

Customer-Installable Features for PL1660R

ESCALA POWER6



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ESCALA POWER6

Customer-Installable Features for PL1660R

Hardware

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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

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

CAUTION:

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

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

(C026)

CAUTION:

Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

CAUTION:

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

CAUTION:

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

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

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

The equipment is suitable for installation in the following:

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

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

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

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

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

About this publication

This book contains information regarding the customer tasks that are involved with installing options on your 17M/MA system.

The customer tasks that are included in this book are predominantly focused on installing hardware features. Those sections are designed to assist you when installing hardware features in your 17M/MA or in an attached expansion unit. This book also contains information for upgrading your system. The information contained within that section focuses on migrating AIX® to a new release, upgrading your servers model to a new 17M/MA model, or upgrading to a new hardware feature.

For information about the accessibility features of this product, for users who have a physical disability, see “Accessibility features,” on page 365.

Customer-Installable Features for the 17M/MA

This book contains information regarding the customer tasks that are involved with installing options on your 17M/MA system.

The customer tasks that are included in this book are predominantly focused on installing hardware features. Those sections are designed to assist you when installing hardware features in your 17M/MA or in an attached expansion unit. This book also contains information for upgrading your system. The information contained within that section focuses on migrating AIX to a new release, upgrading your servers model to a new 17M/MA model, or upgrading to a new hardware feature.

Chapter 1. Control panel, signal cable, or control panel fillers

You might need to remove, install, or replace the control panel (operator panel), signal cable, or control panel fillers in the server. This section includes procedures so that you can perform these tasks.

Model control panel

You might need to remove, install, or replace the control panel in the server. Use the procedure in this section to perform this task.

Important: There are two versions of the control panel cable for this model. When reinstalling or replacing the control panel, ensure that you use the control panel cable that was removed with the control panel, or a replacement cable with the same part number.

Install or replace the control panel with power on

Use the procedures in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for installing a control panel. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

Prerequisites

To replace a control panel with the system power on, you must first gain access to the Advanced System Management Interface (ASMI). For instructions, refer to Managing the Advanced System Management Interface (ASMI).

Install or replace the control panel

To install or replace the control panel with the power on, complete the following procedure:

1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. If you have not already done so, remove the control panel with power on. Refer to “Remove the control panel with power on” on page 4.

Attention: If the system power is on, a control panel filler should be installed for proper air flow and cooling. The control panel opening must be closed either with a filler or a control panel within 15 minutes. Refer to “Model control panel filler” on page 8 for instructions on removing a control panel filler.

3. If necessary, remove the new control panel from its packaging. If there are control-panel overlays included with the new control panel, install the appropriate overlay on the control panel.

Note: Remove the machine type label, with the serial number, from the front of the existing control panel and place the label on the new control panel.

4. Carefully slide the control panel into the control panel bay until you feel the locking tabs A lock in place.

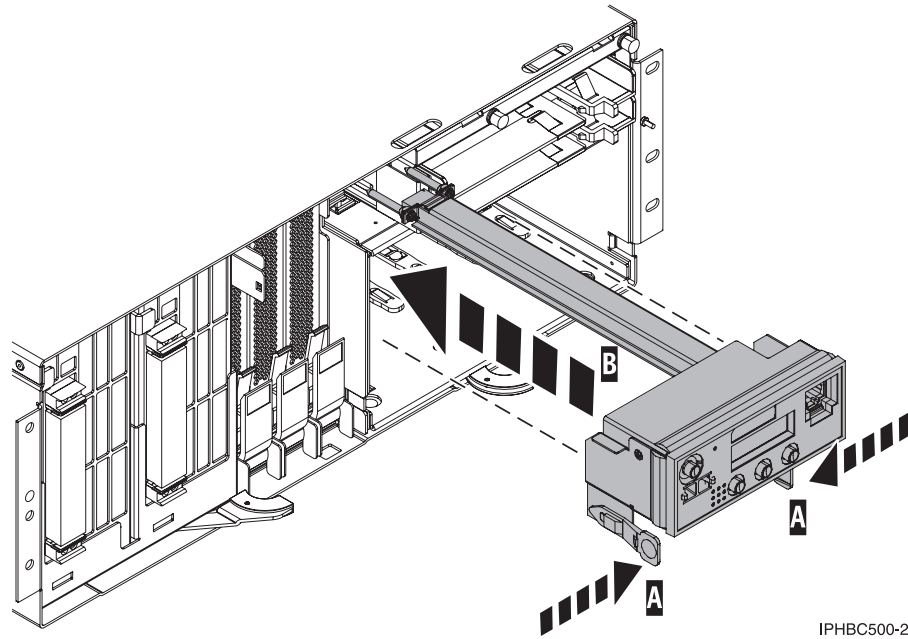


Figure 1. Control panel replacement

5. Access the Advanced System Management Interface (ASMI). For instructions, refer to Managing the Advanced System Management Interface (ASMI).
6. In the navigation area of the ASMI, select **Concurrent maintenance** and then **Control panel**.
7. At the control panel window, select **Install** and click **Continue**.
8. Choose the control panel's location and click **Save Settings**. If the operation was successful, the window will display Operation completed successfully.

Note: If a ball or dot is displayed in the middle of the control panel, toggle between function 02 and function 01 until the ball or dot disappears.

9. Install the front cover onto your system. Refer to "Install the front cover on the model " on page 311.
10. Verify that the new resource is functional. Refer to "Verify the installed part" on page 319.

Related concepts

"Managing the Advanced System Management Interface (ASMI)" on page 293
 Understand how to manage the Advanced System Management Interface (ASMI).

Remove the control panel with power on

You might need to remove the control panel from the server. Use the procedure in this section to perform this task.

Be sure you read these instructions carefully and understand the complexity of the power on procedure before you begin. If you do not feel comfortable using this procedure, go to "Remove the control panel with power off" on page 7.

Attention: Failure to follow these instructions could result in damage to the media device (tape drive, CD, or DVD), or to the system unit, and could result in loss of data.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a control panel. Refer to "Remove a part using the Hardware Management Console" on page 318.

Prerequisites

To remove a control panel with the system power on, you must first gain access to the Advanced System Management Interface (ASMI). For instructions, refer to Managing the Advanced System Management Interface (ASMI).

Remove the control panel

To remove the control panel with the system or logical partition powered on, follow these steps from the system or logical partition that controls the media device:

1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Access the Advanced System Management Interface (ASMI). For instructions, refer to Managing the Advanced System Management Interface (ASMI).

Attention: Do not reset the service processor, or remove and then reapply power to the system during this procedure.

3. In the navigation area of the ASMI, select **Concurrent maintenance** and then **Control panel**.
4. At the Preparing the control panel window, select **Remove** and click **Continue**.
5. Choose the control panel’s location and click **Save Settings**. If the operation was successful, the window will display Operation completed successfully.
6. Remove the front cover from your system. Refer to “Remove the front cover from the model ” on page 311.
7. Remove the control panel by pressing the locking tabs **A** located on either side of the panel, grasping the edges of the panel, and pulling it out of its bay.

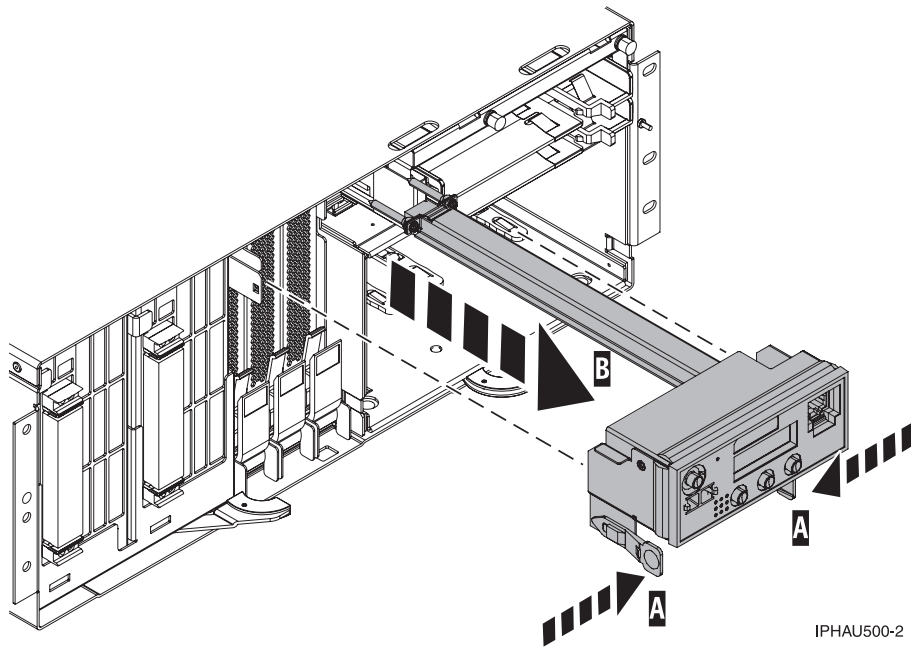


Figure 2. Control panel removal

8. Install or replace the control panel with power on. Refer to “Install or replace the control panel with power on” on page 3.

