grasp the solid-state drive and pull it out from the slot.
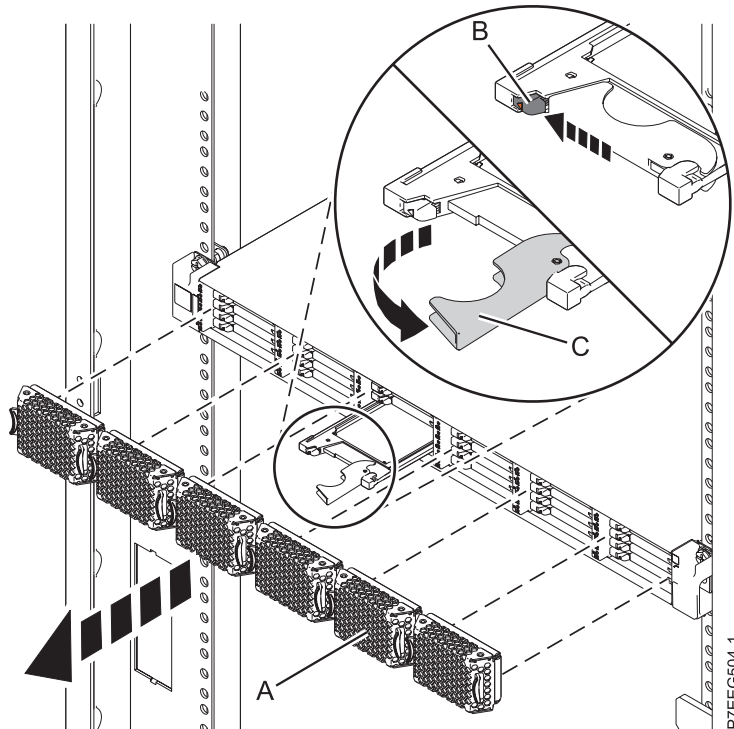7. Press Enter on the console to indicate that you have removed the solid-state drive.
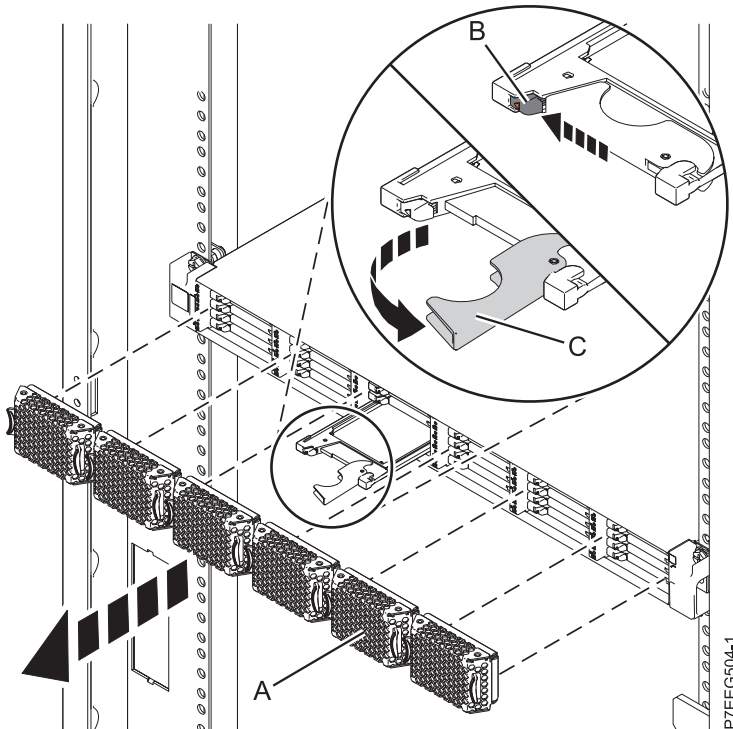
Figure 38. Removing the solid-state drive from the EDR1 PCIe storage enclosure

If you are installing a replacement solid-state drive, proceed to the procedure for replacing the solid-state drive in the EDR1 PCIe storage enclosure. For instructions, see "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 77.

If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off

Learn how to remove a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) drive from a system or logical partition that controls the disk drive or solid-state drive location with the power turned off.

If you are removing a disk drive or solid-state drive as part of a service procedure, continue to use the following procedure.

Complete the following tasks to remove a disk drive or solid-state drive with the power turned off:
- "Preparing to remove a disk drive or solid-state drive" on page 57
- "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 58
- "Removing a solid-state drive from the 5888 PCIe storage enclosure" on page 59 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
- "Removing a solid-state drive from the EDR1 PCIe storage enclosure" on page 60 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)

Related information:

↪ Backplanes

↪ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing to remove a disk drive or solid-state drive

Complete the following steps before removing a disk drive or solid-state drive from a system or from an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Identify the disk drive or solid-state drive to be removed and record the location information. For information, see "Identifying a part" on page 133.
3. Prepare to remove the disk drive or solid-state drive from the system or an expansion unit as follows:
   - If the system or logical partition that controls the disk drive or solid-state drive location is running the AIX operating system, follow the steps in "Preparing to remove a disk drive or solid-state drive from a system or an expansion unit controlled by AIX" on page 101.
   - If the system or logical partition that controls the disk drive or solid-state drive location is running the IBM i operating system, follow the steps in "Preparing to remove a disk drive or solid-state drive from a system or logical partition controlled by IBM i" on page 107.
   - If the system or logical partition that controls the disk drive or solid-state drive location is running the Linux operating system and the disk drive or solid-state drive you want to replace is unprotected or in use, move the data from the disk drive or solid-state drive before continuing with this procedure. For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux PDF* or SAS RAID controllers for Linux topic. The *PCI-X SCSI RAID Controller Reference Guide for Linux PDF* is available from the SCSI PCI Adapters web page.
4. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 141.
5. If you stopped the system, disconnect the power source from the system by unplugging the system. For instructions, see "Disconnecting the power cords from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

   Note: This system can be equipped with a second power supply. Disconnect it before continuing with this procedure. Ensure that the power source to the system has been disconnected.

   (L003)
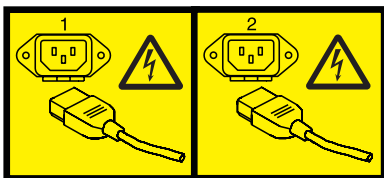
   or

6. Attach a wrist strap.

   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.

Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to remove a disk drive or solid-state drive from a system or from an expansion unit:

1. Unlock the disk drive or solid-state drive handle by squeezing it and pulling it out toward you, as shown in Figure 39 on page 59.
2. Squeeze and pull the handle of the drive out toward you before you remove the disk drive or solid-state drive. If the handle is not all the way out, the disk drive or solid-state drive cannot slide out of the system or out of the expansion unit.
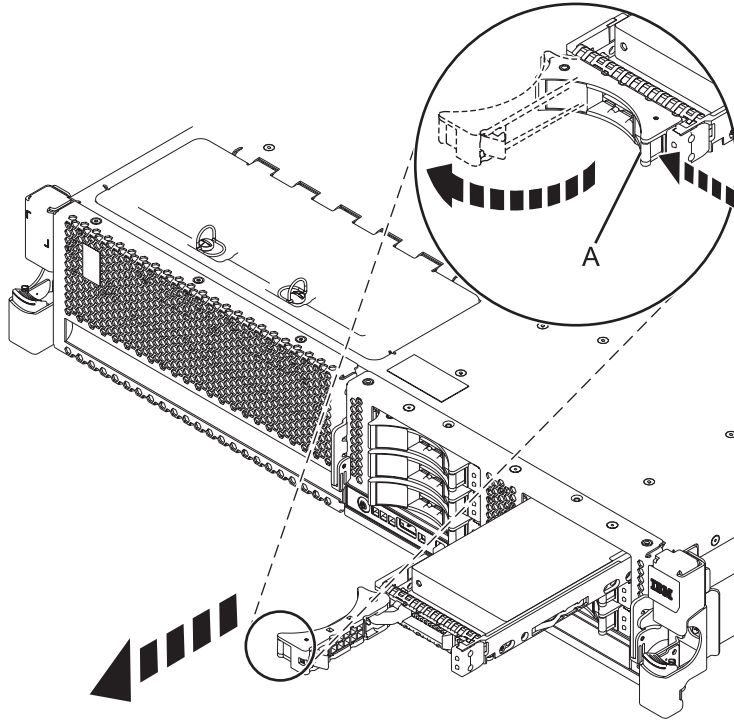
Figure 39. Removing a disk drive from the system

3. Support the bottom of the drive as you slide it out of the system or an expansion unit. Do not hold the disk drive or solid-state drive by the handle.

If you are installing a replacement drive as a replacement for the failed disk drive or solid-state drive, go to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 79.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the 5888 PCIe storage enclosure

Complete the following steps to remove a solid-state drive from the 5888 PCIe storage enclosure.

1. Pull off the bezel **(A)** that covers the slot that contains the solid-state drive. See Figure 40 on page 60.
2. Slide the release latch **(B)** over gently to unlock the drive handle.
3. Grasp the handle **(C)** and pull the drive partially out of the slot.
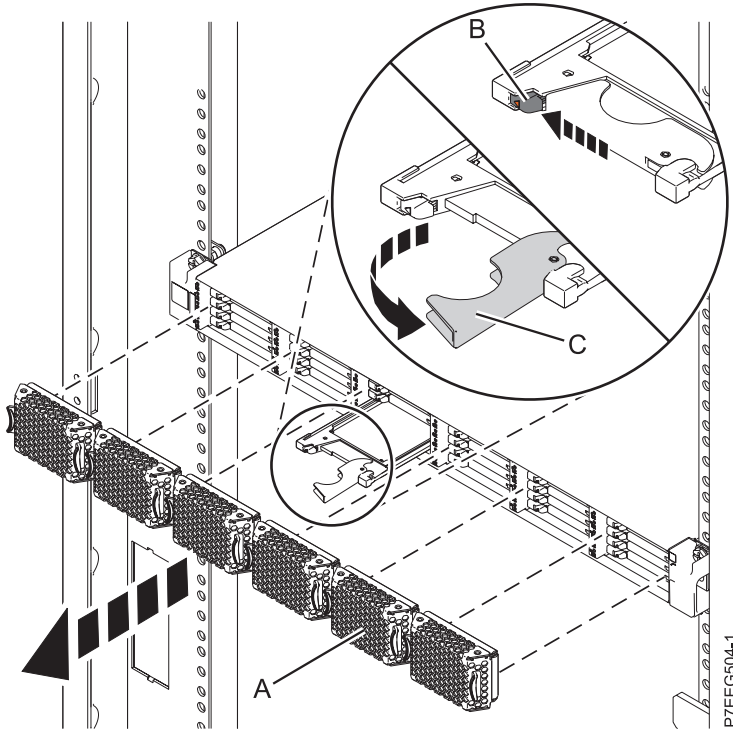
Figure 40. Removing the solid-state drive from the 5888 PCIe storage enclosure

4. Grasp the solid-state drive and pull it out from the slot.

If you are installing a replacement drive as a replacement for the failed disk drive or solid-state drive, go to "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 80.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Removing a solid-state drive from the EDR1 PCIe storage enclosure

Complete the following steps to remove a solid-state drive from the EDR1 PCIe storage enclosure.

1. Pull off the bezel **(A)** that covers the slot that contains the solid-state drive. See Figure 41 on page 61.
2. Slide the release latch **(B)** over gently to unlock the drive handle.
3. Grasp the handle **(C)** and pull the drive partially out of the slot.
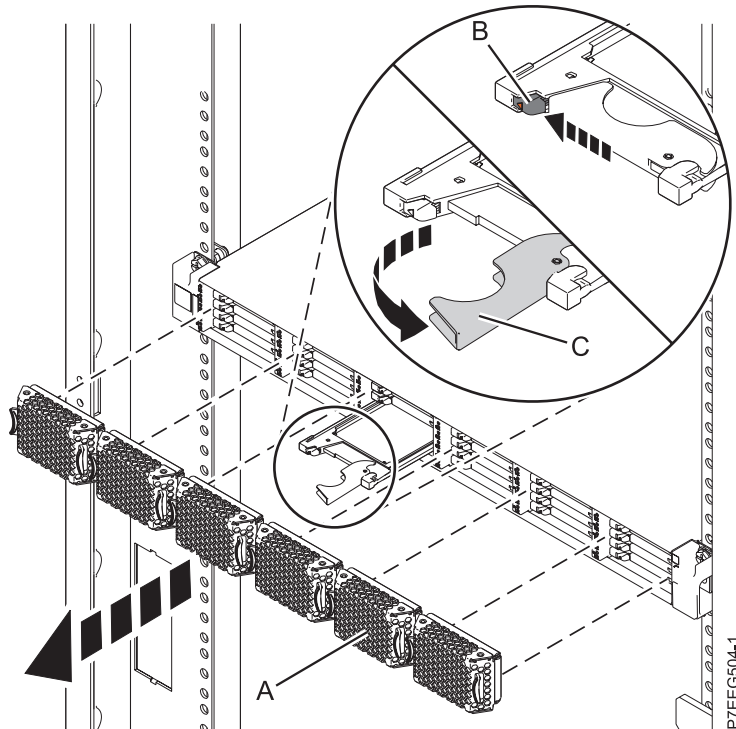
Figure 41. Removing the solid-state drive from the EDR1 PCIe storage enclosure

4. Grasp the solid-state drive and pull it out from the slot.

If you are installing a replacement drive as a replacement for the failed solid-state drive, go to "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 81.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. For instructions, see "Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 90.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to replace a small computer system interface (SCSI) or serial-attached SCSI (SAS) disk drive or solid-state drive in the system or expansion unit with the system power turned on or off.

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

Use this procedure to remove a failed disk drive or solid-state drive and replace it with the same type of disk drive or solid-state drive. If you plan to remove a disk drive or solid-state drive and install a different type of disk drive or solid-state drive, remove the existing disk drive or solid-state drive.

The system or logical partition can be turned off or turned on when you replace the disk drive or solid-state drive. If the disk drive or solid-state drive that is being replaced is in the AIX, IBM i, or Linux root volume group (rootvg) and does not have disk protection, or if it is a PCI Express (PCIe) RAID adapter with integrated solid-state disk drives, then replace the disk drive or solid-state drive by using the procedure for replacing with the power turned off.

Related information:

↪ Backplanes

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the AIX system or logical partition power turned on

Learn how to install a disk drive or solid-state drive in a system or expansion unit with the AIX operating system or logical partition that controls the drive location is powered on.

To replace a drive, you must first ensure that the slot it will occupy does not contain another drive or a disk-drive filler. For the procedure to remove a drive, see "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 36. For the procedure to remove a disk drive filler, see "Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 89.

Attention: Review the following information to determine whether your situation requires a different procedure to be performed instead of this one:

- If the 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 or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 79.
- If you are installing a new or upgraded drive, see "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 12.

If you are replacing a drive as part of a service procedure, continue to use the following 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 complete the task are the same.

Complete the following tasks to replace a disk drive or solid-state drive:
- "Preparing to replace a disk drive or solid-state drive"
- "Preparing to replace a disk drive or solid-state drive by using the diagnostic command" on page 63
- Choose from the following options:
  - "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 63
  - "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 64 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  - "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 65 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing to replace a disk drive or solid-state drive

Complete the following steps before replacing a disk drive or solid-state drive in a system or in an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Find the package that contains the new drive.

   Attention: Drives are fragile. Handle with care.

3. Remove the drive from the static-protective package.

Proceed to the procedure for preparing to replace a disk drive by using the diagnostic command.

Preparing to replace a disk drive or solid-state drive by using the diagnostic command

Complete the following steps before you replace a disk drive or solid-state drive by using the diagnostic command:

1. If you are already on the SCSI and SCSI RAID Hot Plug Manager display, go to 10.
2. Log in as root user.
3. At the command line, type diag and press Enter.
4. On the Diagnostic Operating Instructions display, press Enter to continue.
5. On the Function Selection display, select **Task Selection**.
6. Select **RAID Array Manager**.
7. Depending on the adapter that your drive is attached to, select **IBM SAS Disk Array Manager**, **PCI SCSI Disk Array Manager**, or **PCI-X SCSI Disk Array Manager**.
8. Select **Diagnostics and Recovery Options**.
9. Select **SCSI and SCSI RAID Hot Plug Manager**.
10. Select **Attach a Device to an SCSI Hot Swap Enclosure Device**.

Choose from the following options:

- If you are replacing a drive in a system or expansion unit, proceed to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."
- If you are replacing a drive in the 5888 PCIe storage enclosure, proceed to "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 64.
- If you are replacing a drive in the EDR1 PCIe storage enclosure, proceed to "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 65.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to replace a disk drive or solid-state drive in a system or in an expansion unit:

1. Unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.
2. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit. Do not hold the drive by the handle.
3. Slide the drive halfway into the system.
4. On the console, select the slot that you want the drive to go into, and press Enter.
5. When the identify LED turns on solid, slide the drive all the way into the system, and push the drive handle **(A)** in until it locks, as shown in Figure 42 on page 64.
6. On the console, press Enter to indicate that you have installed the drive.

Figure 42. Replacing a disk drive in the system

Proceed to the procedure for completing the replacement by using the diagnostic command. For instructions, see "Completing the disk drive or solid-state drive replacement by using the diagnostic command" on page 66.

Replacing a solid-state drive in the 5888 PCIe storage enclosure

Complete the following steps to replace a solid-state drive in the 5888 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

    Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive halfway into the 5888 PCIe storage enclosure.
3. Select the drive that you want to replace and press Enter on the console.
4. When the solid-state drive identify LED turns on solid, slide the solid-state drive all the way into the 5888 PCIe storage enclosure until it is fully seated. Then rotate the handle **(A)** to the locked position. See Figure 43 on page 65.
5. On the console, press Enter to indicate that you have installed the solid-state drive.
6. Install the bezel **(B)**.

Figure 43. Replacing a solid-state drive in the 5888 PCIe storage enclosure.

Proceed to the procedure for completing the replacement by using the diagnostic command. For instructions, see "Completing the disk drive or solid-state drive replacement by using the diagnostic command" on page 66.

Replacing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to replace a solid-state drive in the EDR1 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive halfway into the EDR1 PCIe storage enclosure.
3. Select the drive that you want to replace and press Enter on the console.
4. When the solid-state drive identify LED turns on solid, slide the solid-state drive all the way into the EDR1 PCIe storage enclosure until it is fully seated. Then rotate the handle **(A)** to the locked position. See Figure 44 on page 66.
5. On the console, press Enter to indicate that you have installed the solid-state drive.
6. Install the bezel **(B)**.

Figure 44. Replacing a solid-state drive in the EDR1 PCIe storage enclosure.

Proceed to the procedure for completing the replacement by using the diagnostic command. For instructions, see "Completing the disk drive or solid-state drive replacement by using the diagnostic command."

Completing the disk drive or solid-state drive replacement by using the diagnostic command

Complete the following steps after you have replaced the disk drive or solid-state drive:

1. Exit to the Task selection display.
2. Select **Log Repair Action**.
3. Select the disk drive or solid-state drive that you replaced and then press Enter.
4. Select **Commit** after you have made your selection and then press Enter.
5. Exit to the command line.
6. Proceed to completing the procedure.

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. Verify the installed part:
   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.
2. To configure the newly installed disk drive or solid-state drive, see "Preparing a disk drive or solid-state drive for use in an AIX system or logical partition" on page 101.
3. To rebuild the data on the replacement disk drive or solid-state drive, see "Rebuilding data on a replacement disk drive or solid-state drive by using AIX" on page 102.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on

Learn how to replace a disk drive or solid-state drive in a system or expansion unit with the Linux operating system or logical partition that controls the drive location is powered on.

To replace a drive, you must first ensure that the slot it will occupy does not contain another drive or a disk-drive filler. For the procedure to remove a drive, see "Removing the disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 36. For the procedure to remove a disk drive filler, see "Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 89.

Attention: Review the following information to determine whether your situation requires that a different procedure be performed instead of this one:

- In either of the following cases, go to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 79:
  - You are installing a drive that is to be connected with the 6203 or 6204 SCSI adapter.
  - You do not feel comfortable using the procedure with the power turned on.
- If you are installing a new or upgraded drive, see "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the Linux system or logical partition power turned on" on page 12.

If you are replacing a drive as part of a service procedure, continue to use the following procedure.

Complete the following tasks to replace a disk drive or solid-state drive:
- "Preparing to replace a disk drive or solid-state drive"
- "Preparing to replace a disk drive or solid-state drive by using the iprconfig command" on page 68
- Choose from the following options:
  - "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 68
  - "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 69 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  - "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 70 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)
- "Completing the disk drive or solid-state drive replacement by using the iprconfig command" on page 71
- "Completing the procedure" on page 71

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

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing to replace a disk drive or solid-state drive

Complete the following steps before replacing a disk drive or solid-state drive in a system or in an expansion unit:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.

2. Find the package that contains the new drive.

   Attention: Drives are fragile. Handle with care.

3. Remove the drive from the static-protective package.

4. Proceed to preparing to replace a drive by using the iprconfig command.

Preparing to replace a disk drive or solid-state drive by using the iprconfig command

Complete the following steps before you replace a disk drive or solid-state drive by using the iprconfig command:

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 add device**. Press Enter.

   A Concurrent Device Add display similar to the following example is shown.

```
                             Concurrent Device Add


 Choose a single location for add operations

   1=Select


 OPT Name    Platform Location                Description         Status

 --- ------  ------------------------  ------------------------ ----------------

         U5887.001.Z065075-P1-D1                                Empty

         U5887.001.Z065075-P1-D6                                Empty

         U5887.001.Z065075-P1-D7                                Empty

         U5887.001.Z065075-P1-D8                                Empty

         U5887.001.Z065075-P1-D9                                Empty



 e=Exit   q=Cancel   t=Toggle
```
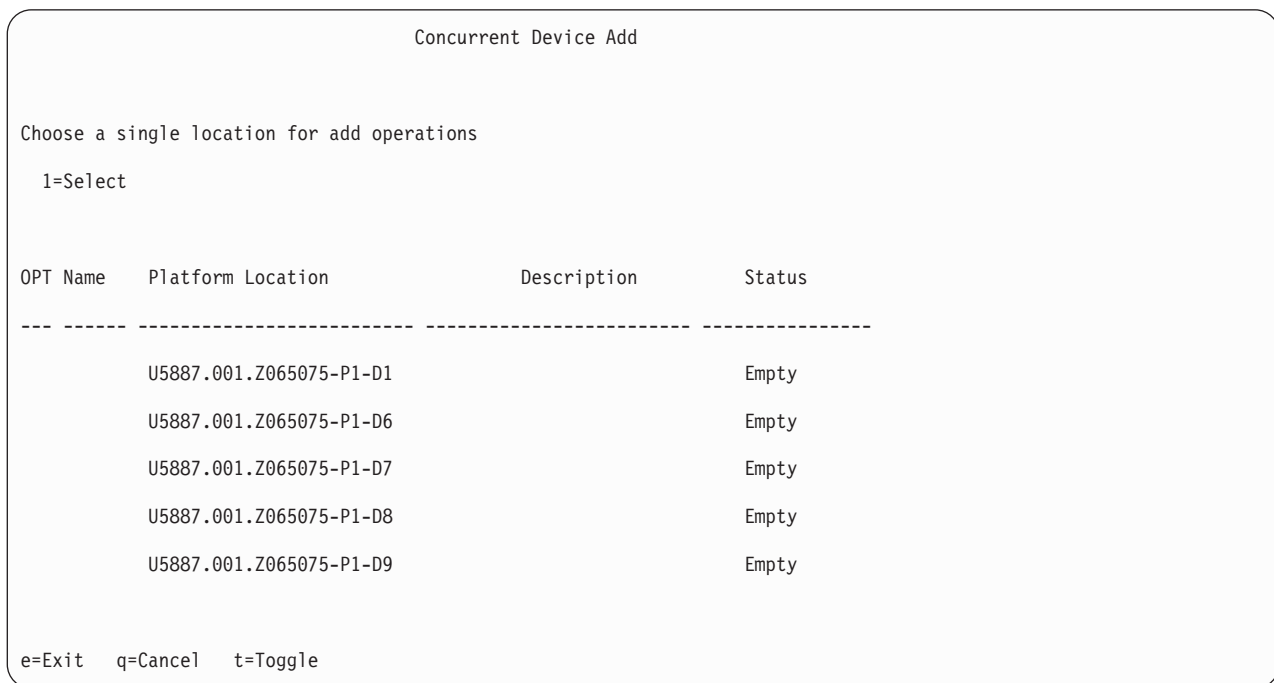
Figure 45. Example Concurrent Device Add display

3. Type 1 (Select) next to the location from which you removed the disk drive or solid-state drive.

   The Verify Device Concurrent Add display is shown. The service indicator flashes for that drive slot.

Choose from the following options:

- If you are replacing a drive in a system or expansion unit, proceed to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."

- If you are replacing a drive in the 5888 PCIe storage enclosure, proceed to "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 69.

- If you are replacing a drive in the EDR1 PCIe storage enclosure, proceed to "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 70.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to replace a disk drive or solid-state drive in a system or in an expansion unit:

1. Unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.
2. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit. Do not hold the drive by the handle.
3. Slide the drive halfway into the system.
4. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, and then press Enter.
5. When the identify LED flashes, slide the drive all the way into the system, and push the drive handle **(A)** in until it locks, as shown in Figure 46.

Figure 46. Installing a disk drive in the system

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the disk drive or solid-state drive replacement by using the iprconfig command" on page 71.

Replacing a solid-state drive in the 5888 PCIe storage enclosure
Complete the following steps to replace a solid-state drive in the 5888 PCIe storage enclosure.
1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.
2. Slide the solid-state drive halfway into the 5888 PCIe storage enclosure.
3. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, and then press Enter.
4. When the solid-state drive identify LED flashes, slide the solid-state drive all the way into the 5888 PCIe storage enclosure until it is fully seated. Then rotate the handle **(A)** to the locked position. See Figure 47 on page 70.
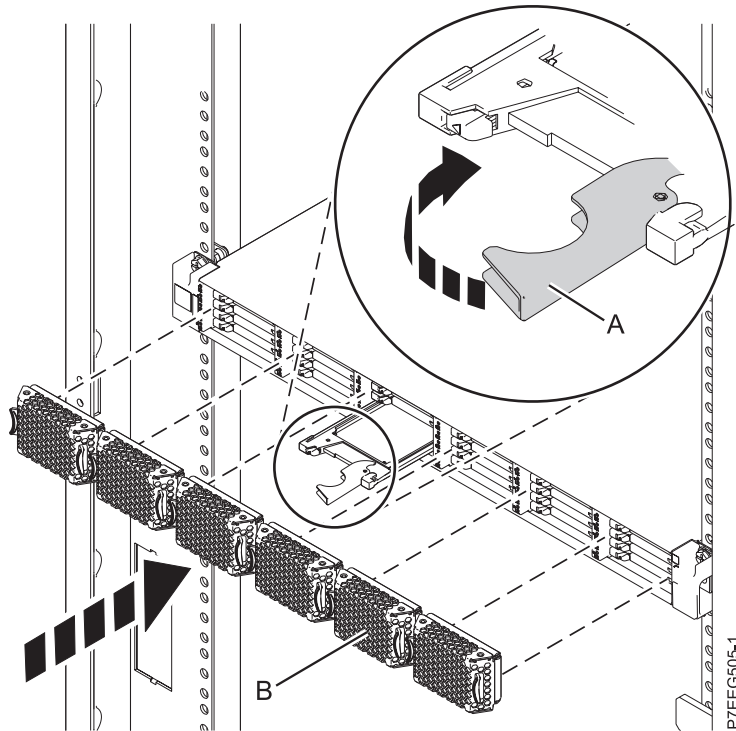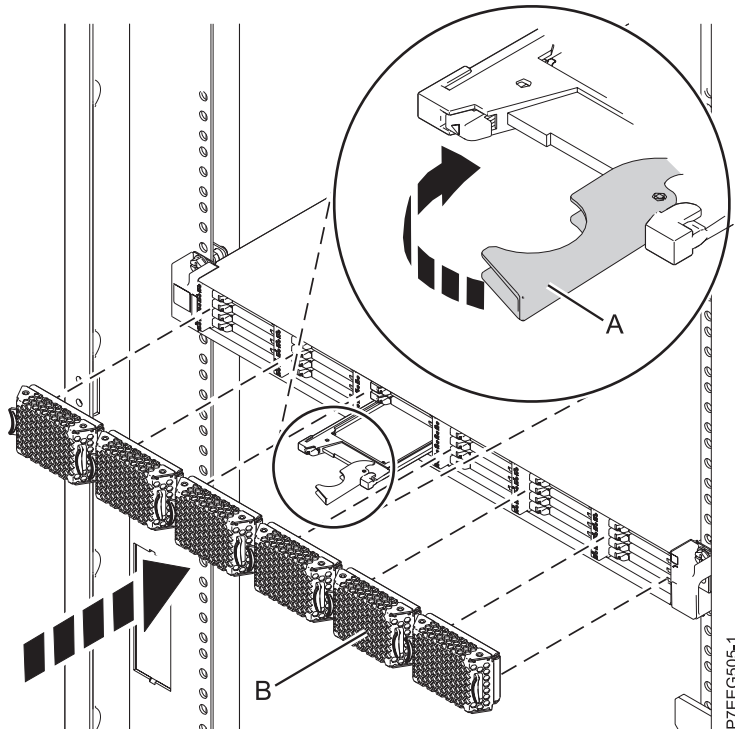5. Install the bezel **(B)**.

