

Disk drives or solid-state drives for the
M6-700, M6-705, M6-715, M7-700,
M7-705 or M7-715

ESCALA Power7



REFERENCE
86 A1 70FG 04

Disk drives or solid-state drives for the M6-700, M6-705, M6-715, M7-700, M7-705 or M7-715

The ESCALA Power7 publications concern the following models:

- Bull Escala E1-700 (Power 710 / 8231-E2B)
- Bull Escala E1-705 (Power 710 / 8231-E1C)
- Bull Escala E2-700 / E2-700T (Power 720 / 8202-E4B)
- Bull Escala E2-705 / E2-705T (Power 720 / 8202-E4C)
- Bull Escala E3-700 (Power 730 / 8231-E2B)
- Bull Escala E3-705 (Power 730 / 8231-E2C)
- Bull Escala E4-700 / E4-700T (Power 740 / 8205-E6B)
- Bull Escala E4-705 (Power 740 / 8205-E6C)
- Bull Escala E5-700 (Power 750 / 8233-E8B)
- Bull Escala M6-700 (Power 770 / 9117-MMB)
- Bull Escala M6-705 (Power 770 / 9117-MMC)
- Bull Escala M6-715 (Power 770 / 9117-MMD)
- Bull Escala M7-700 (Power 780 / 9179-MHB)
- Bull Escala M7-705 (Power 780 / 9179-MHC)
- Bull Escala M7-715 (Power 780 / 9179-MHD)

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

Hardware

November 2012

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B.P.20845
49008 ANGERS CEDEX 01
FRANCE

REFERENCE
86 A1 70FG 04

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Safety notices

Safety notices may be printed throughout this guide.

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

World Trade safety information

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

Laser safety information

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

Laser compliance

The 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 provided power cord. Do not use the 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.

(D005a)

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:

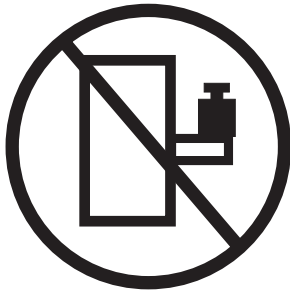
- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:
 - Remove all devices 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)

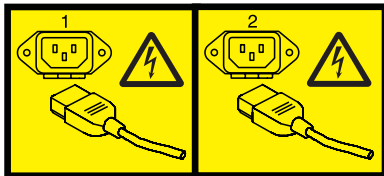
(L001)



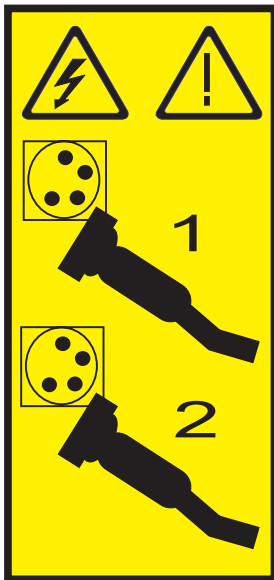
(L002)



(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 approved part. Recycle or discard the battery as instructed by local regulations. (C003a)

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

The following comments apply to the 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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Learn about installing, removing, and replacing disk drives or solid-state drives (SSD) for the 7/70 (17M/MB, 17M/MC, or 17M/MD) or the 7/80 (79M/HB, 79M/HC, or 79M/HD) and for the supported disk drive enclosures.

Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Learn how to install a Small Computer System Interface (SCSI) disk drive, serial-attached SCSI (SAS) disk drive, or solid-state drive (SSD) in the system or expansion unit.

Related information:

 [Backplanes](#)

Solid-state drive configuration rules for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

To 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 many of the same rules as a regular hard disk drive (HDD). For example, SSDs physically resemble, install in the same manner, and in most of the same slots as HDDs. However, some restrictions and configuration rules that apply to SSD are different from HDD. The following tables can help you determine which operating system, adapter, machine type model, and disk drive configuration rules that apply to your system or expansion unit.

After you have reviewed 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 controlled by .

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

Attention: Before installing SSD into your system, you must ensure that you have all the prerequisite updates for both the SSD and the adapters.

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

System, enclosure or expansion unit	Adapter	Mixing rules
17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD	<ul style="list-style-type: none"> FC 5662 Disk/Media Backplane FC 5662 175-MB Cache RAID - Dual IOA Enablement Card FC 5903 PCIe 380 MB Cache Dual x4 3-Gb SAS RAID Adapter FC ESA1 PCIe2 RAID SAS Adapter Dual-port 6 Gb 	<ul style="list-style-type: none"> SSD and HDD cannot be mixed in the same RAID array or mirroring group. SSD and HDD can be mixed in the system disk drive backplane. Remember: You cannot mix SSD and HDD drive types within a parity set. If you are mixing SSD and HDD in a system, ensure that you have enough of each drive type to manage your protection scheme.
58/02 and 58/77	FC 5903: PCIe 380 MB Cache Dual x4 3-Gb SAS RAID Adapter	<ul style="list-style-type: none"> SSD and HDD cannot be mixed on a pair of 5903 adapters. A maximum of nine SSDs are supported on a pair of 5903 adapters.
58/86	<ul style="list-style-type: none"> 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 (BSC) FC 5903: PCIe 380 MB Cache Dual - x4 3-Gb SAS RAID Adapter 	<ul style="list-style-type: none"> 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, attached to the imbedded SAS controller in a system with an imbedded SAS port.

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

System, enclosure or expansion unit	Adapter	Mixing rules
58/87 disk drive enclosure	<ul style="list-style-type: none"> • 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 (BSC) • FC ESA1 PCIe2 RAID SAS Adapter Dual-port 6 Gb • FC ESA1 PCIe2 LP RAID SAS Adapter Dual-port 6 Gb • PCIe2 3.1GB Cache RAID SAS Enclosure 6Gb x8 	<ul style="list-style-type: none"> • 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 imbedded SAS controller in a system with an imbedded SAS port. • The mixing of the SSDs and HDDs is as follows: <ul style="list-style-type: none"> – 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 58/87 for mode 4.

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

System, enclosure or expansion unit	Adapter	Mixing rules
ED/R1 PCIe storage enclosure	PCIe2 3.1 GB Cache RAID SAS Enclosure 6 Gb x8	<ul style="list-style-type: none"> • This enclosure is a 1-unit (1U) high I/O drawer providing 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: <ul style="list-style-type: none"> – One set of 30 bays and the set is owned by both controllers 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 installed at the GX ++ slot in the system.

Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD 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 while the AIX® operating system or logical partition that controls the drive location is powered on.

Before you begin

If you are servicing a failing part, see the service procedures for “Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the AIX system or logical partition power turned on” on page 36. 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.

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 1.

About this task

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.

Attention: The powered-on procedure is a complex set of steps that must be performed precisely as instructed to avoid potential data loss or system damage. You might also consider the powered-off procedure, which is a simpler task that involves less risk of data loss or system damage. For instructions, see “Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 17.

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

Preparing to install a disk drive or solid-state drive

About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. The system or logical partition can either be turned off or turned on when you install the disk drive or solid-state drive. Identify the system for performing the installation or an upgrade. Turn on the system identify (blue) LED. For more information, 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. Remove the front cover:
 - For instructions, see “Removing the front cover from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 105.
 - Removing the front cover for systems that were shipped before 1 March 2011 requires the use of a cover removal tool. For instructions, see “Removing the front cover with the cover removal tool” on page 106.
5. Determine the next available disk drive or solid-state drive position in the system or an expansion unit. For example, the next available disk drive or solid-state drive slot might be P3-D4. For information, see “Disk drive service indicators for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 60.

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.

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.

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

About this task

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

Procedure

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.

What to do next

If you are installing a drive a system or in an expansion unit, proceed to the procedure for installing a disk drive or solid-state drive in the system or expansion unit.

If you are installing a drive in an enclosure, proceed to the procedure for installing a disk drive or solid-state drive in the enclosure.

Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD or in an expansion unit

About this task

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

Procedure

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD" on page 48.
2. If the drive you are installing does not have a bezel preinstalled, then perform the tasks to install a bezel on the drive, then continue with this procedure from step 3. For instructions to install a bezel, see "Installing a disk drive bezel in a disk drive or filler" on page 52.
3. Unlock the drive handle (A) 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 expansion unit.
4. 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.

5. Slide the drive halfway into the system or expansion unit.
6. Select the drive that you want to install and press Enter on the console.
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 in until it locks. See Figure 1 on page 7 showing installing a drive in

the system and Figure 2 showing installing a drive in the 58/03 expansion unit.

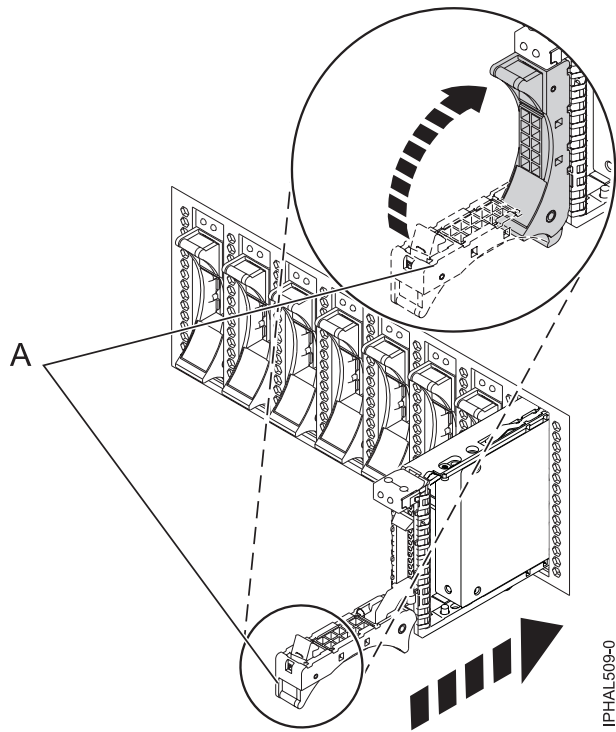


Figure 1. Installing the disk drive in the system

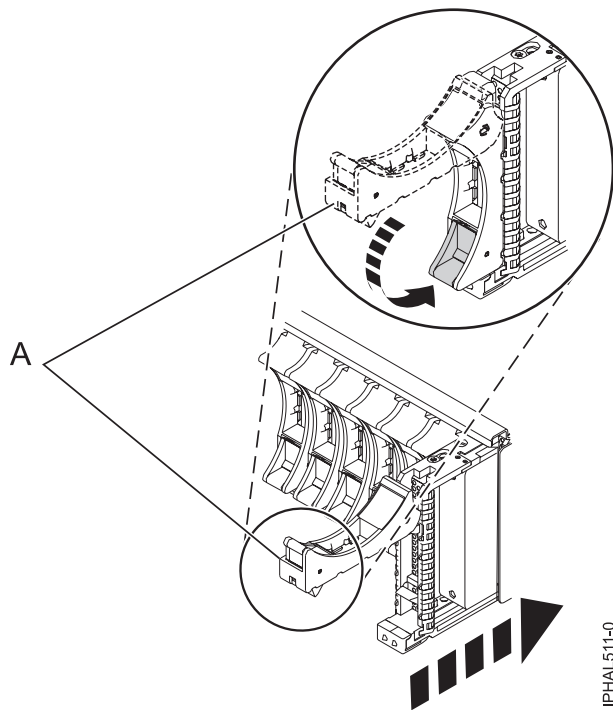


Figure 2. Installing the disk drive in the 58/03 expansion unit

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

9. If you are installing more than one disk drive or solid-state drive, perform all the steps in this procedure until all disk drives or solid-state drives are installed.

What to do next

Proceed to the procedure for completing the disk drive or solid-state drive installation by using the diagnostic command.

Installing a disk drive or solid-state drive in the 58/87 disk drive enclosure

About this task

Perform the following steps to install a disk drive or solid-state drive in the 58/87 disk drive enclosure.

Procedure

1. With the handle in the unlocked position, as shown in Figure 3, 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 58/87 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 58/87 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.

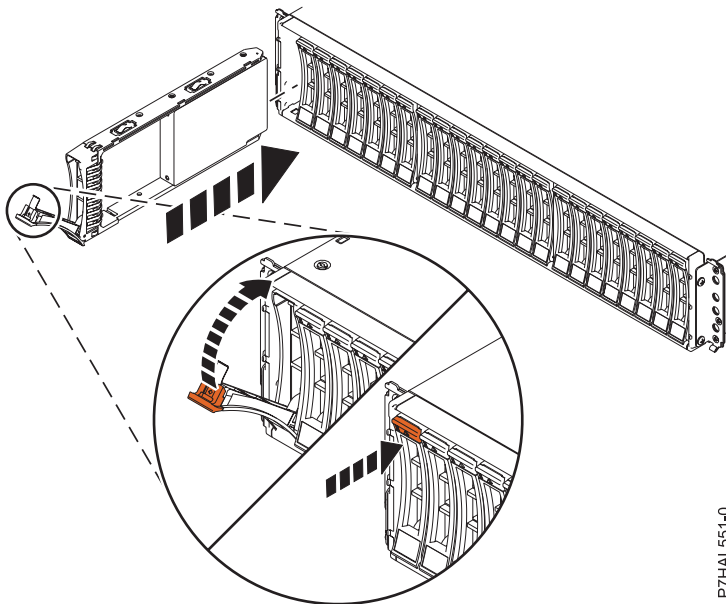


Figure 3. Installing the disk drive in the 58/87 disk drive enclosure

6. On the console, press Enter to indicate that you have installed the drive.
7. Proceed to the procedure for completing the installation by using the diagnostic command.

Installing a solid-state drive in the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to install a solid-state drive in the ED/R1 PCIe storage enclosure.

Procedure

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

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 ED/R1 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 ED/R1 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 ED/R1 PCIe storage enclosure.

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

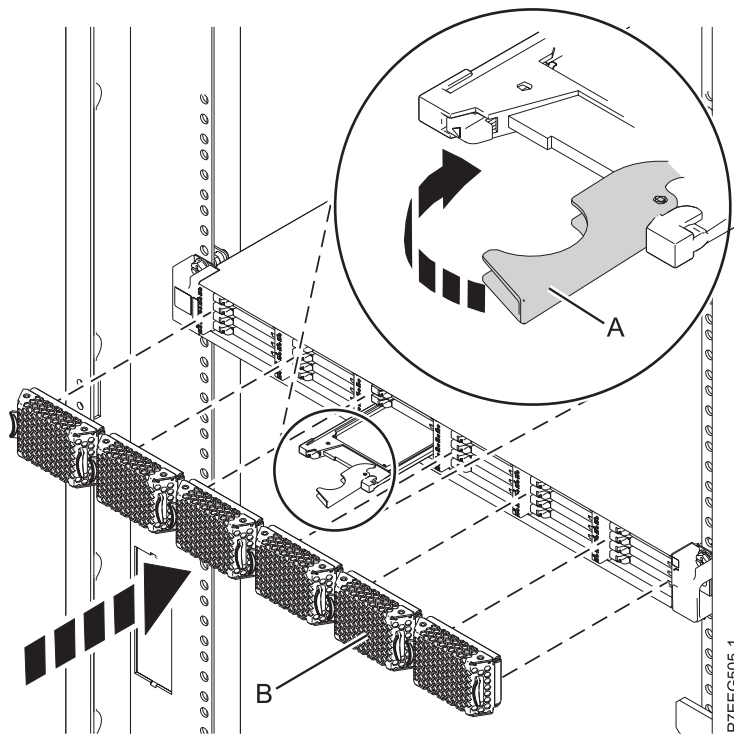


Figure 4. Installing a solid-state drive in the ED/R1 PCIe storage enclosure

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

What to do next

Proceed to the procedure for 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

About this task

Perform the following tasks after you install or replace the disk drive or solid-state drive in the system or in an expansion unit:

Procedure

1. Perform 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. Cancel to get to the SCSI and SCSI RAID Hot Plug Manager menu.
 - e. Select **Configure Added/Replaced Devices**.
2. Proceed to completing the procedure.

Completing the procedure

About this task

Perform the following tasks after you install or replace the disk drive or solid-state drive in the system or in an expansion unit:

Procedure

1. Connect the cable to the backplane. For instructions, see “Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 56.
2. Replace the front cover. For instructions, see “Installing the front cover on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 110.
3. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.
4. 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 67.
5. 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 68.

Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD 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 while the power to the Linux operating system or logical partition that controls the drive location is turned on.

Before you begin

If you are servicing a failing part, see the service procedures for “Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the power to the Linux system or logical partition turned on” on page 40. 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.

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 1.

About this task

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

Preparing to install a disk drive or solid-state drive

About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. The system or logical partition can either be turned off or turned on when you install the disk drive or solid-state drive. Identify the system for performing the installation or an upgrade. Turn on the system identify (blue) LED. For more information, 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. Remove the front cover:
 - For instructions, see “Removing the front cover from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 105.
 - Removing the front cover for systems that were shipped before 1 March 2011 requires the use of a cover removal tool. For instructions, see “Removing the front cover with the cover removal tool” on page 106.
5. Determine the next available disk drive or solid-state drive position in the system or an expansion unit. For example, the next available disk drive or solid-state drive slot might be P3-D4. For information, see “Disk drive service indicators for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 60.

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.

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 a 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

About this task

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

Procedure

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter. The Configuration Utility display is shown.

3. Select **Work with disk unit recovery** from the 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, like the following figure, is shown.

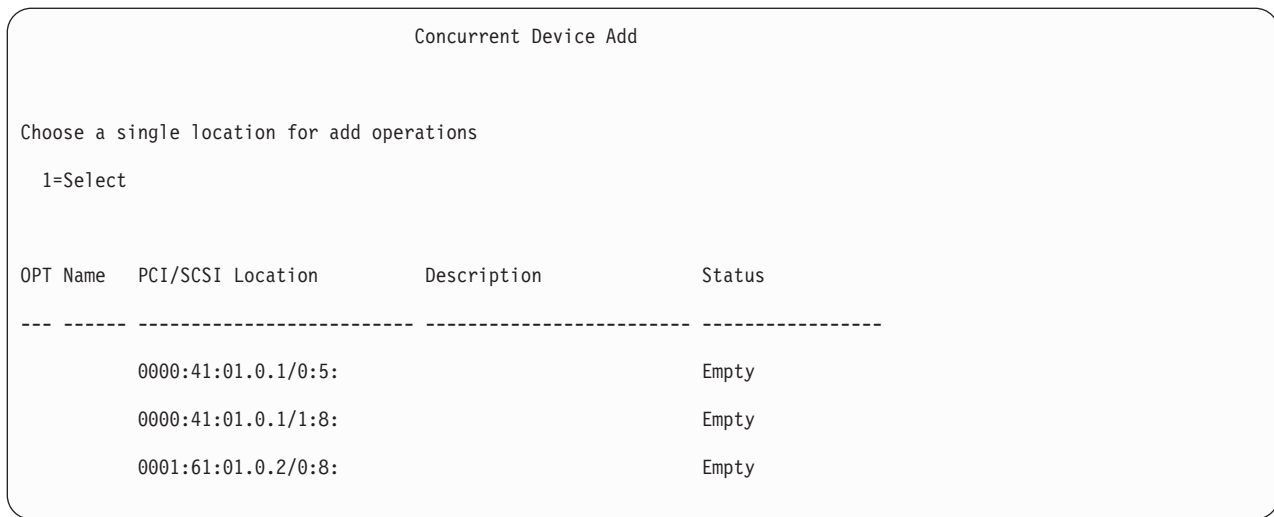


Figure 5. Example Concurrent Device Remove display

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.

What to do next

If you are installing a drive a system or in an expansion unit, proceed to the procedure for installing a disk drive or solid-state drive in the system or expansion unit.

If you are replacing a drive in an enclosure, proceed to the procedure for installing a disk drive or solid-state drive in the enclosure.

Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD or in an expansion unit

About this task

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

Procedure

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 48.
2. If the drive you are installing does not have a bezel preinstalled, then perform the tasks to install a bezel on the drive, then continue with this procedure from step 3. For instructions to install a bezel, see “Installing a disk drive bezel in a disk drive or filler” on page 52.
3. Unlock the drive handle (**A**) 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 expansion unit.

4. 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.

5. Slide the drive halfway into the system or expansion unit.
6. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to install, then press Enter.
7. 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. See Figure 6 showing installing a drive in the system.

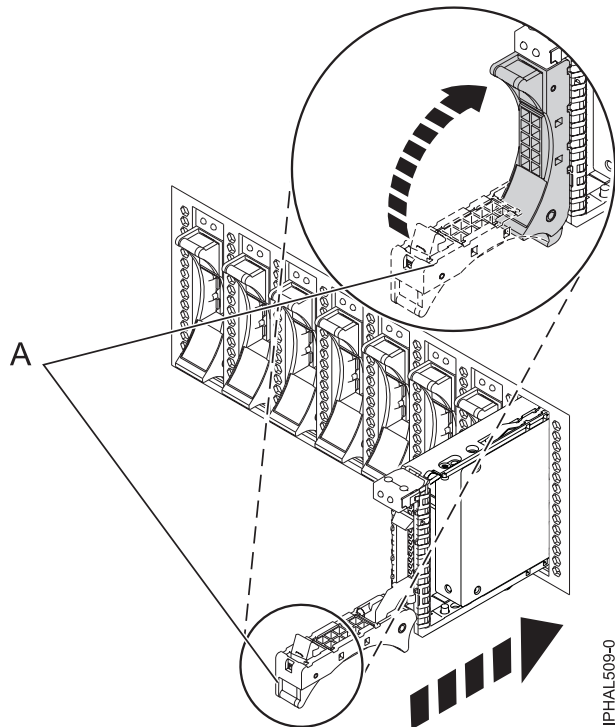


Figure 6. Installing the drive in the system

8. On the console, press Enter to indicate that you have installed the drive.
9. If you are installing more than one disk drive or solid-state drive, perform all the steps in this procedure until all disk drives or solid-state drives are installed.

What to do next

You can proceed to verifying the disk drive or solid-state drive installation procedure.

Installing a disk drive or solid-state drive in the 58/87 disk drive enclosure

About this task

Perform the following steps to install a disk drive or solid-state drive in the 58/87 disk drive enclosure.

Procedure

1. With the handle in the unlocked position, see Figure 7 on page 14, 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 halfway into the 58/87 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 58/87 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.

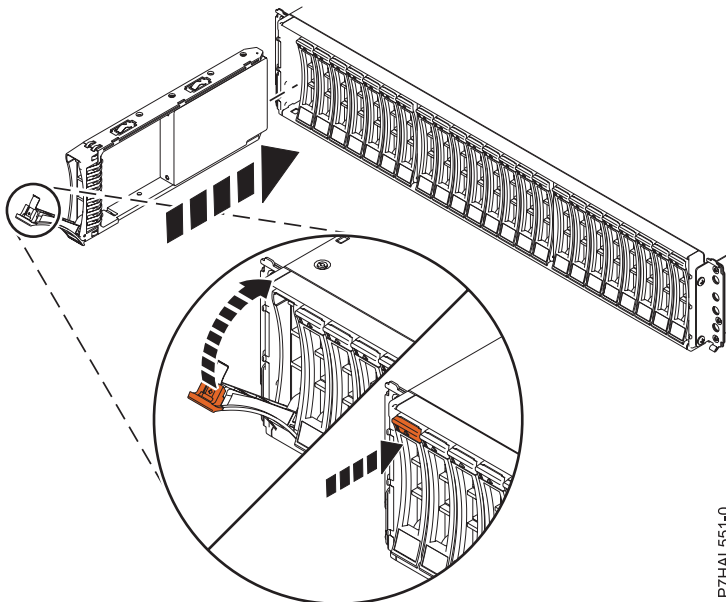


Figure 7. Installing the disk drive in the 58/87 disk drive enclosure

6. On the console, press Enter to indicate that you have installed the drive.
7. Proceed to verifying the installation procedure.

Installing a solid-state drive in the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to install a solid-state drive in the ED/R1 PCIe storage enclosure.

Procedure

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 15.

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 ED/R1 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 ED/R1 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 ED/R1 PCIe storage enclosure.