Attention: If the system power is on, a control panel filler should be installed for proper air flow and cooling. The control panel opening must be closed either with a filler or a control panel within 15 minutes. Refer to “Model control panel filler” on page 8 for instructions on installing a control panel filler.

Related concepts

“Managing the Advanced System Management Interface (ASMI)” on page 293
Understand how to manage the Advanced System Management Interface (ASMI).

Install or replace the control panel with power off

Use the procedure in this section to perform this task.

To install or replace the control panel with the power off, complete the following procedure:

1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Remove the control panel with power off. Refer to “Remove the control panel with power off” on page 7.

Attention: A control panel or control panel filler must be in place when the system power is on for proper air flow and cooling. For instructions on removing a control panel filler, refer to “Model control panel filler” on page 8.

3. If necessary, remove the new control panel from its packaging. If there are control-panel overlays included with the new control panel, install the appropriate overlay on the control panel.

Note: Remove the machine type label, with the serial number, from the front of the existing control panel and place the label on the new control panel for future reference.

4. Carefully slide the control panel into the control panel bay until you feel the locking tabs **A** lock in place.

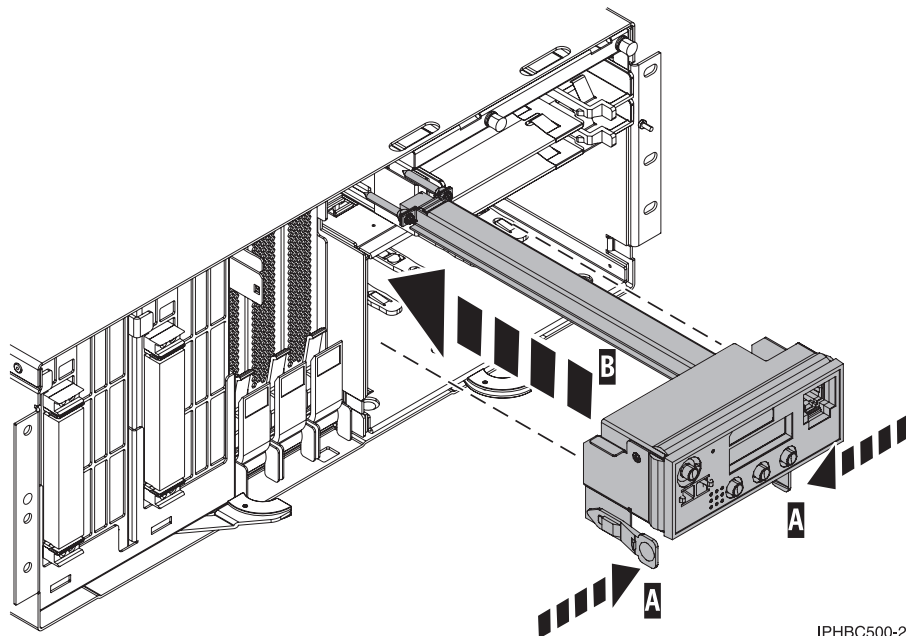


Figure 3. Control panel replacement

5. Install the front cover onto your system. Refer to “Install the front cover on the model ” on page 311.
6. Verify that the new resource is functional. Refer to “Verify the installed part” on page 319.
7. Start the system. Refer to “Start the system or logical partition” on page 300.

Note: If a ball or dot is displayed in the middle of the control panel, toggle between function 02 and function 01 until the ball or dot disappears.

Remove the control panel with power off

You might need to remove the control panel from the server with the power off. Use the procedure in this section to perform this task.

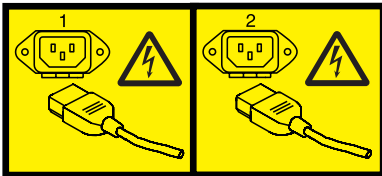
If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a control panel. For instructions, refer to “Remove a part using the Hardware Management Console” on page 318.

To remove the control panel with the power off, complete the following procedure:

1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Stop the system. Refer to “Stop the system or logical partition” on page 303.
3. Disconnect the power source from the system by unplugging the system.

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

(L003)



or



4. Remove the front cover from your system. Refer to “Remove the front cover from the model ” on page 311.
5. Remove the control panel by pressing the locking tabs A located on either side of the panel, grasping the edges of the panel, and pulling it out of its bay.

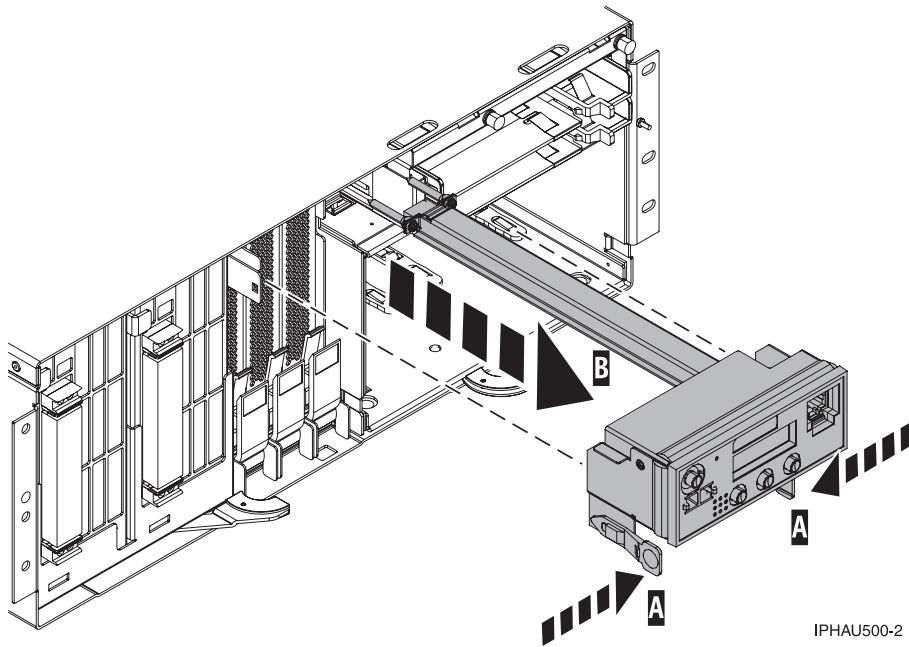


Figure 4. Control panel removal

6. If you are removing the control panel as part of another procedure, return to that procedure now.
Attention: If you are not immediately installing or replacing the control panel, a control panel filler must be in place when the system power is on for proper air flow and cooling. For instructions on installing a control panel filler, refer to “Model control panel filler.”
7. Install or replace the control panel with power off. Refer to “Install or replace the control panel with power off” on page 6.

Model control panel filler

You might need to install or remove the control panel filler from the server. Use the procedure in this section to perform this task.

If the system power is on, a control panel filler should be installed for proper air flow and cooling. The control panel opening must be closed either with a filler or a control panel within 15 minutes.

Remove the control panel filler

1. Remove the front cover from your system. Refer to “Remove the front cover from the model ” on page 311.
2. Locate the control panel filler.
3. Remove the control panel filler by pressing the locking tabs located on either side of the filler, grasping the edges of the panel, and pulling it out of its bay.