Figure 47. Replacing a solid-state drive in the 5888 PCIe storage enclosure.

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the disk drive or solid-state drive replacement by using the iprconfig command" on page 71.

Replacing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to replace a solid-state drive in the EDR1 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive halfway into the EDR1 PCIe storage enclosure.

3. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, and then press Enter.

4. When the solid-state drive identify LED flashes, slide the solid-state drive all the way into the EDR1 PCIe storage enclosure until it is fully seated. Then rotate the handle **(A)** to the locked position. See Figure 48 on page 71.

5. Install the bezel **(B)**.

Figure 48. Replacing a solid-state drive in the EDR1 PCIe storage enclosure.

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the disk drive or solid-state drive replacement by using the iprconfig command."

Completing the disk drive or solid-state drive replacement by using the iprconfig command

Complete the following steps by using the iprconfig command:

1. Press Enter on the Complete Device Concurrent Add display to indicate that the disk drive or solid-state drive is installed.

2. Proceed to completing the procedure.

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. Verify the installed part:
   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.

2. To rebuild data on the newly installed or replaced disk drive or solid-state drive, see "Rebuilding data on a replacement disk drive or solid-state drive in a system or logical partition running Linux" on page 105.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on

Learn how to install a disk drive or solid-state drive in a system or expansion unit with the IBM i operating system or logical partition that controls the drive location is powered on.

To complete this procedure you must have removed the disk drive or solid-state drive. For the procedure to remove the drive, see "Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or an expansion unit controlled by IBM i" on page 45. If you are installing a new or upgraded drive, see "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on" on page 20. If you are removing a disk drive or solid-state drive as part of a service procedure, continue to use the following 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 complete the task are the same.

Complete the following tasks to remove a disk drive or solid-state drive:
- "Preparing to replace the disk drive or solid-state drive"
- Choose from the following options:
  - "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 73
  - "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 74 (This drive enclosure is supported for the 8231-E2D system.)
- "Completing the disk drive or solid-state drive replacement by using the HSM" on page 74
- "Completing the procedure" on page 75

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing to replace the disk drive or solid-state drive

Complete the following steps before replacing a disk drive or solid-state drive in a system or in an expansion unit.

1. Return to the console and wait until the Concurrent Maintenance Results display is shown.
2. Press F12.
3. The physical locations you entered while removing the disk drive or solid-state drive might still show on the display. If not, retype the physical location where you want to install the new disk drive or solid-state 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 or solid-state drive position P3–D4.

   In the example, U5074.001.1234567–DB3–D32, you would install a disk drive or solid-state drive in the expansion unit with type 5074, model 001, sequence number 1234567, and disk drive or solid-state drive position DB3–D32.
4. Select 2 (Install device) for the Action to be performed.
5. Set the time delay, for example, for one minute: 01.

   Note: You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

   Important: Do not press Enter yet.

Choose from the following options:

- If you are replacing a drive in a system or expansion unit, proceed to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."
- If you are replacing a drive in the EDR1 PCIe storage enclosure, proceed to "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 74.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to replace a disk drive or solid-state drive in a system or in an expansion unit:

1. On the system, unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.

2. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit. Do not hold the drive by the handle.

3. Slide the drive halfway into the system or an expansion unit.

4. In the Hardware Service Manager (HSM) display, select the drive that you want to replace.

5. Press Enter on the console.

   Important: When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to slide the drive all the way in and then lock it in place by pushing in the drive handle. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

6. When the identify LED turns on solid, slide the drive all the way into the system or an expansion unit, and push the drive handle **(A)** in until it locks, as shown in Figure 49.
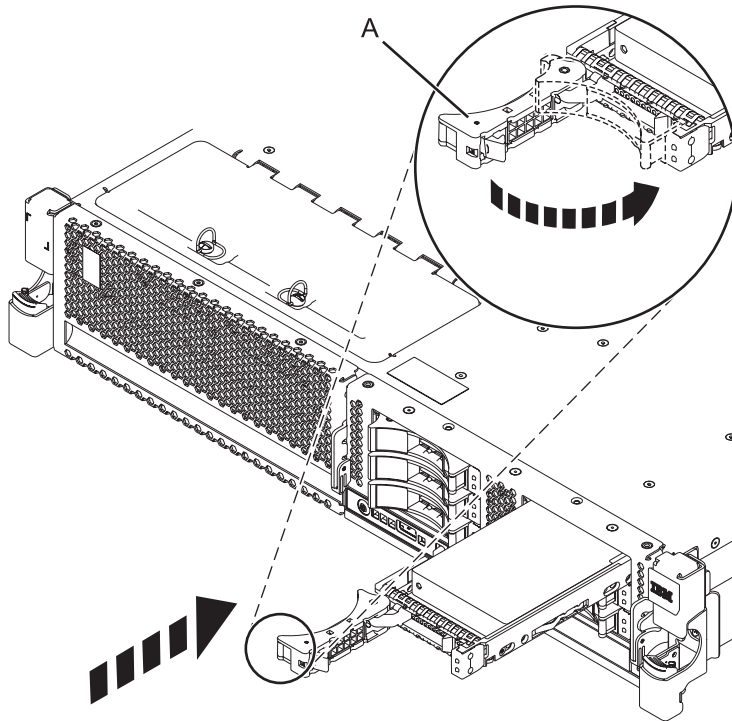

Figure 49. Installing a disk drive in the system

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the disk drive or solid-state drive replacement by using the HSM" on page 74.

Replacing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to replace a solid-state drive in the EDR1 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive halfway into the EDR1 PCIe storage enclosure.

3. Select the drive that you want to replace and press Enter on the console.

   Important: When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to slide the drive all the way in and then lock it in place by pushing in the drive handle. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

4. When the solid-state drive identify LED turns on solid, slide the solid-state drive all the way into the EDR1 PCIe storage enclosure until it is fully seated. Then rotate the handle **(A)** to the locked position. See Figure 50.

5. On the console, press Enter to indicate that you have installed the solid-state drive.

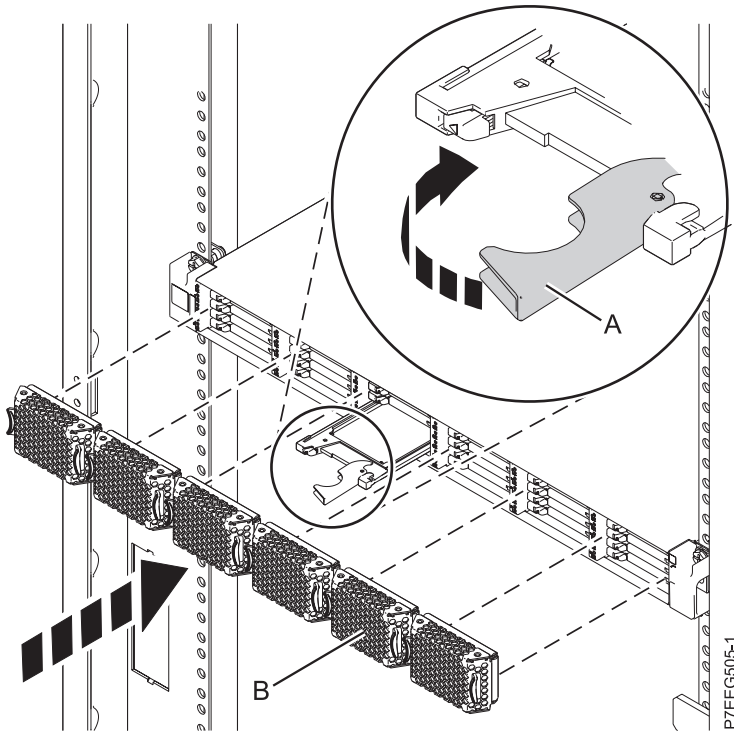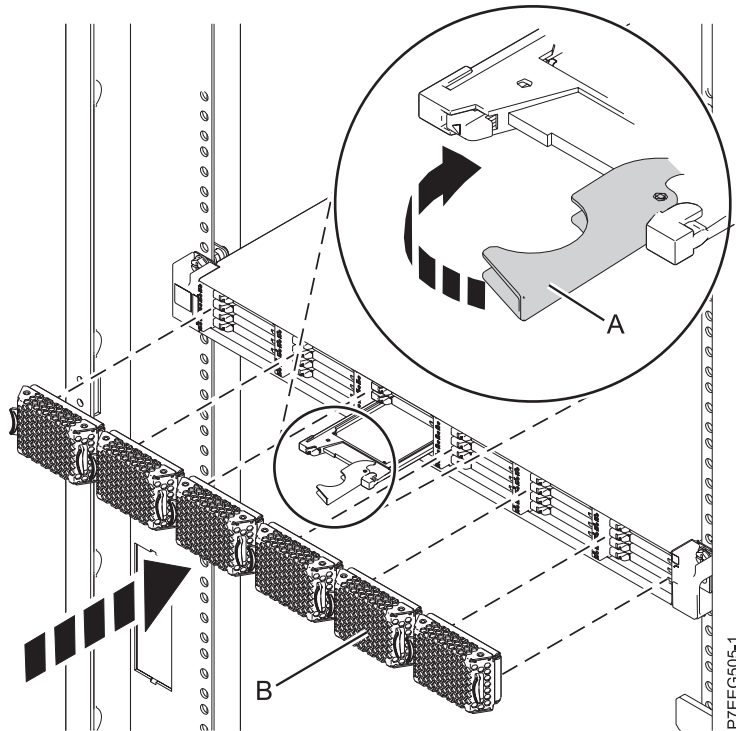6. Install the bezel **(B)**.

Figure 50. Replacing a solid-state drive in the EDR1 PCIe storage enclosure.

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the disk drive or solid-state drive replacement by using the HSM."

Completing the disk drive or solid-state drive replacement by using the HSM

Complete the following task to complete the disk drive or solid-state drive replacement:

1. Return to the console and wait until the Concurrent Maintenance Results display is shown, and then press Enter.

2. If you return to the Service Action Log display, exit the service action log.

3. When the HSM display is shown, press **F3**.

Proceed to completing the procedure.

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. Verify the installed part:
   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.
2. To configure the newly installed disk drive or solid-state drive, see "Configuring a disk drive or solid-state drive in an IBM i system or logical partition" on page 109.
3. To rebuild the data on the replacement disk drive or solid-state drive, see "Rebuilding data on a replacement disk drive or solid-state drive by using IBM i" on page 112.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D by using the hot-spare function in an IBM i system or logical partition

You can use the hot-spare function to replace 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 drive location is powered on.

To complete this procedure, you must have already completed the removal procedure. For the removal procedure, see "Removing a disk drive or solid-state drive using the hot-spare function in an IBM i system or logical partition from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 51. If you are replacing a disk drive or solid-state drive as part of a service procedure, continue to use the following procedure.

Complete the following tasks:
- "Preparing to replace the disk drive or solid-state drive"
- Choose from the following options:
  - "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit" on page 76
  - "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 77 (This drive enclosure is supported for the 8231-E2D system.)
- "Completing the procedure by using the HSM" on page 78

Related information:

➡ Backplanes

➡ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Preparing to replace the disk drive or solid-state drive

Complete the following steps before replacing a disk drive or solid-state drive in a system or in an expansion unit.

1. Return to the console and wait until the Concurrent Maintenance Results display is shown.
2. Press F12.
3. The physical locations you entered while removing the disk drive or solid-state drive might still show on the display. If not, retype the physical location where you want to install the new disk drive or solid-state 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 or solid-state drive position P3–D4.

In the example, U5074.001.1234567-DB3-D32, you would install a disk drive or solid-state drive in the expansion unit with type 5074, model 001, sequence number 1234567, and disk drive or solid-state drive position DB3–D32.

4. Select 2 (Install device) for the Action to be performed.

5. Set the time delay, for example, for one minute: 01.

   Note: You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

   Important: Do not press Enter yet.

Choose from the following options:

- If you are replacing a drive in a system or expansion unit, proceed to "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit."

- If you are replacing a drive in the EDR1 PCIe storage enclosure, proceed to "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 77.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to replace a disk drive or solid-state drive in a system or in an expansion unit:

1. On the system, unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the drive does not slide into the system or an expansion unit.

2. Hold the drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit. Do not hold the drive by the handle.

3. Slide the drive halfway into the system or an expansion unit.

4. In the Hardware Service Manager (HSM) display, select the drive that you want to replace.

5. Press Enter on the console.

   Important: When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to slide the drive all the way in and then lock it in place by pushing in the drive handle. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

6. When the identify LED turns on solid, slide the drive all the way into the system or an expansion unit, and push the drive handle **(A)** in until it locks, as shown in Figure 51 on page 77.
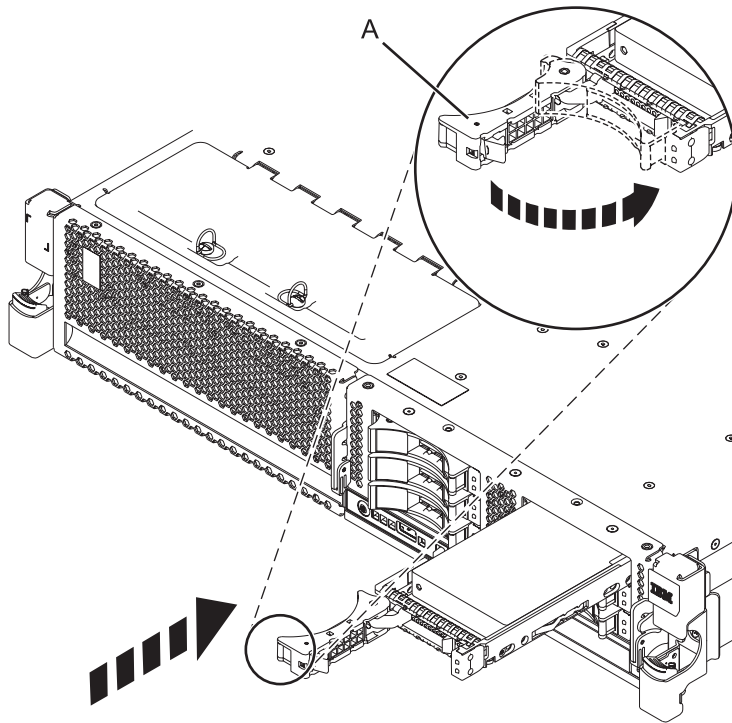
Figure 51. Installing a disk drive in the system

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the procedure by using the HSM" on page 78.

Replacing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to replace a solid-state drive in the EDR1 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive halfway into the EDR1 PCIe storage enclosure.

3. Select the drive that you want to replace and press Enter on the console.

   Important: When you press Enter, after your selected time delay, the service indicator light comes on (solid) for 18 seconds. You then have 18 seconds to slide the drive all the way in and then lock it in place by pushing in the drive handle. You can set an appropriate time delay of 01 - 19 minutes to allow adequate time to access the disk drive or solid-state drive.

4. When the solid-state drive identify LED turns on solid, slide the solid-state drive all the way into the EDR1 PCIe storage enclosure until it is fully seated. Then rotate the handle **(A)** to the locked position. See Figure 52 on page 78.

5. On the console, press Enter to indicate that you have installed the solid-state drive.
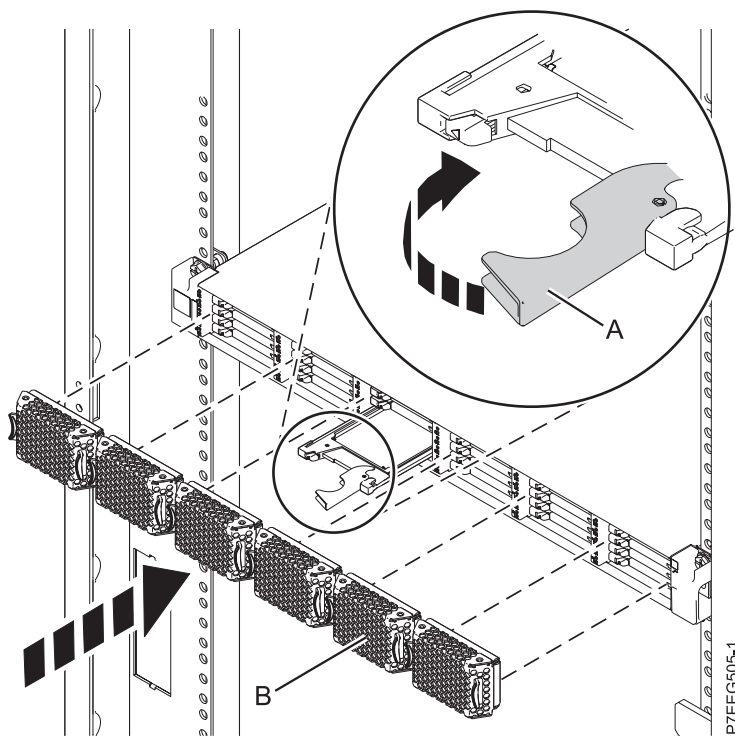
6. Install the bezel **(B)**.

Figure 52. Replacing a solid-state drive in the EDR1 PCIe storage enclosure.

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the procedure by using the HSM."

Completing the procedure by using the HSM

1. Return to the HSM console and wait until the Concurrent Maintenance Results display is shown, and press Enter if you used the concurrent maintenance process above, otherwise continue with the next step.
2. If you return to the Hardware Service Manager (HSM), exit the HSM.
3. Select **Work with disk units** from the Start System Service Tools display.
4. Select **Non-configured disk units** from the Work with Disk Units display, and press Enter.
5. Is the new drive displayed with a status of non-configured?

   Note: It may take several minutes for the new drive to display.
   - No: Contact your next level of support.
   - Yes: Continue with the next step.
6. Press **F3** to return to the Work with Disk Units display.
7. Select **Work with disk unit recovery** from the Work with Disk Units display, and press Enter.
8. Select **Disk unit problem recovery procedure**, and press Enter.
9. Select **Initialize and format disk unit**, and press Enter.
10. Select the new disk and press Enter.

    Note: This will take several minutes to complete.
11. When the drive is initialized and formatted, press **F3** to return to the Work with Disk Units display.
12. Select **Start hot spare**, and press Enter.
13. Select the IOA with the new disk, then press Enter and press Enter again.

14. Does the new hot spare drive have a smaller capacity than previous hot spare 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.

15. Select **Display Device Parity Status**, and press Enter. If the new 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 drives so that the larger drive will become the hot spare, and the smaller drive will become a parity set member.

16. Fail the previous hot spare drive by unlocking the drive handle by squeezing it and pulling it out toward you.

17. Pull the drive out about one inch and wait ten seconds.

18. Push the drive back into the slot and close the handle.

19. Return to step 1 on page 78 and start the hot spare procedure on the larger drive.

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off

Learn how to replace a failed Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) drive in a system or logical partition that controls the drive location with the power turned off.

To complete this procedure, you must have already completed the removal procedure. For the removal procedure, see "Removing a disk drive or solid-state drive from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 56. If you are installing a new or upgraded disk drive or solid-state drive, see "Installing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off" on page 26. If you are replacing a disk drive or solid-state drive as part of a service procedure, continue to use the following procedure.

Complete the following tasks to replace a disk drive or solid-state drive:

• Choose from the following options:
  – "Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the system or logical partition power turned off"
  – "Replacing a solid-state drive in the 5888 PCIe storage enclosure" on page 80 (This drive enclosure is supported for the 8231-E1C and 8231-E2C systems.)
  – "Replacing a solid-state drive in the EDR1 PCIe storage enclosure" on page 81 (This drive enclosure is supported for the 8231-E1D, 8231-E2D, and 8268-E1D systems.)
• "Completing the procedure" on page 82

Related information:

➥ Backplanes

➥ Removing and replacing a disk drive in the 5887 disk drive enclosure unit

Replacing a disk drive or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system or expansion unit

Complete the following steps to replace a disk drive or solid-state drive in a system or in an expansion unit:

1. If the slot you want to use contains a disk drive filler, remove the disk drive filler from the slot. For instructions, see "Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 89.

2. Unlock the drive handle by squeezing it and pulling it out toward you. If the handle is not all the way out, the disk drive or solid-state drive does not slide into the system or an expansion unit.

3. Hold the disk drive or solid-state drive by the top and bottom edges as you position the drive, and insert it into the system or the expansion unit.

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

4. Slide the disk drive or solid-state drive all the way into the system or an expansion unit, and push the disk drive or solid-state drive handle **(A)** in until it locks. See Figure 53.

   Important: When installing a drive, ensure that the drive is fully seated and is all the way into the enclosure.
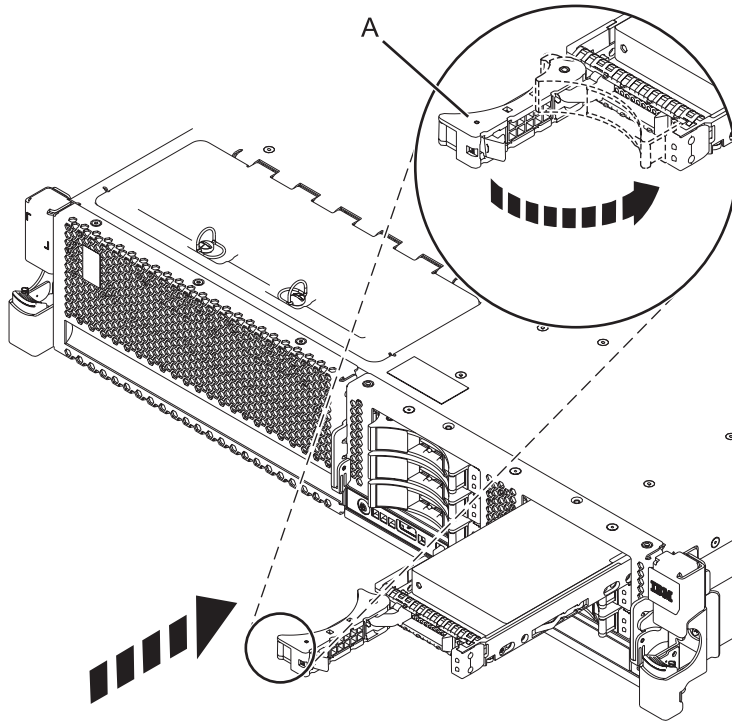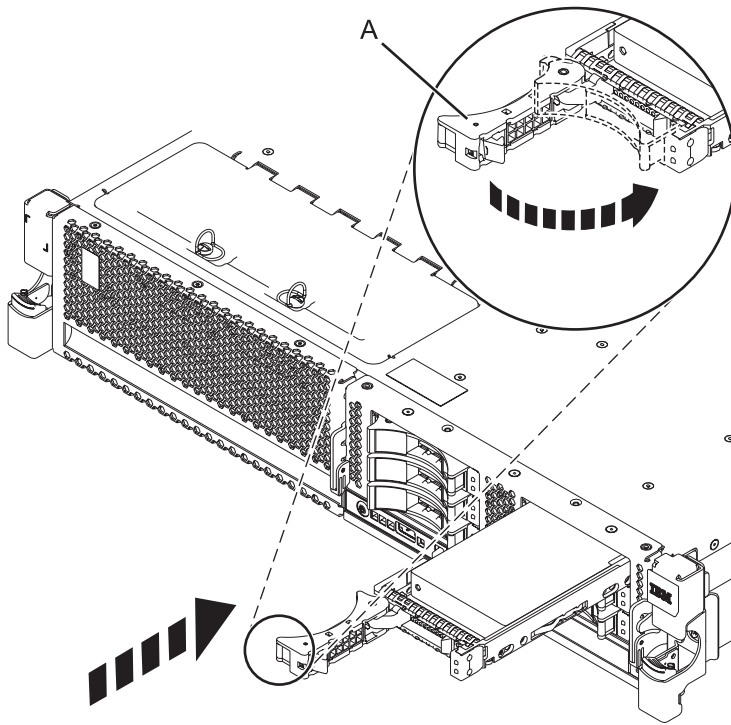

Figure 53. Installing a disk drive in the system

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the procedure" on page 82.

Replacing a solid-state drive in the 5888 PCIe storage enclosure
Complete the following steps to replace a solid-state drive in the 5888 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

   Note: Do not hold the solid-state drive only by the handle. Support the drive by holding the drive by its sides.

2. Slide the solid-state drive into the 5888 PCIe storage enclosure until the drive stops.

3. Rotate the handle (A) to the locked position, as shown in Figure 54 on page 81.

4. Install the bezel **(B)**.
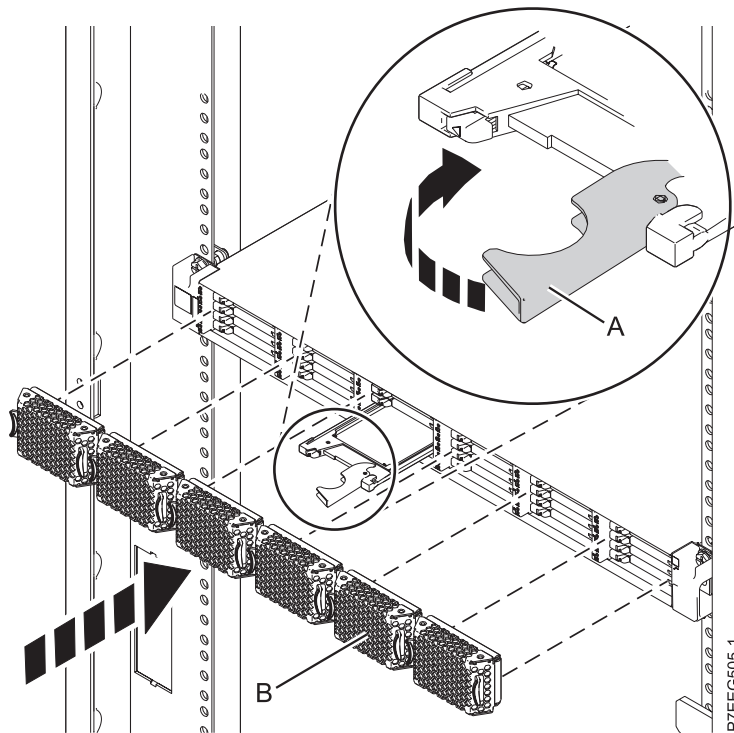
Figure 54. Replacing a solid-state drive in the 5888 PCIe storage enclosure.

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the procedure" on page 82.

Replacing a solid-state drive in the EDR1 PCIe storage enclosure

Complete the following steps to replace a solid-state drive in the EDR1 PCIe storage enclosure.

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure.