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

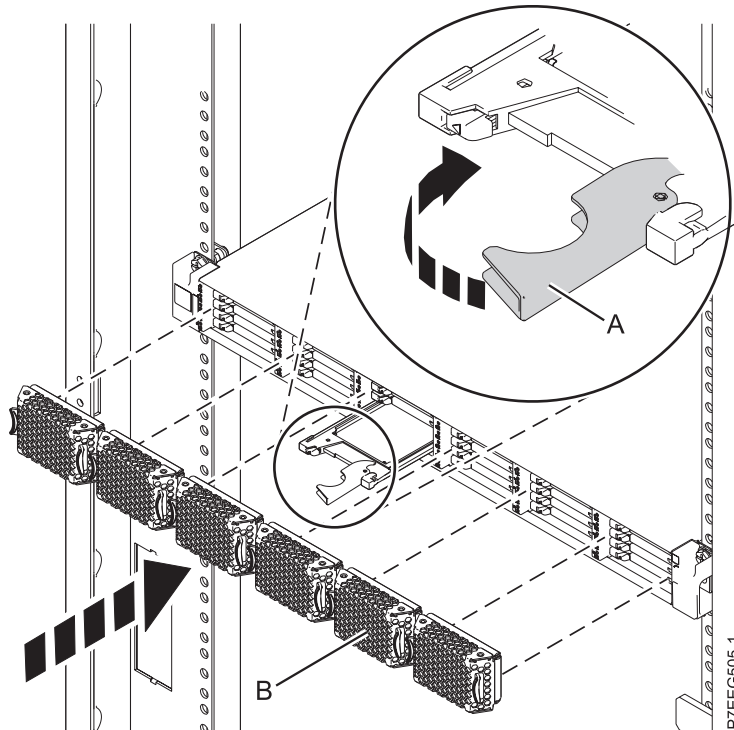


Figure 8. Installing a solid-state drive in the ED/R1 PCIe storage enclosure

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

What to do next

Proceed to the procedure for verifying the installation.

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

About this task

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.

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

Procedure

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter. The Configuration Utility display is shown.
3. Select **Display hardware status**. The Display Hardware Status display is shown, like the following figure.

```

Display Hardware Status

Type option, press Enter.

1=Display hardware resource information details

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

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

```

Figure 9. Example Display Hardware Status

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

What to do next

Proceed to completing the procedure.

Completing the procedure About this task

Perform the following tasks after you install or replace the disk drive or solid-state drive in the system or in an expansion unit:

Procedure

1. Connect the cable to the backplane. For instructions, see “Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 56.
2. Replace the front cover. For instructions, see “Installing the front cover on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 110.

3. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.
4. 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 71.

Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off

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

Before you begin

If you are servicing a failing part, see the service procedures for “Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 44. 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.

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 1.

About this task

Preparing to install a disk drive or solid-state drive

About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. The system or logical partition can either be turned off or turned on when you install the disk drive or solid-state drive. Identify the system for performing the installation or an upgrade. Turn on the system identify (blue) LED. For more information, see Control panel LEDs and Enabling enclosure indicators.
3. Determine the next available disk drive or solid-state drive position in the system or an expansion unit. For example, the next available disk drive or solid-state drive slot might be P3-D4. For information, see “Disk drive service indicators for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 60.

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.

4. 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.
5. If applicable, remove the system unit door, remove the expansion unit door, or open the rack.

6. Stop the system or logical partition. For instructions, see “Stopping a system or logical partition” on page 102 “Stopping a system or logical partition” on page 102.
7. Remove the front cover:
 - For instructions, see “Removing the front cover from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 105.
 - Removing the front cover for systems that were shipped before 1 March 2011 requires the use of a cover removal tool. For instructions, see “Removing the front cover with the cover removal tool” on page 106.
8. Attach the 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.
11. Proceed to installing a disk drive or solid-state drive in the system or disk drive enclosure.

Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD or in an expansion unit

About this task

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

Procedure

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 48.
2. If the drive you are installing does not have a bezel preinstalled, then perform the tasks to install a bezel on the drive, then continue with this procedure from step 3. For instructions to install a bezel, see “Installing a disk drive bezel in a disk drive or filler” on page 52.
3. Unlock the drive handle (A) 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 expansion unit.
4. 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.

5. Slide the drive all the way into the system or expansion unit, and push the drive handle (A) in until it locks. See Figure 10 on page 19 showing installing a drive in the system.

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

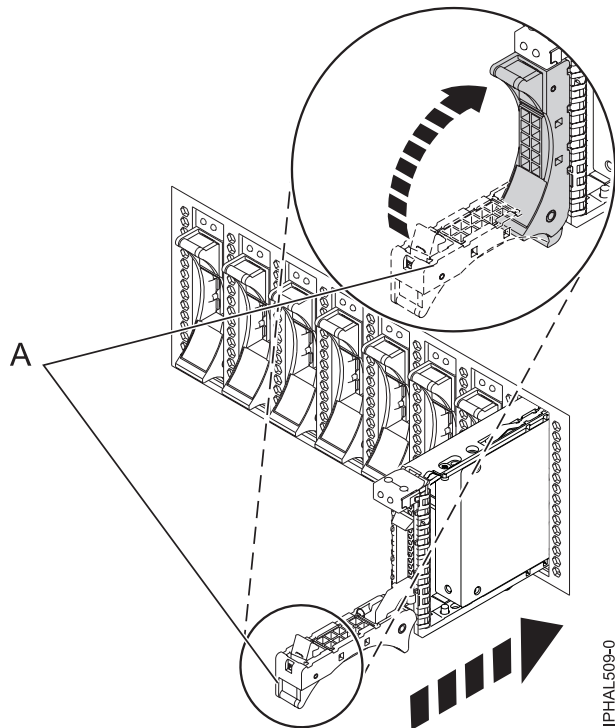


Figure 10. Installing the disk drive in the system

6. If you are installing more than one disk drive or solid-state drive, perform all the steps in this procedure until all disk drives or solid-state drives are installed.

What to do next

You can proceed to completing the disk drive or solid-state drive installation procedure.

Installing a disk drive or solid-state drive in the 58/87 disk drive enclosure

About this task

Perform the following steps to install a disk drive or solid-state drive in the 58/87 disk drive enclosure.

Procedure

1. With the handle in the unlocked position, as shown in Figure 11 on page 20, 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 58/87 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.

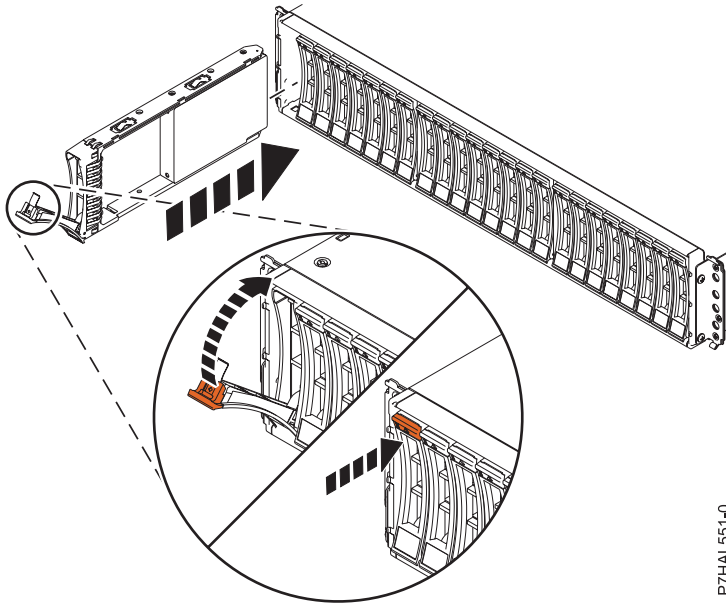


Figure 11. Installing the disk drive in the 58/87 disk drive enclosure

What to do next

Proceed to the procedure for completing the installation.

Installing a solid-state drive in the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to install a solid-state drive in the ED/R1 PCIe storage enclosure.

Procedure

1. With the handle in the unlocked position, align the solid-state drive with the guide rails in the enclosure. See Figure 12 on page 21,

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 ED/R1 PCIe storage enclosure until the drive stops.
3. Rotate the handle **(A)** to the locked position, as shown in Figure 12 on page 21.
4. Install the bezel **(B)**.

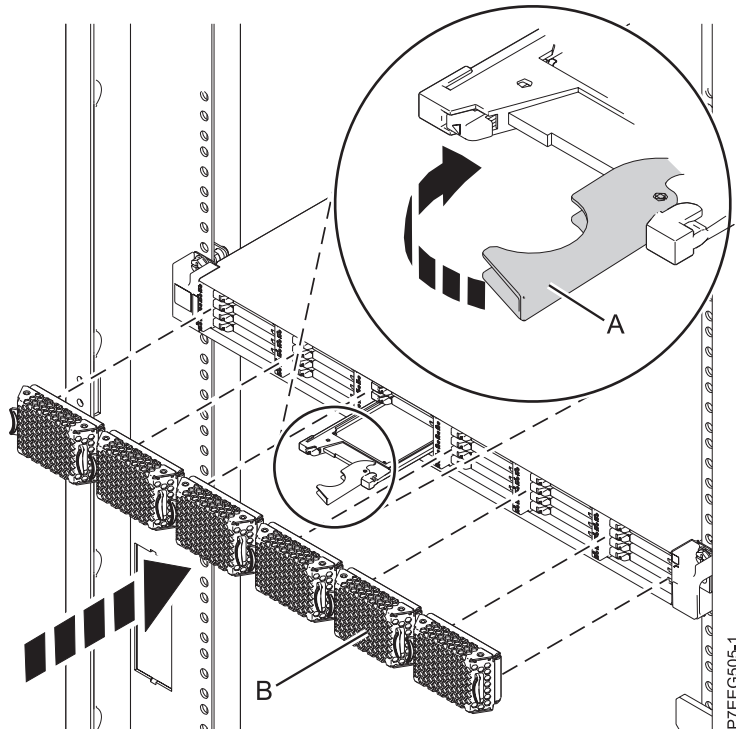


Figure 12. Installing a solid-state drive in the ED/R1 PCIe storage enclosure

What to do next

Proceed to the procedure for completing the installation.

Completing the procedure About this task

Perform the following tasks after you install or replace the disk drive or solid-state drive in the system or in an expansion unit:

Procedure

1. Connect the cable to the backplane. For instructions, see “Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 56.
2. Replace the front cover. For instructions, see “Installing the front cover on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 110.
3. Start the system or logical partition. For instructions, see “Starting the system or logical partition” on page 100.
4. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.
5. 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 67.

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

6. 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 68.
 - “Rebuilding data on a replacement disk drive or solid-state drive in a system or logical partition running Linux” on page 71.

Removing a disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Learn to remove a failed disk drive or solid-state drive from the system 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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the AIX system or logical partition power turned on

Learn to remove a failed Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) drive in a system or an expansion unit while the power of the AIX operating system or logical partition that controls the drive location is turned on.

Before you begin

If you are installing a new or upgraded drive, see “Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the AIX system or logical partition power turned on” on page 4. If you are removing a drive as part of a service procedure, continue to use the following procedure.

About this task

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 31.

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

Related information:

 [Removing and replacing a disk drive in the 5887 disk drive enclosure unit](#)

Preparing to remove a disk drive or solid-state drive

About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.

2. Prepare to remove the disk drive or solid-state drive from the system or an expansion unit as described in “Preparing to remove a disk drive or solid-state drive from a system or an expansion unit controlled by AIX” on page 68.

What to do next

Proceed to the procedure for removing a disk drive or solid-state drive by using the diagnostic command

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

About this task

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

Procedure

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.

What to do next

If you are removing a drive from a system or from an expansion unit, proceed to the procedure for removing a disk drive or solid-state drive from the system or expansion unit.

If you are removing a drive from an enclosure, proceed to the procedure for removing a disk drive or solid-state drive from the enclosure.

Removing the disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Before you begin

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

Procedure

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 service indicators for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 60.
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 13. 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.
5. Press Enter on the console to indicate that you have removed the drive. The identify LED turns off.

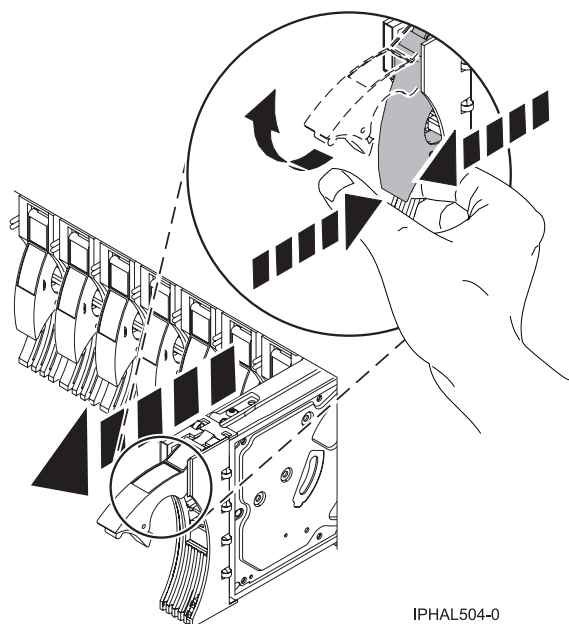


Figure 13. Removing a disk drive from the system

6. If the removed drive has a bezel attached to it, you can remove the disk drive bezel. For instructions, see “Removing a disk drive bezel from a disk drive or filler” on page 51.

Important: If the disk drive bezel does not have a thumbscrew, then the bezel is not removable and the drive is a SAS disk drive. The replacement SAS disk drive comes with a preinstalled bezel.

What to do next

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 35, and select the procedure for replacing a disk drive or solid-state drive for your operating system.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. See “Installing a disk drive filler in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 49.

Removing a solid-state drive from the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to remove a solid-state drive from the ED/R1 PCIe storage enclosure.

Procedure

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 ED/R1 PCIe storage enclosure” on page 66.
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.
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.

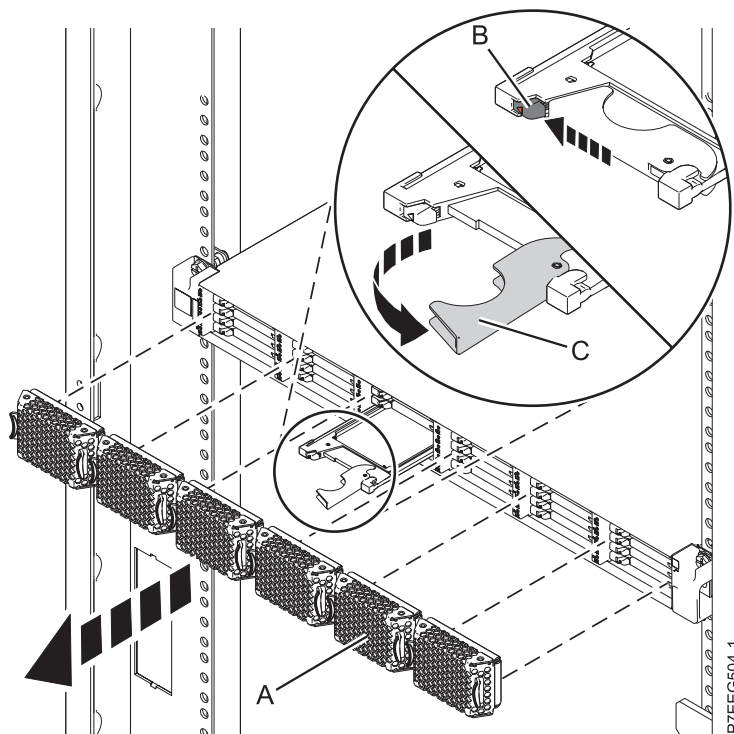


Figure 14. Removing the solid-state drive from the ED/R1 PCIe storage enclosure

What to do next

If you are installing a replacement solid-state drive, proceed to the procedure for replacing the failed solid-state drive in the ED/R1 PCIe storage enclosure.

If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. See the topic for installing a disk drive filler that is relevant to your system.

Removing a disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the Linux system or logical partition power turned on

Learn to remove a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) drive in a system or expansion unit while the power of the Linux operating system or logical partition that controls the drive location is turned on.

Before you begin

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

- Go to “Removing a disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 31 if 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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the Linux system or logical partition power turned on” on page 10.

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 perform the task are the same.

Related information:

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

Preparing to remove a disk drive or solid-state drive

About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. If applicable, remove the system unit door or expansion unit door or open the rack front door.

What to do next

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

About this task

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

Procedure

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

The Configuration Utility display is shown.

3. Select **Analyze log**. Press Enter. The Kernel Messages Log display is shown.

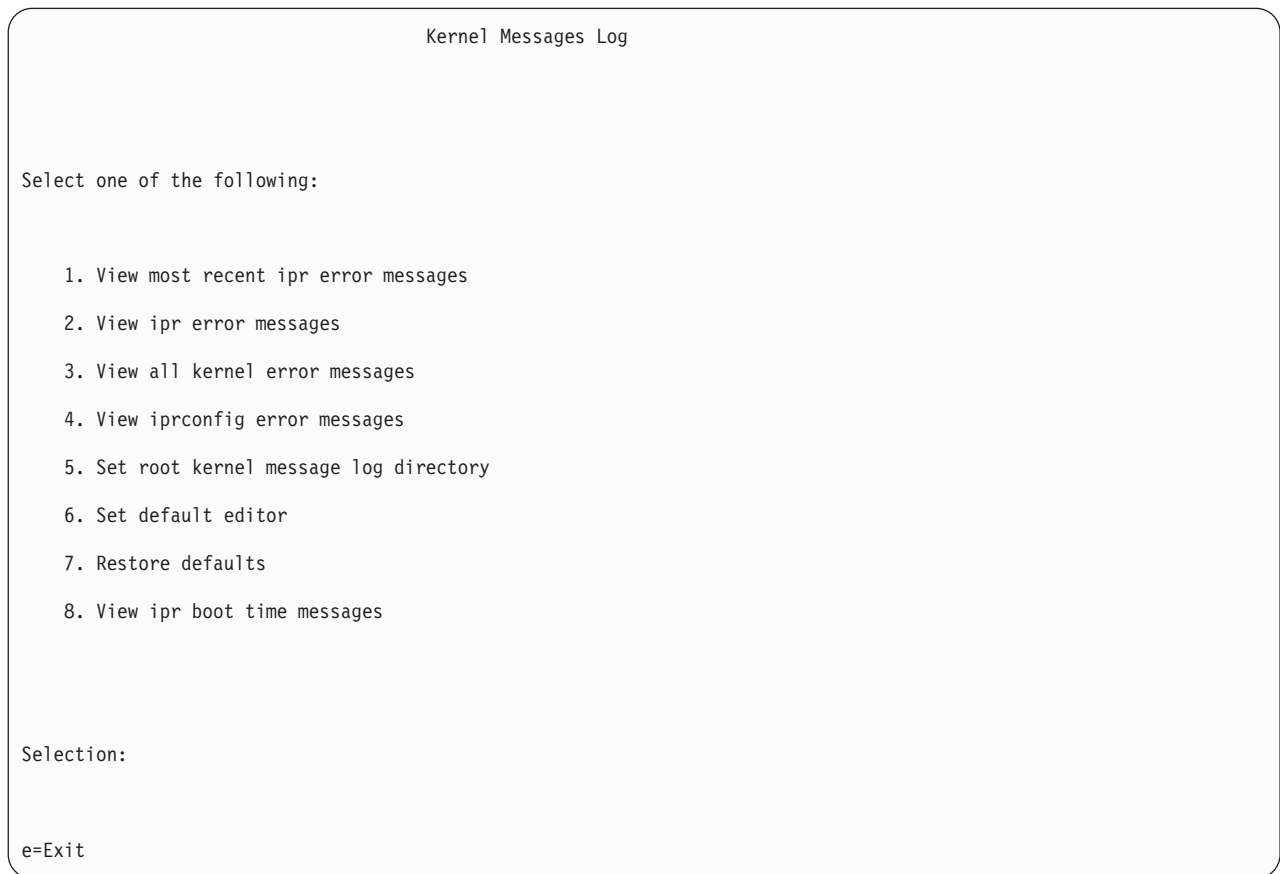


Figure 15. Kernel Messages Log

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:

2:0:8:0 In this example, 2 is the SCSI host number, 0 is the SCSI bus, 8 is the SCSI target ID, and 0 is the logical unit number (LUN).

0/00-04-00

In this example, 0 is the SCSI host number, 00 is the I/O adapter (IOA) SAS port, 04 is the expander port, and 00 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*.
For SAS RAID controller information, see the SAS RAID controllers for Linux
8. Type `iprconfig` on the command line and press Enter.
The Configuration Utility display is shown.
9. Select **Display hardware status** from the Configuration Utility display. Press Enter.
The Display Hardware Status display is shown.

```

Display Hardware Status

Type option, press Enter.

1=Display hardware resource information details

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

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

```

Figure 16. 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 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 perform that procedure.
13. From the 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 example.

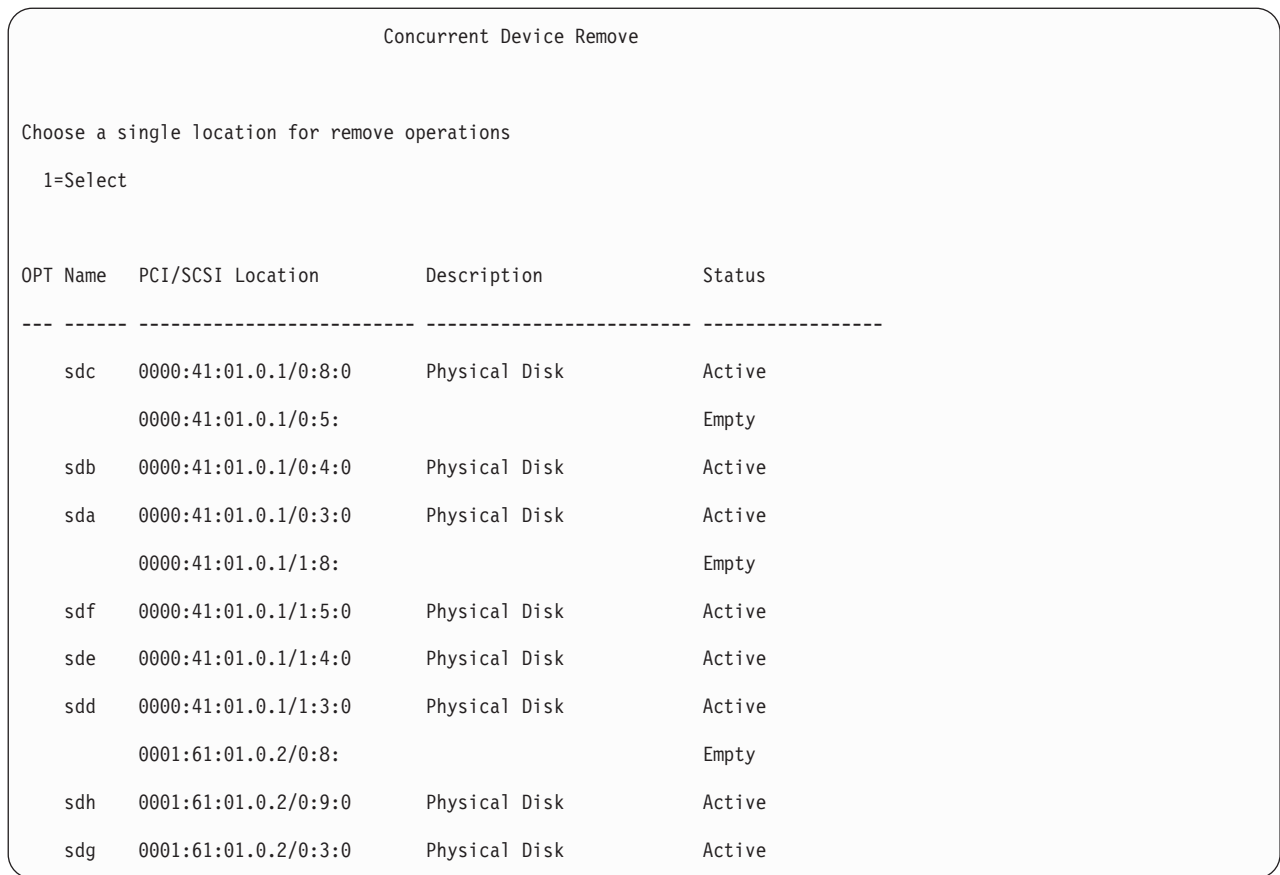


Figure 17. Example Concurrent Device Remove display

15. Press T to toggle between the Concurrent Device Remove panels.
16. Type 1 (Select) next to the location for the drive you want to replace. Press Enter.
The Verify Device Concurrent Remove display is shown. The service indicator flashes for that drive slot.

What to do next

Proceed to the procedure for removing a disk drive or solid-state drive from the system or disk drive enclosure.

Removing the disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Before you begin

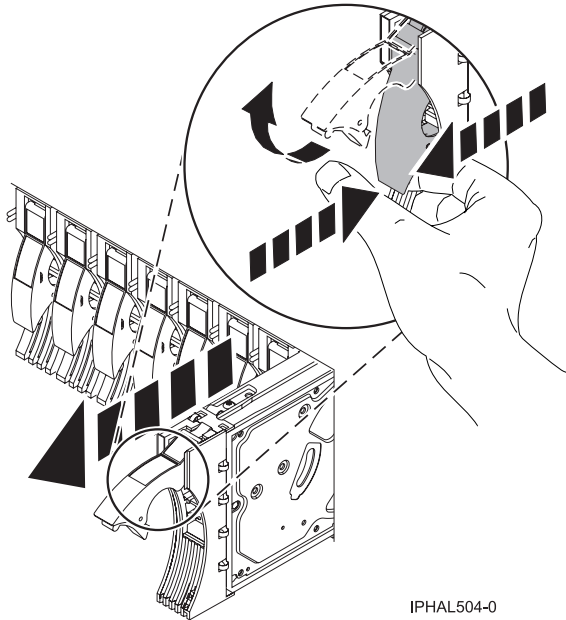
Perform the following tasks to remove a disk drive or solid-state drive from the system or an expansion unit:

Procedure

1. Unlock the drive handle by squeezing it and pulling it out toward you, as shown in Figure 18 on page 30.
2. 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.