Install the control panel filler

1. Carefully slide the control panel filler into the control panel bay until you feel the locking tabs lock in place.
2. Install the front cover onto your system. Refer to “Install the front cover on the model ” on page 311.

Chapter 2. Disk Drive

You might need to install, remove, or replace a disk drive, a disk-drive backplane, or an enclosure. This section includes procedures so that you can perform these tasks.

You can choose to perform these tasks yourself, or contact a service provider to perform the task for you. You might be charged a fee by the service provider for this service.

Note: Disk drives are sensitive devices and must be handled with care as follows:

- Avoid any impact to the disk drive.
- Always handle the disk drive by the sides of its carrier.
- Do not touch the circuit connector, or circuit board along the end of the device.

Install a disk drive

You might need to install a Small Computer System Interface (SCSI) or Serial Attached SCSI (SAS) disk drive in the sever or expansion unit. Use the procedures in this section to perform this task.

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

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

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

DANGER

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

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

- Connect power to this unit only with the 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)

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 “Install a disk drive with the system or logical partition powered off” on page 25.

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

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Remove the system unit door, remove the expansion unit door, or open the rack. For instructions, select the appropriate procedure:
 - “Expansion unit cover or door” on page 305
3. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - “Remove the front cover from the model ” on page 311
 - “Remove the front cover from the 11D/20 expansion unit” on page 309

4. Determine the next available disk drive position in your system or expansion unit. For information, see “Disk drive locations” on page 66.

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

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

Install the disk drive

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. Press Enter to continue.
4. On the Function Selection display, select **Task Selection**.
5. On the Tasks Selection display, select **Hot Plug Task**.
6. Select **SCSI and SCSI RAID Hot Plug Manager**.
7. Select **Attach a Device to a SCSI Hot Swap Enclosure Device**. A list of empty slots in the SCSI hot swap enclosure device is shown.
8. Select the slot where you want to install the disk drive and press Enter.

The disk drive slot enters the Identify state. The concurrent maintenance light for the slot begins flashing. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:

- “Disk-drive concurrent maintenance lights for model 11D/20” on page 83
 - “Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure” on page 83
 - “Disk-drive concurrent maintenance lights for models ” on page 82
9. If the slot you want to use contains a disk-drive filler, complete the following step.

Pull the disk-drive filler from the slot that you want to use, as shown in Figure 5 on page 12

Attention:

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

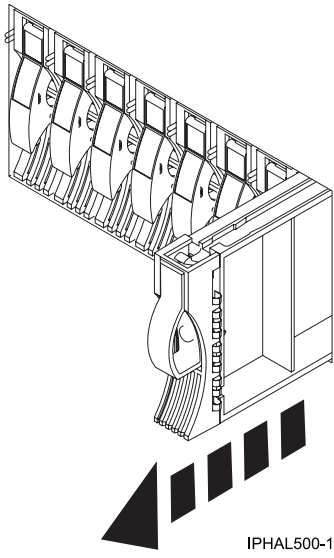


Figure 5. Removing a disk-drive filler from a model .

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

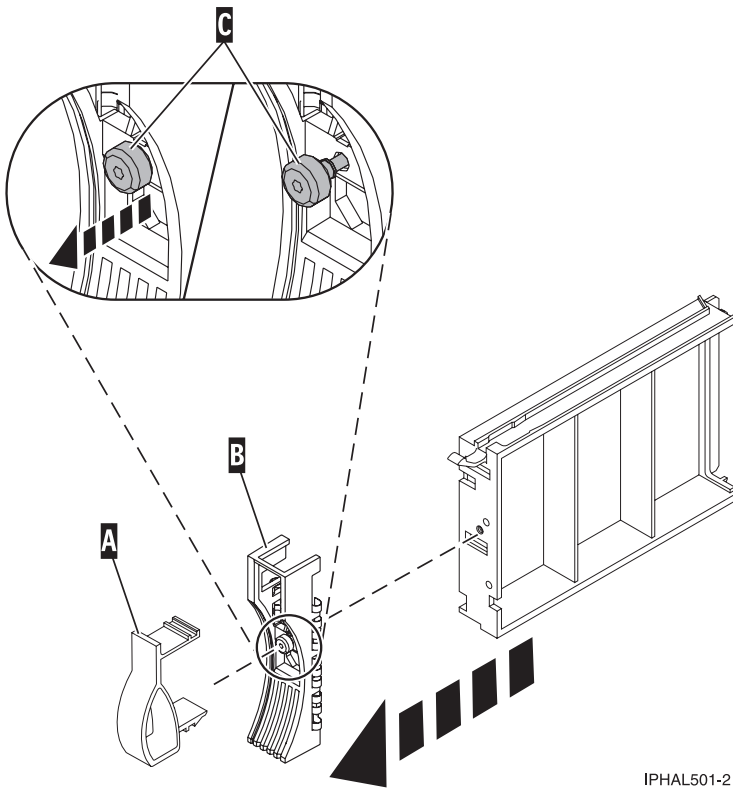
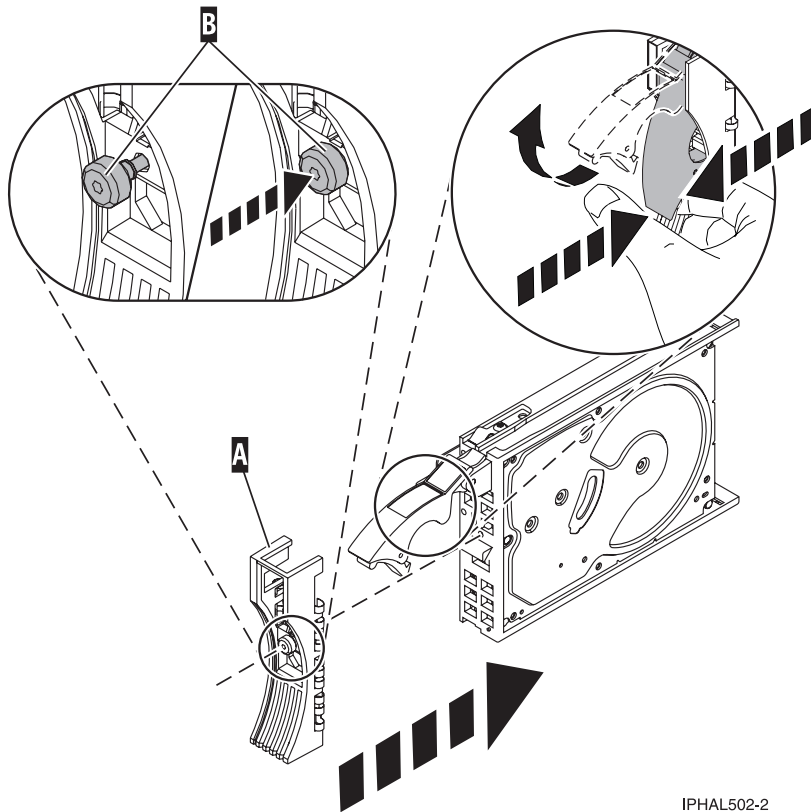


Figure 6. Removing a disk-drive bezel from a disk-drive filler

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

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



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Figure 7. Installing a disk-drive bezel on a disk drive

16. If the disk drive you are installing does not have a bezel preinstalled, then complete the following step.
Press in and then tighten the thumbscrew **B** to secure the bezel **A** to the disk drive.
17. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
18. Slide the disk drive into the system unit until it stops, as shown in Figure 8 on page 14.
19. Push the disk drive handle in until it locks. The light on the disk drive will turn on.