   Note: Do not hold the drive only by the handle. Support the drive by holding the drive by its sides.
2. Slide the solid-state drive into the EDR1 PCIe storage enclosure until the drive stops.
3. Rotate the handle (A) to the locked position, as shown in Figure 55 on page 82.
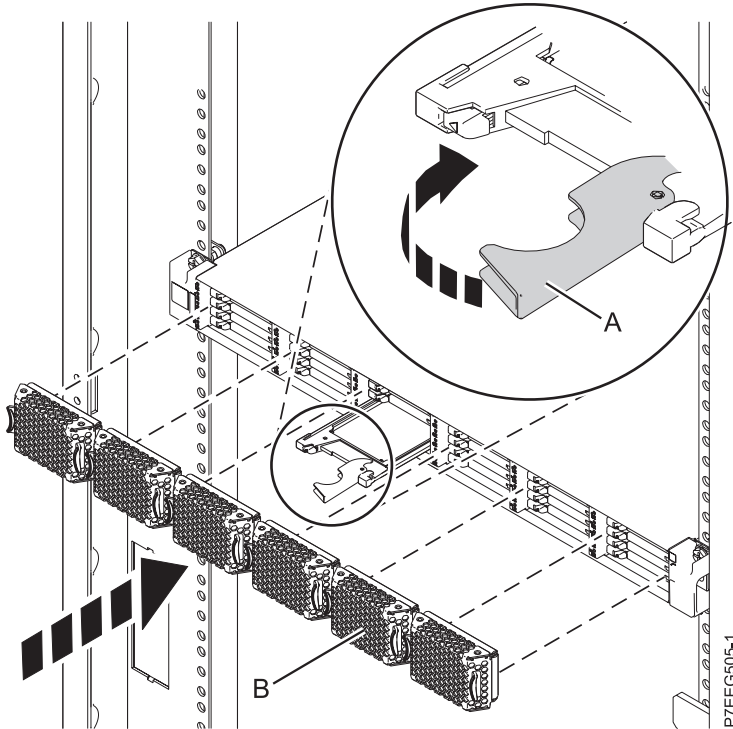4. Install the bezel **(B)**.

Figure 55. Replacing a solid-state drive in the EDR1 PCIe storage enclosure.

Proceed to the procedure for completing the drive replacement. For instructions, see "Completing the procedure."

Completing the procedure

Complete the following steps after you install or replace the disk drive or solid-state drive in a system, enclosure, or expansion unit:

1. If the power cords were disconnected from the system, reconnect them to the system. For instructions, see "Connecting the power cords to the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

2. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 139.

3. Verify the installed part:
   - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
   - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.

4. To configure the newly installed disk drive or solid-state drive, see the following procedures for the applicable operating system that controls the disk drive or solid-state drive:
   - "Preparing a disk drive or solid-state drive for use in an AIX system or logical partition" on page 101.
   - "Configuring a disk drive or solid-state drive in an IBM i system or logical partition" on page 109.

   Note: There is no equivalent procedure for a system or logical partition that is running the Linux operating system.

5. To rebuild the data on the replacement disk drive or solid-state drive, see the following procedures for the applicable operating system that controls the disk drive or solid-state drive:

- "Rebuilding data on a replacement disk drive or solid-state drive by using AIX" on page 102.
- "Rebuilding data on a replacement disk drive or solid-state drive by using IBM i" on page 112.
- "Rebuilding data on a replacement disk drive or solid-state drive in a system or logical partition running Linux" on page 105.

Removing or installing the external SAS port

Learn how to remove or install an external serial-attached Small Computer System Interface (SAS) port from or in the server.

Note: Refill the external SAS port slot with either another external SAS port or a filler. Filling the empty slot ensures proper air flow for cooling and maintains an optimal electromagnetic interference (EMI) compliance.

Removing the external SAS port from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to remove a failed serial-attached SCSI (SAS) port from the disk drive backplane as part of a service procedure.

Complete the following steps to remove the SAS cable from the external SAS connection port on the server system backplane:

1. Identify the system that you will be working on by turning on the system identify (blue) LED. For instructions, see Control panel LEDs and enabling enclosure indicators.
2. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
3. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 141.
4. Disconnect the power source from the system by unplugging the system. For instructions, see "Disconnecting the power cords from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

   Note: This system can be equipped with a second power supply. Disconnect it before continuing with this procedure. Ensure that the power source to the system has been disconnected.
   (L003)

   or

5. Attach a wrist strap.

   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.

6. Place the system into the service position. For instructions, see "Placing the rack-mounted 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D into the service position" on page 147.

7. Remove the service access cover. For instructions, see "Removing the service access cover from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 145.

8. Disconnect and remove all PCI adapters, to gain access to the external SAS port cable. For instructions, see Removing a PCI adapter from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D.

9. Pull the cable bracket at the blue touch point **(B)** and slide the SAS cable out of the external SAS port opening in the rear of the chassis. See Figure 56 on page 85.

10. Pull out the SAS cable **(C)** from the system.

11. Squeeze the latch on the SAS connector **(A)**, and then pull the cable out of the shroud on the system interposer card.
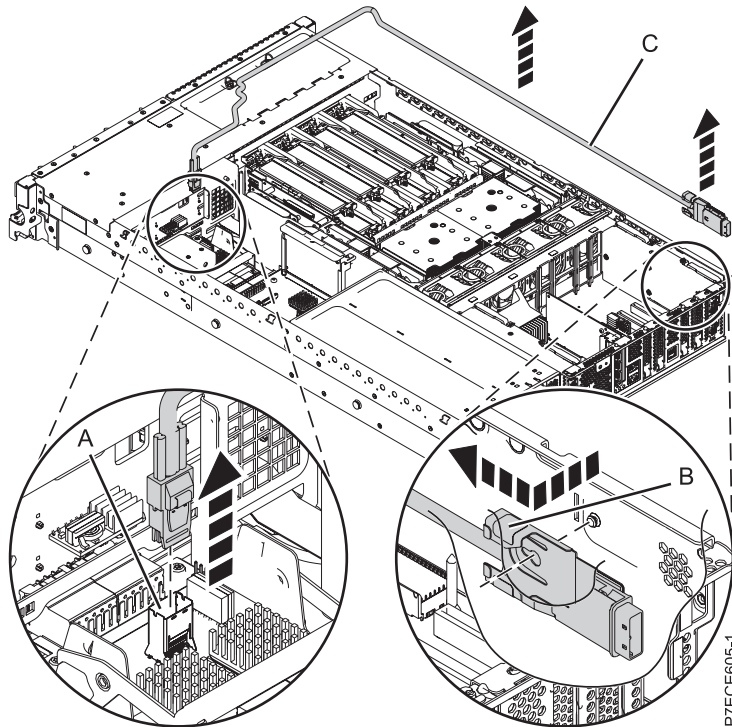
Figure 56. Removing the external SAS port

You can continue with the procedure to replace the SAS port. For instructions, see "Replacing the external SAS port in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 87.

If you are not replacing the SAS port, you can install a filler into the external SAS connection port on the disk drive backplane.

Installing the external SAS port in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to install an external serial-attached SCSI (SAS) port as a part of upgrading your disk drive backplane or to enable internal disk sharing.

If you want to replace a failed SAS port, see "Replacing the external SAS port in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 87.

Complete the following steps to connect the SAS cable to the external SAS connection port on the server system backplane:
1. Identify the system that you will be working on by turning on the system identify (blue) LED. For instructions, see Control panel LEDs and enabling enclosure indicators.
2. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
3. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 141.
4. Disconnect the power source from the system by unplugging the system. For instructions, see "Disconnecting the power cords from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

   Note: This system can be equipped with a second power supply. Disconnect it before continuing with this procedure. Ensure that the power source to the system has been disconnected.
   (L003)

or

5. Attach a wrist strap.

   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.

6. Place the system into the service position. For instructions, see "Placing the rack-mounted 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D into the service position" on page 147.

7. Remove the service access cover. For instructions, see "Removing the service access cover from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 145.

8. Disconnect and remove all PCI adapters, to gain access to the external SAS port cable. For instructions, see Removing a PCI adapter from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D.

9. Remove the filler, if present, from the external SAS connection port on the rear of the system chassis.

10. Connect the mini-SAS connector of the SAS cable to the internal SAS connection port **(C)** on the storage interposer until it snaps in place. See Figure 57 on page 87.

11. Route the cable **(A)** in front of the memory riser cage and along the channel in the side wall until the SAS port connector is near the opening on the rear of the chassis.

12. Align and guide the slot in the bracket of the SAS port connector **(B)** over the guide pin in the chassis. Then slide the SAS port connector into the opening on the rear of the chassis until the tab on the bracket snaps in place.
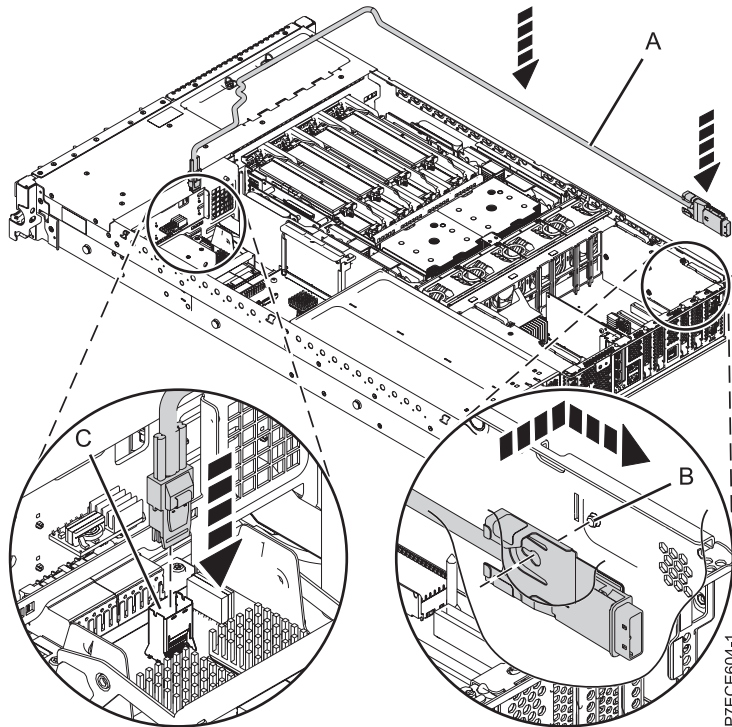
Figure 57. Installing the SAS cable

13. Replace all PCI adapters. For instructions, see Replacing a PCI adapter in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D.

14. Place the system in the operating position. For instructions, see "Placing the rack-mounted 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D into the operating position" on page 148.

15. Replace the service access cover. For instructions, see "Installing the service access cover on the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 146.

16. Connect the power cords to the system. For instructions, see "Connecting the power cords to the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

17. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 139.

18. Verify the installed part:
    - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
    - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.

You can now attach other supported SAS features to the system.

Replacing the external SAS port in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to replace an external serial-attached SCSI (SAS) port as part of a service procedure.

You must have removed the failed external SAS port before you can replace it. Complete this procedure to replace the failed SAS port on the system backplane:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Attach a wrist strap.

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.

3. Connect the mini-SAS connector of the SAS cable to the internal SAS connection port (C) on the storage interposer until it snaps in place. See Figure 58.

4. Route the cable **(A)** in front of the memory riser cage and along the channel in the side wall until the SAS port connector is near the opening on the rear of the chassis.

5. Align and guide the slot in the bracket of the SAS port connector **(B)** over the guide pin in the chassis. Then slide the SAS port connector into the opening on the rear of the chassis until the tab on the bracket snaps in place.
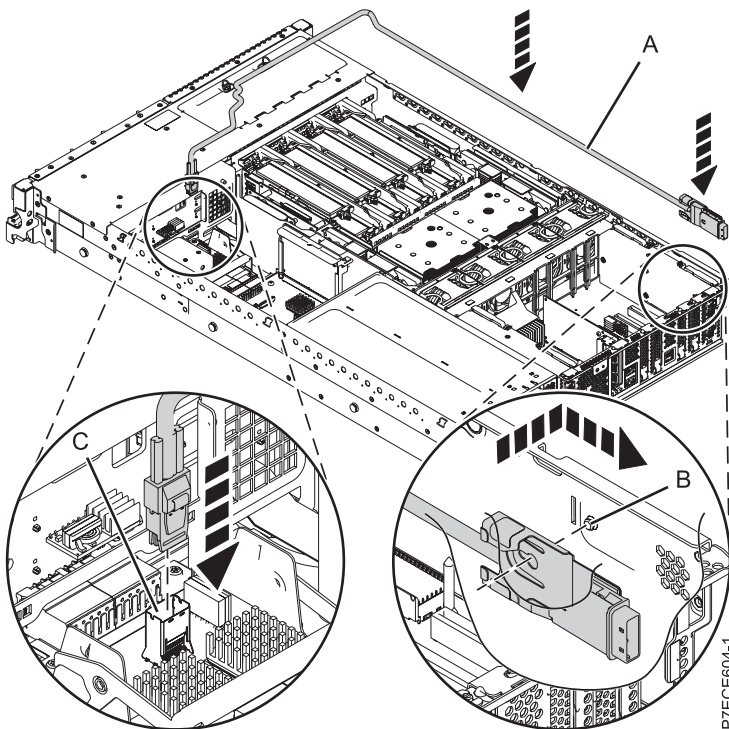
Figure 58. Replacing the SAS cable

6. Replace all PCI adapters. For instructions, see Replacing a PCI adapter in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D.

7. Place the system into the operating position. For instructions, see "Placing the rack-mounted 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D into the operating position" on page 148.

8. Replace the service access cover. For instructions, see "Installing the service access cover on the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 146.

9. Connect the power cords to the system. For instructions, see "Connecting the power cords to the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D" on page 150.

10. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 139.
11. Verify the installed part:
    - If you replaced the part because of a failure, verify the installed part. For instructions, see "Verifying a repair" on page 163.
    - If you installed the part for any other reason, verify the installed part. For instructions, see "Verifying the installed part" on page 151.

You can now attach other supported SAS features to the system.

Removing or installing a disk drive filler

Learn how to remove or install a Small Computer System Interface (SCSI) disk drive filler from a system or an expansion unit.

Note: Refill the disk drive or solid-state drive slots with either another disk drive or solid-state drive or a disk drive filler. Filling the disk drive slot ensures proper air flow for cooling and maintains an optimal electromagnetic interference (EMI) compliance.

Removing a disk drive filler from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to remove a Small Computer System Interface (SCSI) disk drive filler from a server or an expansion unit.

When you are installing a disk drive or solid-state drive in a system or an expansion unit, the slot you want to use can contain a disk drive filler.

To remove the filler before installing a disk drive or solid-state drive in the slot, complete the following steps:
1. Remove the system unit door, expansion unit door, or open the rack front door.
2. Identify the slot that contains the disk drive 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.
3. Hold the filler handle **(A)** and pull out the disk-drive filler from the slot, as shown in Figure 59 on page 90.
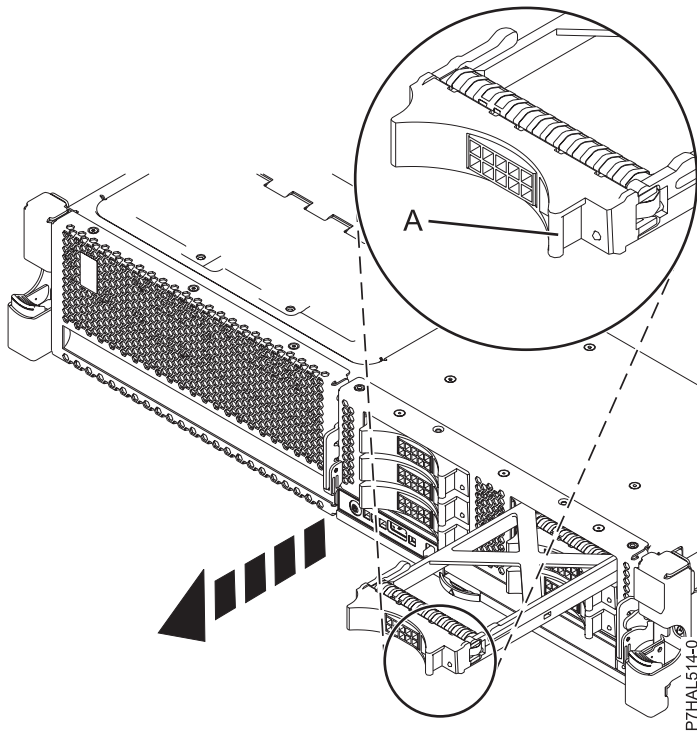
Figure 59. Removing a disk drive filler

Return to the procedure that brought you here.

Installing a disk drive filler in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn how to install a Small Computer System Interface (SCSI) disk drive filler in a system or an expansion unit.

When you remove a disk drive or solid-state drive from a system or an expansion unit, you can install a disk drive filler in the slot if you are not installing a replacement disk drive or solid-state drive.

To install a disk drive filler in a system or an expansion unit, complete the following steps:

1. Hold the disk drive filler by the top and bottom edges as you position the filler, and insert it into the system or the expansion unit.

   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. Slide the disk drive filler all the way into the system or expansion unit, and push the disk drive filler handle **(A)** until it locks, as shown in Figure 60 on page 91.
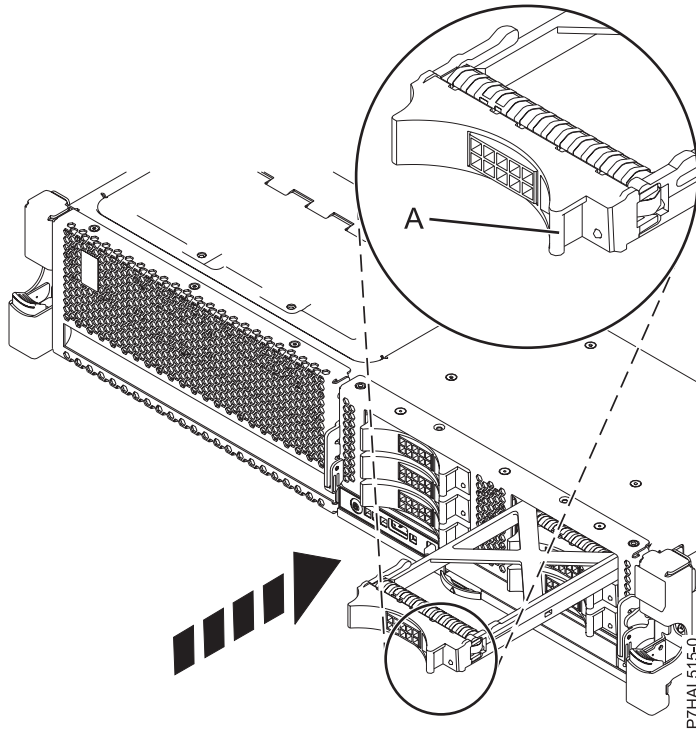
Figure 60. Installing a disk drive filler

Return to the procedure that brought you here.

Disk drive or solid-state drive locations and service indicators

Find out where the disk drives or solid-state drives and service indicators are located on the system, drive enclosure, or an expansion unit.

Learn about the disk drives or solid-state drive locations and location of the service indicators on the system, drive enclosure, or expansion unit.

PCIe RAID and SSD SAS adapter locations

Learn about the PCIe RAID and SSD SAS adapter locations and the location of the service indicators on the PCIe RAID and SSD SAS adapter.

Figure 61 on page 92 shows the PCIe RAID and SSD SAS adapter locations.
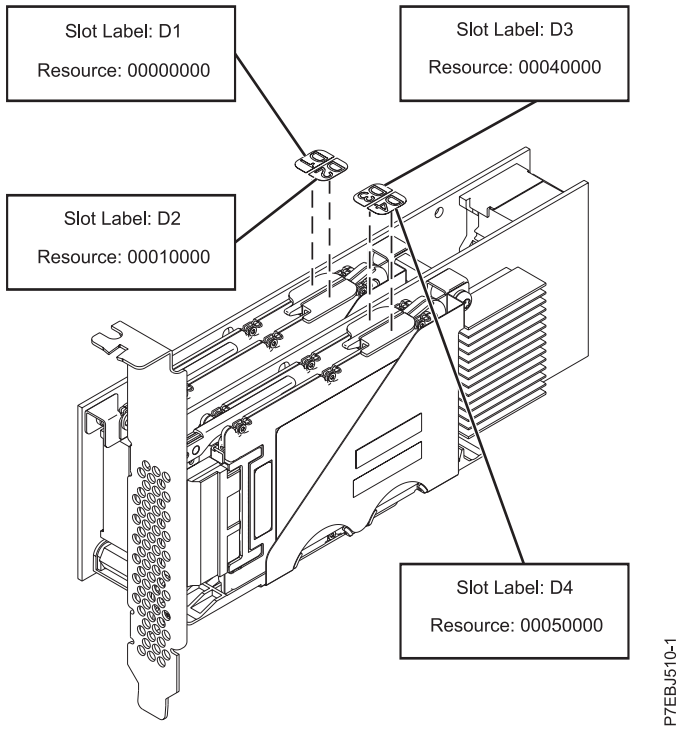
Figure 61. PCIe RAID and SSD SAS adapter locations

Disk drive or solid-state drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Learn about the disk drive locations and the location of the service indicators on the system.

The following figures show the disk drive locations and service indicators for the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D. Service indicators are located above the latch handle on the disk drives.
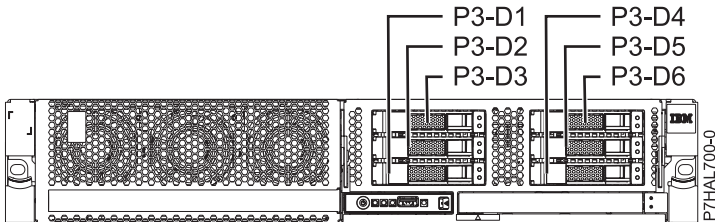
Figure 62. Disk-drive locations for systems with six small-form factor (SFF) bays
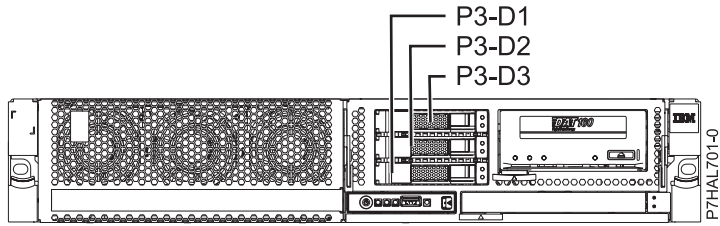
Figure 63. Disk-drive locations for systems with three SFF bays (optional)
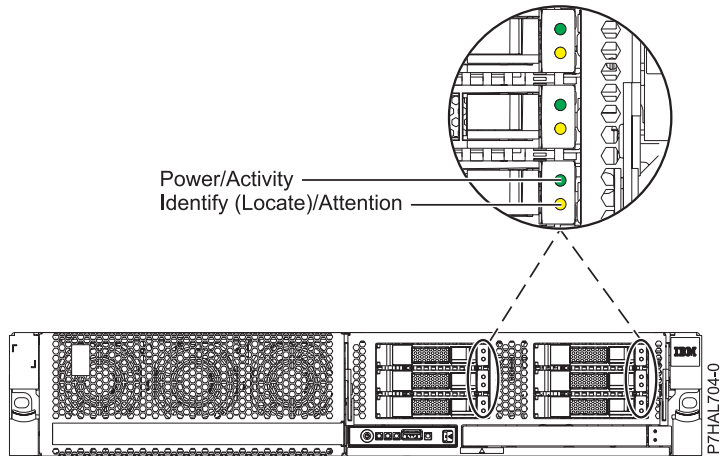
Figure 64. Service indicators locations for systems with six SFF bays
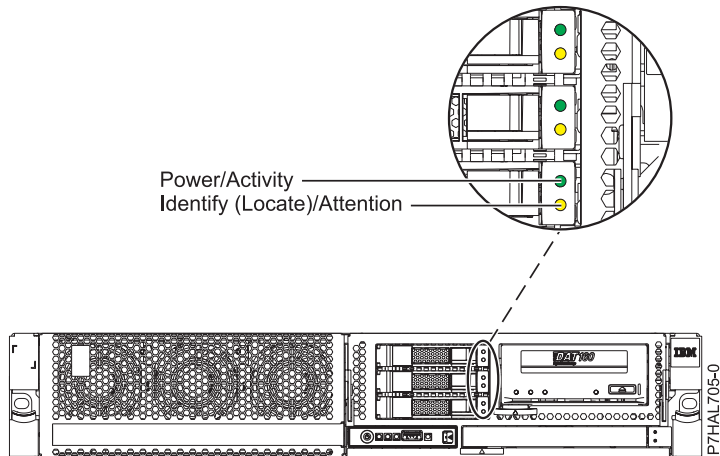
Figure 65. Service indicators locations for systems with three SFF bays (optional)

Disk-drive locations and service indicators for the 5802 expansion unit

Learn about the disk-drive locations and where the service indicators are located for your expansion unit.