- When the identify LED flashes, 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.
- 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. Press Enter on the console to indicate that you have removed the drive. The identify LED turns off.



IPHAL504-0

Figure 18. Removing a disk drive from the system

- If the removed drive has a bezel attached to it, you can remove the disk drive bezel. For instructions, see “Removing a disk drive bezel from a disk drive or filler” on page 51.

Important: If the disk drive bezel does not have a thumbscrew, then the bezel is not removable and the drive is a SAS disk drive. The replacement SAS disk drive comes with a preinstalled bezel.

What to do next

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 35, and select the procedure for replacing a disk drive or solid-state drive for your operating system.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. See “Installing a disk drive filler in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 49.

Removing a solid-state drive from the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to remove a solid-state drive from the ED/R1 PCIe storage enclosure.

Procedure

- Pull off the bezel (A) that covers the slot containing the solid-state drive.
- Slide the release latch (B) over gently to unlock the drive handle. See Figure 19 on page 31.

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.

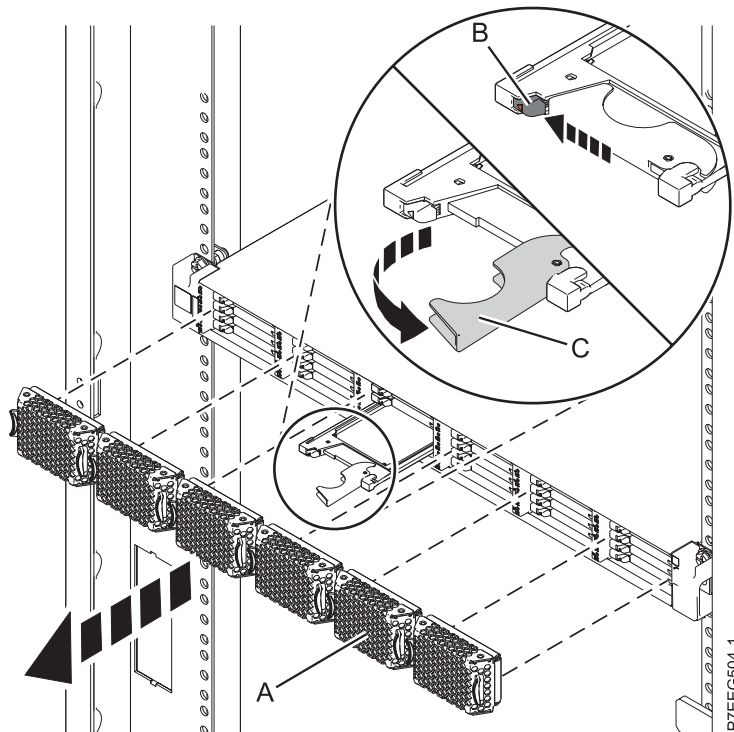


Figure 19. Removing the solid-state drive from the ED/R1 PCIe storage enclosure

What to do next

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. Go to “Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 35 and select the procedure for replacing a disk drive or solid-state drive for your operating system.

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.

Removing a disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off

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

Before you begin

If you are installing a new or upgraded disk drive or solid-state drive with the power turned off, see “Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 17. If you are removing a disk drive or solid-state drive as part of a service procedure, continue to use the following procedure.

About this task

DANGER

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

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

- Connect power to this unit only with the provided power cord. Do not use the 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.

(D005a)

Related information:

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

Preparing to remove a disk drive or solid-state drive

About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
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 95.
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 68.
 - 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.
4. Stop the system or logical partition. For instructions, see “Stopping a system or logical partition” on page 102 “Stopping a system or logical partition” on page 102.
5. If you stopped the logical partition, disconnect the power source.
6. Attach the 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.

What to do next

Proceed to the procedure for removing a disk drive or solid-state drive from the system or disk drive enclosure.

Removing the disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Procedure

1. 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.
2. 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.

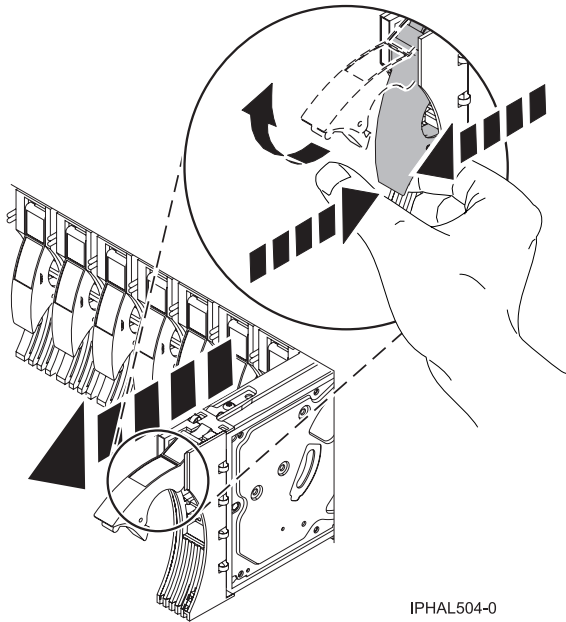


Figure 20. Removing a disk drive from the system

3. If the removed drive has a bezel attached to it, you can remove the disk drive bezel. For instructions, see “Removing a disk drive bezel from a disk drive or filler” on page 51.

Important: If the disk drive bezel does not have a thumbscrew, then the bezel is not removable and the drive is a SAS disk drive. The replacement SAS disk drive comes with a preinstalled bezel.

What to do next

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 35 and select the procedure for replacing a disk drive or solid-state drive for your operating system.

If you are not installing a replacement drive, install a filler in the empty slot to ensure proper air flow for cooling. See Installing a disk drive filler.

Removing a solid-state drive from the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to remove a solid-state drive from the ED/R1 PCIe storage enclosure.

Procedure

1. Pull off the bezel (A) that covers the slot that contains the solid-state drive. See Figure 21 on page 35.
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.

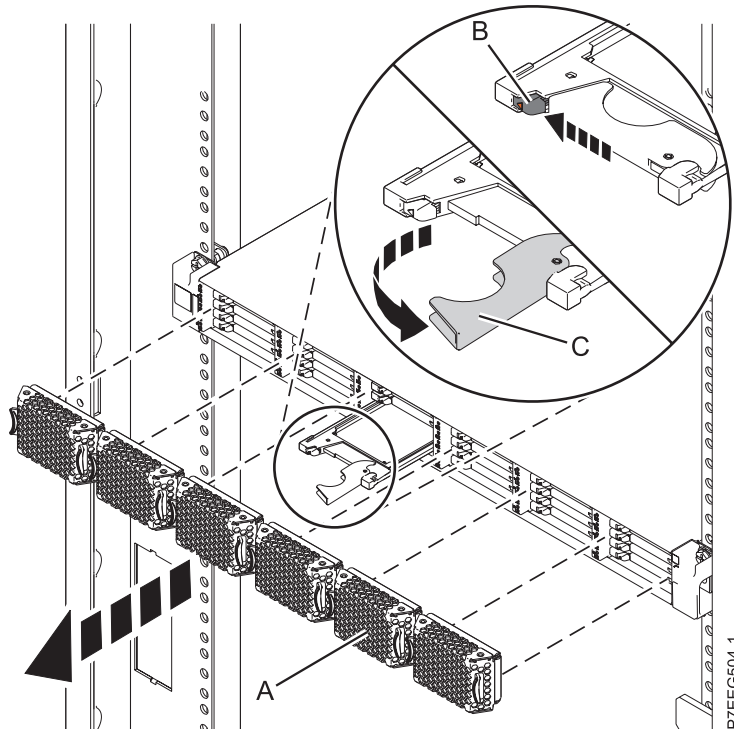


Figure 21. Removing the solid-state drive from the ED/R1 PCIe storage enclosure

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

What to do next

Proceed to the procedure for replacing the failed solid-state drive in the ED/R1 PCIe storage enclosure. If you are not installing a replacement solid-state drive, install a filler in the empty slot to ensure proper air flow for cooling. See the topic for installing a disk drive filler that is relevant to your system.

Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

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.



About this task

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, , 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](#)
-  [Removing and replacing a disk drive in the 5887 disk drive enclosure unit](#)

Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the AIX system or logical partition power turned on

Learn to replace a failed Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) drive in a system or an expansion unit while the power to the AIX operating system or logical partition that controls the drive location is turned on.

Before you begin

In order 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 a disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the AIX system or logical partition power turned on” on page 22. For the procedure to remove a disk-drive filler, see “Removing a disk drive filler from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 48.

Attention: Review the following information to determine if your situation requires for 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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 44.
- If you are installing a new or upgraded drive, see “Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the AIX system or logical partition power turned on” on page 4.

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 perform the task are the same.

Related information:

-  [Removing and replacing a disk drive in the 5887 disk drive enclosure unit](#)

Preparing to replace a disk drive or solid-state drive About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
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.

What to do next

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

Before you begin

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

Procedure

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**.

What to do next

If you are replacing a drive a system or in an expansion unit, proceed to the procedure for replacing a disk drive or solid-state drive in the system or expansion unit.

If you are replacing a drive in an enclosure, proceed to the procedure for replacing a disk drive or solid-state drive in the enclosure.

Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD or in an expansion unit

About this task

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

Procedure

1. If the drive you are installing does not have a bezel preinstalled, then perform the tasks to install a bezel on the drive, then continue with this procedure from step 3. For instructions to install a bezel, see "Installing a disk drive bezel in a disk drive or filler" on page 52.
2. If the drive you are installing has a bezel preinstalled, then go to step 3.
3. 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.
4. 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. Do not hold the disk drive or solid-state drive by the handle.
5. Slide the disk drive or solid-state drive halfway into the system or an expansion unit.
6. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, and then press Enter.

- When the identify LED turns on solid, slide the disk drive or solid-state 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 22.

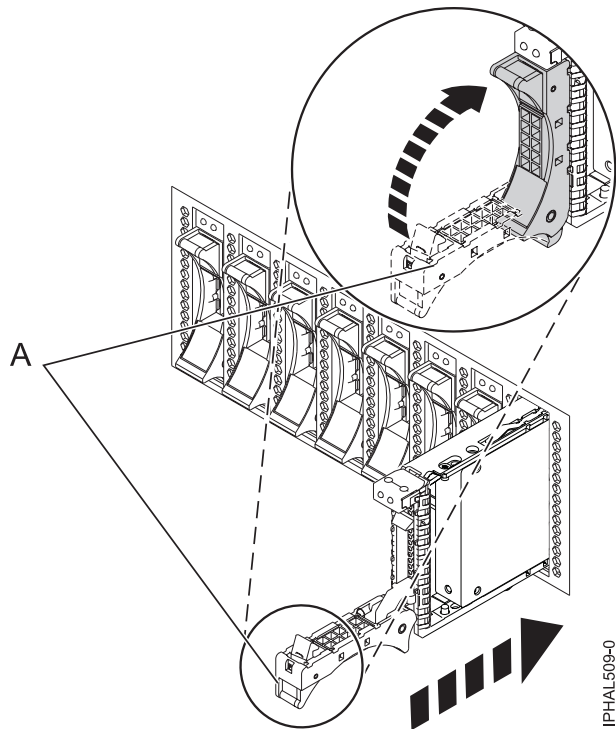


Figure 22. Replacing a disk drive in the system

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

What to do next

Proceed to the procedure for completing the disk drive or solid-state drive replacement by using the diagnostic command.

Replacing a solid-state drive in the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to replace a solid-state drive in the ED/R1 PCIe storage enclosure.

Procedure

- 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.
- Slide the solid-state drive halfway into the ED/R1 PCIe storage enclosure.
- Select the drive that you want to replace and press Enter on the console.
- When the solid-state drive identify LED turns on solid, slide the solid-state drive all the way into the ED/R1 PCIe storage enclosure until it is fully seated. Then rotate the handle (A) to the locked position. See Figure 23 on page 39.
- On the console, press Enter to indicate that you have installed the solid-state drive.

6. Install the bezel (B).

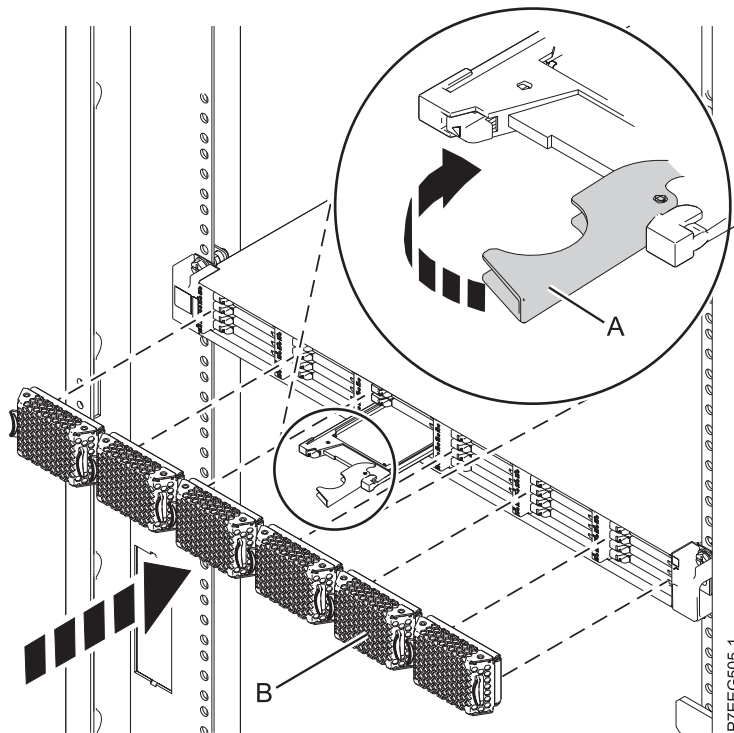


Figure 23. Replacing a solid-state drive in the ED/R1 PCIe storage enclosure.

What to do next

Proceed to the procedure for completing the replacement by using the diagnostic command.

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

About this task

Perform the following tasks after you have replaced the disk drive or solid-state drive:

Procedure

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

About this task

Perform the following tasks after you install or replace the disk drive or solid-state drive in the system or in an expansion unit:

Procedure

1. Connect the cable to the backplane. For instructions, see “Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 56.
2. Replace the front cover. For instructions, see “Installing the front cover on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 110.
3. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.
4. 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 67.
5. 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 68.

Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the power to the Linux system or logical partition turned on

Learn to replace a Small Computer System Interface (SCSI) or serial-attached SCSI (SAS) drive in a system or an expansion unit while the power to the Linux system or logical partition that controls the drive location is turned on.

Before you begin

In order 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 a disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the Linux system or logical partition power turned on” on page 26. For the procedure to remove a disk-drive filler, see “Removing a disk drive filler from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 48.

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

- In either of the following cases, go to “Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 44:
 - 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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the Linux system or logical partition power turned on” on page 10.

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 an expansion unit that you have. However, the steps to perform the task are the same.

Related information:

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

Preparing to replace a disk drive or solid-state drive About this task

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

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
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

About this task

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

Procedure

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

Figure 24. 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.
4. Proceed to replacing the disk drive or solid-state drive in the system or disk drive enclosure.

Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD or in an expansion unit

About this task

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

Procedure

1. If the drive you are installing does not have a bezel preinstalled, then perform the tasks to install a bezel on the drive, then continue with this procedure from step 3 on page 42. For instructions to install a bezel, see “Installing a disk drive bezel in a disk drive or filler” on page 52.
2. If the drive you are installing has a bezel preinstalled, then go to step 3 on page 42.

3. 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.
4. 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. Do not hold the disk drive or solid-state drive by the handle.
5. Slide the disk drive or solid-state drive halfway into the system or an expansion unit.
6. On the Verify Device Concurrent Add display, verify that the selected drive is the drive you want to replace, and then press Enter.
7. When the identify LED flashes, slide the disk drive or solid-state 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 25.

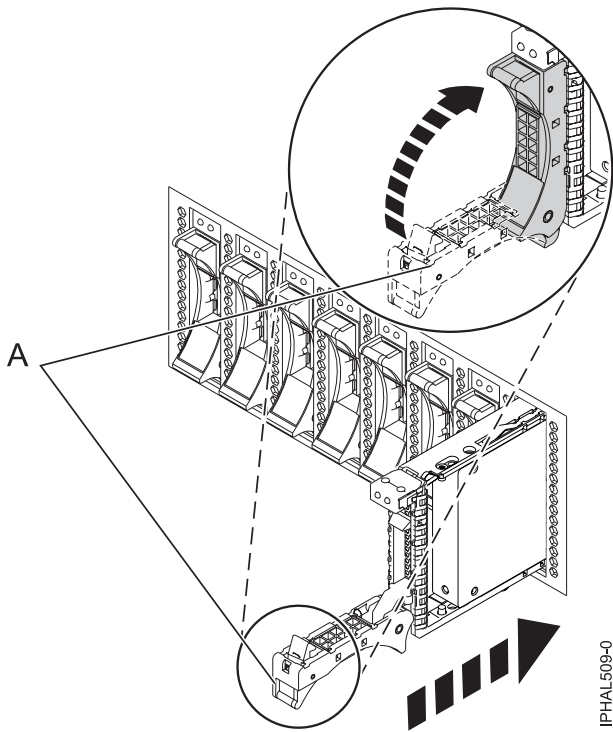


Figure 25. Replacing a disk drive in the system

What to do next

Proceed to the procedure for completing the disk drive or solid-state drive replacement.

Replacing a solid-state drive in the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to replace a solid-state drive in the ED/R1 PCIe storage enclosure.

Procedure

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 ED/R1 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 ED/R1 PCIe storage enclosure until it is fully seated. Then rotate the handle (A) to the locked position. See Figure 26.
5. Install the bezel (B).

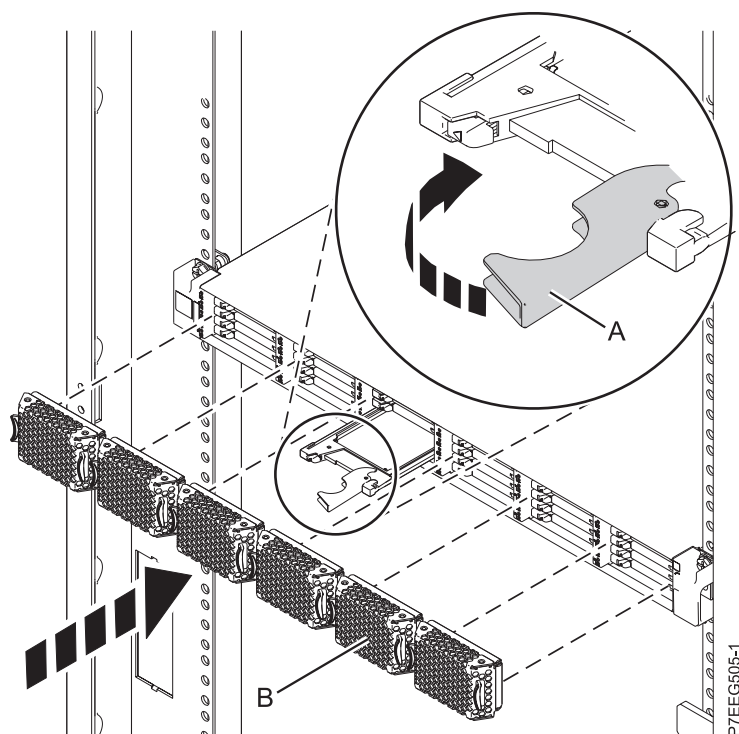


Figure 26. Replacing a solid-state drive in the ED/R1 PCIe storage enclosure.

What to do next

Proceed to the procedure completing the replacement by using the `iprconfig` command.

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

Before you begin

Perform the following tasks by using the `iprconfig` command:

Procedure

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

About this task

Perform the following tasks after you install or replace the disk drive or solid-state drive in the system or in an expansion unit:

Procedure

1. Connect the cable to the backplane. For instructions, see “Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 56.

2. Replace the front cover. For instructions, see “Installing the front cover on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 110.
3. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.
4. 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 71.

Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off

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

Before you begin

To complete this procedure, you must have already removed the drive. For the procedure to remove a drive, see “Removing a disk drive or solid-state drive from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 31. If you are installing a new or upgraded disk drive, see “Installing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD with the system or logical partition power turned off” on page 17.

About this task

DANGER

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

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

- Connect power to this unit only with the provided power cord. Do not use the 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.

(D005a)

If you are replacing a disk drive or solid-state drive as part of a service procedure, continue with this procedure.

Related information:

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

Replacing a disk drive or solid-state drive in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD or in an expansion unit

Procedure

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD" on page 48.
2. If the drive you are installing does not have a bezel preinstalled, then perform the tasks to install a bezel on the drive, then continue with this procedure from step 4 on page 46. For instructions to install a bezel, see "Installing a disk drive bezel in a disk drive or filler" on page 52.
3. If the drive you are installing has a bezel preinstalled, then go to step 4 on page 46.

4. 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.
5. 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. Do not hold the disk drive or solid-state drive by the handle.
6. Slide the disk drive or solid-state 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 27.

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

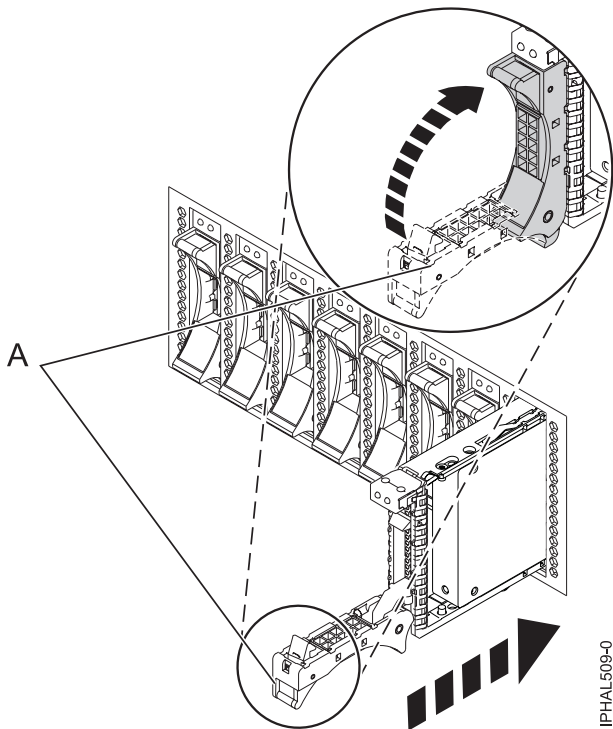


Figure 27. Replacing a disk drive or solid-state drive in the system

What to do next

Proceed to the procedure for completing the disk drive or solid-state drive replacement.

Replacing a solid-state drive in the ED/R1 PCIe storage enclosure

About this task

Perform the following steps to replace a solid-state drive in the ED/R1 PCIe storage enclosure.

Procedure

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 ED/R1 PCIe storage enclosure until the drive stops.
3. Rotate the handle (A) to the locked position, as shown in Figure 28 on page 47.

4. Install the bezel (B).

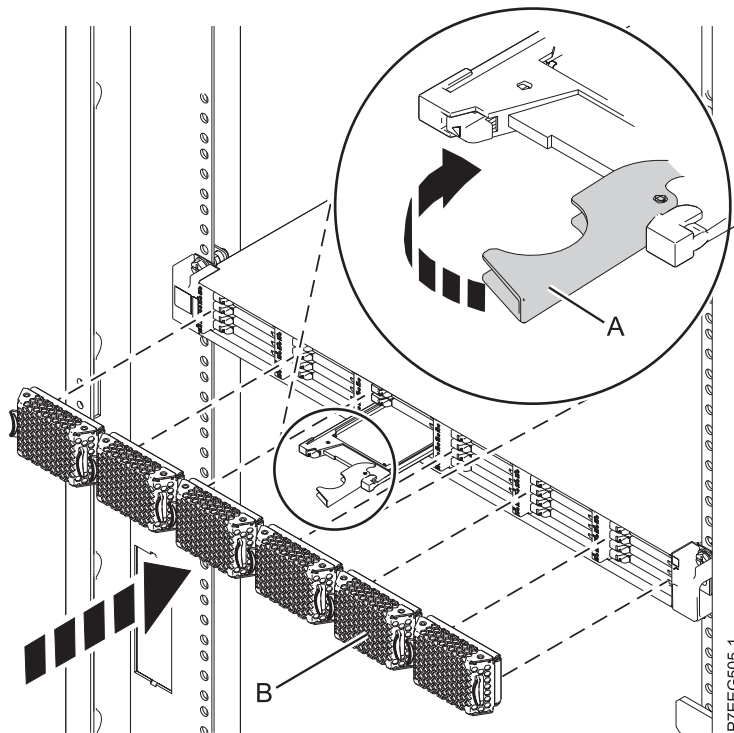


Figure 28. Replacing a solid-state drive in the ED/R1 PCIe storage enclosure.