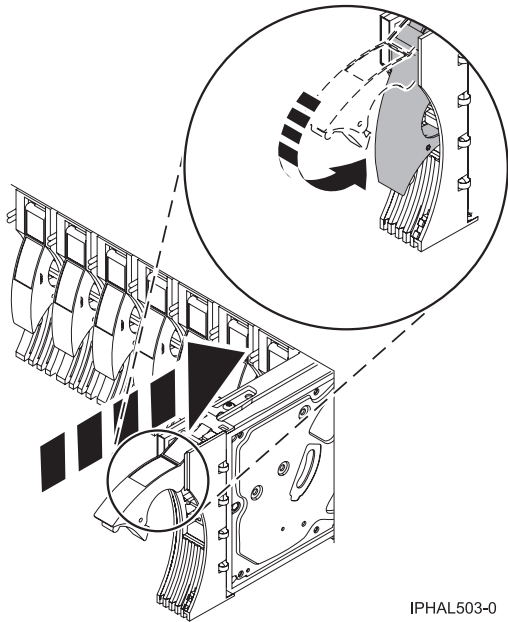


Figure 8. Installing a disk drive in a model

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

Complete the procedure

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
2. Install or close the system, expansion unit, or rack door.
3. Verify the installed part. For instructions, see “Verify an installed feature or replaced part on an AIX system or logical partition” on page 320.
4. To prepare the newly installed disk drive for use, go to “Prepare a disk drive for use in an AIX system or logical partition” on page 84.

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

You might need to install a Small Computer System Interface (SCSI) or Serial Attached SCSI (SAS) disk drive in a system or expansion unit while the Linux[®] operating system or logical partition that controls the disk drive location is powered on. Use the procedure in this section to perform this task.

DANGER

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

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

- Connect power to this unit only with the 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)

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

If any of the following steps apply to you, go to “Install a disk drive with the system or logical partition powered off” on page 25.

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

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

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Remove the system unit door, expansion unit door, or the rack door. For instructions, select the appropriate procedure from the following list:
 - “Expansion unit cover or door” on page 305

3. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - “Remove the front cover from the model ” on page 311
 - “Remove the front cover from the 11D/20 expansion unit” on page 309
 - If you have a front cover from any other models, remove the front cover.
4. Look at the front of the system or expansion unit and determine the next available disk drive position. For information, see “Disk drive locations” on page 66.

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

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

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

Install a disk drive using Linux kernel 2.4

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

Install the disk drive:

1. If the slot you want to use contains a disk-drive filler, complete the following procedure:

Attention:

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

- a. Pull the disk-drive filler from the slot, as shown in Figure 9 on page 17.

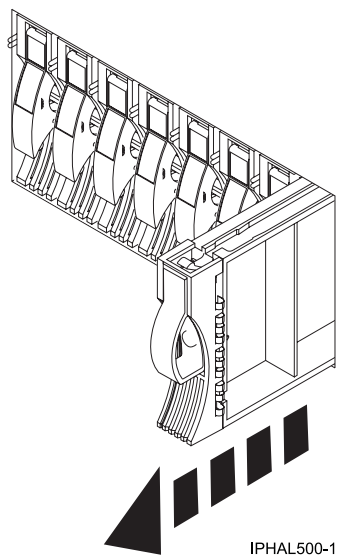


Figure 9. Removing a disk-drive filler from model

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

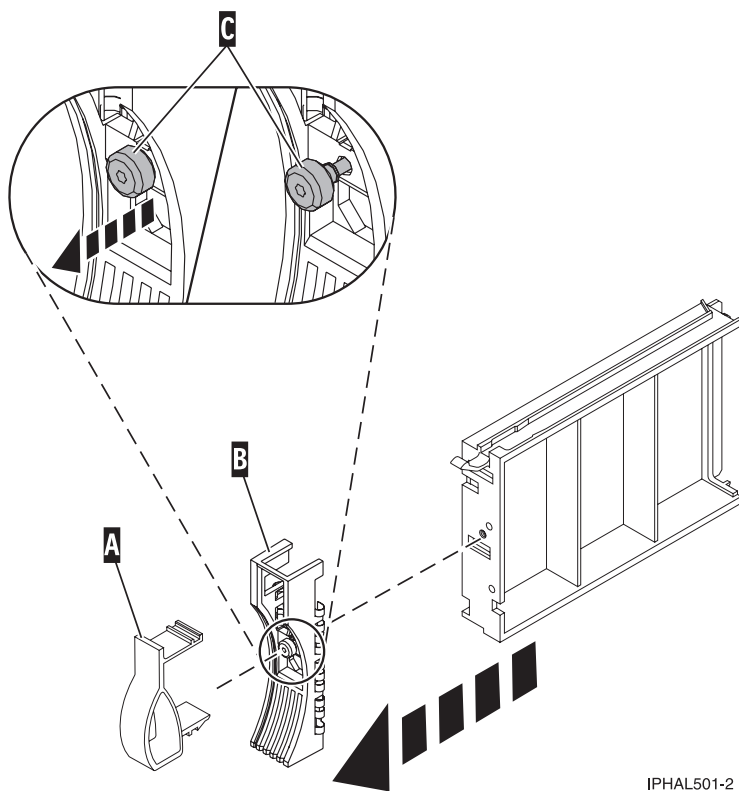
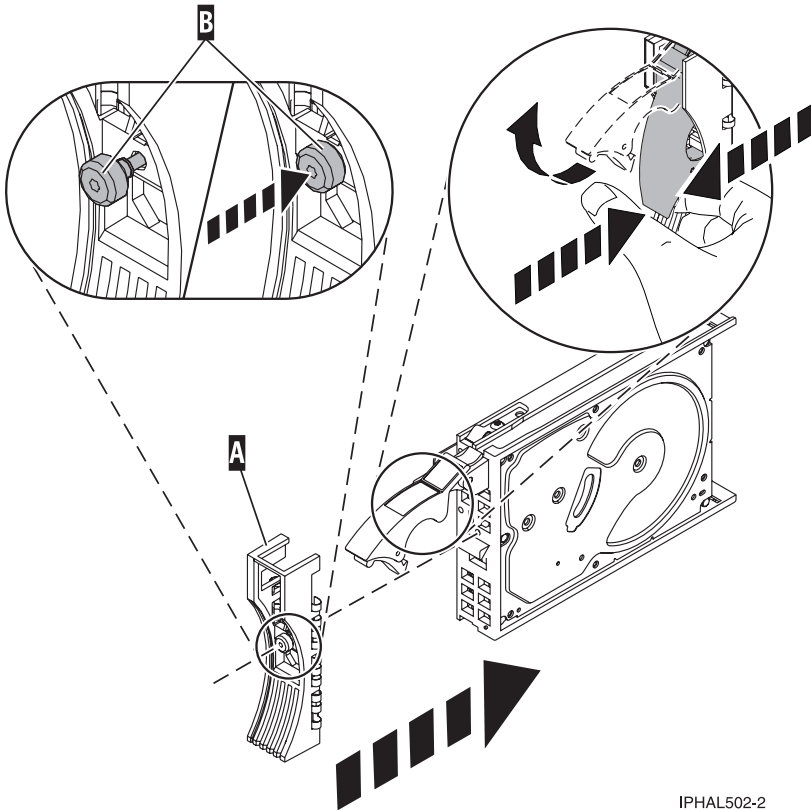


Figure 10. Removing the disk-drive bezel

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

Attention: Disk drives are fragile. Handle with care.

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



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Figure 11. Installing a disk-drive bezel

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

Slide the disk drive all the way in to the system or expansion unit and then lock it in place by pushing in the disk drive handle, as shown in Figure 12 on page 19.

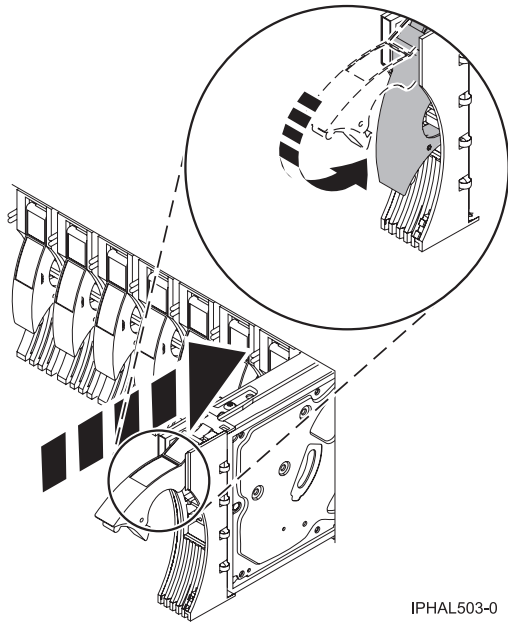


Figure 12. Installing a disk drive in a model

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

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

- “Disk-drive concurrent maintenance lights for models ” on page 82
 - “Disk-drive concurrent maintenance lights for model 11D/20” on page 83
 - “Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure” on page 83
8. If you are installing more than one disk drive, repeat step 1 on page 16 through step 7 on page 18, until all disk drives are installed.
 9. Log in as root user.
 10. Wait 30 seconds after installing the disk drive, and then type `iprconfig` on the command line of the Linux session. Press Enter. The Work with Disk Units display is shown.
 11. Select **Display disk hardware status** from the Work with Disk Units display. Press Enter. A Display Disk Hardware Status display is shown, similar to the following figure.

```

Display Disk Hardware Status

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

Press Enter to continue.

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