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

Service indicators are located at the bottom of the latch handle on each disk drive.
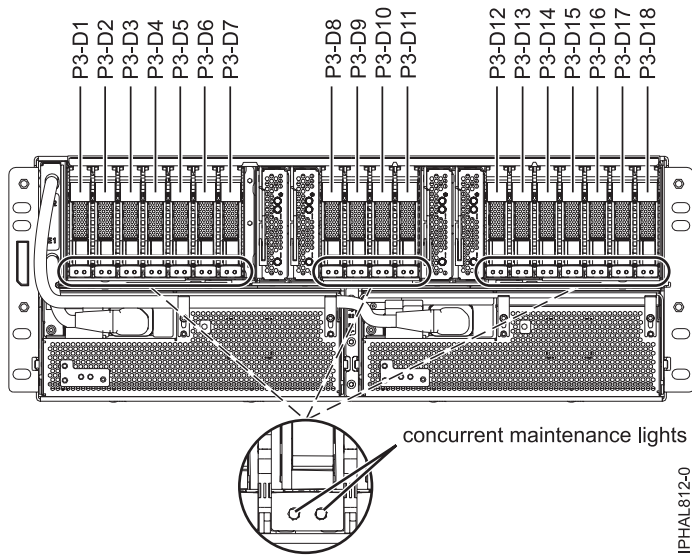
Figure 66. Disk drive locations

Related information:

Cabling the 5802 disk subsystem

Disk drive locations and service indicators for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures

Learn about the disk drive locations and where the service indicators 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 rear of the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures.
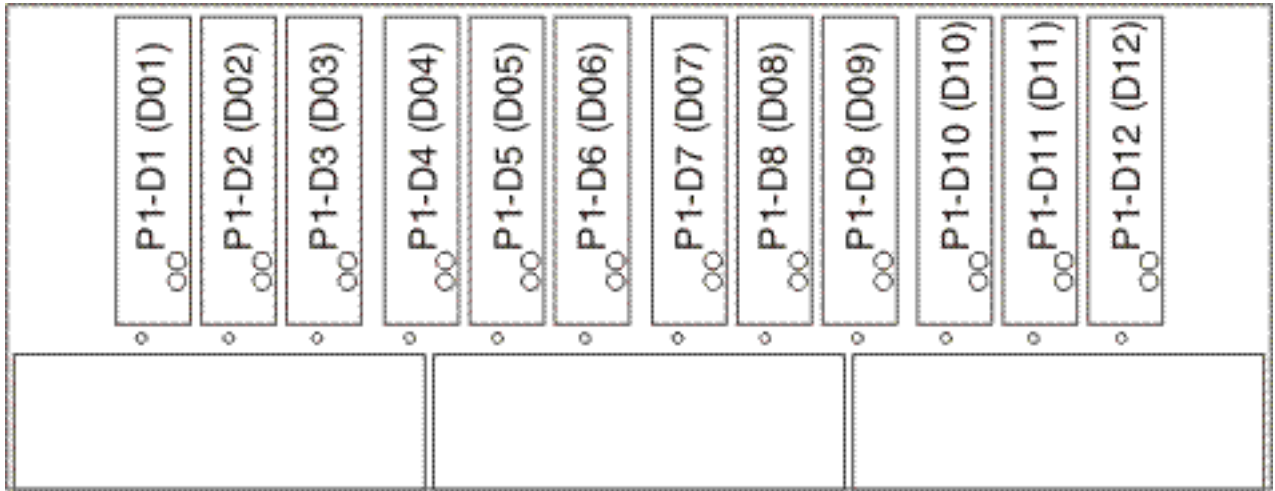
Figure 67. Front view of 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures
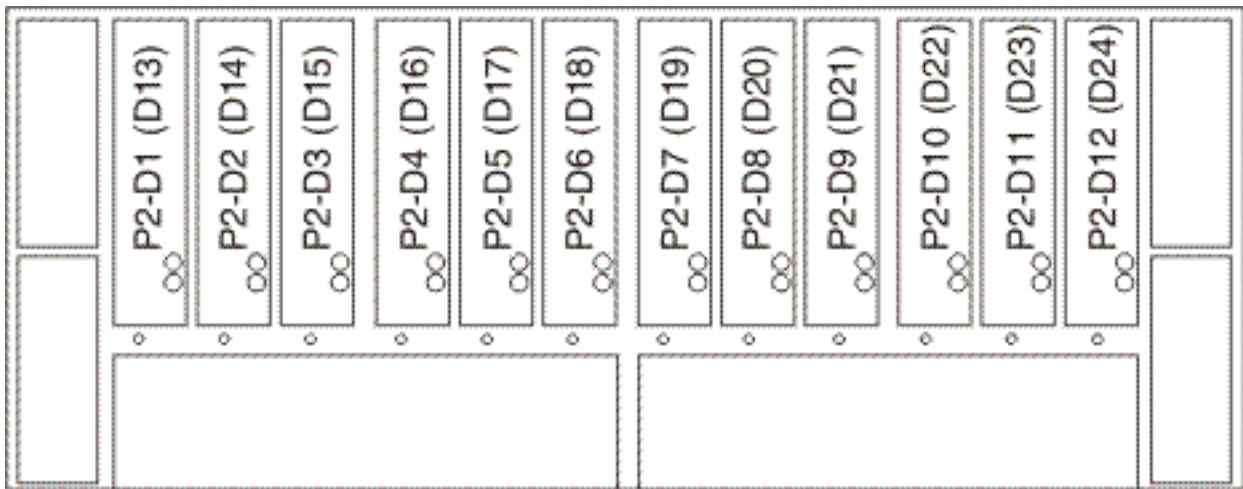
Figure 68. Rear view of 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures

The following figures show the locations of the disk drive service indicators **(A)** for the 5786, 5787, 7031-D24, and 7031-T24 SCSI disk-drive enclosures.
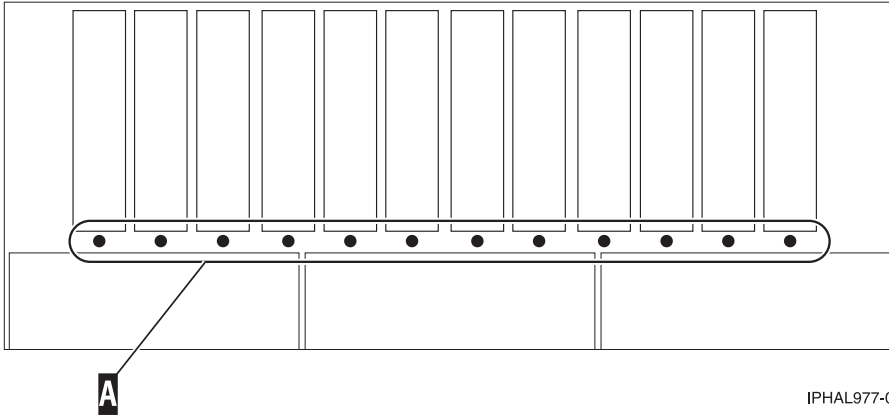
Figure 69. Front view of service indicators for 5786, 5787, 7031-D24, and 7031-T24
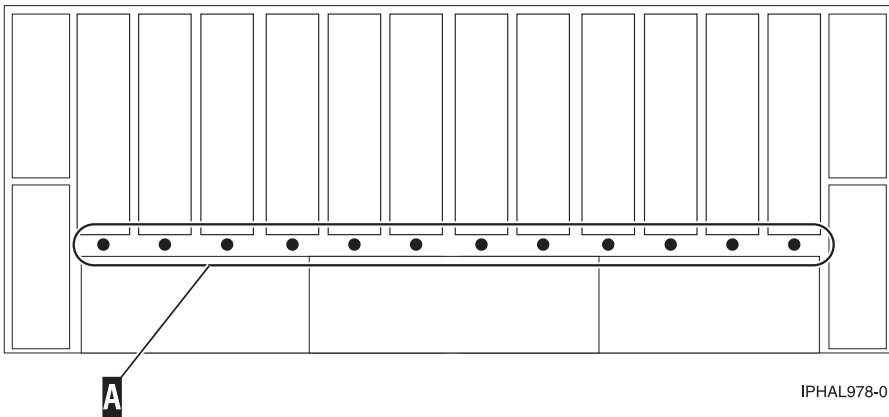
Figure 70. Rear view of service indicators for 5786, 5787, 7031-D24, and 7031-T24

Disk drive locations and service indicators for the 5886 disk drive enclosure

Learn about the disk drive locations and where the service indicators are located for your disk drive enclosure.

The following figure shows the disk drive locations for the 5886 disk drive enclosure.
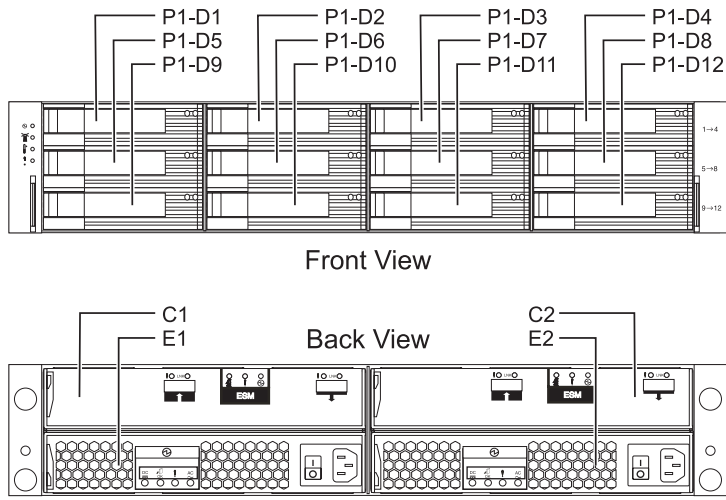
Figure 71. Disk drive locations for the 5886 disk-drive enclosure

The following figure shows the locations of the disk drive service indicators for the 5886 disk-drive enclosure.
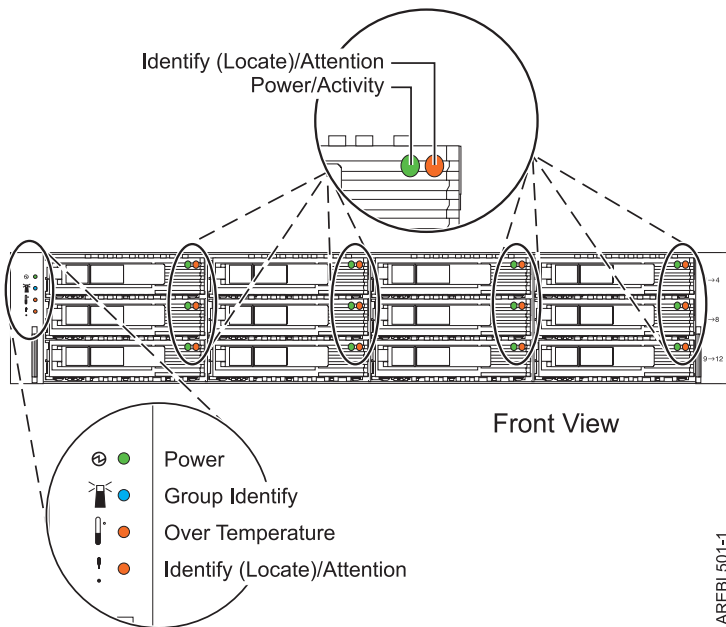
Figure 72. Front view of disk drive enclosure service indicators for the 5886

Disk-drive locations and service indicators for the 5887 disk drive enclosure

Learn about the disk-drive locations and where the service indicators are located for the 5887 disk drive enclosure.

The following figures show the front view and rear view of the 5887 disk drive enclosure and the disk drive locations in the 5887 disk drive enclosure.
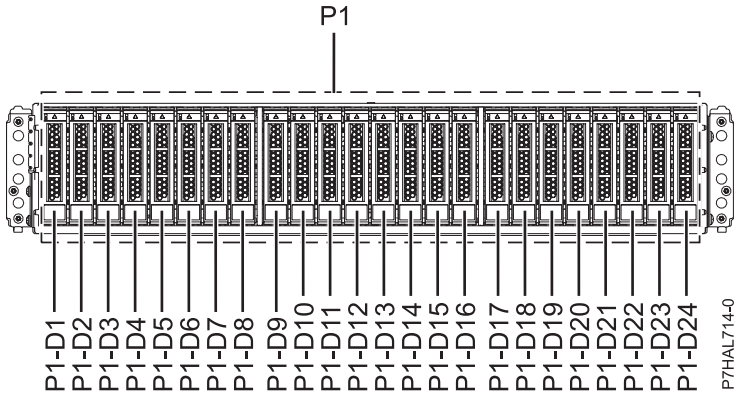
Figure 73. Front view of the 5887 disk drive enclosure showing the disk-drive locations
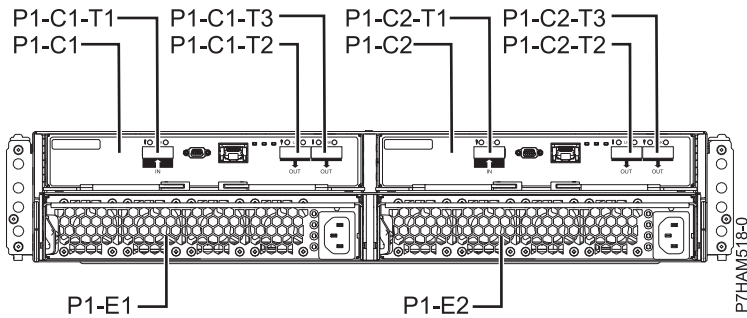
Figure 74. Rear view of the 5887 disk drive enclosure

The following figure shows the locations of the disk-drive service indicators for the 5887 disk drive enclosure.
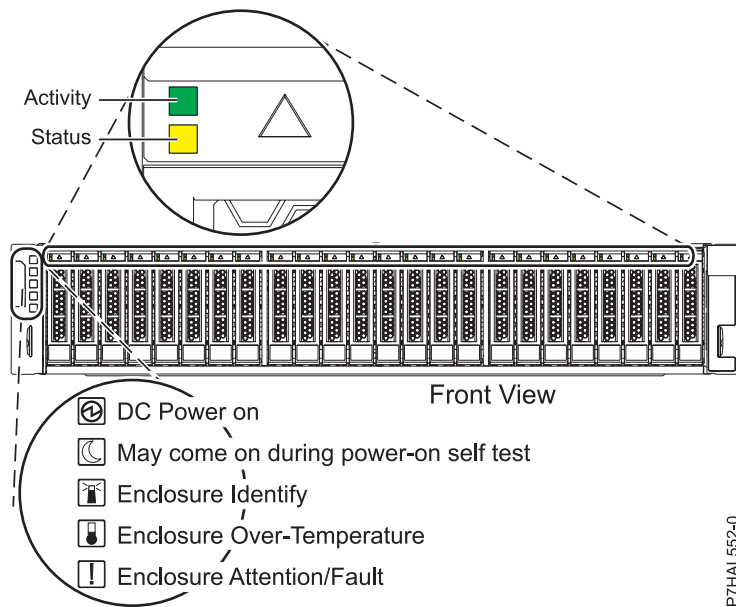
Figure 75. Front view of the 5887 disk drive enclosure showing the service indicators

Solid-state drive locations and service indicators for the 5888 PCIe storage enclosure

Learn about the solid-state drive locations and where the service indicators are located for the 5888 PCIe storage enclosure.

The following figures show the front view and the rear view of the 5888 PCIe storage enclosure and the solid-state drive locations in the 5888 PCIe storage enclosure. P1-D1 to P1-D30 are the location codes for the solid-state drives in the 5888 PCIe storage enclosure.
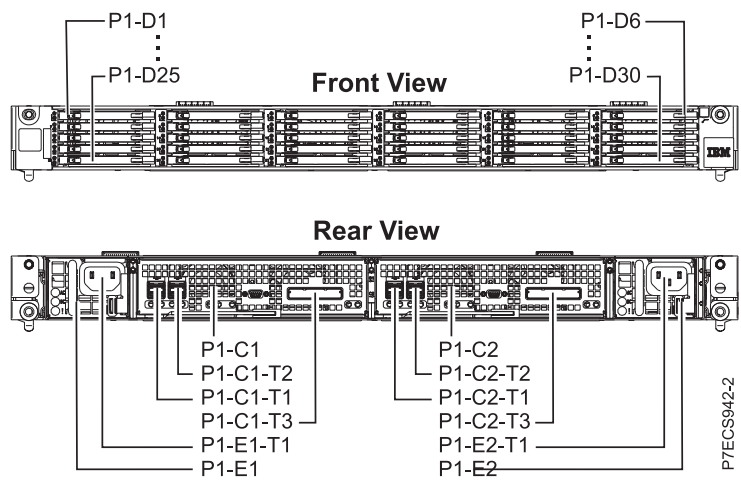
Figure 76. Front view and rear view of the 5888 PCIe storage enclosure showing the solid-state drive locations

The following figure shows the locations of the SSD service indicators for the 5888 PCIe storage enclosure.
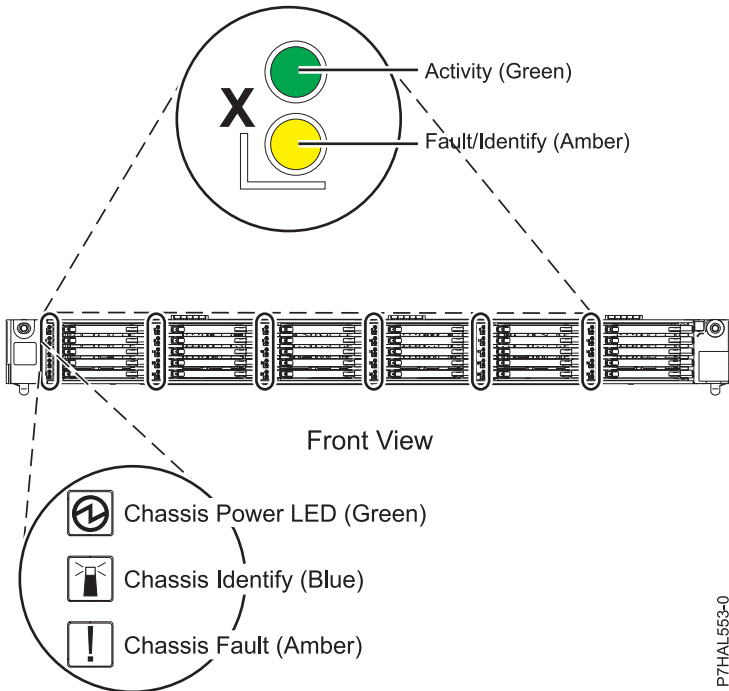
Figure 77. Front view of the 5888 PCIe storage enclosure showing the service indicators

Solid-state drive locations and service indicators for the EDR1 PCIe storage enclosure

Learn about the solid-state drive locations and where the service indicators are located for the EDR1 PCIe storage enclosure.

The following figures show the front view and the rear view of the EDR1 PCIe storage enclosure and the solid-state drive locations in the EDR1 PCIe storage enclosure. P1-D1 to P1-D30 are the location codes for the solid-state drives in the EDR1 PCIe storage enclosure.
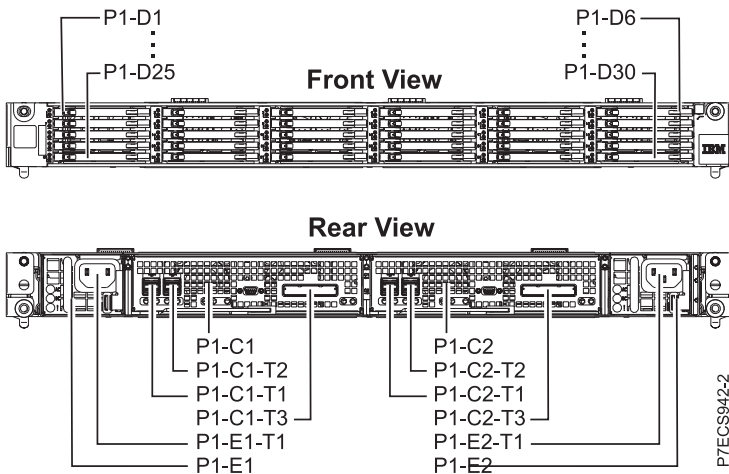
Figure 78. Front view and rear view of the EDR1 PCIe storage enclosure showing the solid-state drive locations

The following figure shows the locations of the SSD service indicators for the EDR1 PCIe storage enclosure.
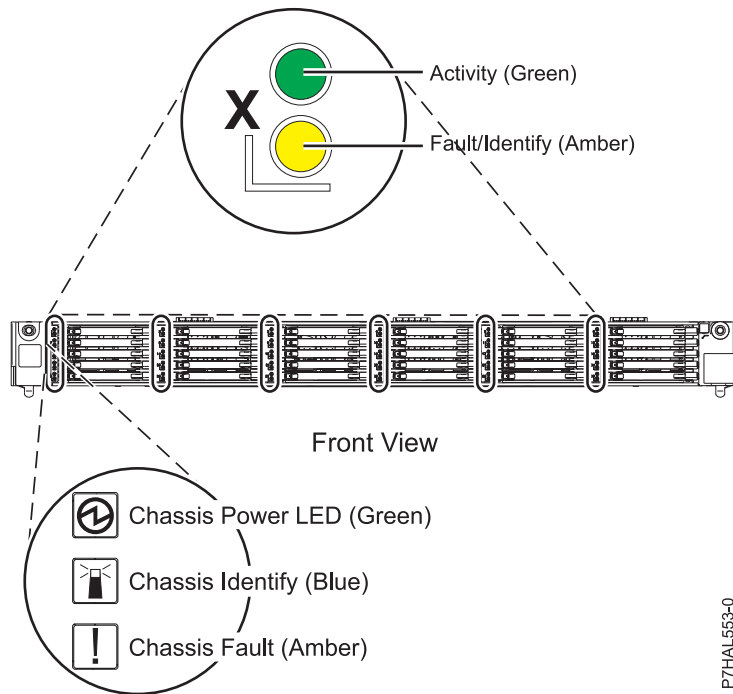
Figure 79. Front view of the EDR1 PCIe storage enclosure showing the service indicators

Related tasks for disk drives or solid-state drives

Find additional information and instructions related to the disk drives or solid-state drives that help you with performing the install, remove, or replace tasks.

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

Configure the newly installed disk drive or solid-state drive for your environment.

If the drive is attached to a PCI-X SCSI RAID controller, see the *PCI-X SCSI RAID Controller Reference Guide for AIX* in the IBM(r) AIX Information Center. If the 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 or solid-state drive from a system or an expansion unit controlled by AIX

Learn the actions you must take to properly remove a disk drive or solid-state drive from a system or an expansion unit controlled by AIX.

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

If the drive is attached to a SAS RAID controller, see SAS RAID controllers for AIX. If the drive is attached to a PCI-X SCSI RAID controller, see the *PCI-X SCSI RAID Controller Reference Guide for AIX* or SAS RAID controllers for AIX topic. If the 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.

Rebuilding data on a replacement disk drive or solid-state drive by using AIX

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

- If the disk drive or solid-state 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.

Preparing to remove a disk drive or solid-state drive in a Linux system

Learn how to prepare the system to remove a disk drive or solid-state drive in a location that is controlled by a system or logical partition that is running Linux.

Preparing 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.

```
                              Kernel Messages Log


Select one of the following:


     1. View most recent ipr error messages

     2. View ipr error messages

     3. View all kernel error messages

     4. View iprconfig error messages

     5. Set root kernel message log directory

     6. Set default editor

     7. Restore defaults

     8. View ipr boot time messages




Selection:


e=Exit
```
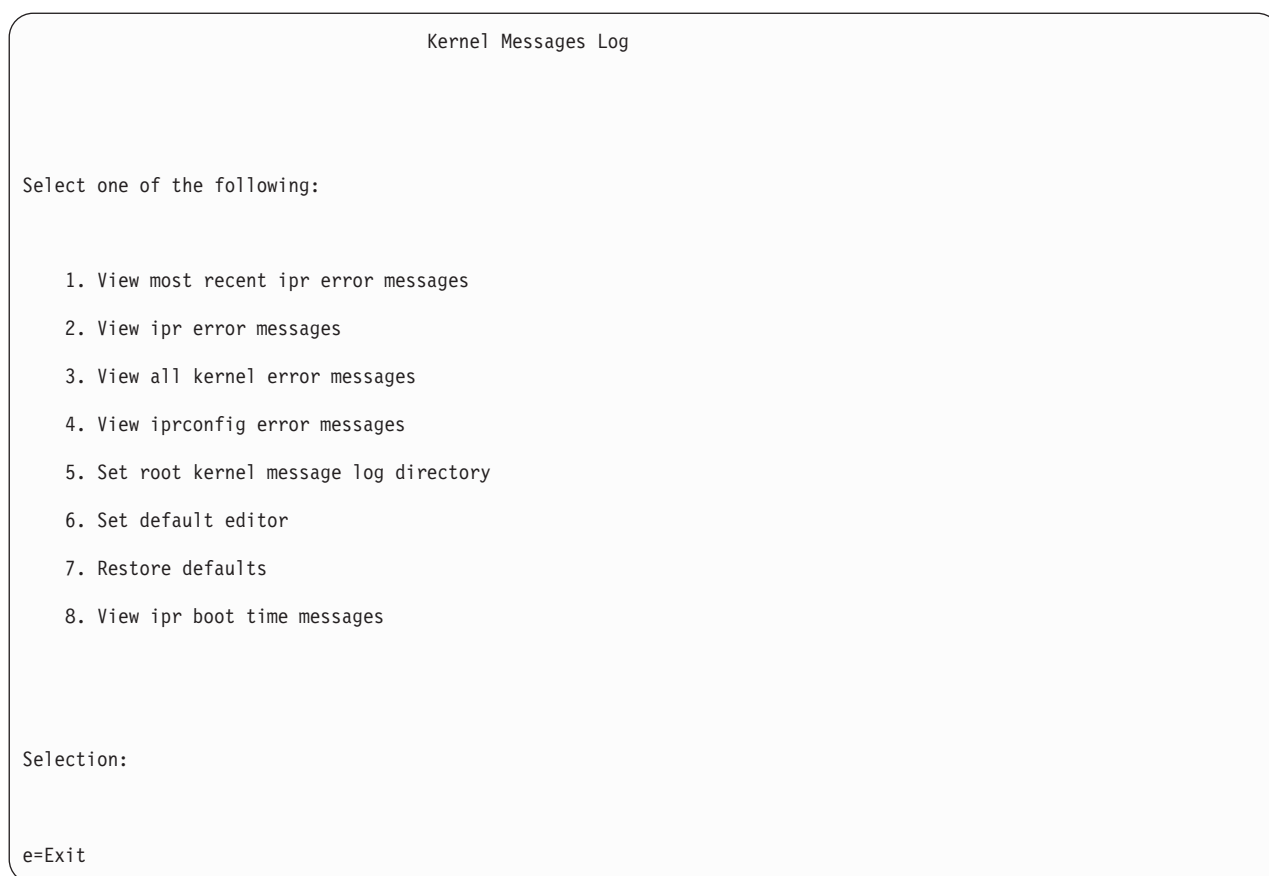
Figure 80. Kernel Messages Log

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 drive you want to replace.
6. Record the location information for the drive.

   Note: The location information is in either of these forms:

   0:0:5:0 In this example, 0 is the SCSI host number, 0 is the SCSI bus, 5 is the SCSI target ID, and 0 is the logical unit number (LUN).

   0/00-0E-02
   In this example, 0 is the SCSI host number, 00 is the I/O adapter (IOA) SAS port, 0E is the expander port, and 02 is the device port.

7. Return to the command line.
8. Type the following command:
   `ls -ld/sys/class/scsi_host/host#`
   Where # is the SCSI host number. Press Enter.
   For example, `ls -ld/sys/class/scsi_host/host0`

   ```
      lrwxrwxrwx. 1 root root 0 Jul 18 16:27 /sys/class/scsi_host/host0

           -> ../../devices/pci0000:01/0000:01:00.0/host0/scsi_host/host0

           0000:01:00.0 is PCI location information.
   ```

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

--- ------ -------------------------- ------------------------ ----------------

         0000:01:00.0/0:             PCI-E SAS RAID Adapter    Operational

         0000:01:00.0/0:0:0:0        Advanced Function SSD     Active

         0000:01:00.0/0:0:1:0        Advanced Function SSD     Active

         0000:01:00.0/0:0:2:0        Advanced Function SSD     Active

         0000:01:00.0/0:0:3:0        Advanced Function SSD     Active

         0000:01:00.0/0:0:4:0        Advanced Function SSD     Active

         0000:01:00.0/0:0:5:0        Advanced Function SSD     Failed

         0000:01:00.0/0:0:6:0        Advanced Function SSD     Active

         0000:01:00.0/0:0:8:0        Enclosure                Active

         0000:01:00.0/0:0:9:0        Enclosure                Active

         0001:01:00.0/1:             PCI-E SAS RAID Adapter    Operational

         0001:01:00.0/1:0:3:0        Advanced Function SSD     Remote

         0001:01:00.0/1:0:4:0        Advanced Function SSD     Remote

         0001:01:00.0/1:0:5:0        Advanced Function SSD     Remote

                                     More...

e=Exit   q=Cancel   r=Refresh   t=Toggle   f=PageDn   b=PageUp
```

Figure 81. Example Display Hardware Status

12. Look for the drive at the PCI location you recorded. The drive might have a Failed status.

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

For PCI-X controller information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*. This guide is available from the SCSI PCI Adapters web page.

For SAS RAID controller information, see the SAS RAID controllers for Linux topic.

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

The Disk Unit Hardware Resource Information Details is displayed like the shown in the following sample.

```
                 Disk Unit Hardware Resource Information Details



Manufacturer . . . . . . . . . . . . . : IBM

Product ID . . . . . . . . . . . . . . : SG9XCA2E200GEIBM

Firmware Version . . . . . . . . . . . : 53433436 (SC46)

Serial Number. . . . . . . . . . . . . : 50B0042M

Capacity . . . . . . . . . . . . . . . : 177.80 GB


Physical location

PCI Address. . . . . . . . . . . . . . : 0000:01:00.0

Resource Path. . . . . . . . . . . . . : 00-0E-02

SCSI Host Number . . . . . . . . . . . : 0

SCSI Channel . . . . . . . . . . . . . : 0

SCSI Id. . . . . . . . . . . . . . . . : 5

SCSI Lun . . . . . . . . . . . . . . . : 0

Platform Location. . . . . . . . . . . : U5887.001.Z065075-P1-D3


Extended Details

                                                       More...

Press Enter to Continue


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

Figure 82. Example Disk Unit Hardware Resource Information Details display

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

Rebuilding data on a replacement disk drive or solid-state drive in a system or logical partition running Linux

You can rebuild data on the replacement drive that was replaced because of a failed disk drive or solid-state drive or as a new installation.

If a hot-spare drive was available and protected the disk array throughout the drive failure, you can configure the newly installed 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.

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

For an unprotected disk drive

If the 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, complete 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.

Rebuilding data by using the iprconfig command

If a hot-spare rebuild was not initiated by the controller, you must initiate a rebuild on the newly installed drive. To initiate the rebuild, complete the following procedure using the iprconfig command.