What to do next

Proceed to the procedure for completing the replacement.

Completing the procedure About this task

Perform the following tasks after you install or replace the disk drive or solid-state drive in the system or in an expansion unit:

Procedure

1. Connect the cable to the backplane. For instructions, see “Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 56.
2. Replace the front cover. For instructions, see “Installing the front cover on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 110.
3. Start the system or logical partition. For instructions, see “Starting the system or logical partition” on page 100.
4. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.
5. 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 67.

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

6. 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 68.
 - “Rebuilding data on a replacement disk drive or solid-state drive in a system or logical partition running Linux” on page 71.

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

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

About this task

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. Perform the following tasks to remove the filler before installing a drive in the slot.

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

Procedure

1. Identify the slot containing 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.
2. Hold the filler handle (A) and pull out the disk drive filler from the slot, as shown in Figure 29 on page 49.

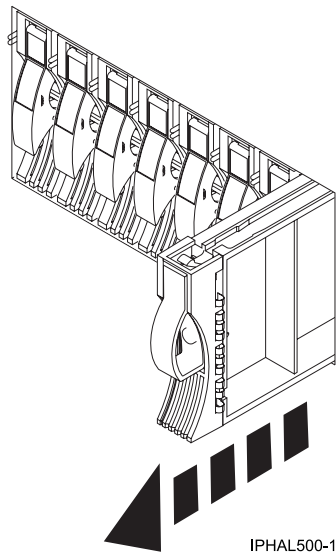


Figure 29. Removing a disk drive filler from the system

What to do next

- If the disk drive filler has a bezel attached, remove the bezel. For instructions, see “Removing a disk drive bezel from a disk drive or filler” on page 51.
- Return to the procedure that you brought you here.

Installing a disk drive filler in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

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

Procedure

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

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
2. Press in and then tighten the thumbscrew (B) to secure the bezel to the drive.
 3. Install the disk drive bezel latch (C) onto the front of the filler, as shown in the figure.

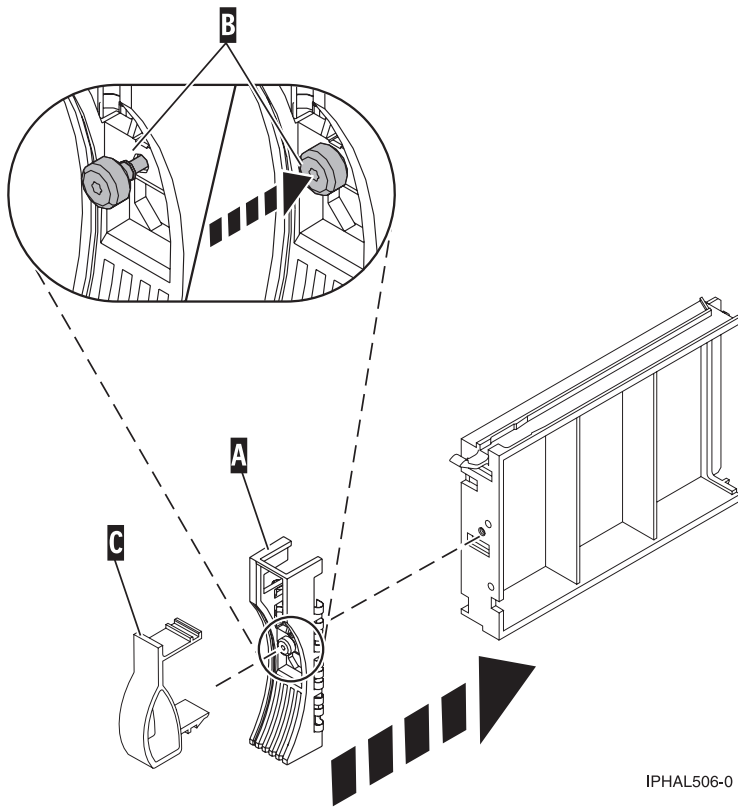


Figure 30. Attaching a bezel to a disk-drive filler

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

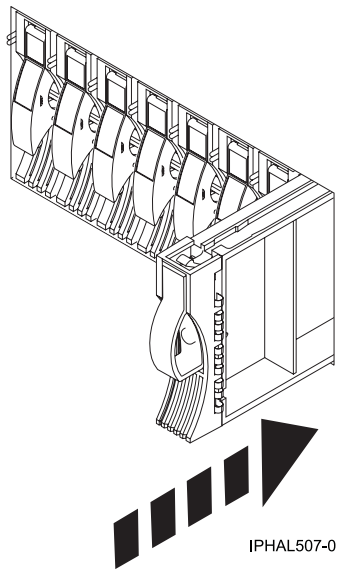


Figure 31. Installing a disk drive filler

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

Removing or installing a disk drive bezel

Learn how to remove or install the disk drive bezel from and into a disk drive.

Removing a disk drive bezel from a disk drive or filler

Learn how to remove a disk drive bezel from a disk drive or a disk drive filler.

About this task

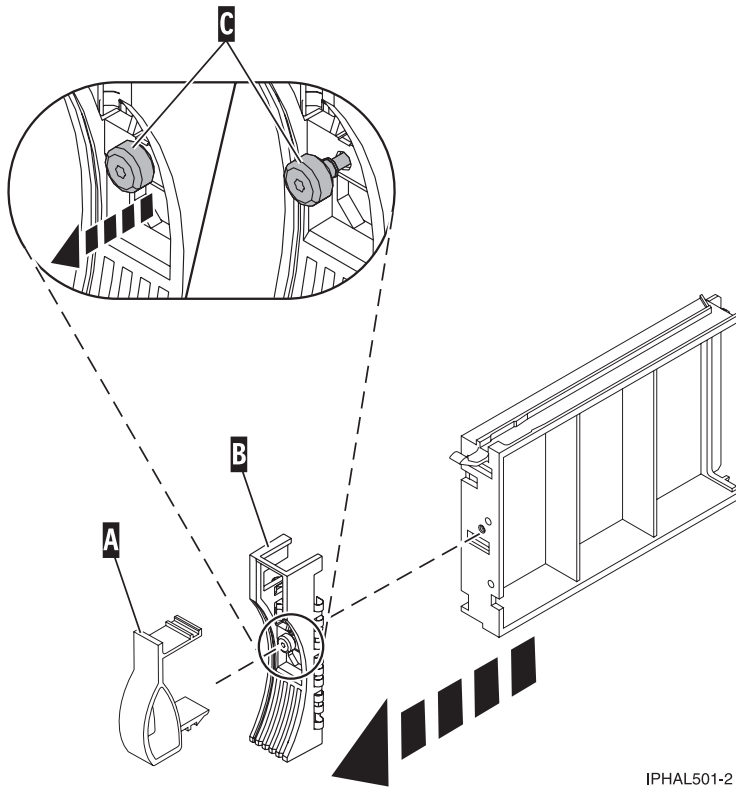
Learn to remove the disk drive bezel from either a failed disk drive that had a bezel installed in it or from the disk drive filler in the slot where you are replacing the failed disk drive. The removed disk drive bezel must be attached in the replacement disk drive or a disk drive filler before installing the disk drive or filler in the system or expansion unit. To install a disk drive filler, see “Installing a disk drive bezel in a disk drive or filler” on page 52. Perform the steps in this procedure only if the disk drive or the disk drive filler has a disk drive bezel attached to it.

Important: If the disk drive bezel does not have a thumbscrew, it is not removable and is a SAS disk drive.

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

Procedure

1. From the removed disk drive or disk drive filler, gently pull off the disk drive bezel latch **(A)** from the front of the filler, as shown in Figure 32 on page 52.
2. Loosen and then pull out on the thumbscrew **(C)** to release the bezel **(B)** from the front edge of the filler.



IPHAL501-2

Figure 32. Removing a disk drive bezel

3. Retain the removed disk drive bezel safely and use the removed bezel to attach it to the replacement disk drive or a disk drive filler.

What to do next

Return to the procedure that brought you here.

Installing a disk drive bezel in a disk drive or filler

Learn how to install a disk drive bezel into a disk drive.

About this task

You must have removed the disk drive bezel from either a failed disk drive that had a bezel installed in it or from the disk drive filler. To remove a disk drive filler, see “Removing a disk drive bezel from a disk drive or filler” on page 51. Perform the steps in this procedure only if the disk drive or the disk drive filler removed had a disk drive bezel attached to it.

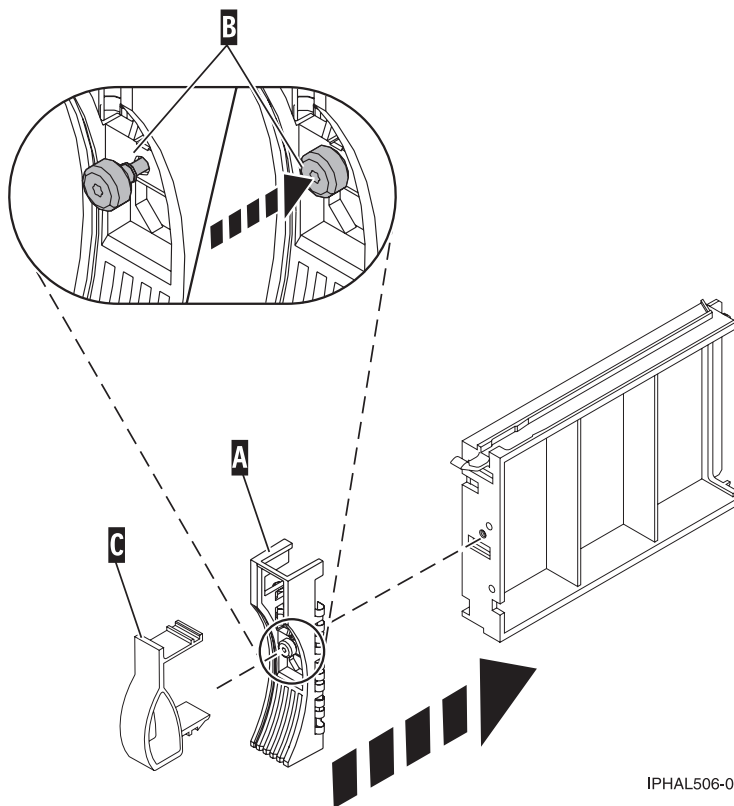
Note: If the disk drive bezel does not have a thumbscrew, it is not removable and is a SAS disk drive. The replacement SAS disk drive comes with an attached bezel.

Procedure

1. Attach the disk drive bezel (A) to the disk drive or to a 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.
2. Press in and then tighten the thumbscrew (B) to secure the bezel to the disk drive or filler.
 3. Install the disk drive bezel latch (C) onto the front of the disk drive or filler, as shown in Figure 33.



IPHAL506-0

Figure 33. Attaching a bezel to a disk drive filler

What to do next

Return to the procedure that brought you here.

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 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Use this procedure to remove an external SAS port as a part of upgrading your disk drive backplane, to remove a failed SAS port, or to enable internal disk sharing.

About this task

Complete the following steps to remove the external SAS port in the server:

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. Stop the system or logical partition. For instructions, see “Stopping a system or logical partition” on page 102 “Stopping a system or logical partition” on page 102.
3. Disconnect all PCI adapters and remove them from the adapter cassettes. For instructions to remove the PCI adapter cassette from the system or expansion unit, see Removing a PCI adapter from a cassette.
4. Press the side tab and pull the SAS shroud (A) out of the SAS connection port on the system backplane, as shown in Figure 34.
5. Push the external SAS port down (B) and then pull the SAS cable out of the system.

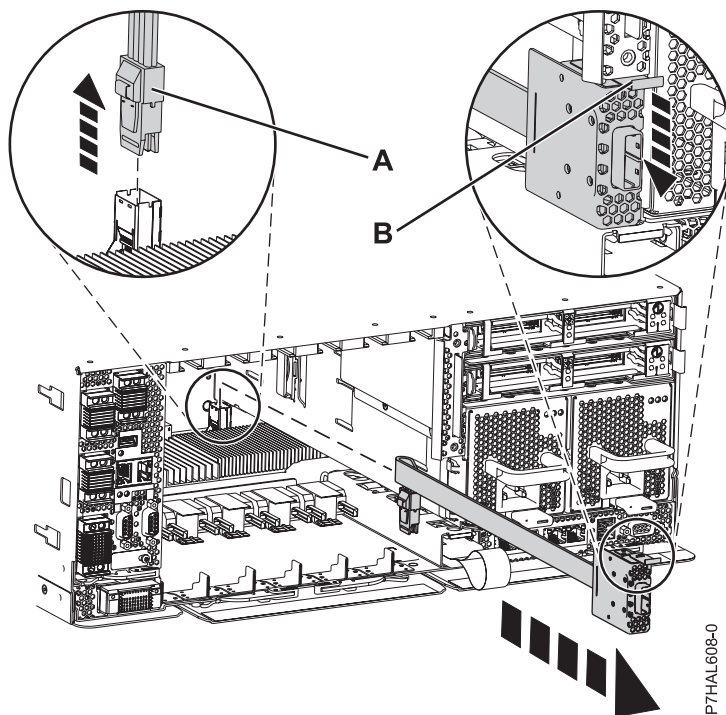


Figure 34. Removing the SAS cable

Results

- You can proceed to replace the failed SAS port with a new SAS port. For instructions, see “Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 56.
- You can install a filler in the removed SAS port connection ports in the system backplane.

Installing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Use this procedure to install an external SAS port as a part of upgrading your disk drive backplane, or to enable internal disk sharing.

About this task

Complete the following steps to install the external SAS port in the server:

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. Stop the system or logical partition. For instructions, see “Stopping a system or logical partition” on page 102 “Stopping a system or logical partition” on page 102.
3. Disconnect all PCI adapters and remove them. For instructions to remove the PCI adapter cassette from the system or expansion unit, see Removing a PCI adapter from a cassette.
4. If the SAS connection port contains a filler, remove the filler.
5. Connect the external port to the back of the system **(B)** until it snaps in place.
6. Push the SAS shroud **(A)** into the SAS connection on the system backplane until it snaps in place.

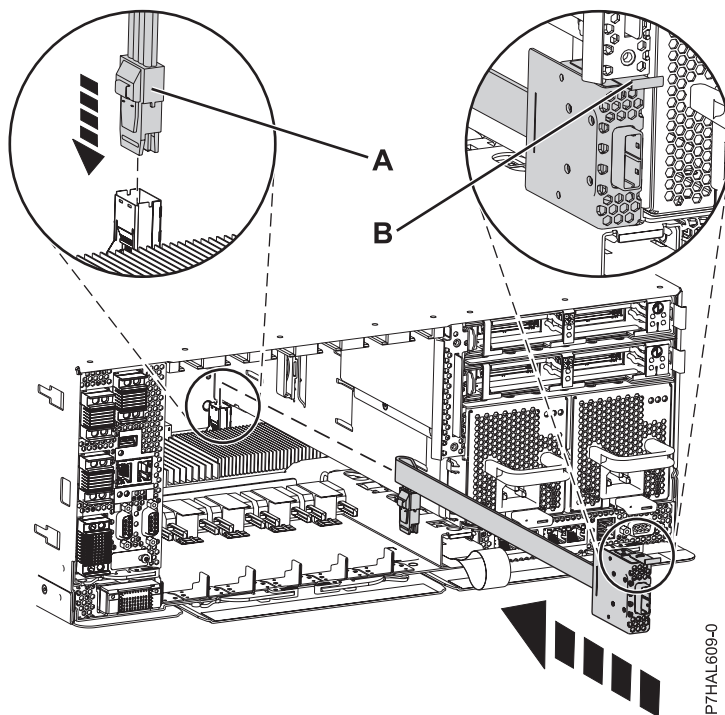


Figure 35. Installing the external SAS port

7. Replace all PCI adapters in the adapter cassettes. To install the PCI adapter cassette in the system or expansion unit, see Installing a PCI adapter contained in a cassette.

8. Start the system or logical partition. For instructions, see “Starting the system or logical partition” on page 100.
9. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.

Results

You may now attach other supported SAS features to your system.

Replacing the external SAS port in the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Use this procedure to replace an external SAS port as a part of upgrading your disk drive backplane, to replace a failed SAS port, or to enable internal disk sharing.

About this task

You must have removed the failed SAS port before you replace the SAS port. For the removal procedure, see “Removing the external SAS port from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD” on page 54. Complete the following steps to replace the external SAS port in the server:

Procedure

1. Connect the external port to the back of the system **(B)** until it snaps in place, as shown in Figure 36.
2. Push the SAS shroud **(A)** into the SAS connection on the system backplane until it snaps in place.

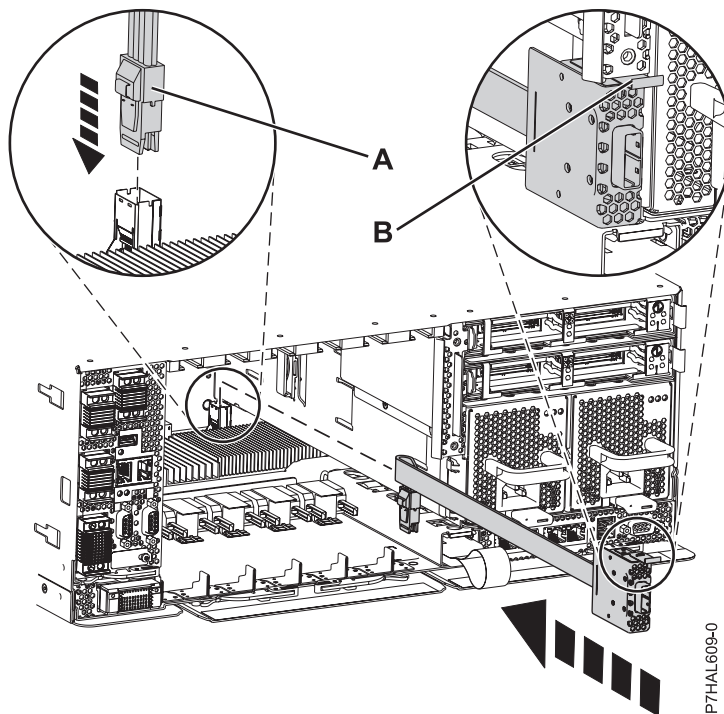


Figure 36. Replacing the SAS cable

3. Replace all PCI adapters in the adapter cassettes. To install the PCI adapter cassette in the system or expansion unit, see Installing a PCI adapter contained in a cassette.

4. Start the system or logical partition. For instructions, see “Starting the system or logical partition” on page 100.
5. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part. For instructions, see “Verifying the installed part” on page 111.

Results

You may now attach other supported SAS features to your system.

Internal disk drive sharing for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

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

Before you begin

Review the disk drive modes and supported disk drive locations, as shown in Table 1. The following figure shows the disk drive locations for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD.

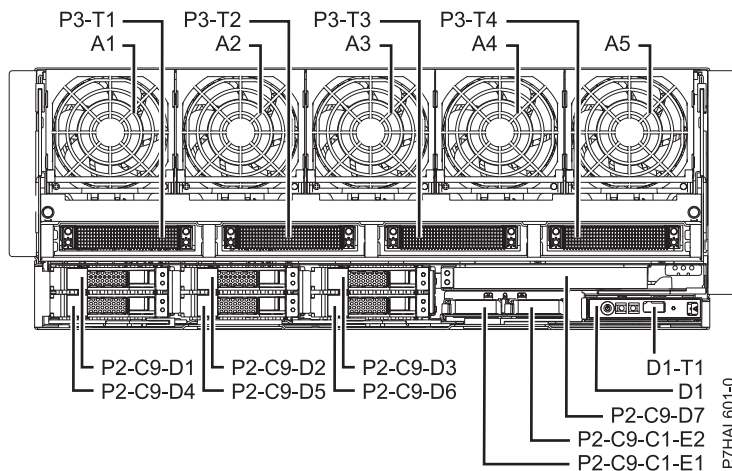


Figure 37. Disk drive locations

Table 2. Disk drive modes and supported disk drive locations

Disk drive mode	SAS port card	Adapter	SAS cable	Disk drive location
RAID internal drives	None	Integrated Dual RAID controller	None	D1, D2, D3, D4, D5, and D6
RAID internal and external drives	SAS External Port feature (FC 1819) - SAS Cable Assembly for SAS Port	Integrated Dual RAID controller	<ul style="list-style-type: none"> • YI Cable (FC 3686) - System to SAS Enclosure, Single Controller/Dual Path 1.5 meter • YI Cable (FC 3687) - System to SAS Enclosure, Single Controller/Dual Path 3 meter 	D1, D2, D3, D4, D5, and D6

Table 2. Disk drive modes and supported disk drive locations (continued)

Disk drive mode	SAS port card	Adapter	SAS cable	Disk drive location
Dual Split Backplane	None	<ul style="list-style-type: none"> Integrated SAS controller (SAS A) Integrated SAS controller (SAS B) 	None	<ul style="list-style-type: none"> D1, D2, and D3 D4, D5, and D6
Triple Split Backplane	SAS Internal Port feature (FC1815) - SAS Cable for triple split disk drive backplane	<ul style="list-style-type: none"> Integrated SAS controller (SAS A) Integrated SAS controller (SAS B) (FC 5901) - PCIe Dual-x4 SAS Adapter 	AI Cable (FC 3679) - Adapter to Internal drive 1 meter	<ul style="list-style-type: none"> D1 and D4 D2 and D5 D3 and D6

The following information is for use after the FC 5901 SAS Storage Adapter is installed. Install the adapter and then return here. See the PCI adapters topic for more information, PCI adapters.

You should also review the tasks in “Before you begin” on page 93 if you have not already done so.

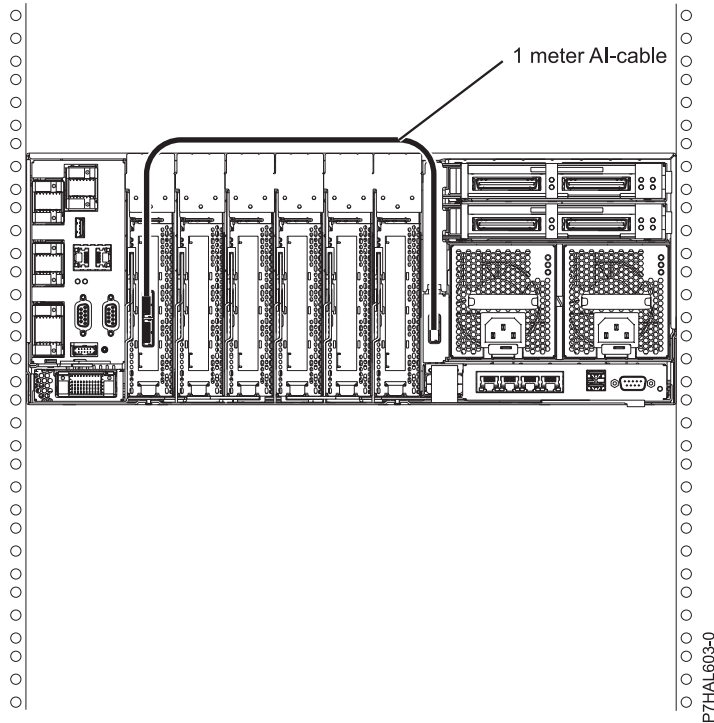
About this task

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

Procedure

1. Stop and power off the system if it is not already, see “Stopping a system or logical partition” on page 102.
2. Cable a single system unit enclosure by doing the following:
 - a. Attach the cable to the SAS port on the rear bulkhead of the system unit enclosure to the top port in the SAS Storage Adapter, as shown in the following figure.

Restriction: Internal disk drive sharing is only available when internal cable feature FC1815 is installed from the DASD backplane to the rear bulkhead of the system unit enclosure. Also, feature FC5662 175 MB cache RAID - dual IOA enablement card must not be installed. The SAS Storage Adapter can be in any of the other slots that support it.



- b. Secure any extra cable.
- 3. Start the system, see “Starting the system or logical partition” on page 100.
- 4. Verify that the feature is installed and working, see “Verifying the installed part” on page 111.

Example

With this function installed, 2 of the 6 of the disks in the system enclosure can be managed by the SAS Storage Adapter.

Note: The Removable Media device is always controlled by a separate embedded SAS controller on the system planar.

What to do next

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

Disk drives or solid-state drives locations and service indicators

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

Learn about the disk drives or solid-state drive locations and location of the service indicators on the system 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 38 on page 60 shows the PCIe RAID and SSD SAS adapter locations.