```

Figure 13. Display Disk Hardware Status display

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

Complete the procedure:

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have a front cover from any other models, install the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Configure the newly installed disk drive for your environment. For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

Install the disk drive using Linux kernel 2.6

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

Install the disk drive:

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

A display similar to the following figure, is shown.

```
x0537pl:~ # lsslot
# Slot      Description      Linux Name      Device(s)
U787A.001.DNZ00XV-P1-C1 Logical I/O Slot 0000:00:02.0  ethernet
U787A.001.DNZ00XV-P1-C2 Logical I/O Slot 0000:00:02.2  pci
U787A.001.DNZ00XV-P1-C3 Logical I/O Slot 0001:00:02.2  pci1069,b166
U787A.001.DNZ00XV-P1-C4 Logical I/O Slot 0000:00:02.6  pci1069,b166
U787A.001.DNZ00XV-P1-C5 Logical I/O Slot 0001:00:02.6  pci1014,0180
U787A.001.DNZ00XV-P1-T5 Logical I/O Slot 0000:00:02.4  ethernet
U787A.001.DNZ00XV-P1-T7 Logical I/O Slot 0000:00:02.3  usb
U787A.001.DNZ00XV-P1-T10 Logical I/O Slot 0001:00:02.4  scsi
U787A.001.DNZ00XV-P1-T12 Logical I/O Slot 0001:00:02.3  ide
U9111.520.10D3C6C-V1-C0 Virtual I/O Slot 30000000      vty
```

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

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

```

                                Concurrent Device Add

Choose a single location for add operations
1=Select

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

```

Figure 15. Example Concurrent Device Remove display

7. Type option 1 next to the location into which you want to install the disk drive and press Enter. The Verify Device Concurrent Add display is shown. A concurrent maintenance light indicates the slot where the disk drive can be installed.
8. Press Enter on the Verify Device Concurrent Add display to verify the location.
9. If the slot you want to use contains a disk-drive filler, follow these steps:

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
- a. Pull the disk-drive filler from the slot as shown in Figure 16 on page 22.

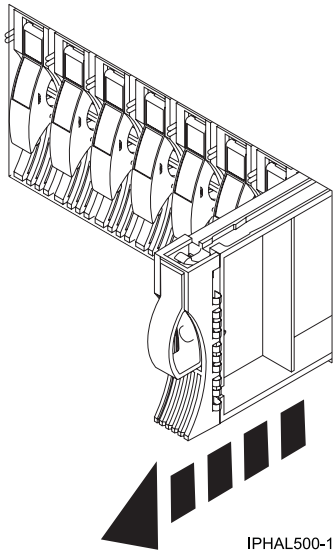


Figure 16. Removing a disk-drive filler from model

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

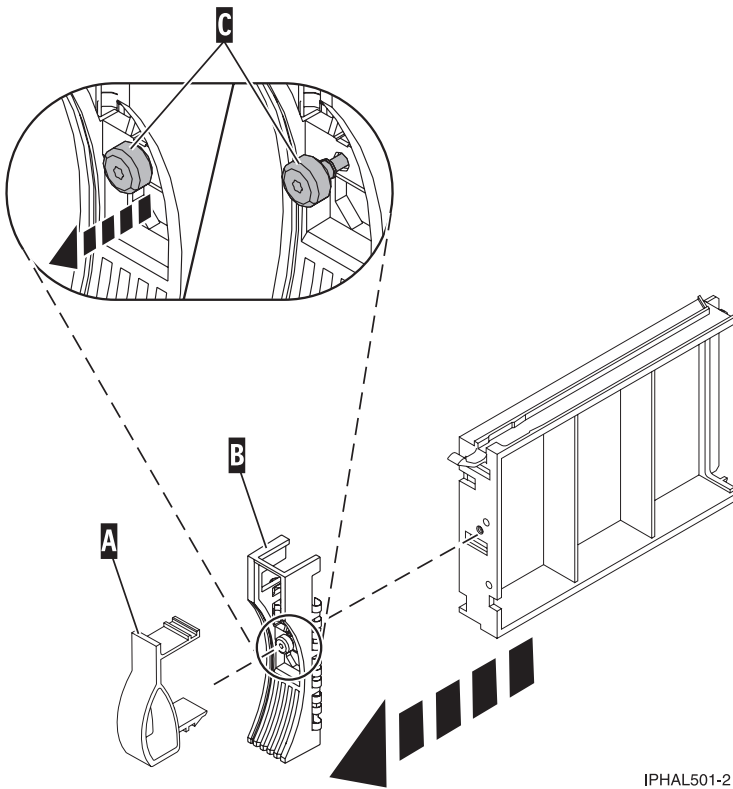


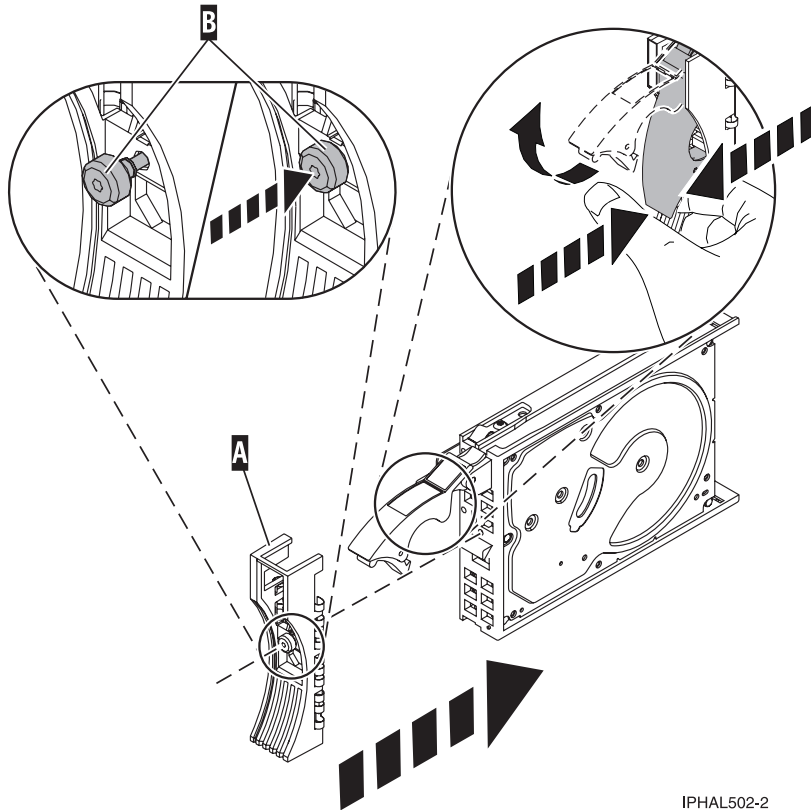
Figure 17. Removing a disk-drive bezel from the disk drive.

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

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

Attention: Disk drives are fragile. Handle with care.