For a disk drive in a RAID Level 5 or RAID Level 10 disk array

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 83. Example Rebuild Disk Unit Data display

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

   Note: Completing a rebuild on a drive overwrites the data currently on the 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
```
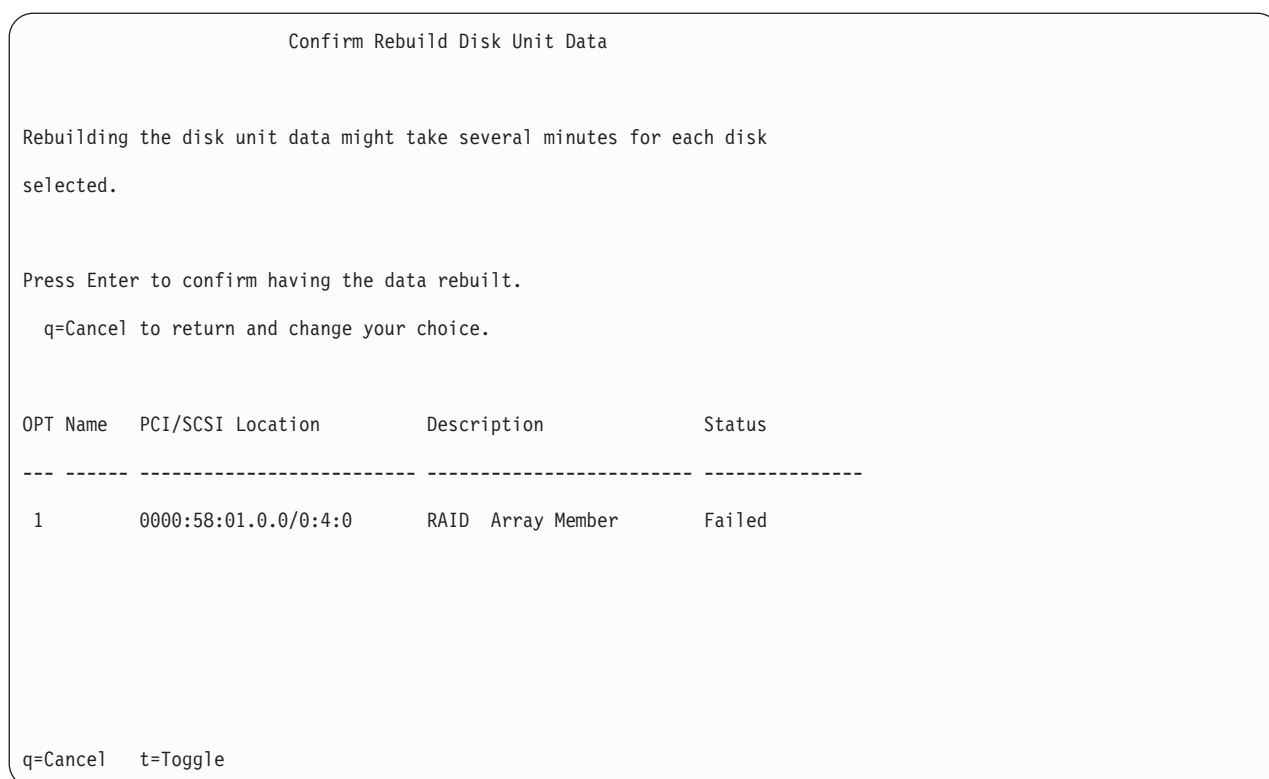
Figure 84. Example Confirm Rebuild Disk Unit Data display

6. To confirm that you want to rebuild the data on the 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.

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

Learn the actions you must take to properly remove a disk drive or solid-state drive.

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

1. Determine the protection status of the drive that you are replacing. For instructions, see "Determining the IBM i disk drive or solid-state drive protection status" on page 108.

2. **For mirrored disk drives** on an IBM i system or logical partition, follow these steps to verify that the 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 drive that is mirrored to the drive that you are replacing (same drive number) have a status of Active?

      • **No**: The replacement must be done by a service provider.

- **Yes**: Does the 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 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 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 or solid-state drive protection status

To determine the protection status of the 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 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 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 drive has mirrored protection, record the status of both drives in the mirrored pair. You need this information in the recovery procedure.

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

   A drive with one of the following statuses has device parity protection only if all other drives in the array are operational:
   - DPY/Active
   - DPY/Failed
   - DPY/HDW Failure
   - DPY/Degraded
   - DPY/Power Loss
   - DPY/Not Ready
   - DPY/Unknown

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

   Examples:

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

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

Configuring a disk drive or solid-state drive in an IBM i system or logical partition

To configure a newly installed 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 website 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 drive that you installed is listed. The serial number must match the serial number you recorded (the last four digits).

   Note: The new drive might take up to five minutes to appear in the list. If the drive is not listed, ensure that the 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 drive to an existing device parity set?
   - **Yes**: Continue with the next step.
   - **No**: Go to step 23 on page 110 for mirroring or no protection. For hot spare, go to 29 on page 111.

   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 110.
13. The following conditions must be met before you can start device parity protection.
    - If there are enough 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 drives in a parity set must be the same capacity with a minimum number of three or four drives and maximum of 10 or 18 drives in the resulting parity set, depending on the drive type.

- Not all drives attached to an advanced function input/output processor have reported to the system. Repeat the operation.
- The type or model of the 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 1 in the Option column. Press Enter.
16. Press Enter to confirm your choice. The configuration starts and might take 30 - 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 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 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.

       Go to IBM i Information Center website (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 displays showing the configuration your system must 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 takes 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 must 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 completing this task, return to the procedure that sent you here.

a. Return to the procedure that sent you here.

29. Complete the following steps for hot spare:

a. Select **Work with hot spare protection** from the **Work with disk configuration** menu.

b. 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 wanted.

Configuring a disk drive or solid-state drive on a load source adapter for hot spare by using the IBM i operating system

To start hot spare protection on your load source adapter you must determine the status of the drive in the load source slot and configure or exchange that drive, which might require you to turn off the power to 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 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 or solid-state drive in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D with the IBM i system or logical partition power turned on" on page 72.

   • Yes: Continue to the next step.

   Restriction: There must be a 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 drive. The next steps will have you change the drive in the desired slot if needed.
   Attention: If the drive acting as hot spare for the load source is of smaller capacity you can suffer data loss.

4. Determine whether a non-configured 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 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 drive to be installed or exchanged with the drive in the load source slot by doing the following:

   a. Select a 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 drive.

   b. Select a non-configured 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 drive.

6. Stop the system if it is running. For instructions on stopping the system, see Stopping the system or logical partition.

7. Exchange the drives from the two locations you recorded in step 5 on page 111 by removing both drives and placing them into the other drives slot.
8. Start the system. For instructions, see Starting the system or logical partition
9. Return to the procedure that sent you here and continue with the next step in that procedure.

Rebuilding data on a replacement disk drive or solid-state drive by using IBM i

Learn how to rebuild data on replacement disks.

To rebuild data on the replacement 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 drive you replaced had **device parity protection (RAID)**, follow these steps to restore device parity protection (RAID) on the drive:
   a. Select **Rebuild disk unit data** on the Work with Disk unit recovery display. Press Enter.
   b. Select 1 to rebuild the drive displayed (the drive displayed is the 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 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 drive that you are exchanging (suspended drive) on the Select Configured Unit to Replace display. Press Enter.
   c. Select the 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 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.

Replacing a SAS conduit card in a 5802 expansion unit with the power turned off

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

Complete the following steps to replace a conduit card:

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 141.
3. 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)
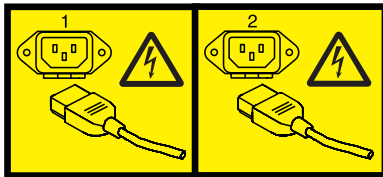
   or

4. Complete the following steps to replace the midplane and SAS conduit card into the system:
   a. Place the card connector **(C)** on the midplane connection **(D)** using the guide track **(B)** to ensure a good connection.
   b. Lift the handle **(A)** to seat and secure the SAS conduit card to the midplane as shown in Figure 85 on page 114.
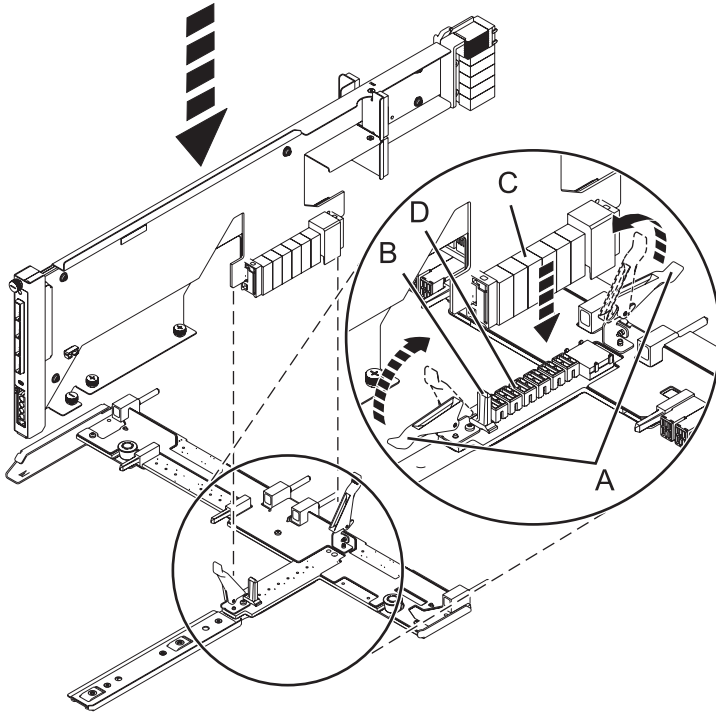
Figure 85. Installing the SAS conduit card into the midplane

5. Complete the following steps to replace the midplane and SAS conduit card into the system:

   a. Align the midplane with the track and ensure that 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.
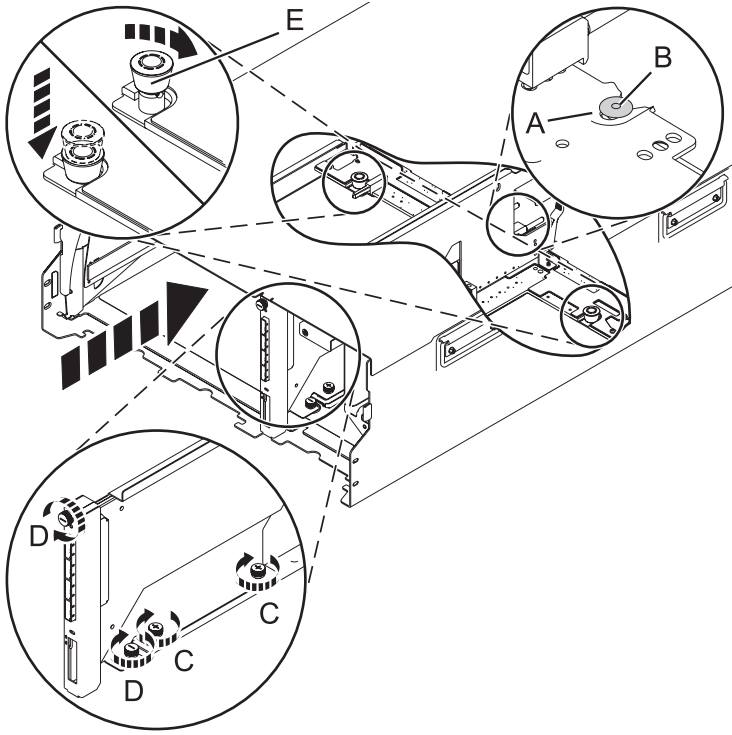
Figure 86. Installing the SAS conduit card and the midplane

6. Attach the power cord cover and secure the thumbscrew **(A)** to the system.
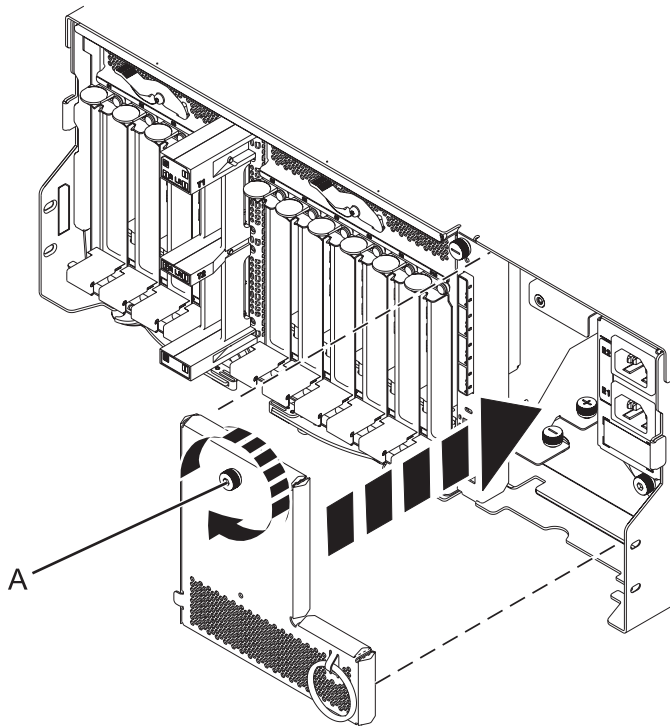
Figure 87. Installing the power cord plate

7. Carefully slide the enclosure management controller into the system and close the latch **(A)** as shown in Figure 88.
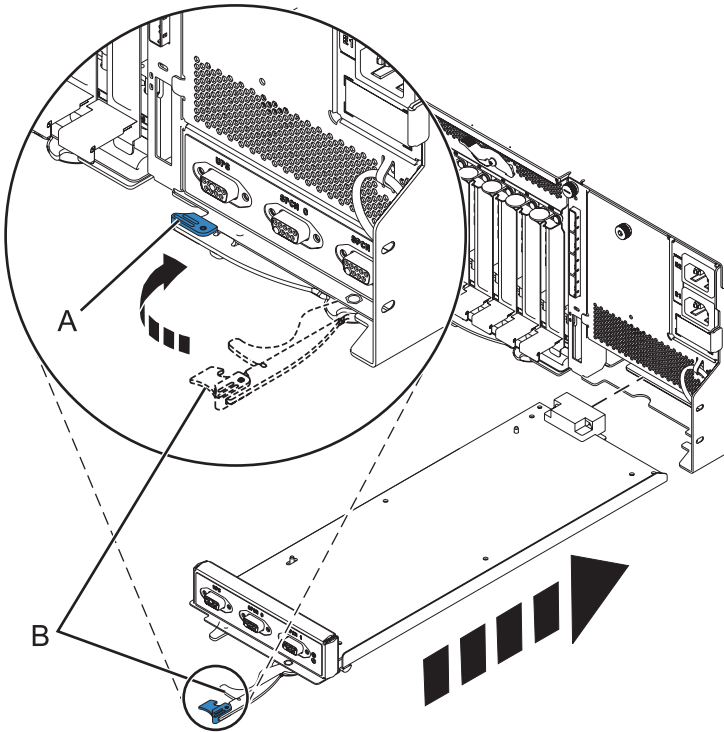
Figure 88. Replacing the enclosure management controller

8. Carefully lift and align the I/O system board with the slot at the rear of the expansion unit.
9. Insert the I/O system board firmly into the server, as shown in Figure 89 on page 117.
10. Secure the I/O system board with the locking tabs **(A)**, as shown in Figure 89 on page 117.
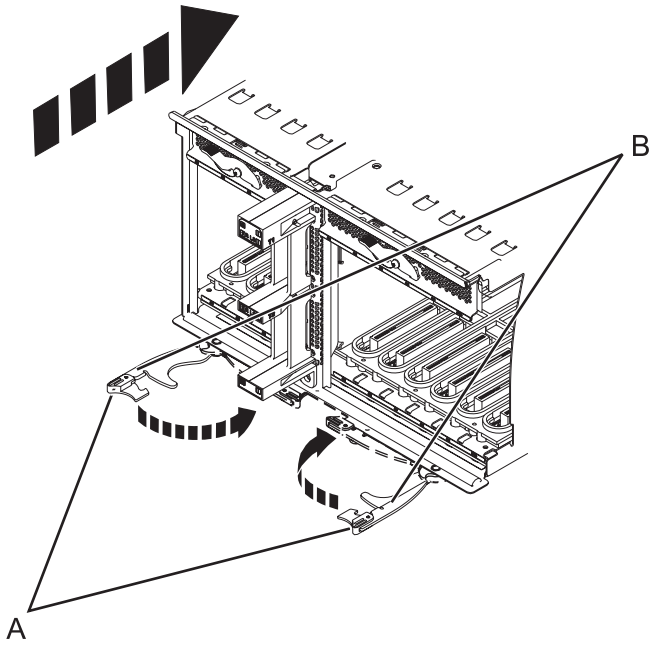
Figure 89. Install the I/O system board on a rack-mounted model

11. 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 Figure 90 on page 118.
12. Close the locking handle **(A)** until the power supply locks into position.
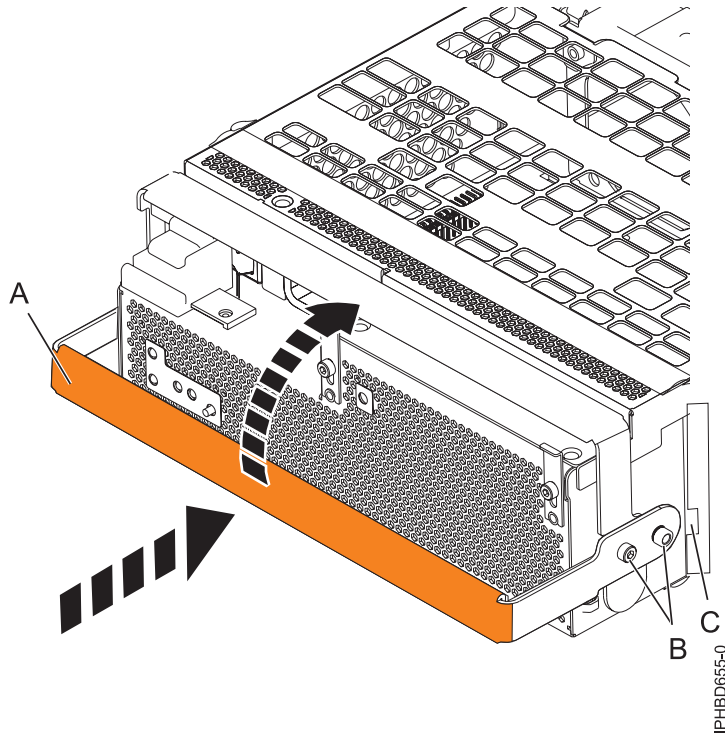
Figure 90. Replacing a power supply

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

    CAUTION:
    The backplane can be heavy to lift. Ensure that you can safely complete this task before you begin.

14. Using your hand to support the bottom of the backplane, slide it into the expansion unit as shown in Figure 91 on page 119.

15. Secure the backplane in place by moving the locking tabs from the open position **(B)** to the locked position **(A)**.
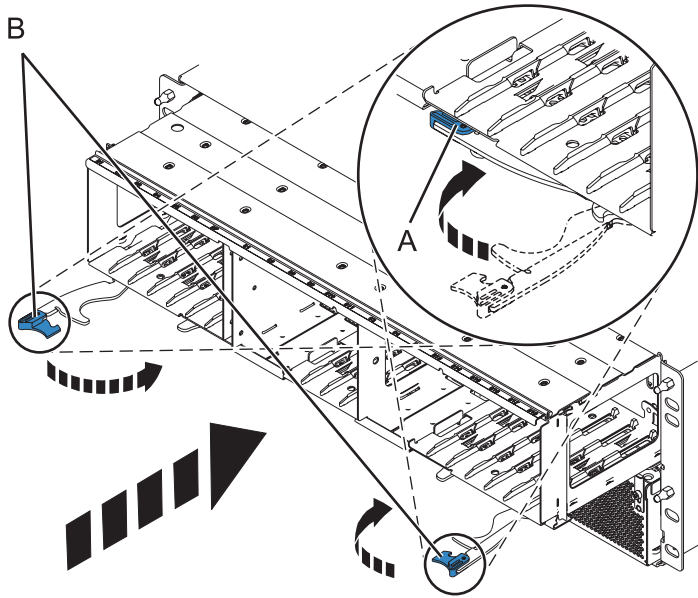
Figure 91. Installing the backplane on a rack-mounted model

16. Replace all disk drive units and fillers, if you had 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.
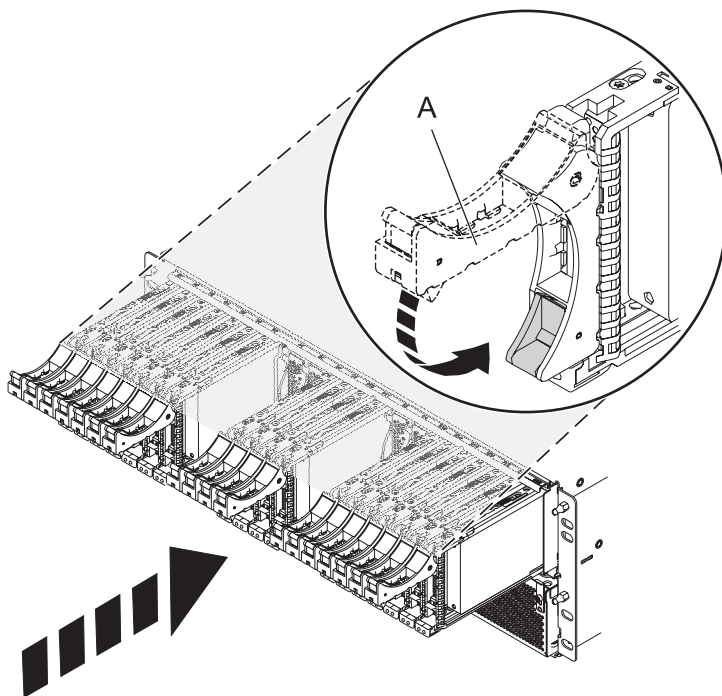
17. Replace all expander cards and fillers, if you had removed them earlier.
   a. Supporting the bottom of the expander card with your hand, align it with the guide rails in the backplane.
   b. Slide the expander card all the way into the backplane.
   c. Push the handle **(A)** toward the card to lock it into place.
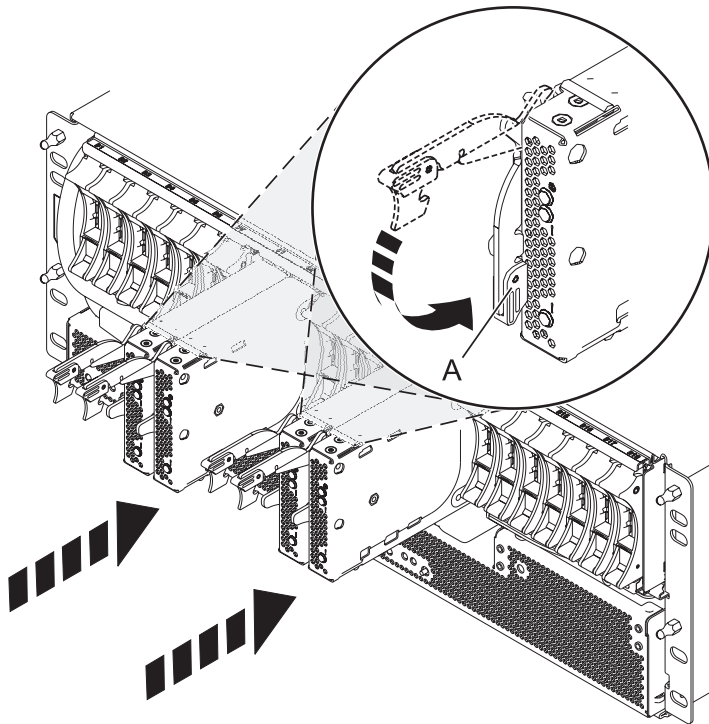
18. Start the system. For instructions, see Starting the system or logical partition.

Continue with any other service actions you are required to complete.

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

Removing a SAS conduit card from a 5802 expansion unit with the power turned off

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

Complete the following steps to remove a SAS conduit card from a 5802 rack-mounted expansion unit:
1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Identify the card you want to remove. For information, see "Identifying a part" on page 133.
3. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 141.
4. Remove the drives and fillers as shown in Figure 92 on page 121.
   a. Squeeze the latch of the drive and pull the handle **(A)** toward you to release the drive.
   b. Support the bottom of the drive with your hand and slide the drive out of the backplane.
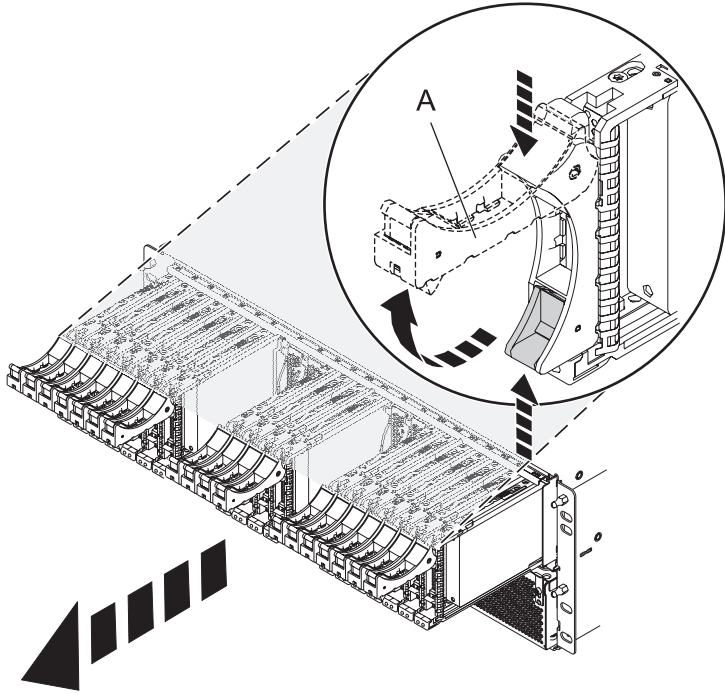
Figure 92. Removing the drives from the backplane

5. Remove the port cards and fillers as shown in Figure 93 on page 122.
   a. Hold 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 the port card out of the backplane.
   c. Place the port card on an electrostatic discharge (ESD) surface.
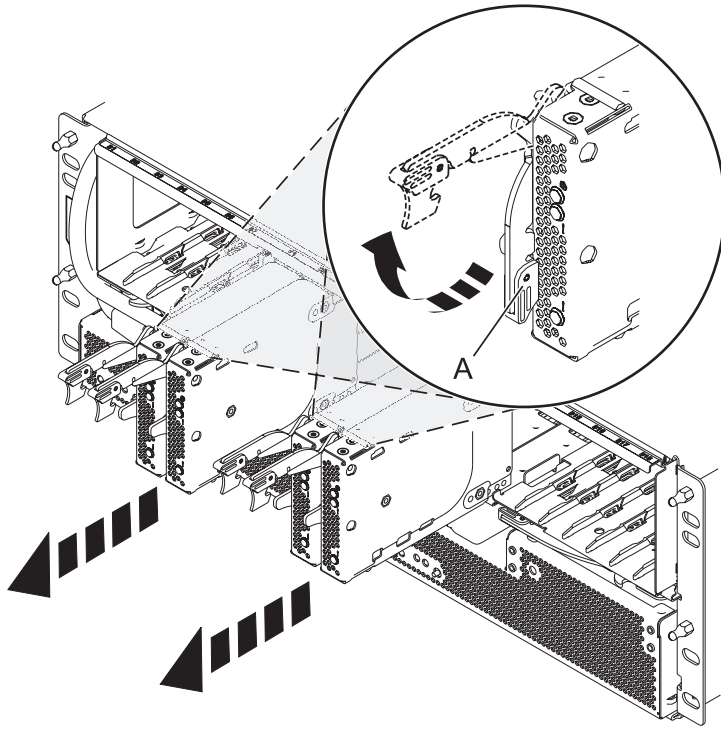
Figure 93. Removing the port card from the backplane

6. Remove the backplane as shown in Figure 94 on page 123.

   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 and use your hand to support the bottom of the backplane.
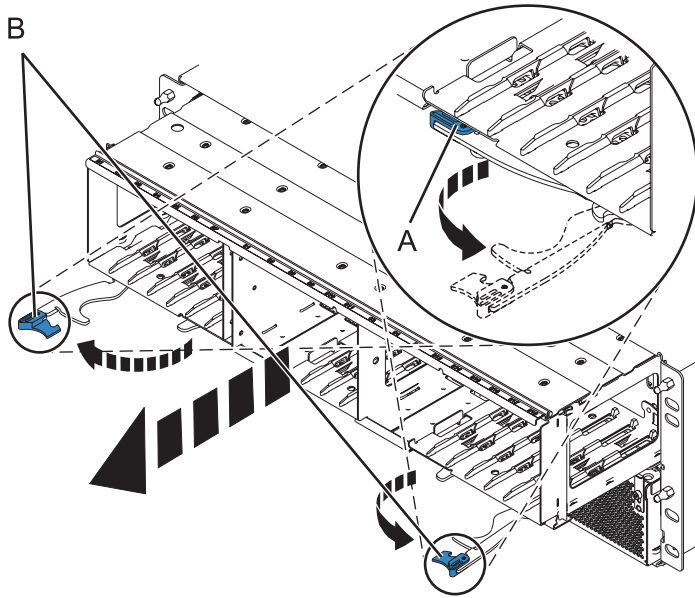
Figure 94. Removing the backplane from the enclosure

7. Disconnect both the offline converter assembly (OCA) power cords by completing the following steps:

   a. Slide the power cord holders **(A)** to the left, located on the front of both the OCAs. See Figure 95 on page 124.

   b. Label and disconnect both the OCA power cords **(B)** from each OCA.
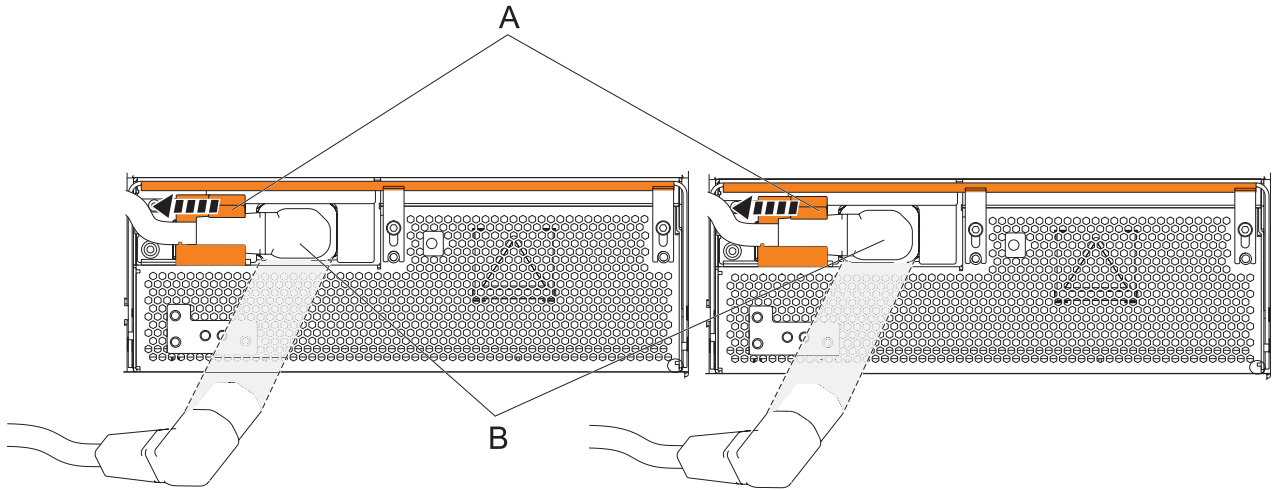
Figure 95. Disconnecting the OCA power cords

8. Remove the offline converter assemblies by completing the following steps:
   a. Pull the OCA handle **(A)** all the way down in the direction shown to unseat the OCA. See Figure 96 on page 125.
   b. Hold both sides of the OCA and pull it out of the enclosure.

      Note: Use both the hands to support the OCA as you pull it out of the enclosure.
   c. Repeat these steps to remove both OCAs.
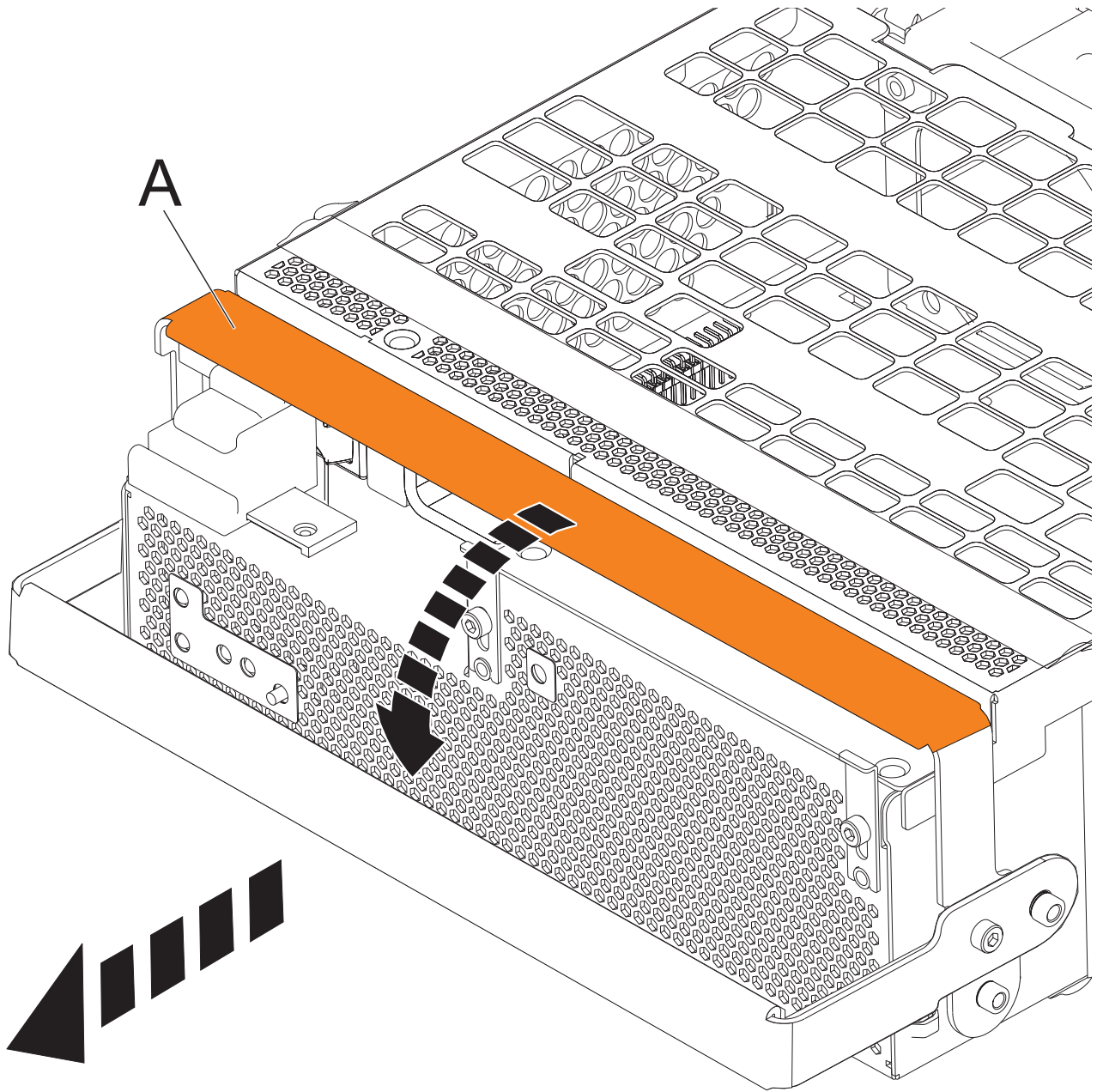
Figure 96. Remove the offline converter assemblies

9. Remove the enclosure management controller by completing 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)**. See Figure 97 on page 126.
   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.
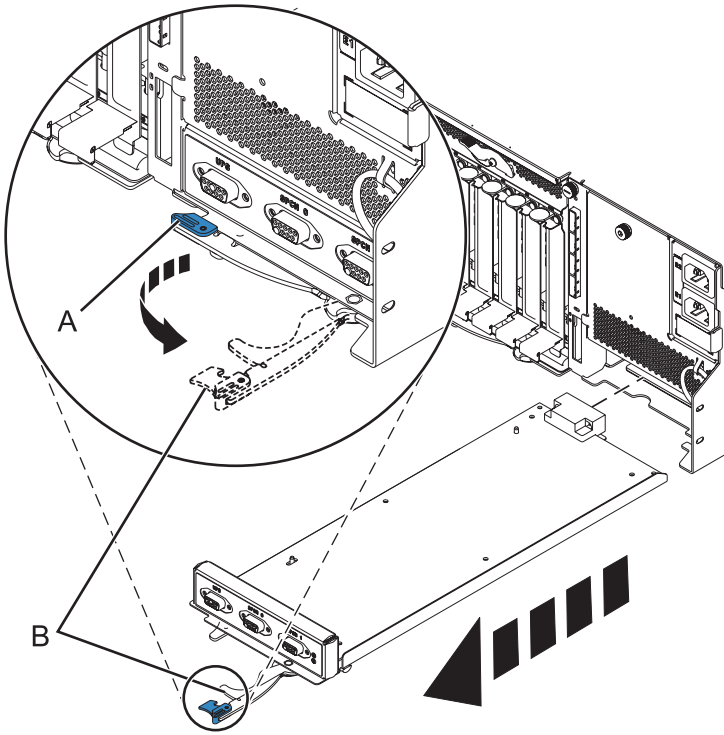
Figure 97. Remove the enclosure management controller

10. Remove the power cord plate by turning the thumbscrew **(A)** and pulling the plate away from the system, as shown in Figure 98.
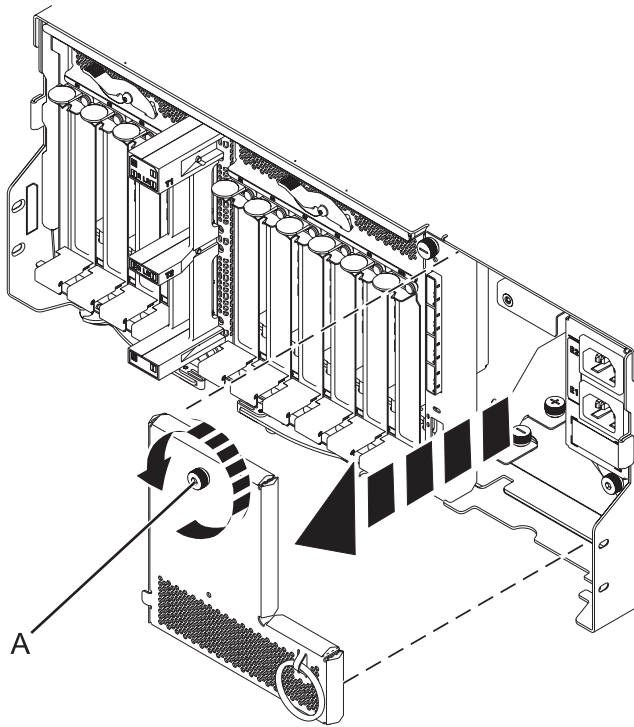
Figure 98. Removing the power cord plate

11. Disconnect the cables from the back of the I/O system board.

12. Squeeze the release latches **(A)** and pull the levers **(B)** out away from the system, as shown in Figure 99.
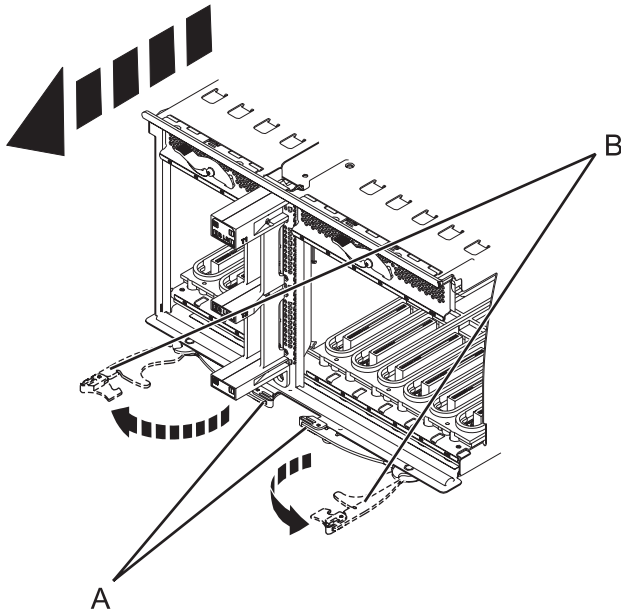
Figure 99. Removing the I/O system board

13. Slide the system board 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.
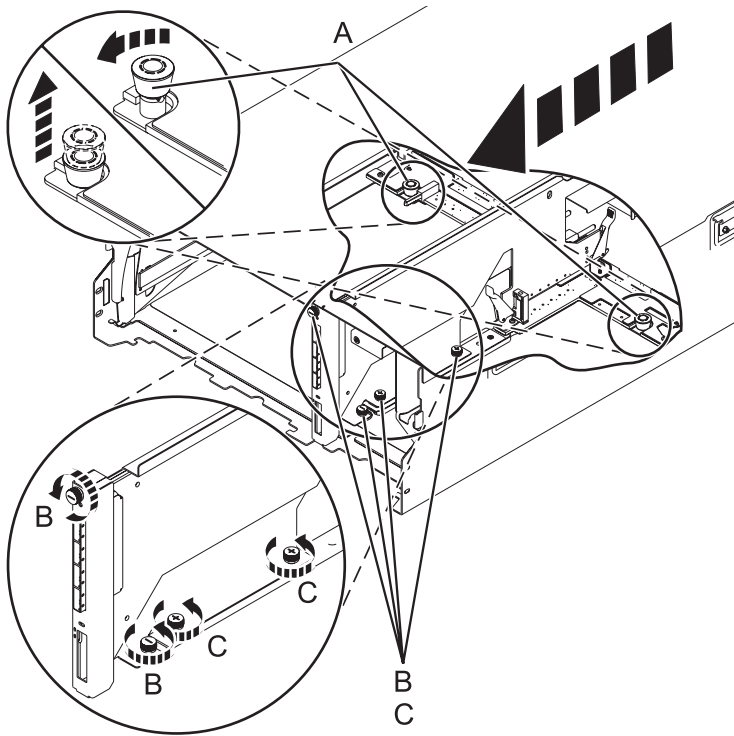
Figure 100. Removing the SAS conduit card and midplane

15. Push the handles **(A)** on the conduit card down to disengage the card from the midplane, and remove the card.
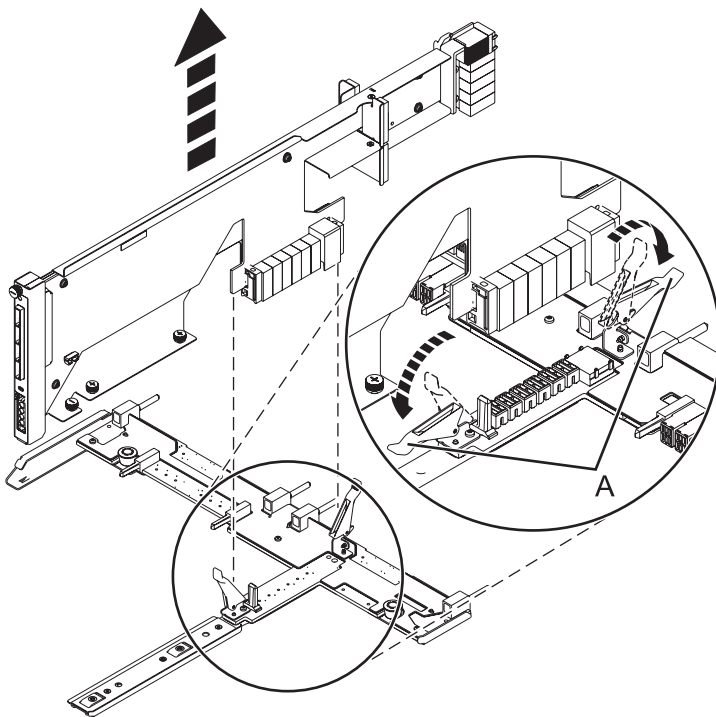
Figure 101. Removing the SAS conduit card from the midplane

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

Replacing a SAS expander card in a 5802 expansion unit with the power turned off

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

Review the requirements in Before you begin.

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.
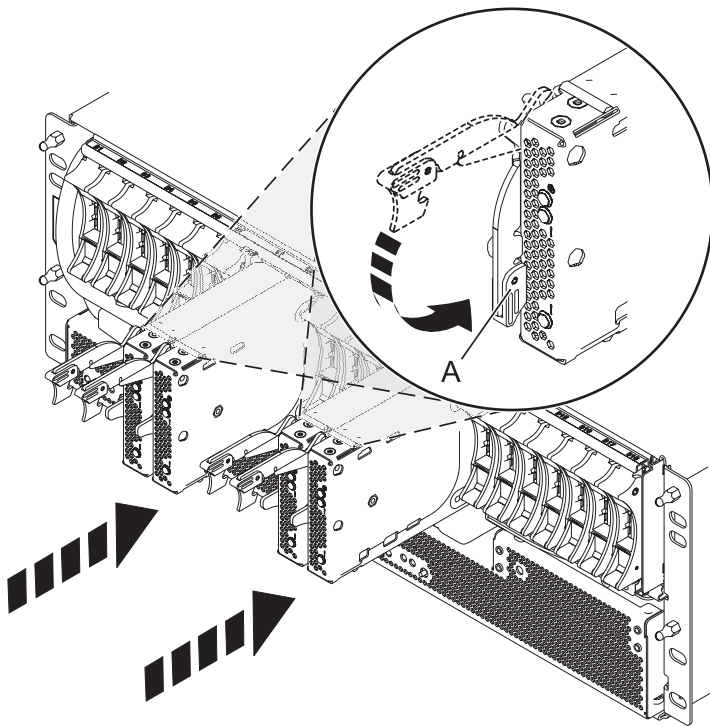
Figure 102. Installing the SAS expander card

3. Start the system. For instructions see, Starting the system or logical partition.
4. Verify the presence of the newly installed card. For instructions, see Verifying the installed part.

Continue with any other service actions you need to perform.

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

1. Complete the prerequisite tasks. For instructions, see "Before you begin" on page 131.
2. Identify the card you are going to remove. For information, see "Identifying a part" on page 133.
3. Lift the handle **(A)** and pull the card out of the system, as shown in the following figure.
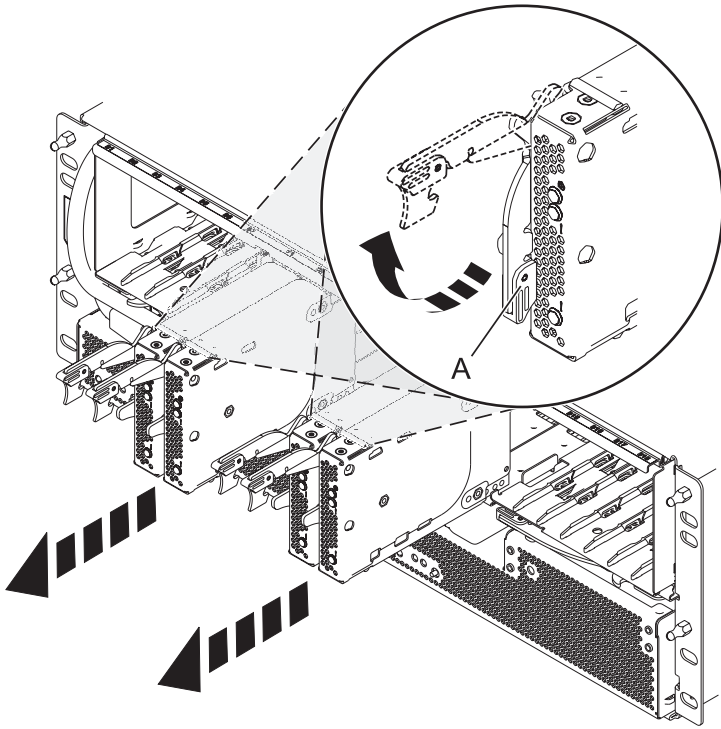
Figure 103. Removing the SAS expander card.

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

Common procedures for installable features

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

Before you begin

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

These precautions are intended to create a safe environment to service your system and do not provide steps for servicing your system. The installation, removal, and replacement procedures provide the step-by-step processes required to service your system.

DANGER

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

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:
- **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. See 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 website to locate your service and support telephone numbers:

   http://www.ibm.com/planetwide

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

8. 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 part

Use these instructions to learn how to identify the location of a failed part, the location of a part to be removed, or the location to install a new 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 the location of a part that you are removing, servicing, or installing.

The combination identify and fault LED (amber color) shows the location of a field replaceable unit (FRU). When removing a FRU, first verify whether you are working on the correct FRU by using the identify function in the management console or other user interface. When removing a FRU by using the hardware management console, the identify function is activated and deactivated automatically at the correct times.

The identify function causes the amber LED to flash. When you turn off the identify function, the LED returns to the state it was previously. For parts that have a blue service button, the identify function sets LED information for the service button so that when the button is pressed, the correct LEDs on that part flash.

If you need to use the identify function, use the following procedures.

Control panel LEDs

Use this information as a guide to the control panel LEDs and buttons.

The control panel has LEDs that indicate various system status.
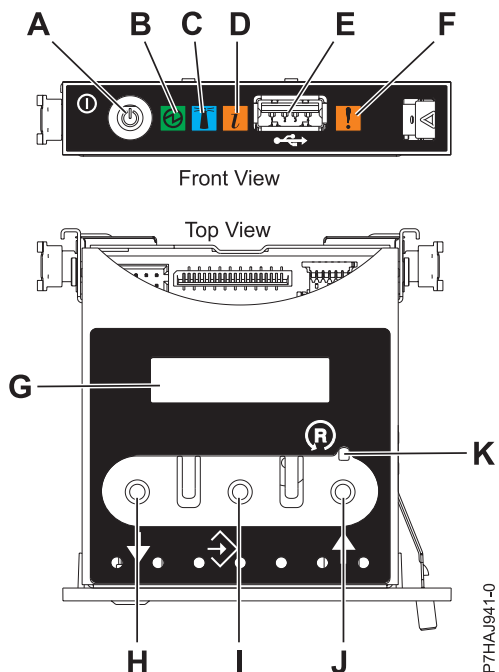
Figure 104. Control panel

- **A**: Power-on button
- **B**: Power LED
  - A constant light indicates full system power to the unit.
  - A flashing 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 flashing to solid. During the transition period, the LED might flash 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**: System information light
  - No light indicates that the system is operating normally.
  - Light on indicates that the system requires attention.
- **E**: USB port
- **F**: Enclosure fault roll-up light
  - A constant light indicates a fault in the system unit.
  - 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

Related concepts:

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.

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. See "Activating the indicator light for the failing part."

Activating the indicator light for the failing part

Use these instructions to help physically identify the location of a part you are servicing.

To activate the indicator light for a failing part, complete the following 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.
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, complete the following 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 and 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 and 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 PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

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.

Related information:

➡ Service and productivity tools for PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

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.

Related information:

➦ Service and productivity tools for PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

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.

Related information:

➦ Service and productivity tools for PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

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.

To locate the failing part, follow these steps:

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

You can use Virtual I/O Server (VIOS) tools to physically locate a part.

To turn on the indicator light for identifying a part, follow these steps:

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** 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.

Starting the system or logical partition

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

Starting a system that is not managed by an HMC or an SDMC

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

To start a system that is not managed by a HMC or SDMC, 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 LED, as shown in the following figure, is slowly flashing.
   - The top of the display, as shown in the following figure, shows 01 V=F.
3. Press the power button **(A)**, as shown in the following figure, on the control panel.
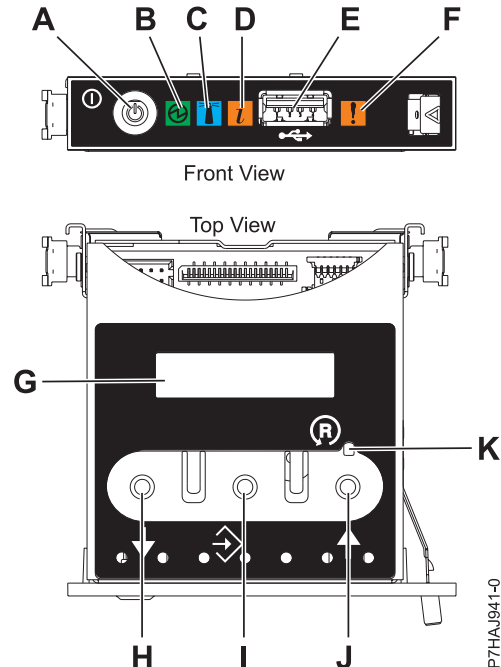
Figure 105. Control panel

- **A**: Power-on button
- **B**: Power LED
  - A constant light indicates full system power to the unit.
  - A flashing 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 flashing to solid. During the transition period, the LED might flash faster.

- **C**: Enclosure identify light
  - A constant light indicates the identify state for the enclosure or for a resource within the enclosure.
  - No light indicates that no resources in the enclosure are being identified.
- **D**: Attention light
  - No light indicates that the system is operating normally.
  - A solid light indicates that the system requires attention.
- **E**: USB port
- **F**: Enclosure fault roll-up light
  - A constant light indicates a fault indicator active 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 aspects after pressing the power button:
   - The power-on light begins to flash faster.
   - The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
   - Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops flashing and remains on, indicating that the system power is on.

Tip: If pressing the power button does not start the system, do the following steps to start the system by using the Advanced System Management Interface (ASMI):

1. Access the ASMI. For instructions, see Accessing the ASMI without an HMC.
2. Start the system by using the ASMI. For instructions, see Powering the system on and off.

Starting a system or logical partition by using the HMC

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

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.

Starting a system or virtual server by using the SDMC

You can use the IBM Systems Director Management Console (SDMC) to start the system or virtual server after the required cables are installed and the power cables are connected to a power source.

For instructions on working with the SDMC, see Managing and configuring the SDMC. For instructions on starting a virtual server, see Managing virtual servers. For instructions on shutting down and restarting virtual servers, see Shutting down and restarting virtual servers.