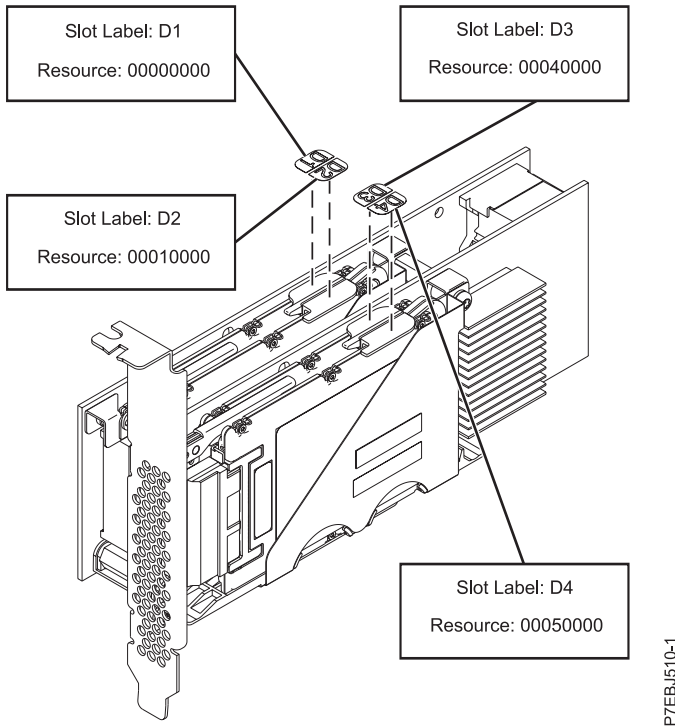


Figure 38. PCIe RAID and SSD SAS adapter locations

Disk drive service indicators for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Learn where the disk drive service indicators are located on your system.

The following figure shows the locations of the disk drive service indicator (A) for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD.

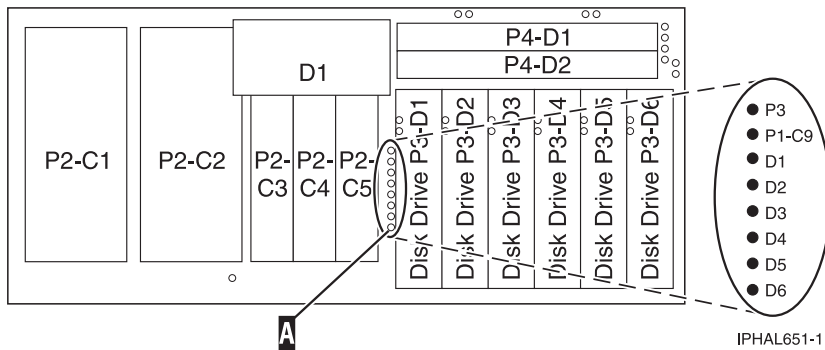


Figure 39. Disk drive service indicators on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Disk-drive locations and service indicators for the 58/87 disk drive enclosure

Learn about the disk-drive locations and where the service indicators are located for the 58/87 disk drive enclosure.

The following figures show the front view and rear view of the 58/87 disk drive enclosure and the disk drive locations in the 58/87 disk drive enclosure.

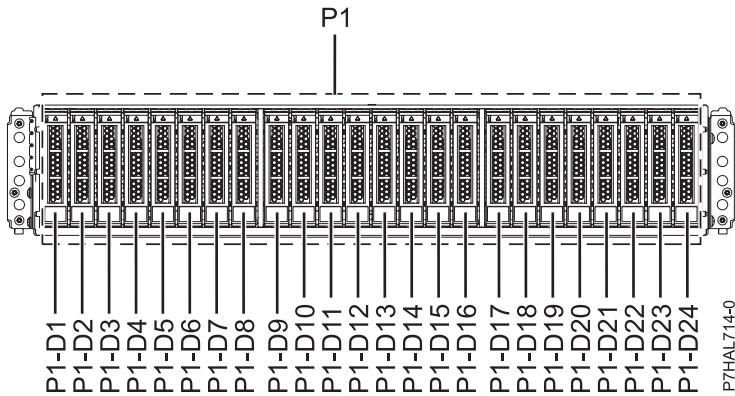


Figure 40. Front view of the 58/87 disk drive enclosure showing the disk-drive locations

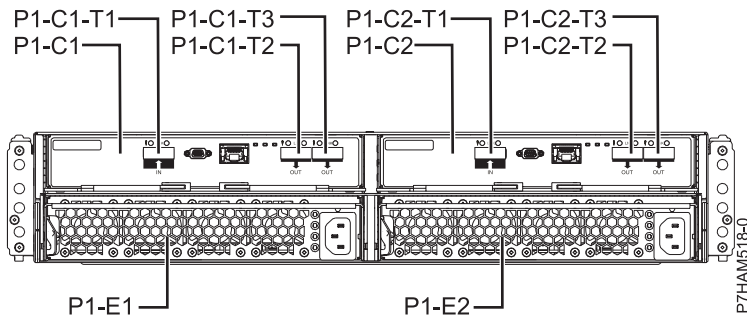


Figure 41. Rear view of the 58/87 disk drive enclosure

The following figure shows the locations of the disk-drive service indicators for the 58/87 disk drive enclosure.

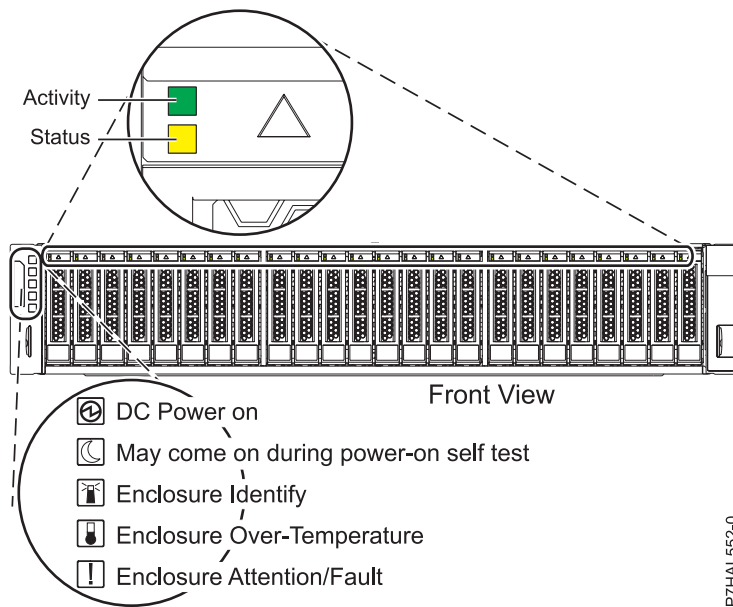


Figure 42. Front view of the 58/87 disk drive enclosure showing the service indicators

Disk drive locations and service indicators for the 58/86 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 58/86 disk drive enclosure.

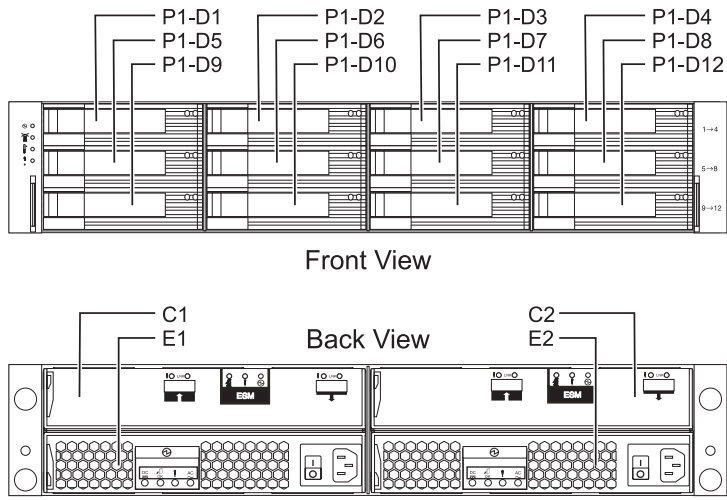


Figure 43. Disk drive locations for the 58/86 disk-drive enclosure

The following figure shows the locations of the disk drive service indicators for the 58/86 disk-drive enclosure.

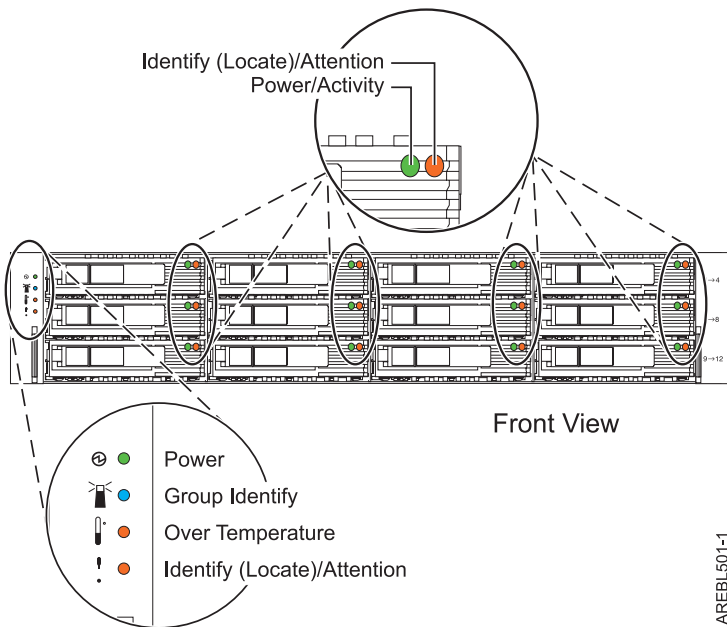


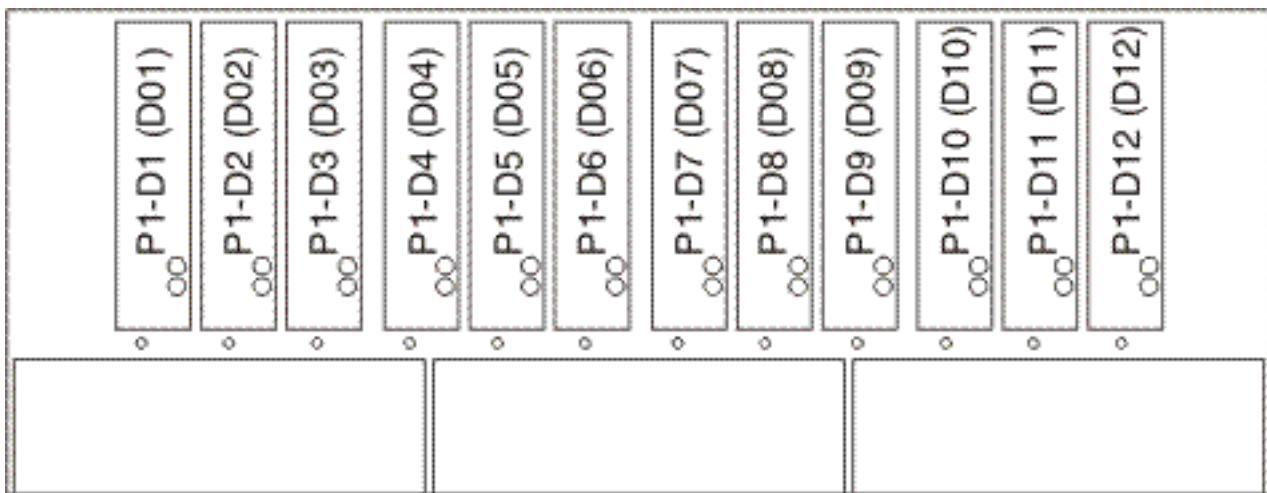
Figure 44. Front view of disk drive enclosure service indicators for the 58/86

Disk drive locations and service indicators for the 31D/24, and 31T/24 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 31D/24, and 31T/24 SCSI disk-drive enclosures.



IPHAL975-0

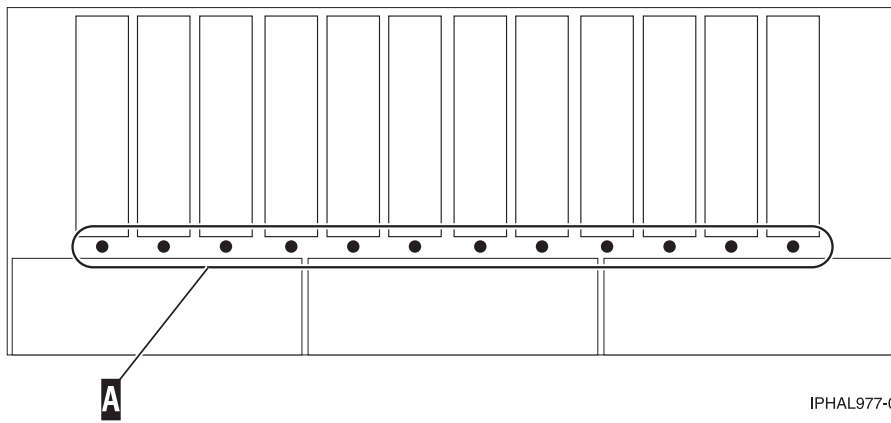
Figure 45. Front view of 31D/24, and 31T/24 SCSI disk-drive enclosures



IPHAL976-0

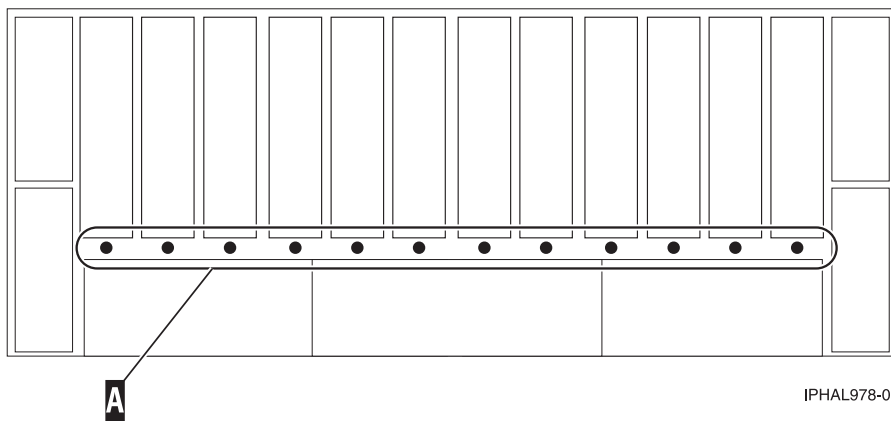
Figure 46. Rear view of 31D/24, and 31T/24 SCSI disk-drive enclosures

The following figures show the locations of the disk drive service indicators (A) for the 31D/24, and 31T/24 SCSI disk-drive enclosures.



IPHAL977-0

Figure 47. Front view of service indicators for 31D/24, and 31T/24



IPHAL978-0

Figure 48. Rear view of service indicators for 31D/24, and 31T/24

Disk-drive locations and service indicators for the 58/02 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 58/02.

Service indicators are located at the bottom of the latch handle on each disk drive.

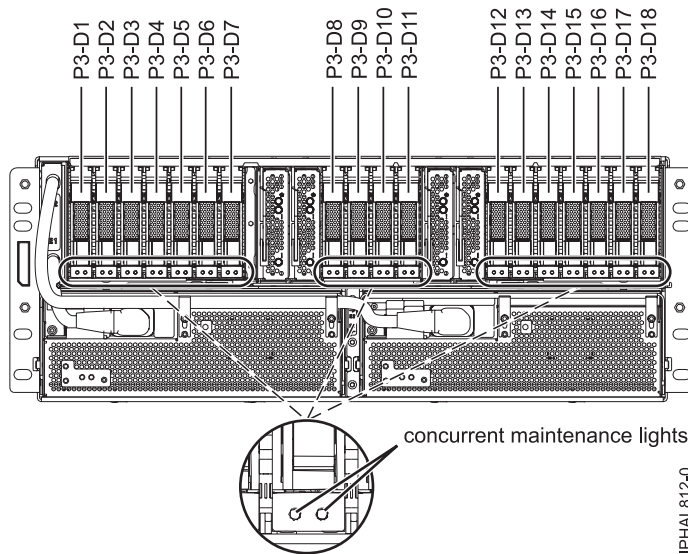


Figure 49. Disk drive locations

Related information:

Cabling the 5802 disk subsystem

Solid-state drive locations and service indicators for the ED/R1 PCIe storage enclosure

Learn about the solid-state drive locations and where the service indicators are located for the ED/R1 PCIe storage enclosure.

The following figures show the front view and the rear view of the ED/R1 PCIe storage enclosure and the solid-state drive locations in the ED/R1 PCIe storage enclosure. P1-D1 to P1-D30 are the location codes for the solid-state drives in the ED/R1 PCIe storage enclosure.

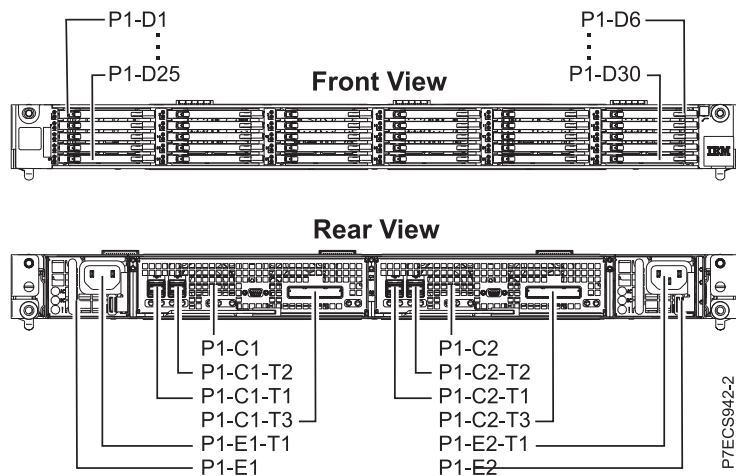


Figure 50. Front view and rear view of the ED/R1 PCIe storage enclosure showing the solid-state drive locations

The following figure shows the locations of the SSD service indicators for the ED/R1 PCIe storage enclosure.

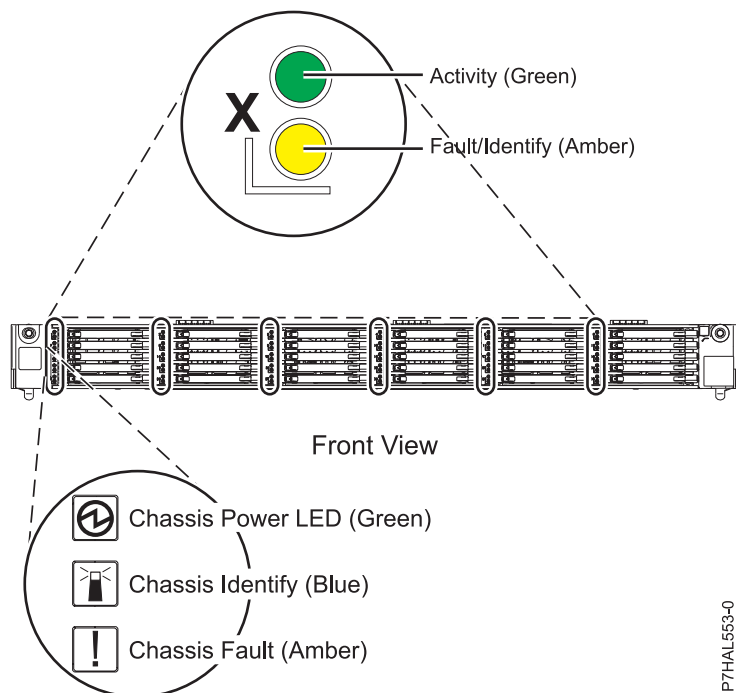


Figure 51. Front view of the ED/R1 PCIe storage enclosure showing the service indicators

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.

About this task

If the drive is attached to a PCI-X SCSI RAID controller in an AIX system or partition, see the *PCI-X SCSI RAID Controller Reference Guide for AIX*.

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.

About this task

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.

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.

About this task

- 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*.

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 Procedure

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

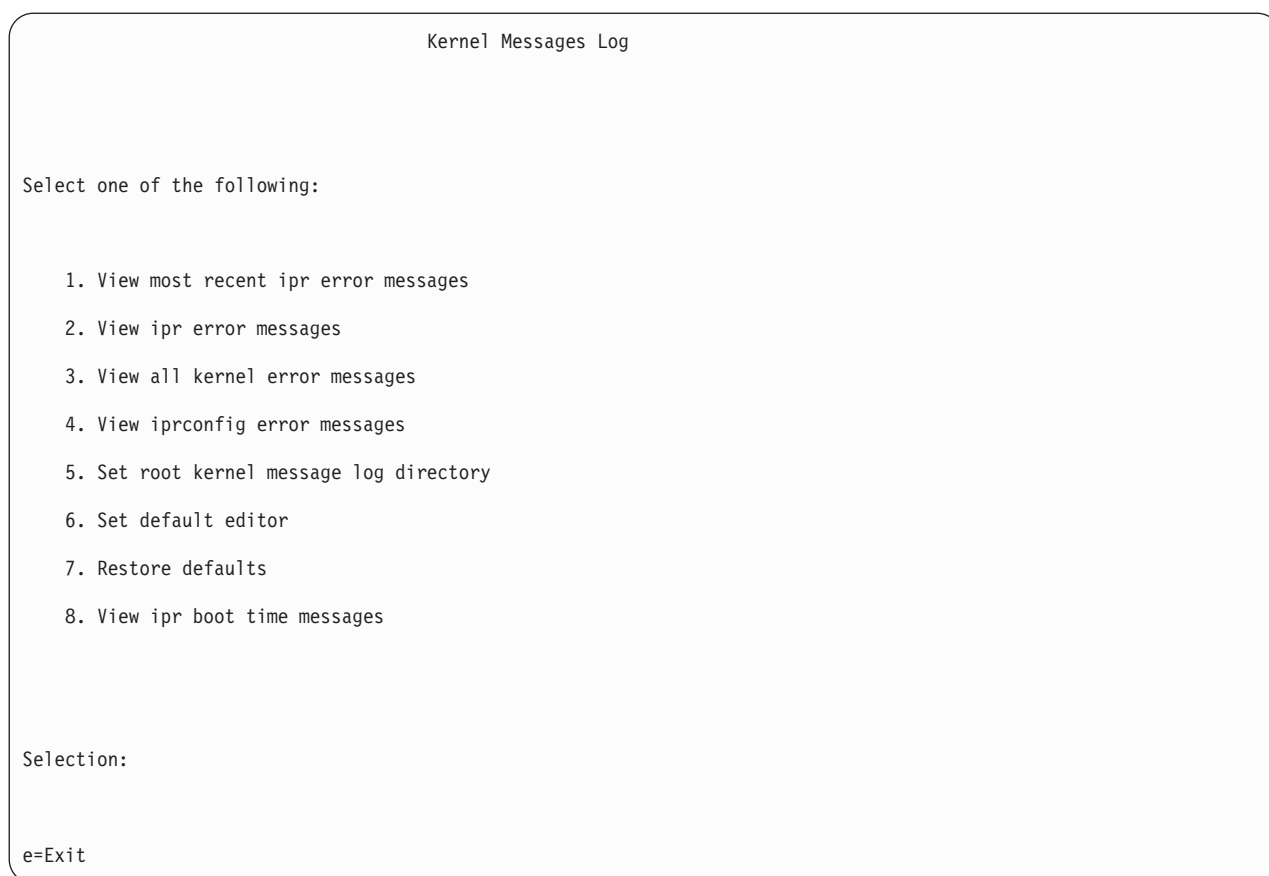


Figure 52. Kernel Messages Log

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

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

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

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

```

Display Hardware Status

Type option, press Enter.

1=Display hardware resource information details

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

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

```

Figure 53. 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*.
 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.