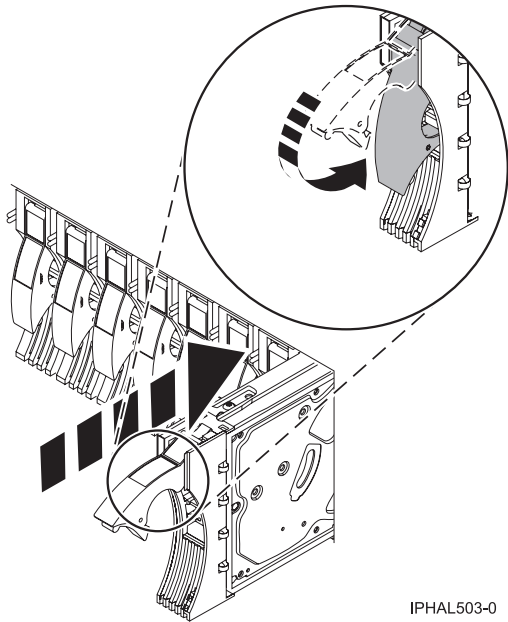
11. Remove the disk drive from the static-protective package. Record the serial number (use the last 4 digits) of the disk drive.
12. Unlock the disk drive handle by squeezing and pulling it out toward you. If the handle is not all the way out, the disk drive cannot slide into the system or expansion unit.
13. If your disk drive does not have a bezel preinstalled, follow these steps to install the disk-drive bezel on the new disk drive:
 - a. Attach the bezel **A** to the disk drive, as shown in the following figure.



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

- b. Press in and then tighten the thumbscrew **B** to secure the bezel to the disk drive.
14. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
15. The Complete Device Concurrent Add display is shown.
16. Slide the disk drive into the system.
Slide the disk drive all the way in into the system or expansion unit and then lock it in place by pushing in the disk drive handle, as shown in Figure 19 on page 24.



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Figure 19. Installing a disk drive in a model

17. Press Enter. The concurrent maintenance light stops blinking and remains on when you have installed the disk drive properly.
To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
 - “Disk-drive concurrent maintenance lights for models ” on page 82
 - “Disk-drive concurrent maintenance lights for model 11D/20” on page 83
 - “Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure” on page 83
18. If you are installing more than one disk drive, repeat step 2 on page 20 through step 17 until all disk drives are installed.

Verify that the new disk drive is operational:

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

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

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

```

Display Hardware Status

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

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

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

```

Figure 20. Example Display Hardware Status

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

Complete the procedure:

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - “Install the front cover on the 11D/1157/91 or 57/94 expansion unit” on page 308
 - If you have a front cover from any other models, remove the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Configure the newly installed disk drive for your environment. For information, go to the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

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

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

DANGER

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

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

- Connect power to this unit only with the 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)

Prepare the system

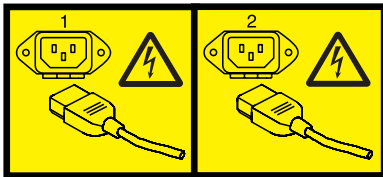
1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Remove the system unit door or expansion unit door, or open the rack. For instructions, select the appropriate procedure from the following list:
 - “Expansion unit cover or door” on page 305
3. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - “Remove the front cover from the model ” on page 311
 - “Remove the front cover from the 11D/20 expansion unit” on page 309
 - If you have a front cover from any other models, remove the front cover.
4. Determine the next available disk drive position in your system or expansion unit. For information, see “Disk drive locations” on page 66.

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

5. Stop the system or the logical partition that controls the disk drive location. For instructions, see “Stop the system or logical partition” on page 303.
6. If you stopped the logical partition, do not disconnect the power source. If you stopped the system, disconnect the power source from the system by unplugging the system.

Note: This system may be equipped with a second power supply. Before continuing with this procedure, ensure that the power source to the system has been completely disconnected.

(L003)



or



Install the disk drive

1. If the slot you want to use contains a disk drive filler, follow these steps:

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
- a. Pull the disk-drive filler from the slot you want to use, as shown in Figure 21 on page 28.

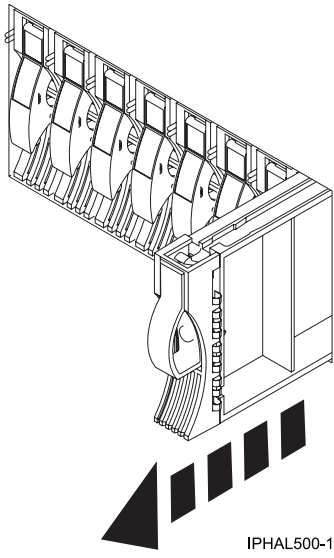


Figure 21. Removing a disk-drive filler from a model

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

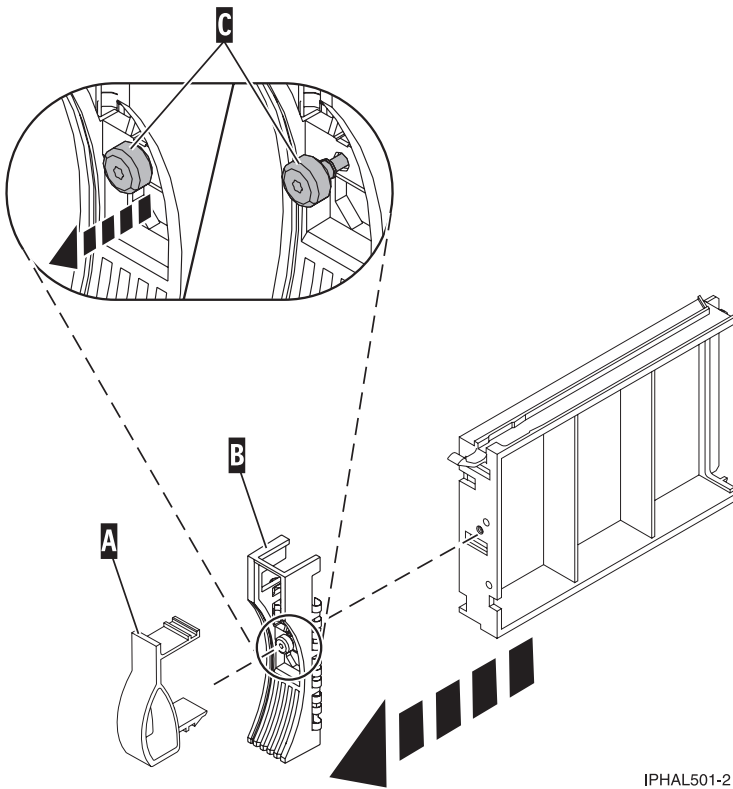


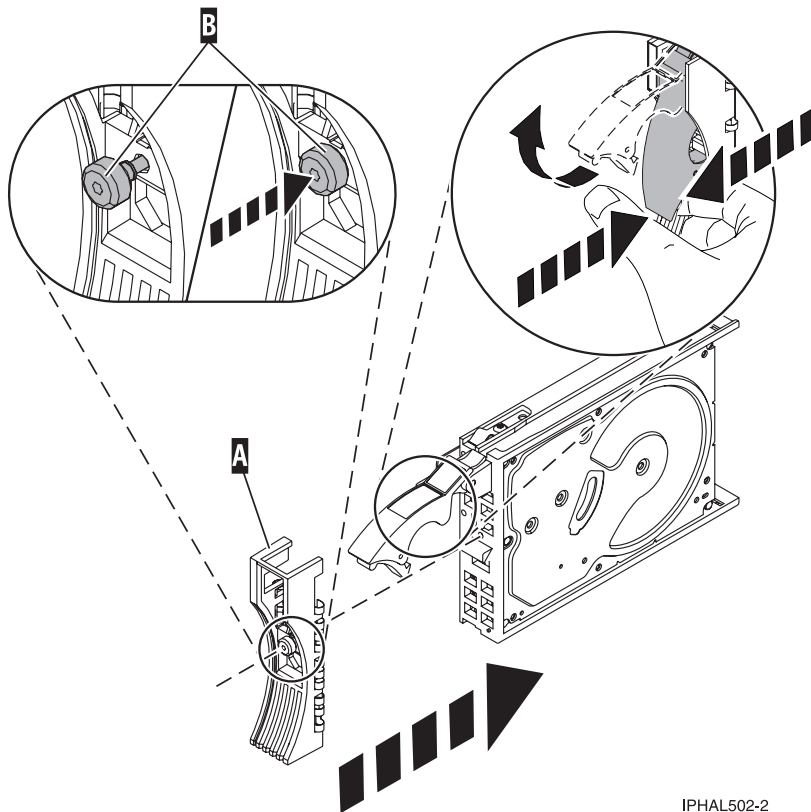
Figure 22. Removing a disk-drive bezel

c. Loosen, and then pull out on the thumbscrew **C** to release the bezel **B** from the front edge of the filler.

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

Attention: Disk drives are fragile. Handle with care.