Progress indicators, also known as checkpoints, display on the control panel while the system is being started. When the power-on light on the control panel stops flashing 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.

Stopping a system that is not managed by an HMC or an SDMC

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

Before you stop the system, follow these steps:
1. 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 by using an alternate method.

The following procedure describes how to stop a system that is not managed by the HMC or the SDMC.
1. Log in to the system as a user with the authority to run the **shutdown** or **pwrdwnsys** (Power Down System) command.
2. At the command line, enter one of the following commands:
   - If your system is running the AIX operating system, type **shutdown**.
   - If your system is running the Linux operating system, type `shutdown -h now`.
   - If your system is running the IBM i operating system, type PWRDWNSYS. If your system is partitioned, use the PWRDWNSYS command to power down each of the secondary partitions. Then, use the PWRDWNSYS command to power down the primary partition.

   The command stops the operating system. The system power turns off, the power-on light begins to slowly flash, and the system goes into a standby state.
3. At the Linux command line, type `shutdown -h now`.

   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.
4. 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.
5. Set the power switches of any devices connected to the system to off.

6. Unplug any power cables that are attached to the peripheral devices, such as printers and expansion units.

   Important: The system may be equipped with a second power supply. Before continuing with this procedure, ensure that all power sources to the system have been disconnected.
   (L003)
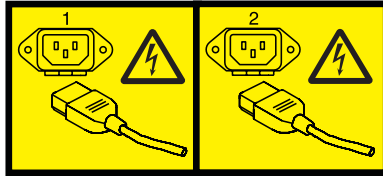
   or

Stopping a system by using the HMC

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

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

Attention: 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

Use the following steps to stop the system by using the HMC:

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** > **Operations** > **Power Off**.
5. Select the appropriate power-off mode and click **OK**.

Related information:

Shutting down and restarting logical partitions

Stopping a system by using the SDMC

You can use the IBM Systems Director Management Console (SDMC) to stop the system or a virtual server.

By default, the managed system is set to power off automatically when you shut down the last running virtual server on the managed system. If you set the managed system properties on the SDMC 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 virtual servers on the managed system before powering off the managed system. Powering off the managed system without shutting down the virtual servers first causes the virtual servers 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 with 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

Use the following steps to stop the system by using the SDMC.

1. In the Power Systems Resource area, select the managed system you want to power off.
2. From the **Actions** menu, select **Operations** > **Power Off**.
3. Select the appropriate power-off mode and click **OK**.

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 from 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.
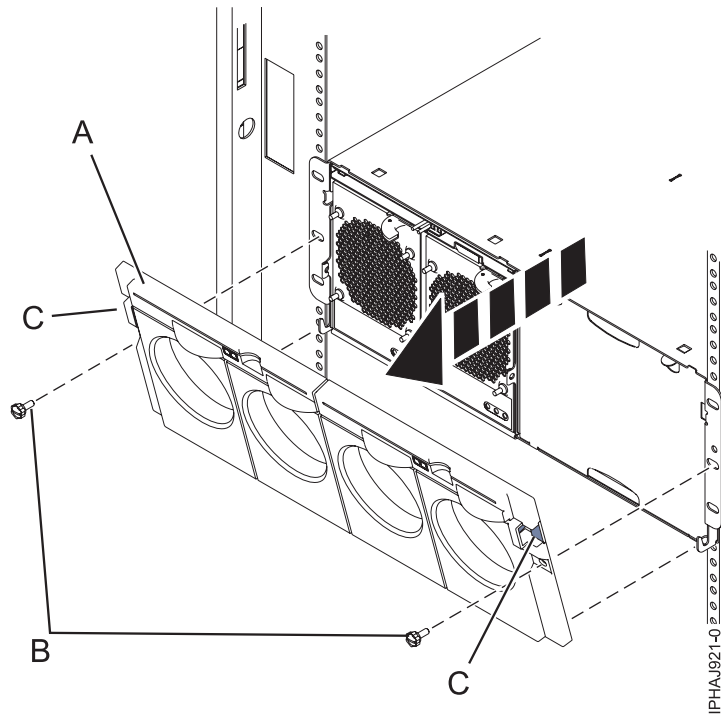
Figure 106. Remove the front cover for model 7314-G30 or 5796

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.
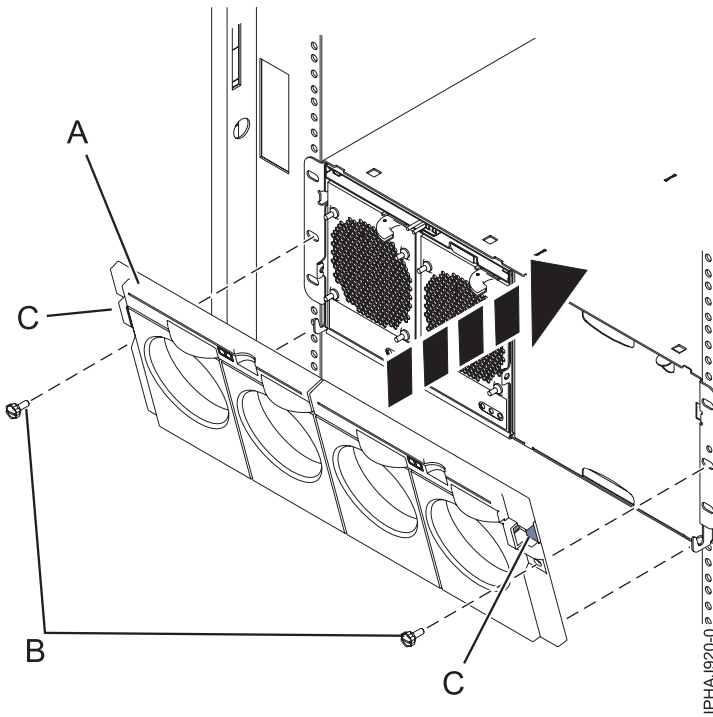
Figure 107. Front cover on a model 7314-G30 or 5796

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 on the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system

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

Removing the service access cover from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Use this procedure to remove the service access cover.

Perform the following steps to remove the service access cover:

1. Loosen the thumbscrew **(A)** located at the rear of the cover.
2. Slide the cover **(B)** toward the rear of the system. When the front of the service access cover has cleared the upper frame ledge, lift the cover up and off the system.

   Attention: When the service access cover is removed, the system powers down.
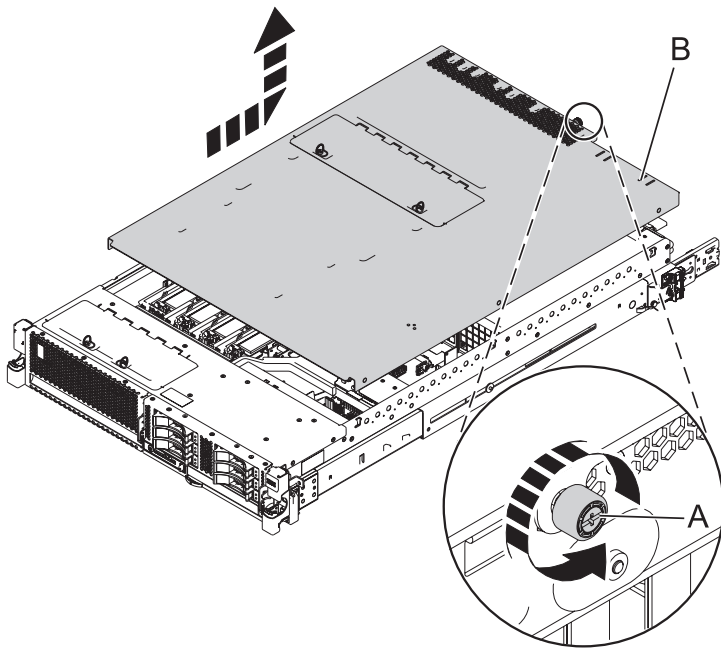
Figure 108. Removing the service access cover

Installing the service access cover on the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Use this procedure to install the service access cover.

Perform the following steps to install the service access cover:

1. Place the service access cover **(A)** on top of the system, about 25 mm (1 in.) from the upper chassis ledge.
2. Hold the service access cover against the system unit and slide it toward the front of the system. The tabs of the service access cover slide beneath the upper chassis ledge.
3. Align the thumbscrew **(B)** located on the rear of the service access cover with the two holes on the rear of the system chassis.
4. Tighten the thumbscrews to secure the service access cover.
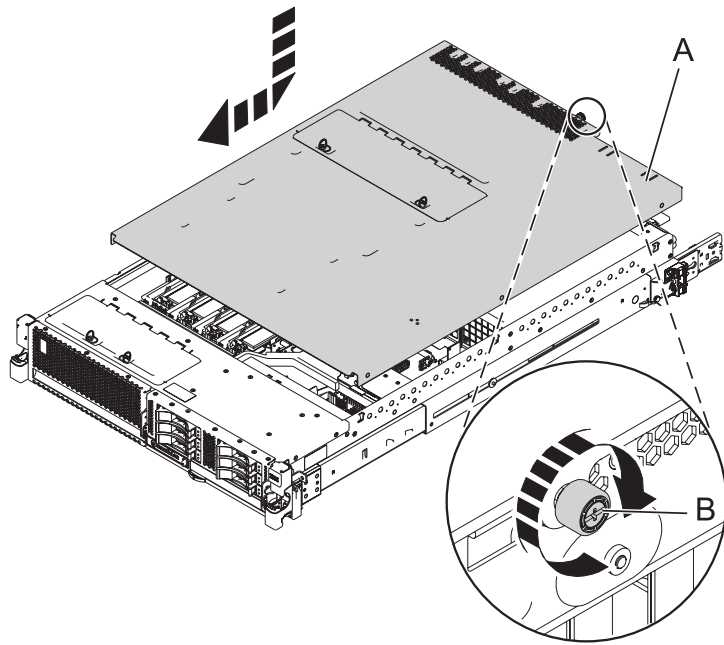
Figure 109. Installing the service access cover

Placing the rack-mounted 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D system into the service position or operating position

Use these procedures to place a system into the service position or operating position to perform service or to gain access to internal components.

Placing the rack-mounted 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D into the service position

Use this procedure to place the rack-mounted system into the service position.

Notes:

- When placing the system into the service position, it is essential that all stability plates are firmly in position to prevent the rack from toppling. Ensure that only one system unit is in the service position at a time.
- Ensure that the cables at the rear of the system do not catch or bind as you pull the unit forward in the rack.
- When the rails are fully extended, the rail safety latches lock into place. This action prevents the system from being pulled out too far.

1. Open the front rack door.
2. Identify the system unit that you are servicing in the rack.
3. While holding the system unit release latches down on both the left and right sides, pull the system unit out from the rack until the rails are fully extended and locked.
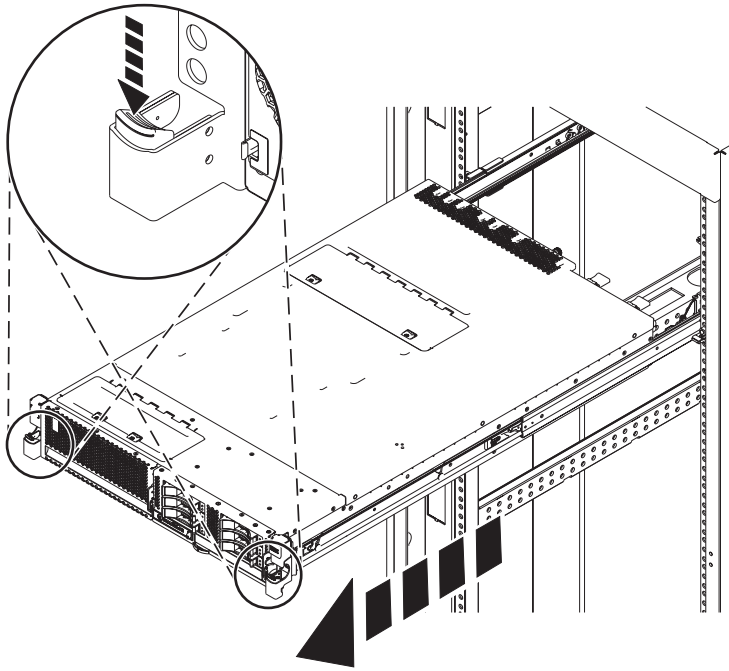
Figure 110. Placing the system in the service position

Placing the rack-mounted 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D into the operating position

Use this procedure to place the rack-mounted system into the operating position.

When placing the system in the operating position, ensure that the cables at the rear of the system do not catch or bind as you push the system unit back into the rack.

1. Unlock the blue safety rail latches **(A)** by lifting them upward.
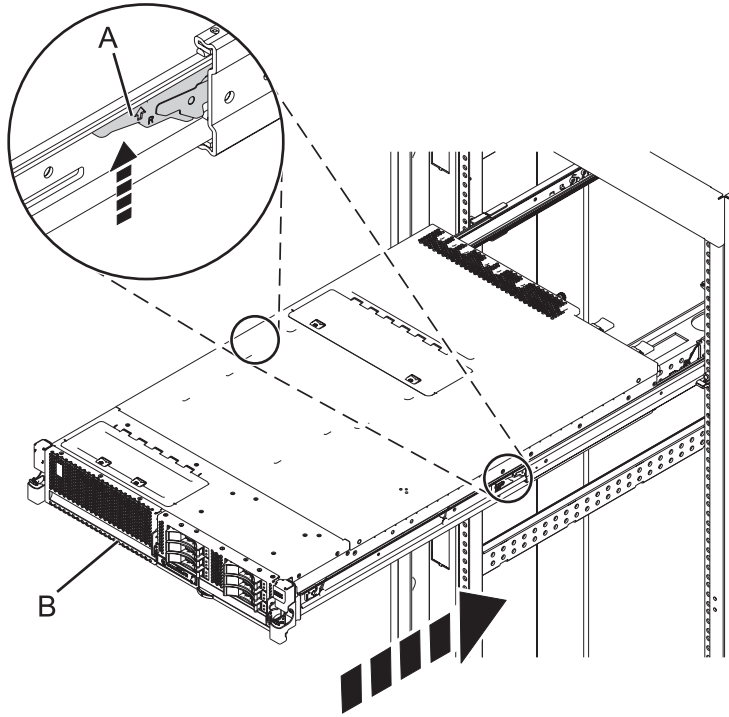
Figure 111. Unlocking the safety rail latches

2. Push the system unit back into the rack until both system-unit release latches have locked into position.
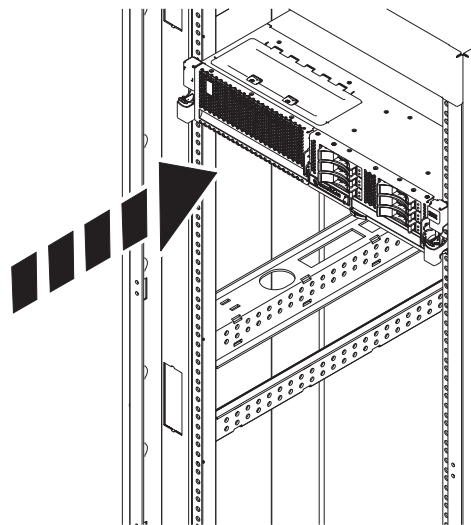
Figure 112. Placing the system in the operating position

3. Close the front rack door of the system unit that you are servicing.

Disconnecting the power cords from the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Use this procedure to disconnect the power cords from the system.

Perform the following steps to disconnect the power cords from the system:

1. Open the rear rack door on the system unit that you are servicing.
2. Identify the system unit that you are servicing in the rack.
3. Disconnect all power cords from the system unit that you are servicing.

   Note: This system might be equipped with two power supplies. Before continuing with any remove and replace procedures that require the power to be off, ensure that both power sources to the system have been completely disconnected.
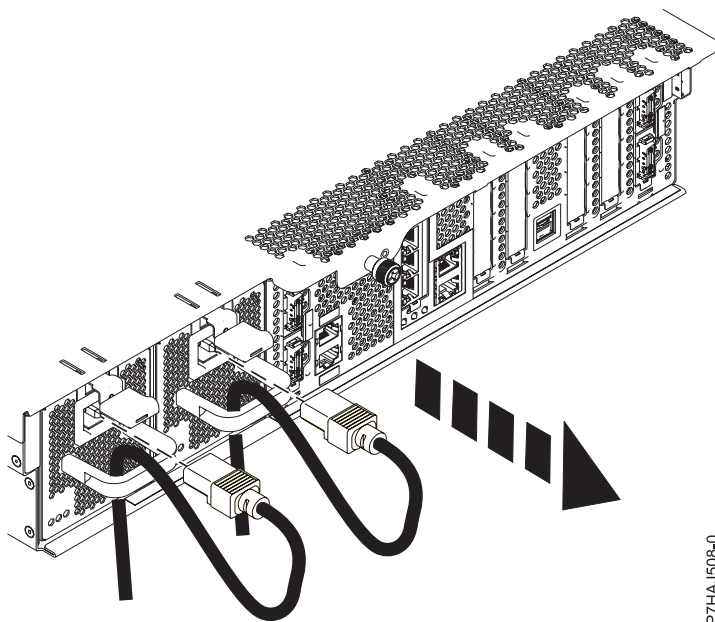
Figure 113. Removing the power cords

Connecting the power cords to the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D

Use this procedure to connect the power cords to the system.

Perform the following steps to connect the power cords to the system:

1. Open the rear rack door on the system unit that you are servicing.
2. Identify the system unit that you are servicing in the rack.
3. Connect all power cords to the system unit that you are servicing. Ensure that the cords are threaded through the handles.
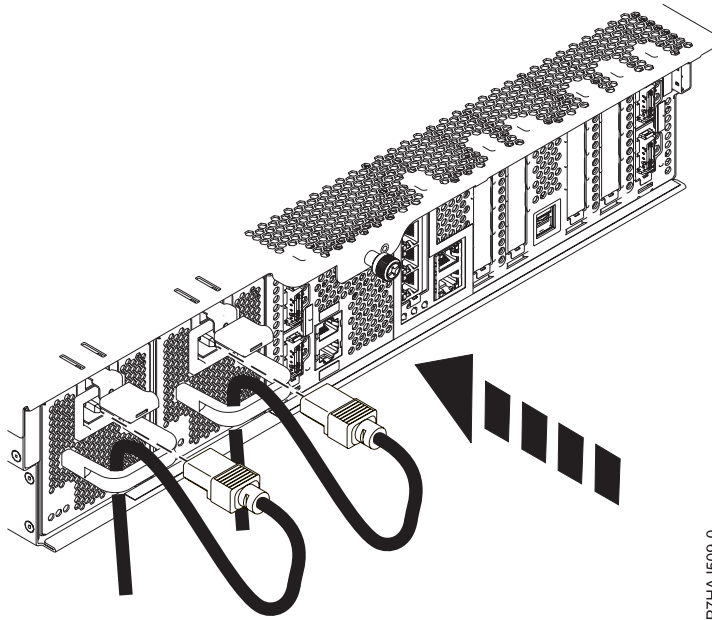
Figure 114. Connecting the power cords

Verifying the installed part

You can verify a newly installed or replaced part on your system, logical partition, or expansion unit by 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 the AIX operating system 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 the AIX operating system:

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 the AIX operating system:

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.

2. Is the system powered off?

   No: Go to step 4.

   Yes: Continue with the next step.

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.

   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.

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

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.

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 on page 154.

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 136.
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 and 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 an AIX or 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 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 a boot device on the server or logical partition on which you are working, follow these steps:

   a. Access the ASMI. For information on using the ASMI, see Accessing the ASMI.

   b. On the ASMI main menu, click **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**. When the optical drive is powered on, insert the stand-alone 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 must be initiated by 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 the HMC

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 by using the HMC" on page 158 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 by using the HMC" on page 157. **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 by using the HMC

Use this procedure to activate or deactivate LEDs by using Service Focal Point from the Hardware Management Console (HMC).

Deactivating a system attention LED or partition LED by using the HMC:
You can deactivate the attention LED for a system or logical partition if you decide that a problem is not a high priority and you decide to repair the problem at a later time. The deactivation also allows the LED to be activated again when another problem occurs.

To deactivate a system attention LED by using HMC, complete the following steps:

1. In the navigation area, open **Systems Management**.
2. Open **Servers** and select the required system.
3. In the content area, select the required partition.
4. Select **Tasks** > **Operations** > **Deactivate Attention LED**. A confirmation window is displayed with an indication that there still might be open problems with the system.
5. Click **OK** to continue with the deactivation. A window is displayed that provides the details of the system or partition, and a confirmation that the system or logical partition attention LED was deactivated.

Activating or deactivating an identify LED by using the HMC:
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** > **Operations** > **LED Status** > **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 and click **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 by using the HMC

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 the installed part by using the SDMC

If you installed or replaced a part, use the IBM Systems Director Management Console (SDMC) to update your SDMC 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. From the SDMC, examine the service action event log for any open service action events. See "Viewing serviceable events by using the SDMC" on page 160 for details.
2. Are there any service action events that are open?

    No: If the system attention LED is still on, use the SDMC to turn off the LED. See "Activating and deactivating LEDs by using the SDMC." **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 **Delete** or **Ignore**.

    Note: These options are only available from the problem event log.

Activating and deactivating LEDs by using the SDMC

Use this procedure to activate or deactivate LEDs by using the IBM Systems Director Management Console (SDMC).

Deactivating a system attention LED or partition LED by using the SDMC:
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.

To deactivate the system attention LED, complete the following steps:

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions** > **Service and Support** > **Hardware** > **System Attention LED**.
3. Select **Deactivate System Attention LED**. 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.
4. Select one of the virtual servers, and select **Deactivate System Attention LED**. 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 logical partition.
    - An indication that you cannot activate the virtual server LED.

Activating or deactivating an identify LED by using the SDMC:
The system provides several LEDs that help identify various components, such as enclosures or field replaceable units (FRUs). 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. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions** > **Service and Support** > **Hardware** > **Identify LED**.
3. In the Identify LED, Select Enclosure window, select the system unit or enclosure.
4. To activate or deactivate an identify LED, click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
5. To activate or deactivate an identify LED for a FRU, select a system or enclosure from the table, and then click **List FRUs**.
6. 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 by using the SDMC

Use this procedure to view a serviceable event, including details, comments, and service history.

To view serviceable events, follow these steps:

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions** > **System Status and Health** > **Event Log**.
3. Optional: You can narrow the event criteria by using the Event filter menu.
4. Select a line in the Events window, and select **Actions** > **Properties**. The Properties window opens, showing detailed information about the serviceable event. The table shows information, such as problem number, reference code, and the field replaceable units (FRUs) associated with this event.

Verifying an installed part or replaced part on a system or logical partition by using Virtual I/O Server tools

If you installed or replaced a part, you might want to use the tools in Virtual I/O Server (VIOS) to verify that the part is recognized by the system or logical partition.

Verifying the installed part by using VIOS

You can verify the operation of a newly installed part or a replacement part.

Perform the following steps to verify an installed or replaced part:

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 steps:

- 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 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 is running in LPAR mode, note the logical partition in which you installed the part. 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 part or replacement part, complete the following 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.
   - **Yes:** Go to step 5.

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 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.

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 error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the error log to indicate that a system-detectable part has been replaced. 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 error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the error log to indicate that a system-detectable part has been replaced. 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.

a. 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. For instructions, see Changing service indicators.

Verifying a repair

Use these procedures to verify hardware operation after making repairs to the system.

Choose from the following options:
- To verify the repair of a system that is currently powered off, go to step 1.
- To verify the repair of a system that is currently powered on with no operating system loaded, go to step 3.
- To verify the repair of a system that is currently powered on and that has an operating system loaded, go to step 5.

1. Power on the server and all attached I/O enclosures.

Did all the enclosures power on?
Yes: Go to step 3.↓ Go to step 3.
No: Continue with the next step.

2. Choose from the following options:

- If the original problem was that an enclosure would not power on and you have another FRU to replace, locate and replace the next field-replaceable unit (FRU).
- If the next FRU in the FRU list is an isolation procedure, perform the isolation procedure.
- If the original problem was that an enclosure would not power on and you have an isolation procedure to complete, perform the isolation procedure.
- If the original problem was that an enclosure would not power on and there are no more FRUs or isolation procedures in the FRU list, contact your next level of support.
- If you have a new problem, perform problem analysis and repair the new problem.

3. Load the operating system.

Did the operating system load successfully?
Yes: Go to step 5.
No: Continue with the next step.

4. Choose from the following options:

- If the original problem was a failing disk drive that contained the operating system software, go to step 5.
- If the original problem was that the operating system would not load and you have another FRU to replace, go to your FRU locations section to locate the next FRU.
- If the next FRU in the FRU list is an isolation procedure, perform the isolation procedure.
- If the original problem was that the operating system would not load and you have an isolation procedure to complete, perform the isolation procedure.
- If the original problem was that the operating system would not load and there are no more FRUs or isolation procedures in the FRU list, contact your next level of support.
- If you have a new problem, perform problem analysis and repair the new problem.

5. Choose from the following options:
    - "Verifying the repair in AIX" on page 164
    - "Verifying the repair in Linux" on page 169
    - "Verifying a repair by using an IBM i system or logical partition" on page 167

Verifying the repair in AIX

You can use this procedure to verify that a repair is complete using the AIX operating system.

Use this maintenance analysis procedure (MAP) to check out the server after a repair is completed.

1. Did you replace a disk drive in the root volume group?

No   Go to step 3.

Yes   Continue with the next step.

2. Run stand-alone diagnostics either from a CD or from a Network Installation Management (NIM) server.

Did you encounter any problems?

No   Reinstall the operating system and continue with step 5.

Yes   If the original problem still exists, replace the field-replaceable unit (FRU) or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

            If a new problem has occurred, go to Beginning problem analysis.

3. Did you replace a FRU with the power turned on and concurrently with system operations?

No   Go to step 5.

Yes   Continue with the next step.

4. Did you use an AIX diagnostics service aid hot-swap operation to change the FRU?

Yes   Go to step 6.

No   Go to step 7 on page 165.

> **Note:** The AIX diagnostic service aid was used if a resource was removed by using the **Hot Plug** task.

5. If any FRUs have been removed that should be reinstalled, reinstall them now:

   1. If the system is not powered on, power it on now.
   2. Perform a slow boot.
   3. Wait until the AIX operating system login prompt is displayed or until system activity on the operator panel or display has stopped.
   4. Did you encounter any problems?

   No   Continue at step 6.

   Yes   If the original problem still exists, replace the FRU or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

               If a new problem occurs, go to Beginning problem analysis.

6. If the Resource Repair Action menu is already displayed, go to step 9 on page 165; otherwise, perform the following steps:

1. Log into the operating system either with root authority (if needed, ask the customer to enter the password) or use the CE login.
2. Enter `diag -a` command and check for missing resources. Follow any instructions that are displayed. If an SRN displays, suspect a loose card or connection. If no instructions are displayed, no resources were detected as missing. Continue with the next step.

7. Perform the following steps:

1. Enter `diag` at the command prompt.
2. Press Enter.
3. Select the **Diagnostics Routines** option.
4. When the Diagnostic Mode Selection menu is displayed, select **System verification**.
5. When the Diagnostic Selection menu is displayed, select the **All Resources** option or test the FRUs you exchanged and any devices that are attached to the FRUs you exchanged by selecting the diagnostics for the individual FRU.

Did the Resource Repair Action menu (801015) display?

No   Continue with the next step.

Yes   Go to step 9.

8. Did the TESTING COMPLETE, no trouble was found menu (801010) display?

Yes   Use the **Log Repair Action** option, if not previously logged, in 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**.
Note: If the system attention indicator is on, this action will set it back to the normal state.

Go to step 11 on page 166.