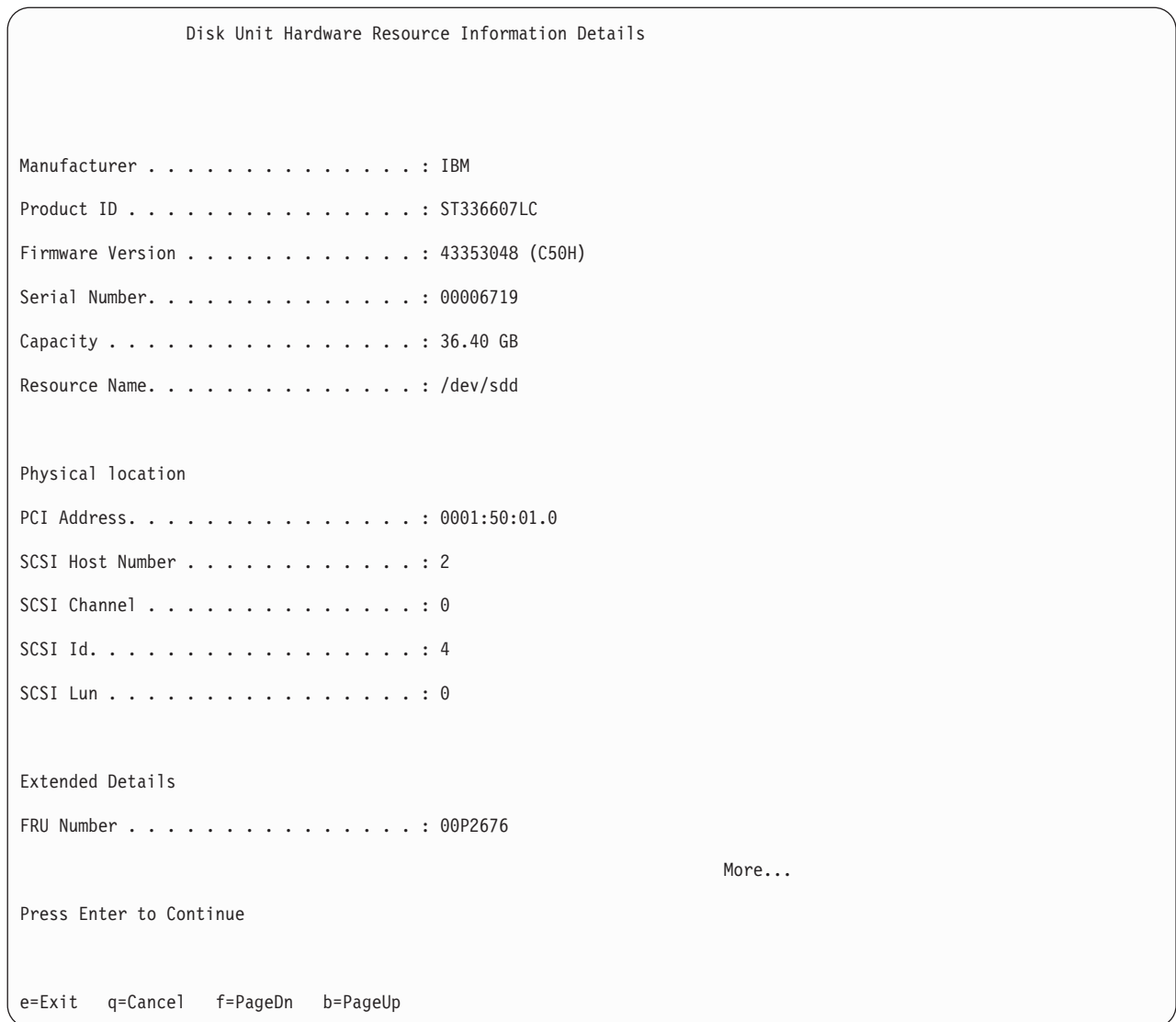


Figure 54. Example Disk Unit Hardware Resource Information Details display

15. Record the physical location information.
16. Return to the 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.

About this task

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*.

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, perform these tasks:

Procedure

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

About this task

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, perform the following procedure using the iprconfig command.

For a disk drive in a RAID Level 5 or RAID Level 10 disk array

Procedure

1. Log in as root user.
2. Type iprconfig on the command line of the Linux session and press Enter. The Configuration Utility display is shown.
3. Select **Work with disk unit recovery** from the 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 55. Example Rebuild Disk Unit Data display

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

Note: Performing 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.

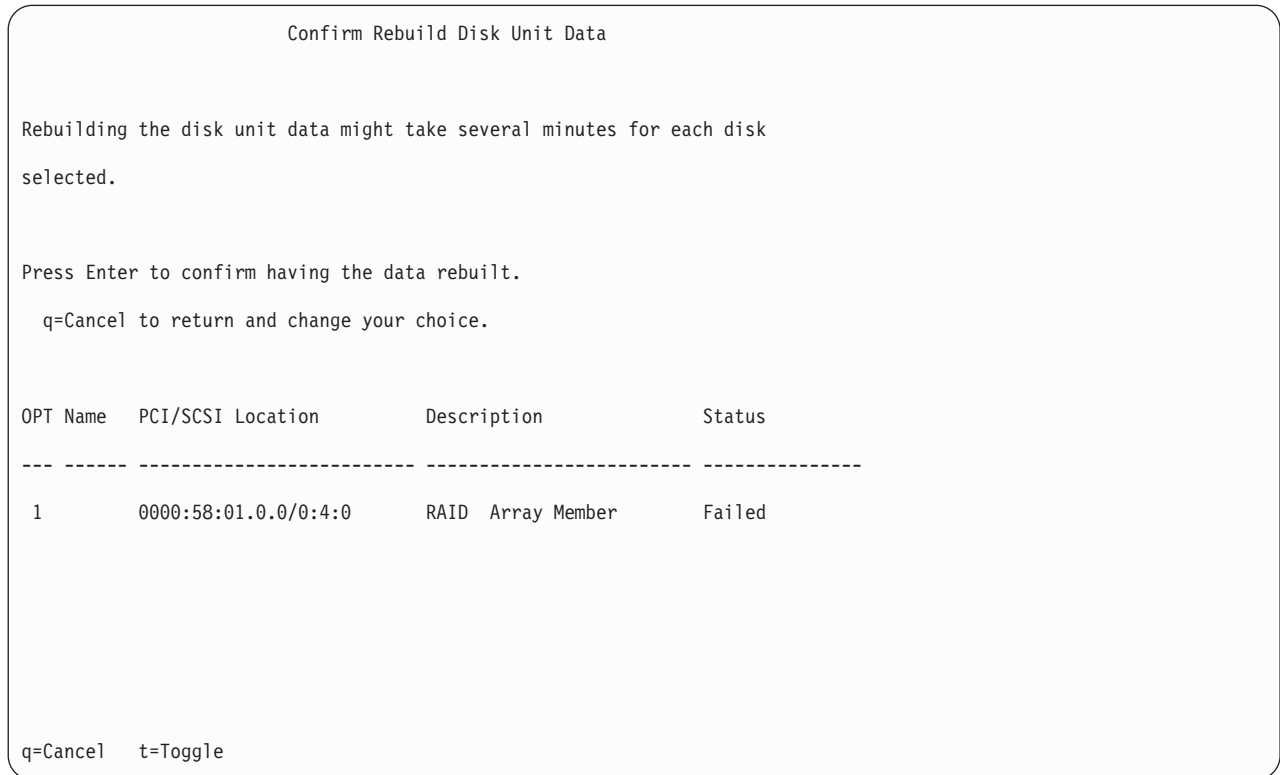


Figure 56. Example Confirm Rebuild Disk Unit Data display

- 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.

Replacing a SAS conduit card in a 58/02 expansion unit with the power turned off

Learn how to replace a SAS conduit card in the 58/02 expansion unit with the power turned off.

Before you begin

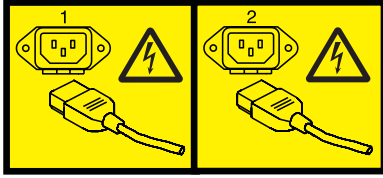
Perform the prerequisite tasks as described in Before you begin.

Procedure

- Stop the system if it is running. For instructions, see Stopping the system or logical partition.
- Disconnect the power source from the system by unplugging the system.

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

(L003)



or



3. Perform 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 57 on page 75.

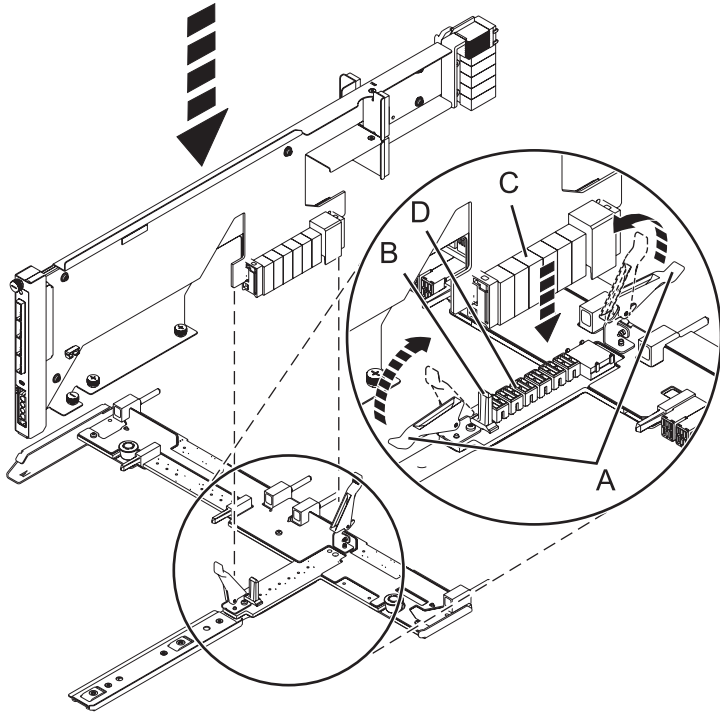


Figure 57. Installing the SAS conduit card into the midplane

4. Perform 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.

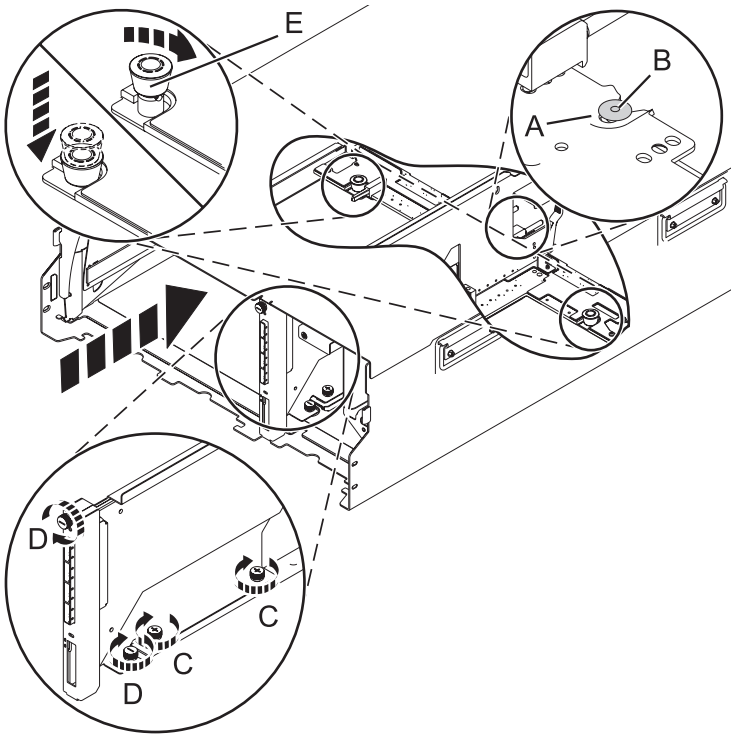


Figure 58. Installing the SAS conduit card and the midplane

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

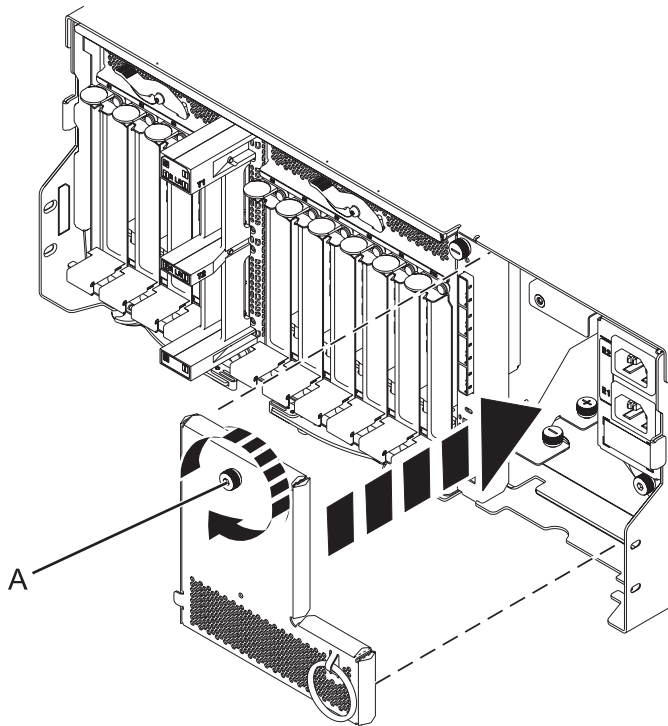


Figure 59. Installing the power cord plate

- Carefully slide the enclosure management controller into the system and close the latch (A) as shown in Figure 60.

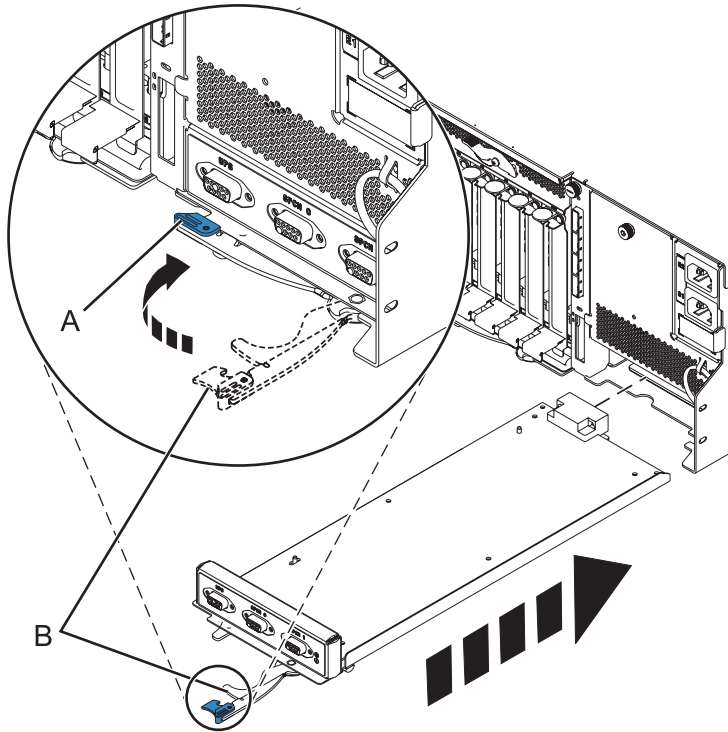


Figure 60. Replacing the enclosure management controller

- Carefully lift and align the I/O system board with the slot at the rear of the expansion unit.
- Insert the I/O system board firmly into the server, as shown in Figure 61 on page 78.
- Secure the I/O system board with the locking tabs (A), as shown in Figure 61 on page 78.

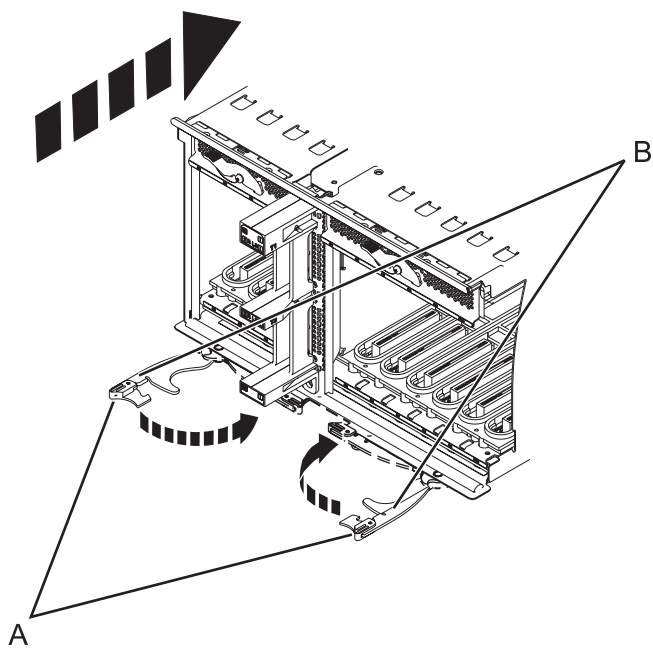


Figure 61. Install the I/O system board on a rack-mounted model

10. To replace the power supply, with the locking handle (A) in the open position, push the power supply into the expansion unit as shown in Figure 62 on page 79.
11. Close the locking handle (A) until the power supply locks into position.

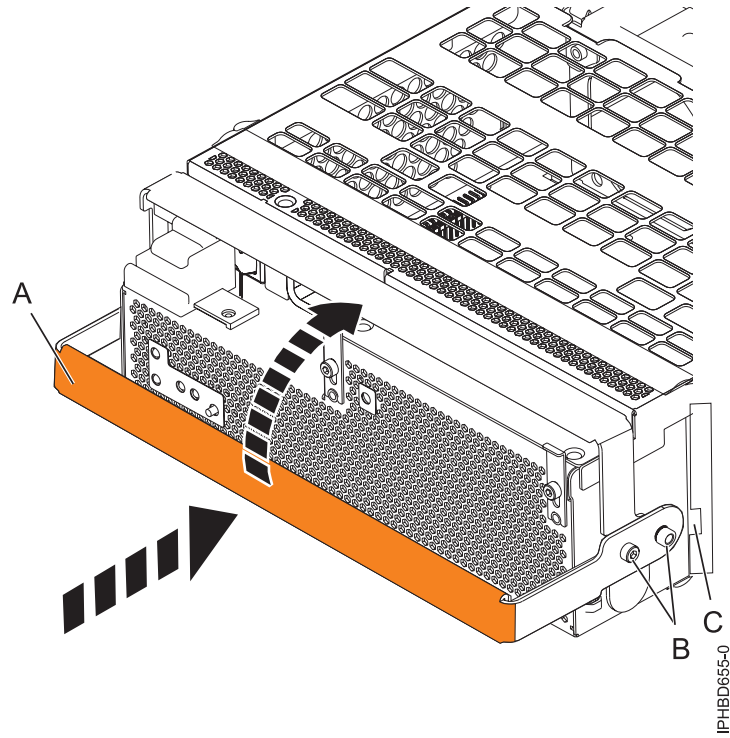


Figure 62. Replacing a power supply

12. 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 perform this task before you begin.

13. Using your hand to support the bottom of the backplane, slide it into the expansion unit as shown in Figure 63 on page 80.
14. Secure the backplane in place by moving the locking tabs from the open position (**B**) to the locked position (**A**).

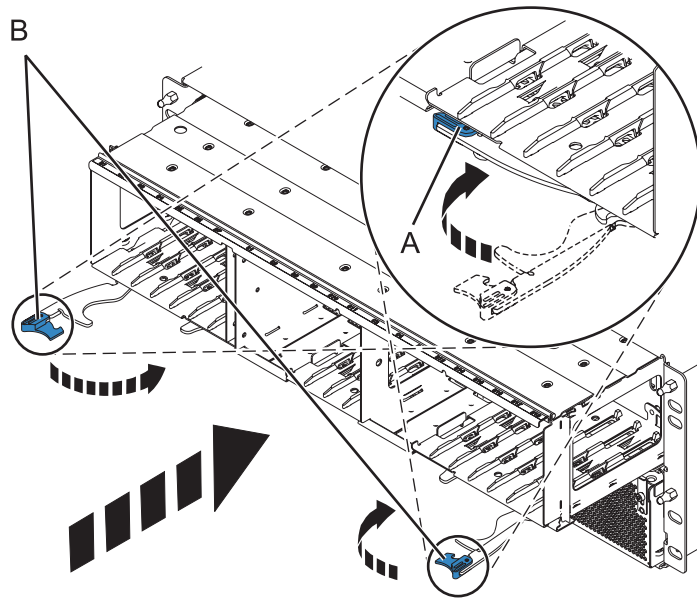
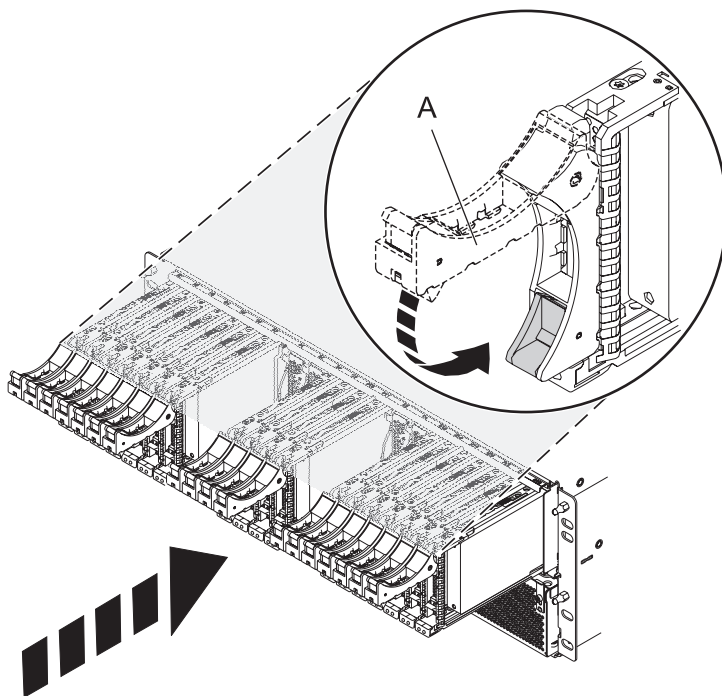
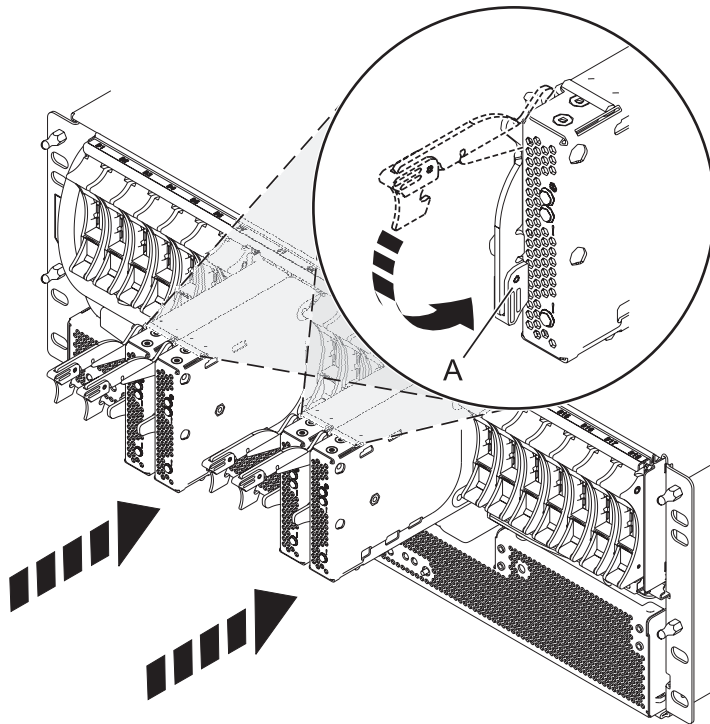


Figure 63. Installing the backplane on a rack-mounted model

15. 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.



16. 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.



17. Start the system. For instructions, see Starting the system or logical partition.

What to do next

Continue with any other service actions you are required to perform.

- For information about connecting the system, see Connecting the expansion units.
- For information about installing the PCI adapters into the system board, see Model 58/02 and 58/77 expansion units, PCI adapters, and cassettes.

Removing a SAS conduit card from a 58/02 expansion unit with the power turned off

Learn how to remove a SAS conduit card from a 58/02 rack-mounted expansion unit if you must replace a failing part with the power turned off.

Before you begin

Perform the following steps to remove a SAS conduit card from a 58/02 rack-mounted expansion unit:

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. Identify the card you want to remove. For information, see “Identifying a part” on page 95.
3. Stop the system or logical partition. For instructions, see “Stopping a system or logical partition” on page 102 “Stopping a system or logical partition” on page 102.

4. Remove the drives and fillers as shown in Figure 64.
 - 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.

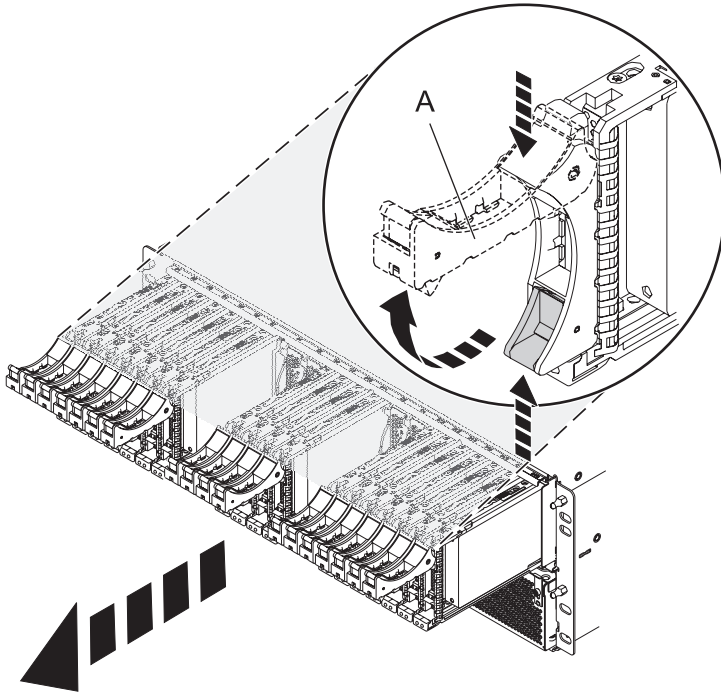


Figure 64. Removing the drives from the backplane

5. Remove the port cards and fillers as shown in Figure 65 on page 83.
 - 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.