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



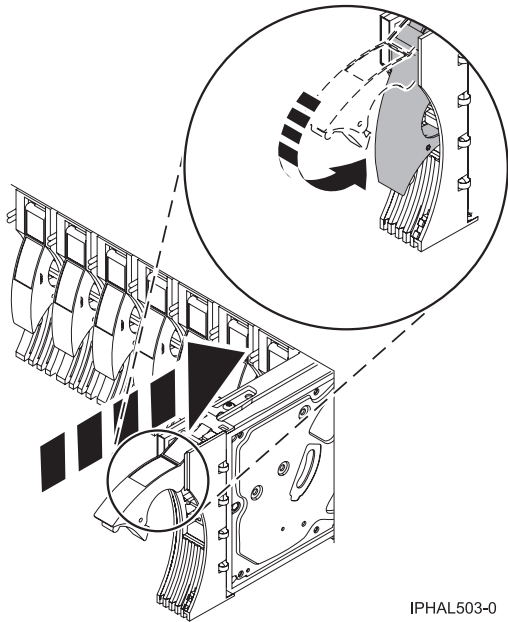
IPHAL502-2

Figure 23. Installing a disk-drive bezel

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

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

8. Push the disk drive handle in until it locks, as shown in Figure 24 on page 30.



IPHAL503-0

Figure 24. Installing a disk drive in a model

9. If you are installing more than one disk drive, repeat step 1 on page 27 through step 8 on page 29 until all disk drives are installed.

Complete the procedure

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have a front cover from any other models, install the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Reconnect all system power cables.
4. Reconnect the system to the power supply by plugging it into the system.
5. Start the system or logical partition. For instructions, see “Start the system or logical partition” on page 300.
6. To configure the newly installed disk drive, select the procedure for the operating system that controls the disk drive.
 - “Prepare a disk drive for use in an AIX system or logical partition” on page 84
 - For information on configuring the newly installed disk drive for a Linux environment, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

Remove a disk drive

You might need to remove a Small Computer System Interface (SCSI) or Serial Attached SCSI (SAS) disk drive from the sever or expansion unit. This section includes information about the disk-drive enclosure and procedures so that you can perform these tasks.

To remove and replace a failed disk drive, go to “Replace a disk drive” on page 31. If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a disk drive. For instructions, see “Remove a part using the Hardware Management Console” on page 318.

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

- “Replace a disk drive with the AIX system or logical partition powered on.”
- “Replace a disk drive with the Linux system or logical partition powered on” on page 37.

Replace a disk drive

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

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

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

Use this procedure to remove a failed disk drive and replace it with the same type of disk drive. If you plan to remove a disk drive and install a different type of disk drive, remove the existing disk drive as described in “Remove a disk drive” on page 30, then install the new disk drive as described in “Install a disk drive” on page 9. If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for replacing a disk drive. For instructions, see “Exchange a part using the Hardware Management Console” on page 319.

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

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

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

DANGER

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

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

- Connect power to this unit only with the 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)

Attention: The powered-on procedure is a complex set of steps that must be performed exactly to avoid potential data loss or system damage. You might also consider the powered-off procedure, which is a simpler task that involves less risk of data loss or system damage. If the system or logical partition that controls the disk drive you are replacing is at the AIX command line, you can use this powered-on procedure. If the disk drive that you are replacing is in the root volume group (rootvg) and it is not protected by either Redundant Array of Independent Disks (RAID) or mirroring, or to use the powered-off procedure, go to “Replace a disk drive with the system or logical partition powered off” on page 52.

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

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Prepare to remove the disk drive from the system or expansion unit as described in “Prepare to remove a disk drive from a system or expansion unit controlled by AIX” on page 84.
3. Remove the system unit door, expansion unit door, or the rack door. For instructions, select the appropriate procedure from the following list:

- “Expansion unit cover or door” on page 305
4. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - “Remove the front cover from the model ” on page 311
 - “Remove the front cover from the 11D/20 expansion unit” on page 309
 - If you have a front cover from any other models, remove the front cover.

To replace a Just a Bunch of Disks (JBOD) disk drive attached to any SCSI or SCSI RAID adapter, see the procedure in “Replace a SCSI disk drive” on page 58.

Remove the disk drive

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

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

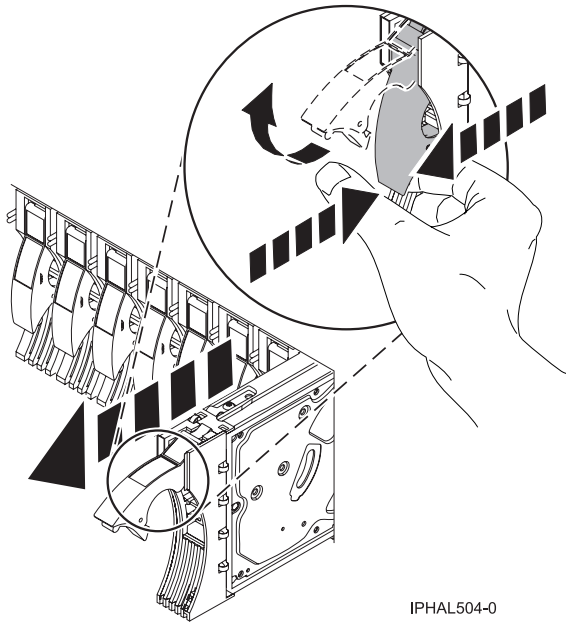
 - If you have a RAID disk drive attached to a 2498 PCI SCSI RAID adapter, continue with step 7.
 - If you have a JBOD disk drive attached to any SCSI or SCSI RAID adapter, go to “Replace a SCSI disk drive” on page 58.
 - If you have RAID drives attached to any other adapter, go to the *PCI-X SCSI RAID Controller Reference Guide for AIX*.
7. Select **RAID Hot Plug Devices**.
8. On the Resource Selection List, select the adapter that is connected to the array that contains the disk drive you want to replace. Press Enter.
9. Select **Commit**.
10. On the Identify and Remove Resources menu, select **Remove**. Press Enter.

A list of the disk drives that you can remove is shown. If the disk drive you want to remove does not appear on the list, ask your system administrator to put the disk drive in the Failed state before continuing with this procedure. For information, see *AIX System Management Guide: Operating System and Devices*.
11. Select the drive that you want to remove and press Enter. The concurrent maintenance light for the slot will flash rapidly.

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

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

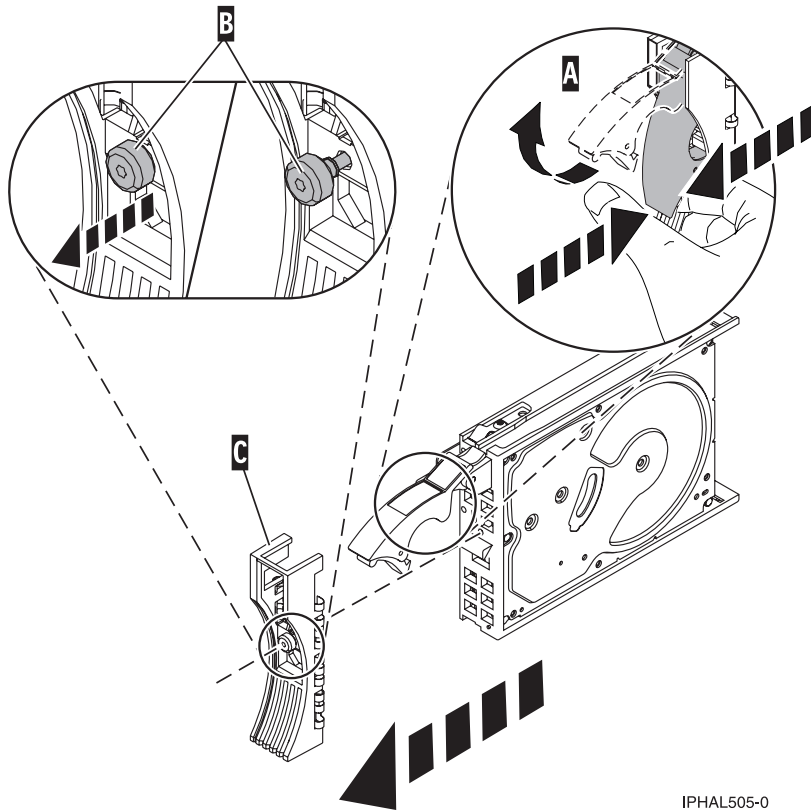
 - “Disk-drive concurrent maintenance lights for models ” on page 82
 - “Disk-drive concurrent maintenance lights for model 11D/20” on page 83
 - “Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure” on page 83
12. Unlock the disk drive handle by squeezing it and pulling it out toward you as shown in Figure 25 on page 34.