No   If the original problem still exists, replace the FRU or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

If a new problem occurs go to Beginning problem analysis.

9. When a test is run on a resource in system verification mode, that resource has an entry in the AIX error log. If the test on that resource was successful, the Resource Repair Action menu is displayed.

After replacing a FRU, you must select the resource for that FRU from the Resource Repair Action menu. This updates the AIX error log to indicate that a system-detectable FRU has been replaced.

Note: If the system attention indicator is on, this action will set it back to the normal state.
Perform the following steps:

1. 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 is not displayed on the resource list, select **sysplanar0**.
2. Press **Commit** after you make your selections.

Did another Resource Repair Action (801015) display?

No   If the No Trouble Found menu displays, go to step 11.

Yes   Continue with the next step.

10.   The parent or child of the resource you just replaced might also require that you run the Resource Repair Action service aid on it.

When a test is run on a resource in system verification mode, that resource has an entry in the AIX error log. If the test on the resource was successful, the Resource Repair Action menu displays.

After replacing that FRU, you must select the resource for that FRU from the Resource Repair Action menu. This updates the AIX error log to indicate that a system-detectable FRU has been replaced.

Note: If the system attention indicator is on, this action will set it back to the normal state.

Perform the following steps:

1. From the RESOURCE REPAIR ACTION menu, select the parent or child of the resource that has been replaced. 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**.
2. Press COMMIT after you make your selections.
3. If the No Trouble Found menu is displayed, continue with the next step.

11. If you changed the service processor or network settings, as instructed in previous MAPs, restore the settings to the value they had prior to servicing the system. If you ran stand-alone diagnostics from CD-ROM, remove the stand-alone diagnostics CD-ROM from the system.

Did you perform service on a RAID subsystem that involvedchanging of the PCI RAID adapter cache card or changing the configuration?

Note: This information does not apply to the PCI-X RAID adapter or cache.

No   Go to the close of call procedure.

Yes   Continue with the next step.

12. Use the **Recover Options** selection to resolve the RAID configuration. To do this, perform the following steps:

1. On the PCI SCSI Disk Array Manager display, select **Recovery options**.
2. If a previous configuration exists on the replacement adapter, this must be cleared. Select **Clear PCI SCSI Adapter Configuration** and press F3.
3. On the Recovery Options screen, select **Resolve PCI SCSI RAID Adapter Configuration**.
4. On the Resolve PCI SCSI RAID Adapter Configuration screen, select **Accept Configuration on Drives**.
5. On the PCI SCSI RAID Adapter selections menu, select the adapter that you changed.
6. On the next screen, press Enter.
7. When you see the Are You Sure selection menu, press Enter to continue.
8. If you see a `Failed` status message, verify that you selected the correct adapter, and then repeat this procedure. When the recovery is complete, exit the operating system.
9. Go to the Closing a service call procedure.

Verifying a repair by using an IBM i system or logical partition

Use this procedure to verify a repair by using the IBM i operating system.

1. Was the system powered off during the repair?

    Yes: Continue with the next step.

    No: Continue with step 3.

2. Perform the following tasks:

    a. Verify that the power cable is plugged into the power outlet.

    b. Verify that power is available at the customer's power outlet.

3. Was the partition powered off during the repair?

    Yes: Continue with the next step.

    No: Continue with step 6.

4. Select the IPL type and mode for the system or logical partition that the customer uses (see IPL type mode and speed options in the Service functions).

5. Start an IPL by powering on the system or partition (see Powering on and powering off). Did the system complete the IPL?

    Yes: Continue with the next step.

    No: This might be a new problem. Go to the Starting a repair action. **This ends the procedure.**

6. Did the system or partition remain running throughout the repair, and was the I/O processor, I/O adapter, or storage device replaced?

    Yes: Continue with step 10.

    No: Continue with the next step.

7. Use the service action log or serviceable event view (if the system is managed by an HMC) to look for any reference codes that are related to this IPL (see Searching the service action log). Are there any reference codes that are related to this IPL?

    Yes: Continue with the next step.

    No: If the problem was related to removable media or communications, perform the verification procedures in the Service functions to verify that the problem is corrected. Then return the system to the customer and have the customer verify the system date and time. **This ends the procedure.**

8. Is the new reference code the same as the original reference code?

   Yes: Continue with the next step.

   No: A new symptom might have occurred. Go to the Start of call procedure. **This ends the procedure.**

9. Are there any other failing items that remain to be replaced?

   Yes: Replace the next failing item listed for this reference code. **This ends the procedure.**

   No: Contact your next level of support for assistance. **This ends the procedure.**

10. Was concurrent maintenance performed on an optical storage unit?

    Yes: The product activity log and service action log, in most cases, contain a reference code for the optical storage unit when concurrent maintenance is performed. You can ignore this reference code. Perform the following:

    - Perform the verification procedures in the Service functions topic to verify that the problem is corrected.

    - Return the system to the customer and have the customer verify the system date and time. **This ends the procedure.**

    No: Continue with the next step.

11. Use the service action log to look for any new reference codes (see Using the Service Action Log). Are there any new reference codes?

    Yes: Continue with the next step.

    No: Go to step 14.

12. Is the new reference code the same as the original reference code?

    Yes: Continue with the next step.

    No: A new symptom might have occurred. Go to the Start of call procedure to determine the cause of the problem. **This ends the procedure.**

13. Are there any other failing items that need to be replaced?

    Yes: Replace the next failing item listed for the reference code. **This ends the procedure.**.

    No: Contact your next level of support for assistance. **This ends the procedure.**

14. Are you working with a tape device?

    Yes: Perform the verification procedures in the Service functions to verify that the problem is corrected. After the verification test is complete, the tape device description will be set to the failed state because a resource change was detected. Perform the following tasks:

    - Vary the tape device description off and then on.

    - Return the system to the customer and have the customer verify the system date and time. Then go to Verifying the repair from the HMC. **This ends the procedure.**

    No: Continue with the next step.

15. Are you working with an IOP or an IOA?

    Yes: Use the display hardware configuration service function to check for any missing or failed hardware:

    - On the command line, enter the STRSST (Start System Service Tools command). If you cannot get to SST, select DST. Do not IPL the system or partition to get to DST.

    - On the Start Service Tools Sign On display, enter the user ID with the service authority and password.

    - Select **Start a service tool** > **Hardware service manager** > **Logical hardware resources** > **System bus resources**.

    - Select the function key for **Include nonreporting resources**.

    - If the IOP and IOA that you just replaced is a failed or nonreporting resource, the problem has not been fixed. Continue to the next failing item in the failing item list. **This ends the procedure.**

No: Perform the verification procedures in the Service functions topics to verify that the problem is corrected. Resources that usually vary on automatically during an IPL, or that were previously varied on manually, might need to be varied on again after the verification procedures are complete. Return the system to the customer and have the customer verify the system date and time. **This ends the procedure.**

Verifying the repair in Linux

You can use this procedure to verify that a repair is complete by using the Linux operating system.

1. Run stand-alone diagnostics from either a CD or from a Network Installation Management (NIM) server. See Running the stand-alone diagnostics from CD-ROM.

Did you encounter any problems?

No   Reboot the operating system and continue with the close of call procedure.

Yes   If the original problem still exists, replace the field-replaceable unit (FRU) or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

If a new problem has occurs go to Beginning problem analysis and repair the new problem.

Verifying the repair from the management console

Perform these procedures to close problem numbers, clear hardware messages, and prepare the server to return to the customer by using the management console.

Follow this checklist before performing the procedures:

- You return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.

  Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every 2 hours.

- While you were performing the problem analysis on the original serviceable event, other serviceable-event numbers might have been opened. Close all serviceable events that were opened as a result of your service activity.

- Server verification has been performed and there are no problems that require additional service actions.

- If the repair was done by using the HMC online repair procedures, ensure that the original serviceable event is now closed.

1. Is a management console used to manage the server that you are servicing?

- **Yes:** Continue with the next step.
- **No:** Return to the "Verifying a repair" on page 163. **This ends the procedure.**

2. Are you closing a service event that was a repair on the management console personal computer?

- **Yes:** Continue with the next step.
- **No:** Go to step 4.

3. Power on the management console. Did the power-on process complete without errors?

- **Yes:** Ensure that the management console can be used to perform server management tasks, and return the management console to normal operations. Go to "Closing a service call" on page 170. **This ends the procedure.**
- **No**: Go to the *HMC isolation procedures*. **This ends the procedure.**

4. Log into the management console as the service representative. If invalid user or invalid password is displayed, get the correct login information from the system administer.

1. If logged into the System Manager, select **Exit from the Console**, located in the System Manager window.
2. Log in to the System Manager with the following:
   - User identification - `service`
   - Password - `service mode`

5. View Serviceable Event Details.

1. In the navigation area, click **Service Applications**.
2. In the navigation area, click **Service Focal Point**.
3. In the Contents area, click **Manage Serviceable Events**.
4. Designate the set of Serviceable Events you want to view. When you are finished, click **OK**. The **Service Event Overview** window opens.

Note: Only the events that match all of the criteria you specify are shown.

6. Close open or delayed events.

1. Select the problem to close in the Service Event Overview window.
2. Select the **Selected** menu, located on the menu bar.
3. Click **Close Event**.
4. Enter your comments in the **Serviceable Event Comments** window, and click **Close Event**.
5. Close all events associated with the problem on which you were working.

7. Did the Service Event Overview window contain the event or events on which you were working?

- **Yes:** Return the HMC to normal operations. Go to "Closing a service call." **This ends the procedure.**
- **No:** Go to Detecting problems. **This ends the procedure.**

Closing a service call

Perform these procedures to close serviceable events, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedure:
- Return the server to the state that the customer normally uses such as IPL type, IPL mode, and the way the system is configured or partitioned.

  Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.
- While you were performing the problem analysis on the original serviceable event, other serviceable events might have been opened. Close all serviceable events that were opened as a result of your service activity.
- Ensure that server verification has been performed and no problems require additional service actions.
- If the repair was done using the management console online repair procedures, ensure that the original serviceable event is now closed.
  1. Record the system reference code (SRC), or symptom, and the location code of the field-replaceable unit (FRU) you replaced, for future reference. Is the server managed by a management console?

- **Yes:** Continue with the next step.
- **No:** Do one of the following steps:
  - If the server is managed by Integrated Virtualization Manager (IVM), go to "Closing a service call by using Integrated Virtualization Manager" on page 179.
  - If the server is not partitioned and is running the AIX or Linux operating system, go to "Closing a service call by using AIX or Linux" on page 175.

2. On the Hardware Management Console (HMC), open **Manage Serviceable Events** and examine the service action event log for any open service action events.

3. Are any service action events open?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 183. Return the system to the customer. **This completes the repair.**

4. Record the list of open service action events.

5. From the list of serviceable events recorded in step 4, complete the following steps 6 - step 32 on page 174 for each open service action event.

6. Determine the error class of the serviceable event. Record for future use.

7. Examine the details of the open service action event.

Is the error code that is associated with this service action event the same as recorded in step 1 on page 170?

- **Yes:** Go to step 11 on page 172.
- **No:** Continue with the next step.

8. Examine the FRU list of the service action event. Are any FRUs listed for the service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 11 on page 172.

9. Is the FRU list identical that is, the same FRUs, same number of FRUs, and same order of FRUs) to the FRU list of the error code recorded in step 1 on page 170?

- **Yes:** Go to step 11 on page 172.
- **No:** Continue with the next step.

10. The FRU list is different. Is the FRU you replaced and recorded in step 1 on page 170 in the list of FRUs for this service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 on page 174.
  Note: Some service action events will remain open when you leave this MAP. Further service actions might be required to complete the repair.

11. Examine the details of this service action event, and record the partitions involved in this service action event for use in a later step.

12. Is the error code associated with this service action event of the form A11-xxx or A01-xxx?

- **Yes:** Continue with the next step.
- **No:** Go to step 17.

13. Have you begun a list of A*xx* partitions from prior service action events that you processed in this MAP?

- **Yes:** Go to step 15.
- **No:** Continue with the next step.

14. Begin a new list of A*xx* partitions by copying the list of partitions obtained in step 11. Go to step 16.

15. Add the partition list obtained in step 11 to the existing list of A*xx* partitions obtained from processing previous service action events in this maintenance analysis procedure (MAP).

16. Remove all entries in the list of all partitions you recorded in step 11. If you are referred to the list of partitions obtained in step 11 in future steps, the list is empty. Go to step 17.

17. Select and highlight the service action event from the Error Associated With This Serviceable Event window.

18. Click **Close Event**.

19. Add comments for the serviceable event. Include any unique additional information. Click **OK**. The following steps will add or update FRU information.

20. Did you replace, add, or modify a FRU of the open service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 22 on page 173.

21. From the FRU list, select a FRU that you need to update. Double-click the FRU, and update the FRU information. Go to step 23.

22. Select the **No FRU Replaced for this Serviceable Event** option.

23. Click **OK** to close the service action event.

24. Is the list of all partitions you recorded in step 11 on page 172 empty?

- **Yes:** Go to step 32 on page 174.
- **No:** Continue with the next step.

25. Does the list of all partitions you recorded in step 11 on page 172 contain more than one entry?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 on page 174.

26. Is the error class recorded in step 25 AIX?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 on page 174.

27. Perform all the following steps for each entry in the list of all partitions you recorded in step 11 on page 172, except for the partition you were using to debug the original problem.

28. From the list of all partitions, open the HMC virtual terminal window of a partition, and then type `diag` at the AIX command prompt.

29. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
3. Select the **Log Repair** option.
4. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
5. Click **Commit** after you make your selection.

Note: If the terminal type is not defined, you are prompted to define it before you can proceed.

30. Exit from diagnostics in this partition and return to the AIX command prompt.

31. Have all the partitions in the list of all the partitions you recorded in step 11 on page 172 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 24 on page 173 to process the next partition in the list you recorded in step 11 on page 172.

32. Have all the serviceable events recorded in step 4 on page 171 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 5 on page 171 and process the next service action event in the list of serviceable events recorded in step 4 on page 171.

33. While processing all service action events, were you directed to step 14 on page 172?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 183. Return the system to the customer. **This completes the repair.**
  Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

34. Perform all the following steps for each entry in the list of A*xx* partitions you began recording in step 14 on page 172, except for the partition you were using to debug the original problem.

35. From the list of A*xx* partitions, open the management console virtual terminal window of a partition , and then type `diag` at the AIX command prompt.

36. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
   Note: If the terminal type is not defined, you are prompted to define it before you can proceed.
3. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
4. Click **Commit** after you make your selection.

37. Exit from diagnostics in this partition and return to the AIX command prompt.

38. Have all the partitions in the list of A*xx* partitions you began recording in step 14 on page 172 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 34 to process the next partition in the list you recorded in step 14 on page 172.

39. If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 183. **This completes the repair.** Return the system to the customer.

Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

Closing a service call by using AIX or Linux

If the server is not connected to a management console and not using Integrated Virtualization Manager (IVM), perform these procedures to close serviceable events, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedure:

- Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.

  Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.

- While you were performing the problem analysis on the original serviceable event, other serviceable-event numbers might have been opened. Close all serviceable events that were opened as a result of your service activity.

- Ensure that server verification has been performed and that no problems require additional service actions.

- If the repair was done by using the IVM online repair procedures, ensure that the original serviceable event is now closed.

1. Did you use a hot-swap operation by using an AIX diagnostics service aid to change the FRU?

- **Yes:** Go to step 4
- **No:** Continue with the next step.

2. Do you have any field-replaceable units (FRUs) (for example cards, adapters, cables, or devices) that were removed during problem analysis that you want to put back into the system?

   Note: If the system backplane or battery has been replaced and you are loading diagnostics from a server over a network, it might be necessary for the customer to set the network boot information for this system before diagnostics can be loaded. Also, set the system time and date information after the repair is completed.

- **Yes:** Reinstall all of the FRUs that were removed during problem analysis. Go to step 3
- **No:** Continue with the next step.

3. Is the system or logical partition that you are performing a repair action on running the AIX operating system?

- **Yes:** Continue with the next step.
- **No:** Go to step 5 on page 176.

4. Does the system or logical partition you are performing a repair action on have the AIX operating system installed?

   Note: If you have just replaced a hard disk in the root volume group, answer no to this question.