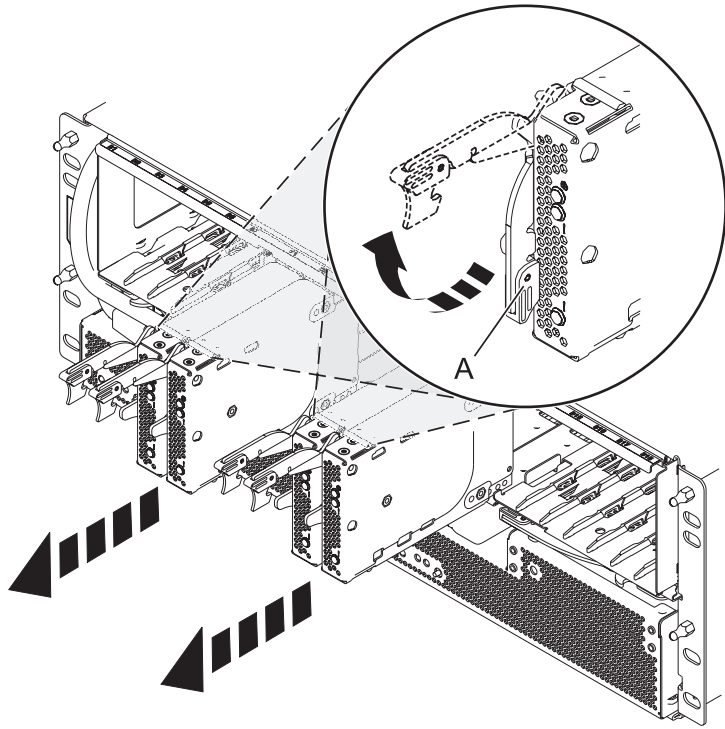


Figure 65. Removing the port card from the backplane

6. Remove the backplane as shown in Figure 66 on page 84.

CAUTION:

The backplane might be heavy. Ensure that you can safely perform 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.

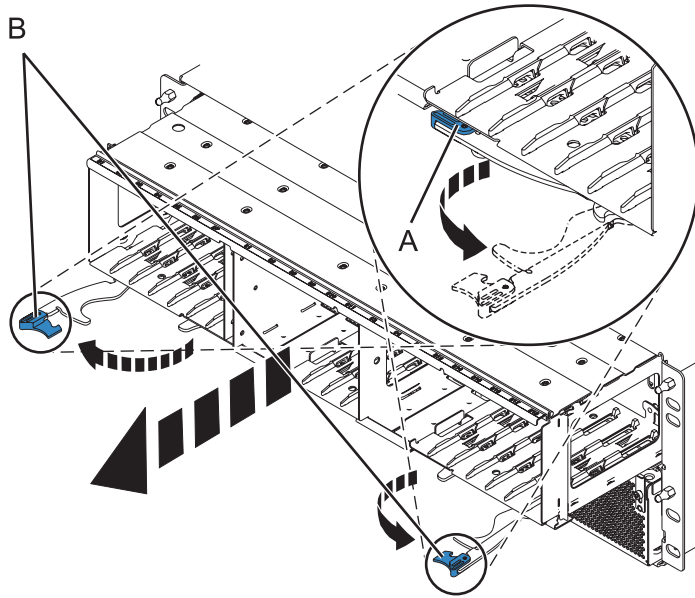


Figure 66. Removing the backplane from the enclosure

7. Disconnect both the offline converter assembly (OCA) power cords by performing the following steps:
 - a. Slide the power cord holders **(A)** to the left, located on the front of both the OCAs. See Figure 67 on page 85.
 - b. Label and disconnect both the OCA power cords **(B)** from each OCA.

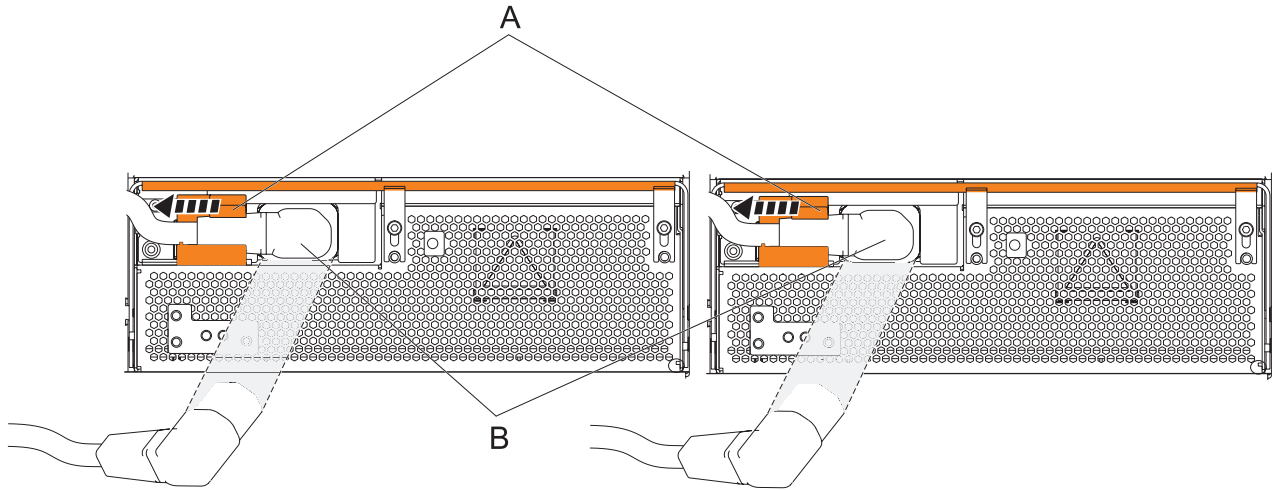


Figure 67. Disconnecting the OCA power cords

8. Remove the offline converter assemblies by performing the following steps:
 - a. Pull the OCA handle (A) all the way down in the direction shown to unseat the OCA. See Figure 68 on page 86.
 - 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.

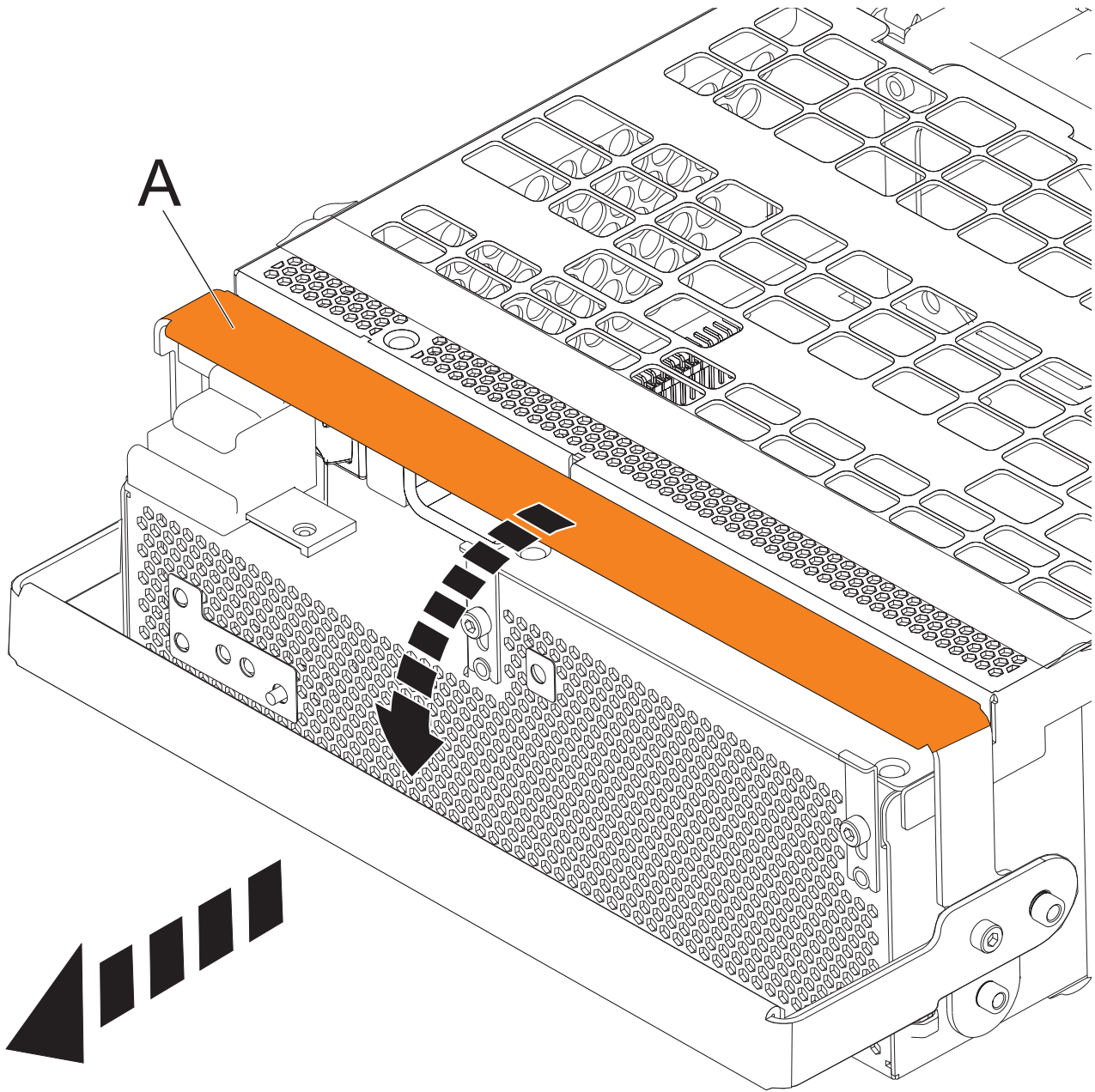


Figure 68. Remove the offline converter assemblies

9. Remove the enclosure management controller by performing 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 69 on page 87.
 - 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.

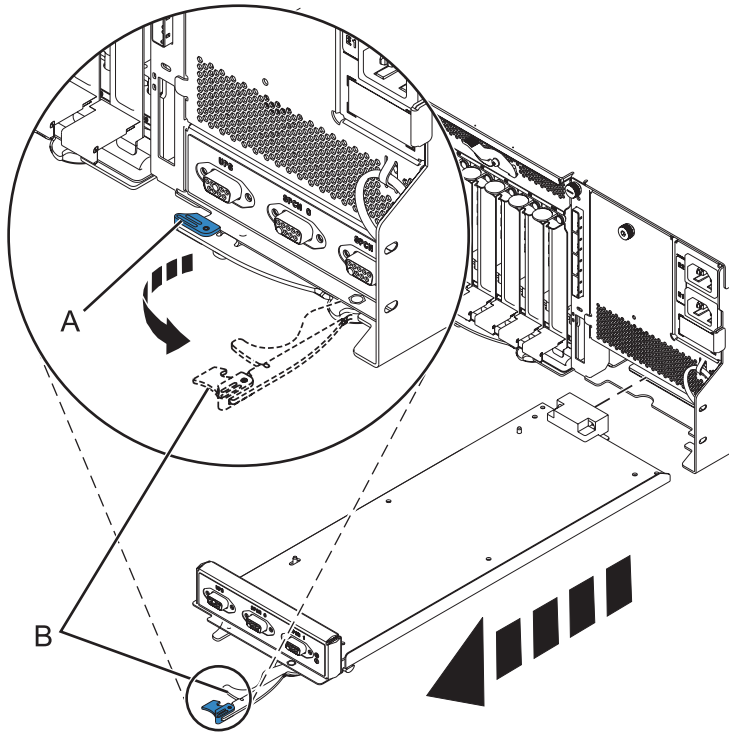


Figure 69. Remove the enclosure management controller

10. Remove the power cord plate by turning the thumbscrew (A) and pulling the plate away from the system, as shown in Figure 70.

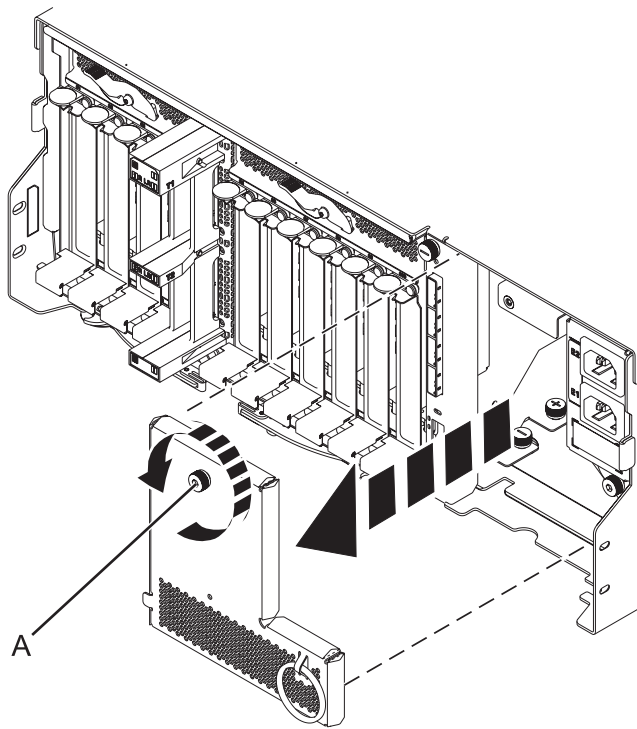


Figure 70. Removing the power cord plate

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 71.

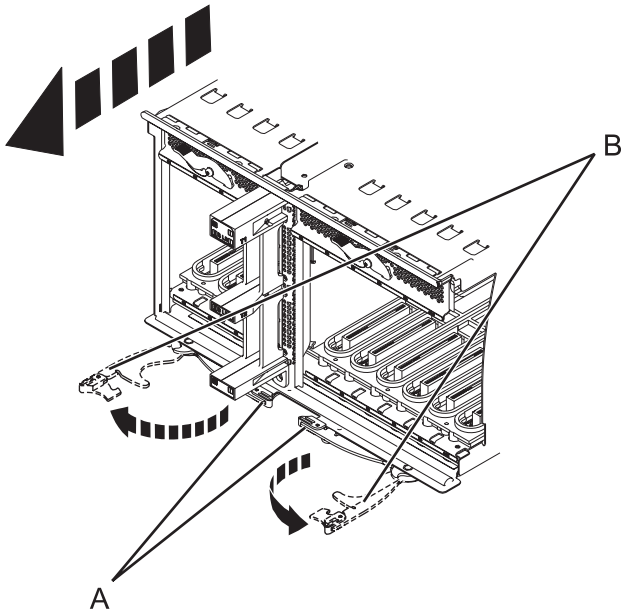


Figure 71. Removing the I/O system board

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.

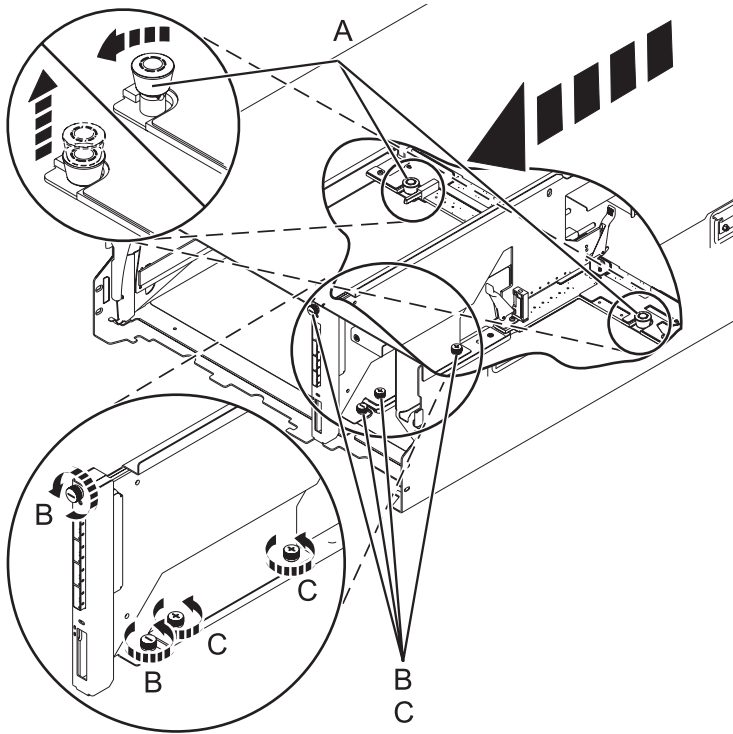


Figure 72. Removing the SAS conduit card and midplane

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

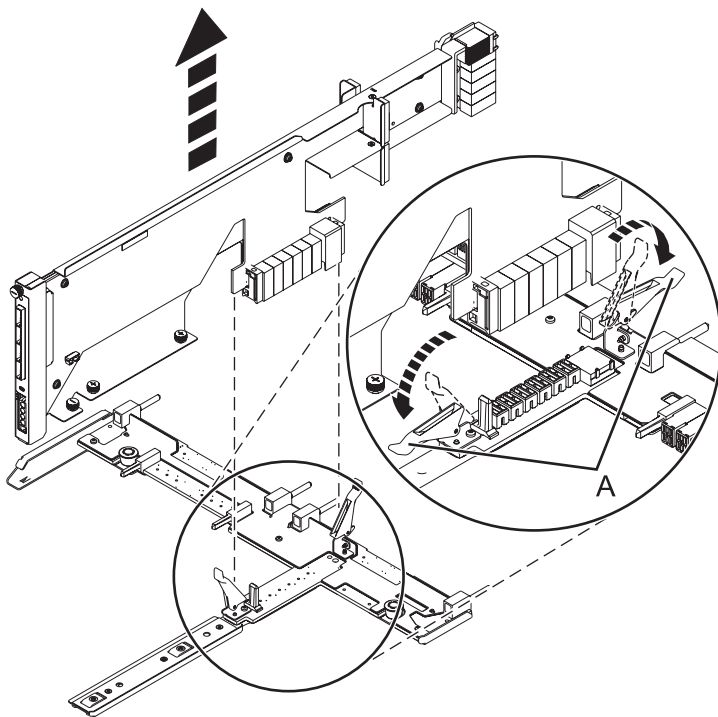


Figure 73. Removing the SAS conduit card from the midplane

What to do next

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

Replacing a SAS expander card in a 58/02 expansion unit with the power turned off

Learn how to replace a SAS expander card in a 58/02 expansion unit with the power turned off.

Before you begin

Review the requirements in Before you begin.

About this task

Procedure

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.

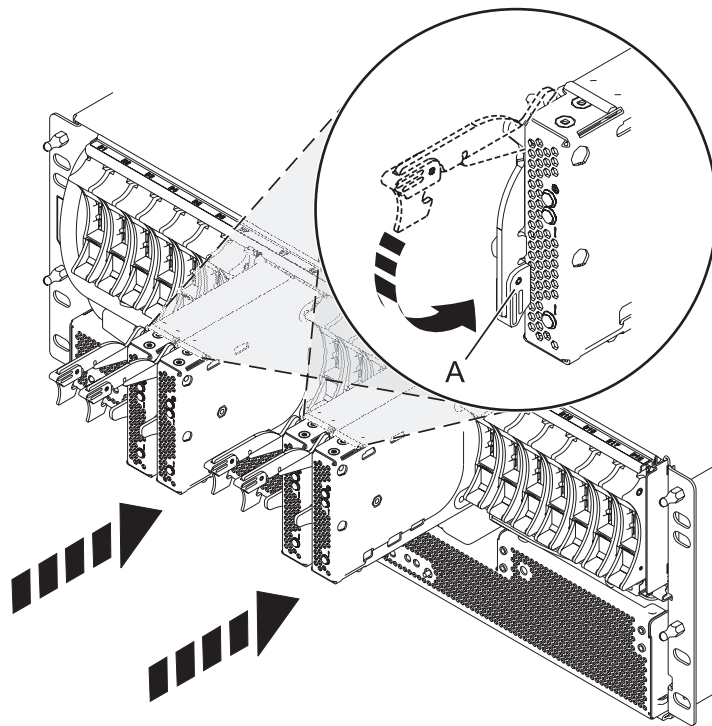


Figure 74. Installing the SAS expander card

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.

What to do next

Continue with any other service actions you need to perform.

Removing a SAS expander card from a 58/02 expansion unit with power turned off

Learn how to remove a SAS expander card from a 58/02 (rack-mounted) expansion unit if you need to replace a failing part with power turned off.

Procedure

1. Perform prerequisite tasks. For instructions, see “Before you begin” on page 93.
2. Identify the card you are going to remove. For information, see “Identifying a part” on page 95.
3. Lift the handle (A) and pull the card out of the system, as shown in the following figure.

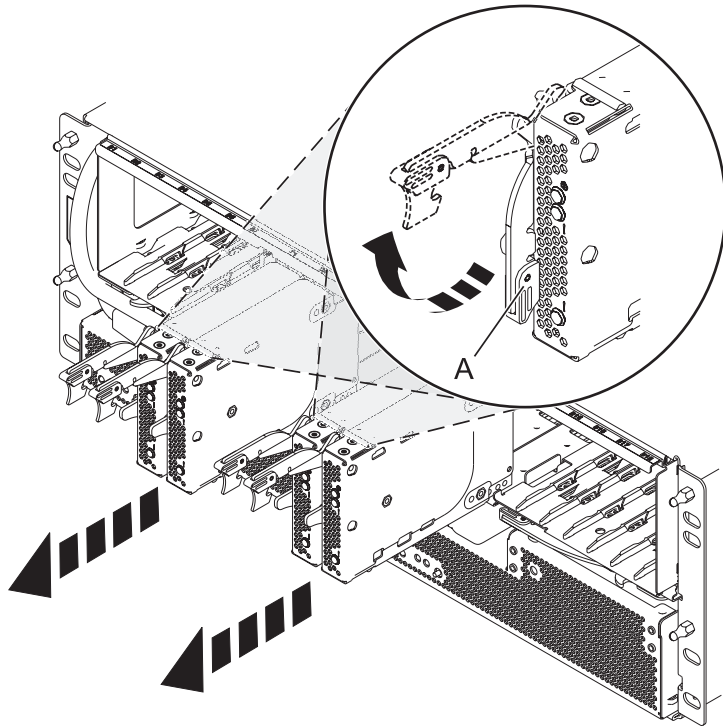


Figure 75. Removing the SAS expander card.

What to do next

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.

About this task

These precautions are intended to create a safe environment to service your system and do not provide steps for servicing your system. The installation, removal, and replacement procedures provide the step-by-step processes 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 provided power cord. Do not use the 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.

(D005a)

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:

Procedure

1. If you are installing a new feature, ensure that you have the software required to support the new feature. See IBM® Prerequisite website at add URL here.
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.
7. If you encounter difficulties during the installation, contact your service provider, 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.

About this task

For 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.

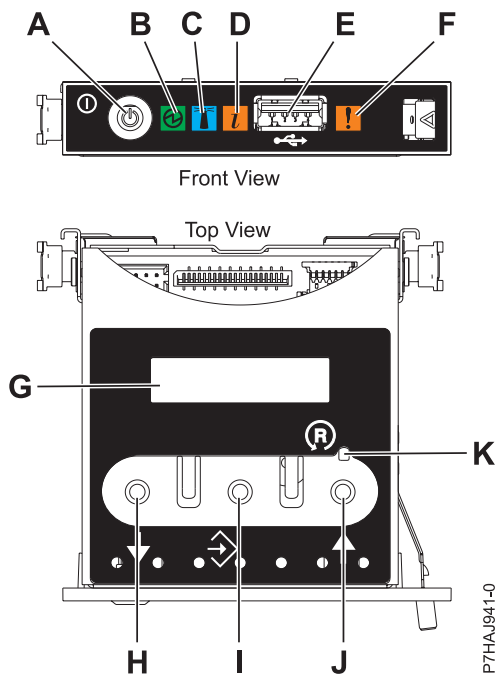


Figure 76. Control panel

- **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.

Procedure

1. Log in as root user or `ce login-`.
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.

What to do next

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.

About this task

To activate the indicator light for a failing part, complete the following steps:

Procedure

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.

About this task

To deactivate the indicator light, complete the following steps:

Procedure

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 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.

About this task

To activate the indicator light, follow these steps:

Procedure

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.

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.

About this task

To locate the failing part in a system or logical partition, follow these steps:

Procedure

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.

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.

About this task

To activate the indicator light, follow these steps:

Procedure

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.

Deactivating the failing-part indicator light

After you complete a removal and replacement procedure, you must deactivate the failing-part indicator light.

About this task

To deactivate the indicator light, follow these steps:

Procedure

1. Log in as root user.
2. At the command line, type `/usr/sbin/usysident -s normal -l location_code` and press Enter.

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.

About this task

To locate the failing part, follow these steps:

Procedure

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.

Results

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.

About this task

To turn on the indicator light for identifying a part, follow these steps:

Procedure

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 a 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 Systems Director Management Console (SDMC).

About this task

To start a system that is not managed by a HMC or SDMC, follow these steps:

Procedure

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.

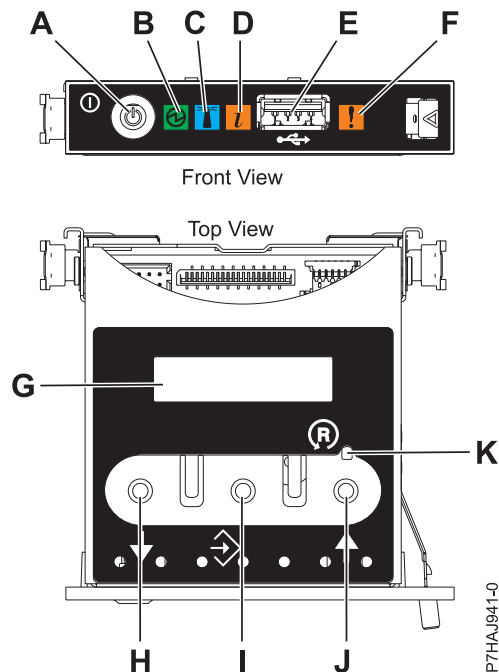


Figure 77. Control panel

- **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.

What to do next

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.

About this task

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 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.

About this task

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.

About this task

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 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 begin

Before you stop the system, follow these steps:

1. Ensure that all jobs are completed and end all applications.
2. Ensure that the operating system is stopped.
Attention: Failure to do so can result in the loss of data.
3. 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.

About this task

The following procedure describes how to stop a system that is not managed by the HMC or the SDMC.

Procedure

1. Log in to the system as a user with the authority to run the **shutdown** or **pwrdownsys** (Power Down System) command.
2. At the command line, enter one of the following commands:
 - If your system is running the AIX operating system, type **shutdown**.
 - If your system is running the Linux operating system, type **shutdown -h now**.

- If your system is running the 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.

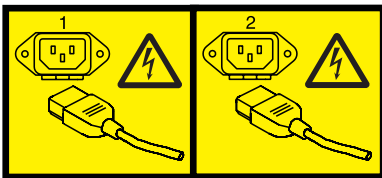
3. At the Linux command line, type `shutdown -h now`.

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 unit from electrical outlets. Ensure that you unplug power cables from 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.

About this task

By default, the managed system is set to power off automatically when you shut down the last running logical partition on the managed system. If you set the managed system properties on the HMC so that the managed system does not power off automatically, you must use this procedure to power off your managed system.

Attention: If possible, shut down the running logical partitions on the managed system before powering off the managed system. Powering off the managed system without shutting down the logical partitions first causes the logical partitions to shut down abnormally and can cause data loss. If you use a Virtual I/O Server (VIOS) logical partition, ensure that all clients are shut down or that the clients have access to their devices using an alternate method.

To power off a managed system, you must be a member of one of the following roles:

- Super administrator
- Service representative
- Operator
- Product engineer

Use the following steps to stop the system by using the HMC:

Procedure

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 Systems Director Management Console (SDMC) user interface to stop the system or a virtual server.

About this task

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.

Procedure

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 covers for the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

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

Removing the front cover from the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Use this procedure to remove the cover to access components or perform service.

Before you begin

This procedure applies to covers that were shipped after 1 March 2011. For covers that were shipped prior to 1 March 2011, use the Removing the front cover with the cover removal tool procedure.

Note: The older covers that were shipped before 1 March 2011 can be identified by a single blue stripe (A) on the cover assembly latches. Newer covers that were shipped after 1 March 2011 have two blue stripes (B) on the cover assembly latches. See Figure 78.

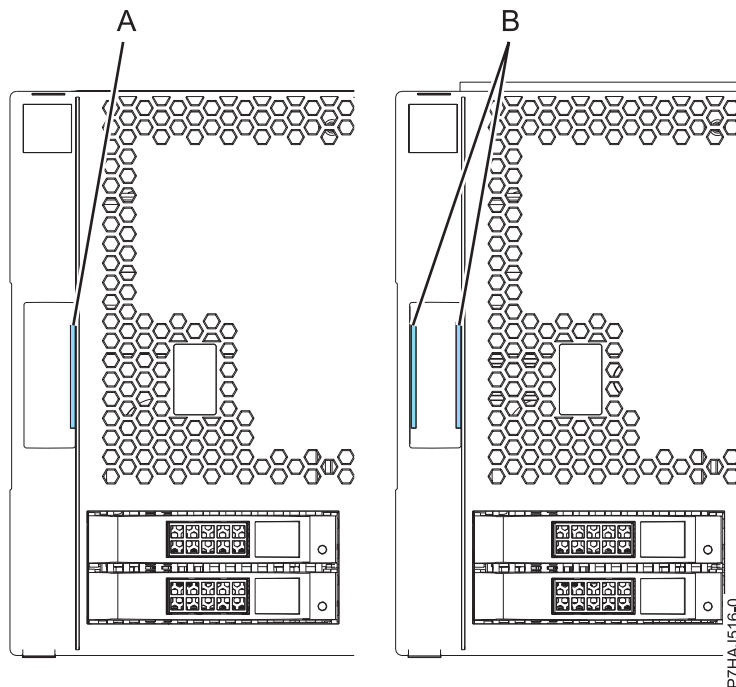


Figure 78. Identifying the older and newer covers

About this task

To remove the front cover, complete the following steps:

Procedure

1. If necessary, open the front rack door.
2. Pull out the latches (A) located on both sides of the cover as shown in the following figure.

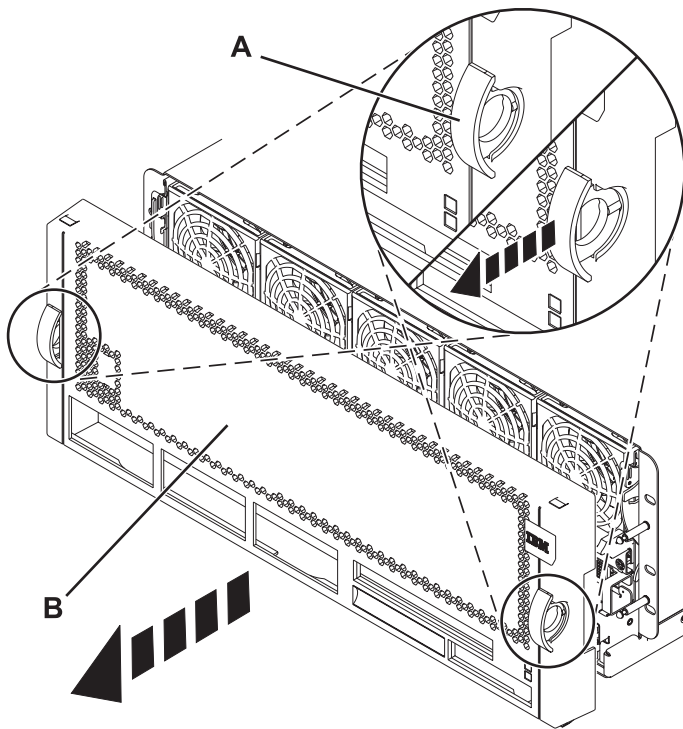


Figure 79. Removing the front cover

3. Pull off the cover (B) to remove it from the system unit.

Removing the front cover with the cover removal tool

Removing the front cover from the 17M/MB, 17M/MC, 79M/HB, or 79M/HC systems that were shipped before 1 March 2011 requires the use of a cover removal tool.

About this task

Systems that were shipped before 1 March 2011 require the use of a cover removal tool to prevent the front fans from being inadvertently removed and prevent an unexpected outage.

Note: The older covers that were shipped before 1 March 2011 can be identified by a single blue stripe (A) on the cover assembly latches. Newer covers that were shipped after 1 March 2011 have two blue stripes (B) on the cover assembly latches. See Figure 80 on page 107.

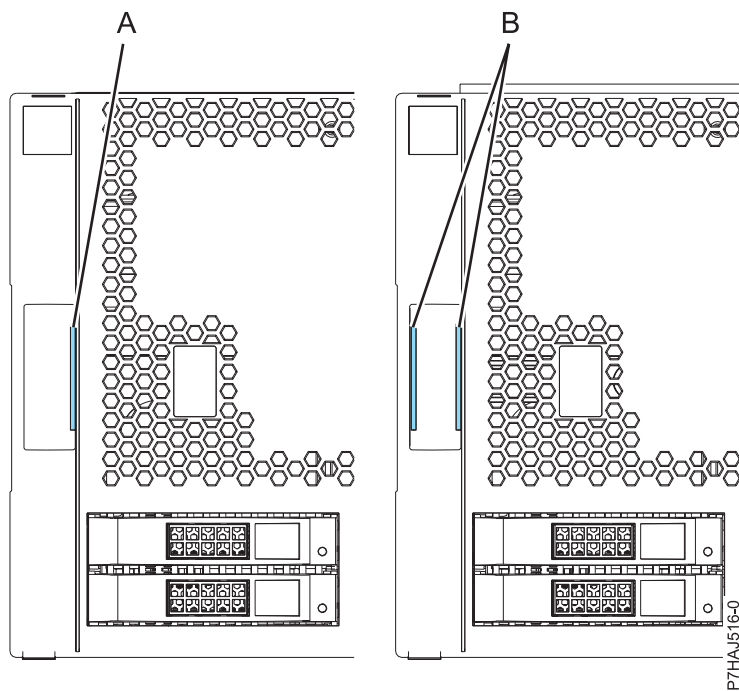


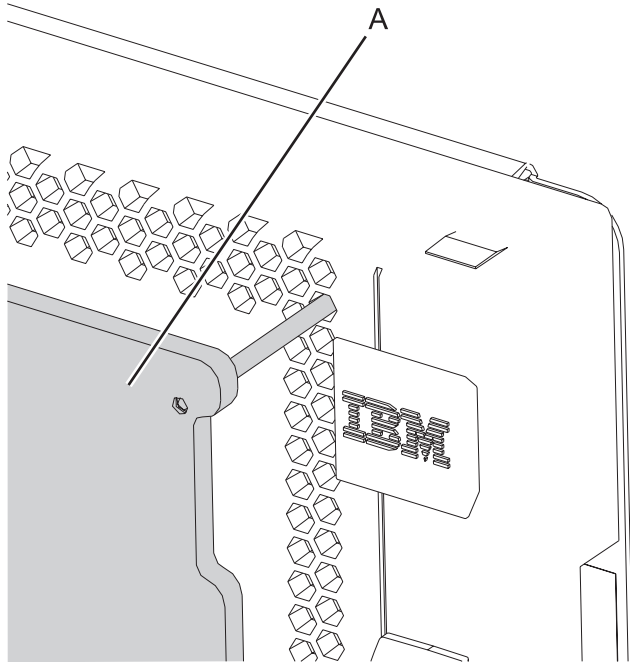
Figure 80. Identifying the older and newer covers

Important: Do not remove the cover to view the enclosure serial number. If you need to check the enclosure serial number, use one of the following methods:

- From the Advanced System Management Interface (ASMI), complete the following steps. This procedure can be performed in the FSP standby mode.
 1. Expand **System Information**.
 2. Click **Vital Product Data** in the left column.
 3. From the Vital Product Data panel, click **Enclosure VPD (EV)** for each enclosure configured.
 4. Click **Details** to view results.
- From the Hardware Management Console (HMC), complete the following steps. The server must be powered on to the partition standby mode.
 1. Expand **Hardware Information**.
 2. Select **View Hardware Topology** to view the enclosure ID for each enclosure.

To remove the front cover with the cover removal tool, complete the following steps:

1. Remove the cover removal tool (PN 74Y9219) from the shipping box, if needed.
2. If necessary, open the front rack door.
3. Align the cover removal tool (A) with the front cover of the system as shown in the following figure.

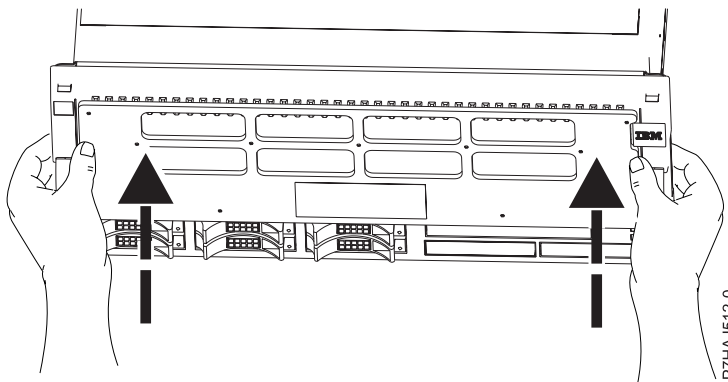


P7HAJ511-1

Figure 81. Aligning the cover removal tool

Note: The top pins of the cover removal tool align with the second hole down from the top of the cover. Pins must be inserted through the hole until the removal tool pins contact the system and cannot be pushed forward any further. There is a gap between the system and the cover removal tool.

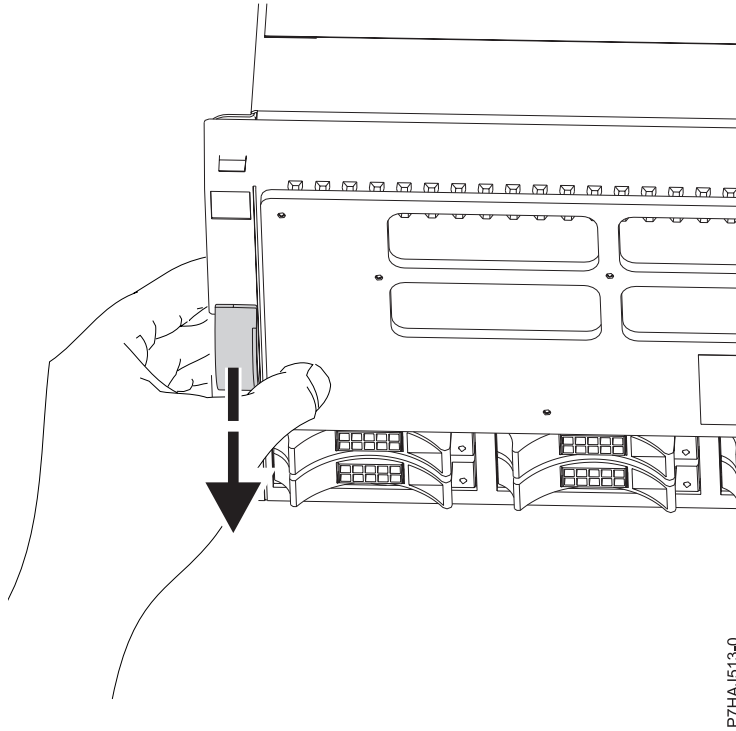
4. Place hands on the cover removal tool as shown in the following figure while pressing the tool against the system.



P7HAJ512-0

Figure 82. Cover removal tool use

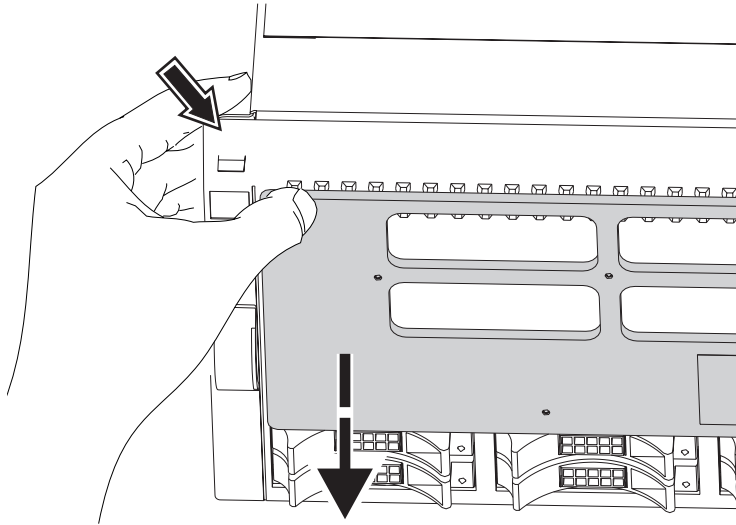
5. While keeping forward pressure on the cover removal tool, pull the cover assembly latches to disengage them as shown in the following figure, which releases the retention mechanism.



P7HAJ513-0

Figure 83. Releasing the cover latches

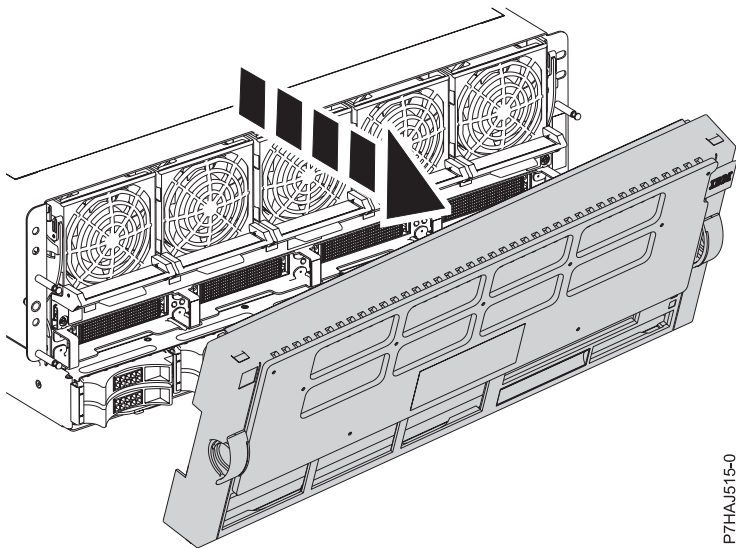
6. If the front cover is difficult to remove, the cover might be adhering to the fan assemblies at the top of the system. Apply forward pressure against the cover removal tool and place fingers underneath the edge of the cover near the top corners. Then, pull the cover toward the cover removal tool as shown in the following figure.



P7HAJ514-0

Figure 84. Removing a cover that adheres to the fan assemblies

7. After the cover assembly is unlatched and lying against the cover removal tool, remove both from the front of the system as shown in the following figure.



P7HAJ515-0

Figure 85. Removing the cover

8. Repeat these steps for all system covers that must be removed.

Installing the front cover on the 17M/MB, 17M/MC, 17M/MD, 79M/HB, 79M/HC, or 79M/HD

Use this procedure to install the cover after accessing components or performing service.

About this task

To install the front cover, complete the following steps:

Procedure

1. Position the cover (**A**) on the front of the system unit so that the four pins on the system match the four holes on the rear of the cover.

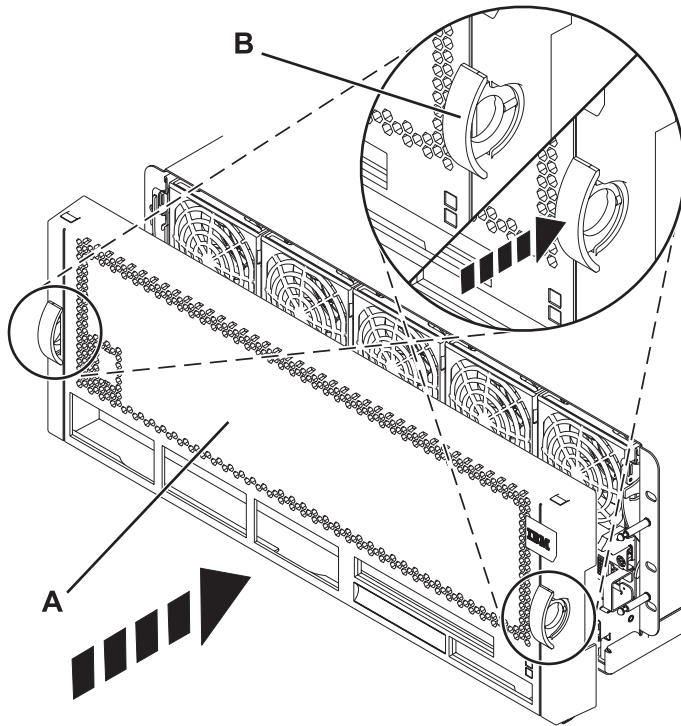


Figure 86. Installing the front cover

2. Press the tabs (**B**) to snap the cover into position.
3. Close the front rack door.

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.

About this task

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 on page 113.
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 on page 113.

If the **Diagnostic selection** menu is shown with **M** appearing next to any resource, follow these steps:

 - a. Select the resource and press Enter.
 - b. Select **Commit**.
 - c. Follow any instructions that are shown.
 - d. If the *Do you want to review the previously displayed error?* message is shown, select **Yes** and press Enter.

- e. If an SRN is shown, suspect a loose card or connection. If no obvious problem is shown, record the SRN and contact your service provider for assistance.
 - f. If no SRN is shown, go to step 5.
5. Test the part by doing the following steps:
 - a. At the command line, type `diag` and press Enter.
 - b. From the **Function Selection** menu, select **Advanced Diagnostics Routines** and press Enter.
 - c. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
 - d. Select **All Resources**, or select the diagnostics for the individual part to test only the part you replaced and any devices that are attached to the part you replaced and press Enter.
Did the **Resource Repair Action** menu appear?
No: Go to step 6.
Yes: Go to step 7.
 6. Did the *Testing Complete, No trouble was found* message appear?
 - **No:** There is still a problem. Contact your service provider. **This ends the procedure.**
 - **Yes:** Select **Log Repair Action**, if not previously logged, from the **Task Selection** menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the resource list, select `sysplanar0` and press Enter.

Tip: This action changes the indicator light for the part from the fault state to the normal state.
Go to step 9 on page 114.
 7. Select the resource for the replaced part from the **Resource Repair Action** menu. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

Note: On systems with an indicator light for the failing part, this action changes the indicator light to the normal state.
 - a. Select the resource that has been replaced from the **Resource Repair Action** menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select `sysplanar0` and press Enter.
 - b. Select **Commit** after you make your selections. Did another **Resource Repair Action** display appear?
No: If the **No Trouble Found** display appears, go to step 9 on page 114
Yes: Go to step 8.
 8. Select the parent or child of the resource for the replaced part from the **Resource Repair Action** menu if necessary. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

Note: This action changes the indicator light for the part from the fault state to the normal state.
 - a. From the **Resource Repair Action** menu, select the parent or child of the resource that has been replaced. If the repair action was to reseat a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select `sysplanar0` and press Enter.
 - b. Select **Commit** after you make your selections.
 - c. If the **No Trouble Found** display appears, go to step 9 on page 114.

9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the values they had prior to servicing the system.
10. Did you do any hot-plug procedures before doing this procedure?
 - No:** Go to step 11.
 - Yes:** Go to step 12.
11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?
 - No:** Contact your service provider. **This ends the procedure.**
 - Yes:** Go to step 12.
12. Are the indicator lights still on?
 - **No. This ends the procedure.**
 - **Yes.** Turn off the lights. See the following for instructions: Changing service indicators.

Verifying the installed part in a Linux system or logical partition

If you have installed a new part, learn how to verify that the system recognizes the part.

About this task

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.

Before you begin

- 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.

About this task

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:

Procedure

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.

About this task

To verify the installed part, complete these steps:

Procedure

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 117 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.” **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:

About this task

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:

Procedure

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:

About this task

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:

Procedure

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.

About this task

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:

Procedure

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 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.

About this task

To verify the installed part, complete these steps:

Procedure

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 120 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 Systems Director Management Console (SDMC).

Deactivating a system attention LED or partition LED by using the SDMC:

About this task

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:

Procedure

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:

About this task

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:

Procedure

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.

About this task

To view serviceable events, follow these steps:

Procedure

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.

About this task

Perform the following steps to verify an installed or replaced part:

Procedure

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:

Procedure

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 on page 122.
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 on page 122.

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.

Notices

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Electronic emission notices

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

Class A Notices

The following Class A statements apply to the servers.

Federal Communications Commission (FCC) statement

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

equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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

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

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

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
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 7032 15 2941
email: lugi@de.ibm.com

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

VCCI Statement - Japan

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

VCCI-A

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

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

**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

**Japanese Electronics and Information Technology Industries Association (JEITA)
Confirmed Harmonics Guideline with Modifications (products greater than 20 A per phase)**

高調波ガイドライン準用品

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

声 明

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

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

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者：

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

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

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

Electromagnetic Interference (EMI) Statement - Korea

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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 A

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

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.

New Orchard Road

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Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland GmbH

Technical Regulations, Abteilung M372

IBM-Allee 1, 71139 Ehningen, Germany

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.

Electromagnetic Interference (EMI) Statement - Russia

ВНИМАНИЕ! Настоящее изделие относится к классу А.
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Class B Notices

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

Federal Communications Commission (FCC) statement

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

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

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

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

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

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

Industry Canada Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication equipment.

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Technical Regulations, Department M372
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VCCI Statement - Japan

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。 VCCI-B

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

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline with Modifications (products greater than 20 A per phase)

高調波ガイドライン準用品

Electromagnetic Interference (EMI) Statement - Korea

이 기기는 가정용(B급)으로 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

Germany Compliance Statement

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

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse B ein.

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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 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

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

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

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

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