- **Yes:** Go to step 7 on page 176.
- **No:** Continue with the next step.

5. Run stand-alone diagnostics in problem determination mode from either a CD-ROM or from a Network Installation Management (NIM) server.

   Note: For instructions about running stand-alone diagnostics from a CD and not by using an HMC, go to Running the stand-alone diagnostics from CD on a server without an HMC attached.

   For instructions about running stand-alone diagnostics from a NIM server, go to Running the stand-alone diagnostics from a Network Installation Management server.

   Did you encounter any problems?

- **Yes:** Go to Problem analysis.
- **No:** Continue with the next step.

6. The system hardware is functioning correctly.

If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 183.

This completes the repair.
Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned. This might require you to reboot the operating system.

Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.

7. Complete the following steps:

1. If the system supports, do a slow boot on the system. For instructions, see Performing a slow boot. If the system does not support a slow boot, do a normal boot.
2. Power on the system.
3. Wait until the AIX operating system login prompt is displayed or until system activity on the operator panel or display has stopped.

Did the AIX Login Prompt display?

- **Yes:** Continue with the next step.
- **No:** Go to Problem analysis.

8. If the Resource Repair Action menu is already displayed, go to 12 on page 177; otherwise, complete the following steps:

1. Log into the operating system, either with root authority (if needed, ask the customer to enter the password) or use the CE login.
2. Enter the `diag -a` command and check for missing resources. Follow any instructions that are displayed. If a system request number (SRN) is displayed, suspect a loose card or connection. If no instructions are displayed, no resources were detected as missing. Continue with step 9.

9. Complete the following steps:

1. Enter `diag` at the command prompt and press **Enter**.
2. Select the **Diagnostics Routines** option.
3. When the Diagnostic Mode Selection menu is displayed, select **Problem determination**.
4. When the Advanced Diagnostic Selection menu is displayed, select the **All Resources** option. Alternatively, test the FRUs you exchanged and any devices that are attached to the FRUs you exchanged by selecting the diagnostics for the individual FRU.

Did the Resource Repair Action menu (801015) display?

- **Yes:** Go to step 13 on page 178.
- **No:** Continue with the next step.

10. Did the TESTING COMPLETE, no trouble was found menu (801010) display?

- **Yes:** Continue with the next step.
- **No:** There is still a problem. Go to Problem analysis.

11. Select the **Log Repair Action** option, if not previously logged, in 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**.
Note: If the system attention indicator is on, this will set it back to the normal state. Go to step 14 on page 178.

12. Run a test on a resource that has an entry in the AIX error log, in the system verification mode. If the test on the resource was successful, the Resource Repair Action menu is displayed.

After replacing a FRU, select the resource for that FRU from the Resource Repair Action menu. This updates the AIX error log to indicate that a system-detectable FRU has been replaced.
Note: If the system attention indicator is on, this action will set it back to the normal state.

To select the resource for the replaced FRU, complete the following steps:
1. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
2. Click **Commit** after you make your selection.

Did another Resource Repair Action (801015) display?

- **Yes:** Continue with the next step.
- **No:** If the No Trouble Found menu is displayed, go to step 14.

13.

Run a test on a resource that has an entry in the AIX error log, in the system verification mode. If the test on the resource was successful, the Resource Repair Action menu is displayed.
Note: The parent or child of the resource you just replaced might also require that you run the Resource Repair Action service aid on it.

After replacing that FRU, select the resource for that FRU from the Resource Repair Action menu. This updates the AIX error log to indicate that a system-detectable FRU has been replaced.
Note: If the system attention indicator is on, this action will set it back to the normal state.

To select the resource for the replaced FRU, complete the following steps:

1. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
2. Click **Commit** after you make your selection.

Did the No Trouble Found menu display?

- **Yes:** Continue with the next step.
- **No:** Go to Problem analysis.

14. If you changed the service processor or network settings, as instructed in previous MAPs, restore the settings to the value they had prior to servicing the system. If you ran stand-alone diagnostics from CD-ROM, remove the stand-alone diagnostics CD-ROM from the system.

Did you perform service on a RAID subsystem that involved changing the PCI RAID adapter cache card or changing the configuration?
Note: This does not refer to the PCI-X RAID adapter or cache.

- **Yes:** Continue with the next step.
- **No:** Go to step 16 on page 179.

15. Use the **Recover Options** selection to resolve the RAID configuration. To do this, complete the following steps:

1. On the PCI SCSI Disk Array Manager dialog, select **Recovery options**.

2. Select **Clear PCI SCSI Adapter Configuration** and press F3 to clear any previous configuration data that exists on the replacement adapter.

3. On the Recovery Options dialog, select **Resolve PCI SCSI RAID Adapter Configuration**.

4. On the Resolve PCI SCSI RAID Adapter Configuration dialog, select **Accept Configuration on Drives**.

5. On the PCI SCSI RAID Adapter selections menu, select the adapter that you changed.

6. On the next dialog, press Enter.

7. When you see the Are You Sure selection menu, press Enter to continue. When the recovery action is complete, the status message of **OK** is shown.

8. If you receive a status message of Failed, verify that you selected the correct adapter, and then repeat this procedure. When recovery is complete, exit the operating system.

9. Go to step 16.

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16. The system hardware is functioning correctly. Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.

Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.

Closing a service call by using Integrated Virtualization Manager

Perform these procedures to close serviceable events, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedure:

- Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.

  Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.

- While you were performing the problem analysis on the original serviceable event, other serviceable-event numbers might have been opened. Close all serviceable events that were opened as a result of your service activity.

- Ensure that server verification has been performed and there are no problems that require additional service actions.

- If the repair was done by using the Integrated Virtualization Manager (IVM) online repair procedures, ensure that the original serviceable event is now closed.

  1. Record the system reference code (SRC), or symptom, and the location code of the field-replaceable unit (FRU) you replaced for future reference.

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2. On the IVM, open **Manage Serviceable Events** and look at existing serviceable events.

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3. Are there any service action events that are open?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 183. Return the system to the customer. **This completes the repair.**

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4. Record the list of open service action events.

5. From the list of serviceable events recorded in step 4 on page 179, complete steps 6 - 30 on page 182 for each open service action event.

6. Determine the error class of the serviceable event. Record it for future use.

7. Examine the details of the open service action event.

Is the error code associated with this service action event the same as recorded in step 1 on page 179?

- **Yes:** Go to step 11.
- **No:** Continue with the next step.

8. Examine the FRU list of the service action event. Are any FRUs listed for the service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 11.

9. Is the FRU list identical that is, the same FRUs, same number of FRUs, and same order of FRUs) to the FRU list of the error code recorded in step 1 on page 179?

- **Yes:** Go to step 11.
- **No:** Continue with the next step.

10. Is the FRU you replaced and recorded in step 1 on page 179 in the list of FRUs for this service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 30 on page 182.
  Note: Some service action events remain open when you leave this MAP. Further service actions might be required to complete the repair.

11. Examine the details of this service action event, and record the partitions involved in this service action event for use in a later step.

12. Is the error code associated with this service action event of the form A11-xxx or A01-xxx?

- **Yes:** Continue with the next step.
- **No:** Go to step 17 on page 181.

13. Have you begun a list of A*xx* partitions from prior service action events that you processed in this maintenance analysis procedure (MAP)?

- **Yes:** Go to step 15 on page 181.
- **No:** Continue with the next step.

14. Begin a new list of A*xx* partitions by copying the list of partitions obtained in step 11 on page 180. Go to step 16.

15. Add the partition list obtained in step 11 on page 180 to the existing list of A*xx* partitions obtained from processing previous service action events in this MAP.

16. Remove all entries in the list of all partitions you recorded in step 11 on page 180. If you are referred to the list of partitions obtained in step 11 on page 180 in future steps, the list is empty. Go to step 17.

17. Select and highlight the service action event from the Manage Serviceable Events window.

18. Click **Close Event**.

19. Add comments for the serviceable event. Include any unique additional information. Click **OK**.

20. Add or update the FRU information:

Did you replace, add, or modify a FRU of the open service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 22.

21. Click **OK** to close the service action event.

22. Is the list of all partitions you recorded in step 11 on page 180 empty?

- **Yes:** Go to step 30 on page 182.
- **No:** Continue with the next step.

23. Does the list of all partitions you recorded in step 11 on page 180 contain more than one entry?

- **Yes:** Continue with the next step.
- **No:** Go to step 30 on page 182.

24. Is the error class recorded in step 23?

- **Yes:** Continue with the next step.
- **No:** Go to step 30 on page 182.

25. Perform all the following steps for each entry in the list of all partitions you recorded in step 11 on page 180, except for the partition you were using to debug the original problem.

26. From the list of all partitions, open the IVM virtual terminal window of a partition, and then type `diag` at the AIX command prompt.

27. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
3. Select the **Log Repair** option.
4. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
5. Click **Commit** after you make your selection.

Note: If the terminal type is not defined, you are prompted to define it before you can proceed.

28. Exit from diagnostics in this partition and return to the AIX command prompt.

29. Have all the partitions in the list of all partitions you recorded in step 11 on page 180 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 25 to process the next partition in the list you recorded in step 11 on page 180.

30. Have all the serviceable events recorded in step 4 on page 179 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 5 on page 180 and process the next service action event in the list of serviceable events recorded in step 4 on page 179.

31. While processing all service action events, were you directed to step 14 on page 181?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 183. Return the system to the customer. **This completes the repair.**
  Note: If during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

32. Complete all the following steps for each entry in the list of A*xx* partitions you began recording in step 14 on page 181, except for the partition you were using to debug the original problem.

33. From the list of A*xx* partitions, open the management console virtual terminal window of a partition , and then type `diag` at the AIX command prompt.

34. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
   Note: If the terminal type is not defined, you are prompted to define it before you can proceed.
3. Select the **Log Repair** option.
4. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
5. Click **Commit** after you make your selection.

35. Exit from diagnostics in this partition and return to the AIX command prompt.

36. Have all the partitions in the list of A*xx* partitions you began recording in step 14 on page 181 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 on page 182 to process the next partition in the list you recorded in step 14 on page 181.

37. If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs." **This completes the repair**. Return the system to the customer.

Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

Activating and deactivating LEDs

You can use these procedures to activate or deactivate light-emitting diodes (LEDs) by using the management console or the Advanced System Management Interface (ASMI).

For IBM Power Systems servers that contain the POWER7 processor, the LEDs can be used to identify or verify a part that you are servicing. The error and identify function (amber) LED indicates an error and corresponds to the location code in the system reference code (SRC). The LED is activated and deactivated automatically.

Additionally, the following procedures can also be used to activate and deactivate LEDs.
- "Deactivating a system attention LED or partition LED by using the management console"
- "Activating or deactivating an identify LED by using the management console" on page 184
- "Deactivating a system attention LED or logical partition LED by using the Advanced System Management Interface" on page 185
- "Activating or deactivating an identify LED by using the Advanced System Management Interface" on page 185

Deactivating a system attention LED or partition LED by using the management console

You can deactivate a system attention LED or a logical partition LED if you decide that a problem is not a high priority and you decide to repair the problem at a later time. You can do this task from the Hardware Management Console (HMC) or the IBM Systems Director Management Console (SDMC).

If you want to be alerted if another problem occurs, you must deactivate the system attention LED so that it can be activated again if another problem occurs.

To deactivate a system attention LED by using the HMC, complete the following steps:

1. In the navigation area, open **Systems management**.
2. Select the server you are working on.
3. Open **Operations** > **LED Status**.
4. Select **View System Attention**. The System attention LED window opens. The selected system and its LED state are displayed in the upper part of the window. The logical partition and its LED state are displayed in the lower part of the window. From the system attention LED window, you can deactivate both the System attention LED and the logical partition LED.
5. 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.
6. 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.

To deactivate a system attention LED by using the SDMC, complete the following steps:

1. On the **Welcome** page, under the **Resources** tab, select the server.
2. Click **Actions** > **Service and Support** > **Hardware** > **System Attention LED**.
3. Click **OK**.

Activating or deactivating an identify LED by using the management console

You can activate or deactivate an identify LED for components attached to the system from the Hardware Management Console (HMC) or from the IBM Systems Director Management Console (SDMC).

The system provides several LEDs that help identify various components in the system, such as enclosures or field-replaceable units (FRUs). 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 connect 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 by using the HMC, follow these steps:

1. In the navigation area, open **Systems management**.
2. Select the server you are working on.
3. Click **Operations** > **LED Status** > **Identify LED**. The Identify LED, Select Enclosure window opens.

4. 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.

5. To activate or deactivate an identify LED for a FRU, select an enclosure from the table, and then select **Selected** > **List FRUs**.

6. 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.

To activate or deactivate an identify LED for an enclosure or FRU by using the SDMC, complete these steps:

1. On the **Welcome** page, under the **Resources** tab, select the server.

2. Click **Actions** > **Service and Support** > **Hardware** > **Identify LED**.

3. 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.

4. To activate or deactivate an identify LED for a FRU, select an enclosure from the table, and then click **List FRUs**.

5. Select one or more FRUs from the table, and then click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Deactivating a system attention LED or logical partition LED by using the Advanced System Management Interface

You can deactivate a system attention LED or a logical partition LED by using the Advanced System Management Interface (ASMI).

The system attention indicator provides a visual signal that the system as a whole requires attention or service. Each system has a single system attention indicator. When an event occurs that either needs your intervention or that of service and support, the system attention indicator lights continuously. The system attention indicator is turned on when an entry is made in the service processor error log. The error entry is transmitted to the system error log and to the operating system error log.

To perform this operation, your authority level must be one of the following levels:
- Administrator
- Authorized service provider

To turn off the system attention indicator, do the following steps:

1. In the ASMI Welcome pane, specify your user ID and password, and click **Log In**.

2. In the navigation area, expand **System Configuration** > **Service Indicators** > **System Attention Indicator**.

3. In the right pane, click **Turn off system attention indicator**. If the attempt is unsuccessful, an error message is displayed.

Activating or deactivating an identify LED by using the Advanced System Management Interface

You can activate or deactivate an identify LED by using the Advanced System Management Interface (ASMI).

You can specify the location code of any indicator to view or modify its current state. If you provide the wrong location code, the advanced system manager attempts to go to the next higher level of the location code.

The next level is the base-level location code for that field replaceable unit (FRU). For example, a user types the location code for the FRU located on the second I/O slot of the third enclosure in the system. If

the location code for the second I/O slot is incorrect (the FRU does not exist at this location), an attempt to set the indicator for the third enclosure is initiated. This process continues until a FRU is located or no other level is available.

To perform this operation, your authority level must be one of the following levels:
- Administrator
- Authorized service provider

To change the current state of an indicator, do the following steps:
1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **System Configuration** > **Service Indicators** > **Indicators by Location code**.
3. In the right pane, enter the location code of the FRU and click **Continue**.
4. Select the preferred state from the list.
5. Click **Save settings**.

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Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with

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

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

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European Community Compliance Statement

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This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

European Community contact:
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Technical Regulations, Department M372
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Tele: +49 7032 15 2941
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Electromagnetic Interference (EMI) Statement - People's Republic of China

声　明

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種情況下，使用者會被要
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IBM Taiwan Contact Information:

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電話：0800-016-888

Electromagnetic Interference (EMI) Statement - Korea

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

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland GmbH
Technical Regulations, Abteilung M372
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Tel: +49 7032 15 2941
email: lugi@de.ibm.com

Generelle Informationen:

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

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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Industry Canada Compliance Statement

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Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

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

IBM Taiwan Contact Information

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse B

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