IPHAL504-0

Figure 25. Removing a disk drive from a model

13. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.
The concurrent maintenance light for the slot turns off when you remove the disk drive.
14. If your new disk drive does not have a bezel preinstalled, then perform the following step.
Loosen and pull out on the thumbscrew **B** to release the bezel **C** from the disk drive, as shown in the following figure.

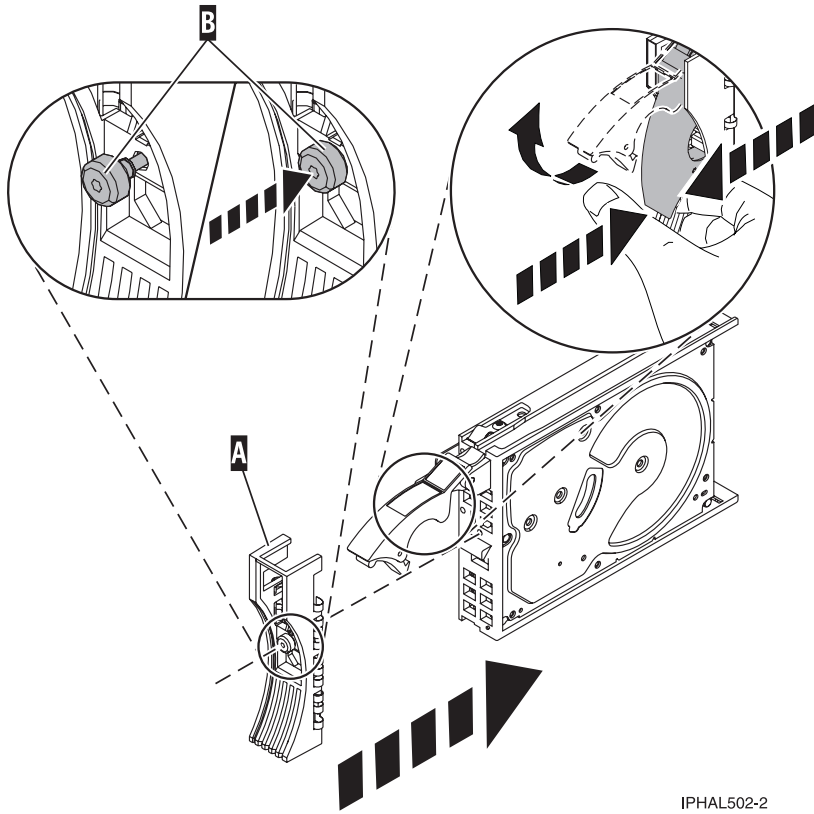


IPHAL505-0

Figure 26. Removing a disk-drive bezel

Replace the disk drive

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



IPHAL502-2

Figure 27. Installing a disk-drive bezel

6. Install the disk drive as shown in Figure 28 on page 37.
 - a. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
 - b. Slide the disk drive into the system until it stops.

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

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

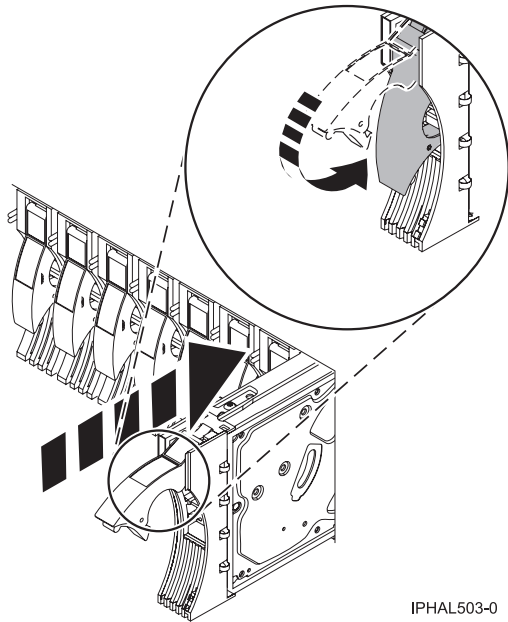


Figure 28. Installing a disk drive in a model

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

Complete the procedure

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have a front cover from any other models, install the front cover.
2. Install or close the front door of the system, expansion unit or rack.
3. To prepare the disk drive for use, go to “Rebuild data on a replacement disk drive using AIX” on page 84.

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

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

DANGER

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

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

- Connect power to this unit only with the 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)

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

Go to “Replace a disk drive with the system or logical partition powered off” on page 52, if:

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

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

Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Is the disk drive you are replacing in a redundant array of independent disk (RAID) 0 array or is the disk drive you are replacing in a failed RAID level 5 or 10 array?
 - If yes, you must delete the disk array before replacing the disk. For instructions, see *PCI-X SCSI RAID Controller Reference Guide for Linux*.

- If no, your drive is configured as Just a Bunch of Disks (JBOD) or is configured within a degraded array. Proceed to the next step.
3. If the disk drive you are replacing is in a redundant array of independent disk (RAID) Level 0 disk array or in a failed RAID Level 5 or RAID Level 10 disk array, you must delete the disk array before replacing the disk. For instructions, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.
 4. Remove the system unit door or expansion unit door or open the rack front door. For instructions, select the appropriate procedure from the following list:
 - “Expansion unit cover or door” on page 305
 5. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - “Remove the front cover from the model ” on page 311
 - “Remove the front cover from the 11D/20 expansion unit” on page 309
 - If you have a front cover from any other models, remove the front cover.

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

Replace the disk drive using Linux kernel 2.4

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

Prepare to remove the disk drive:

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

```

                                Kernel Messages Log

Select one of the following:

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

Selection:

e=Exit
```

Figure 29. Kernel Messages Log

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

11. On the Display Disk Unit Details display, type 5 (Display hardware resource information details) next to the disk drive you want to replace.

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

```

Disk Unit Hardware Resource Information Details

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

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

Press Enter to continue.

e=Exit      q=Cancel      v=Display Extended VPD
```

Figure 30. Disk Unit Hardware Resource Information Details display

12. Record the physical location information.
13. Exit to the Work with Disk Units display.
14. If the disk drive you want to replace is unprotected or in use, move the data from the disk drive before continuing with this procedure.

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

Remove the disk drive:

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

```

Device Concurrent Maintenance

Type the choices, then press Enter.

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

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

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

Or leave blank and press Enter to cancel

```

Figure 31. Example Device Concurrent Maintenance display

3. Enter either the physical location information or the PCI or SCSI location for the disk drive you want to replace. Press Enter.
 4. Specify 1 (Remove device) for the action to be performed.
 5. Enter a time value in minutes, allowing enough time for you to remove the disk drive.
- The concurrent maintenance light indicates that you can remove the disk drive. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
- “Disk-drive concurrent maintenance lights for models ” on page 82
 - “Disk-drive concurrent maintenance lights for model 11D/20” on page 83
 - “Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure” on page 83

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

```

Device Concurrent Maintenance Action

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

You have 1 minute to perform the operation

During this time, your system can seem unresponsive

c=Confirm  q=Cancel

```

Figure 32. Example Device Concurrent Maintenance Action display

7. Enter c to confirm that you want to remove the disk drive at the specified location.
A Device Concurrent Maintenance Action In Progress display is shown, similar to the following display.

Device Concurrent Maintenance Action In Progress

Please remove the device located in:
Location: U0.1-P1-I4/Z1-A8

Figure 33. Example Device Concurrent Maintenance Action In Progress display

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
8. Squeeze and pull the handle of the disk drive out toward you before you remove the disk drive, as shown in Figure 34. If the handle is not all the way out, the disk drive can not slide out of the system or expansion unit.

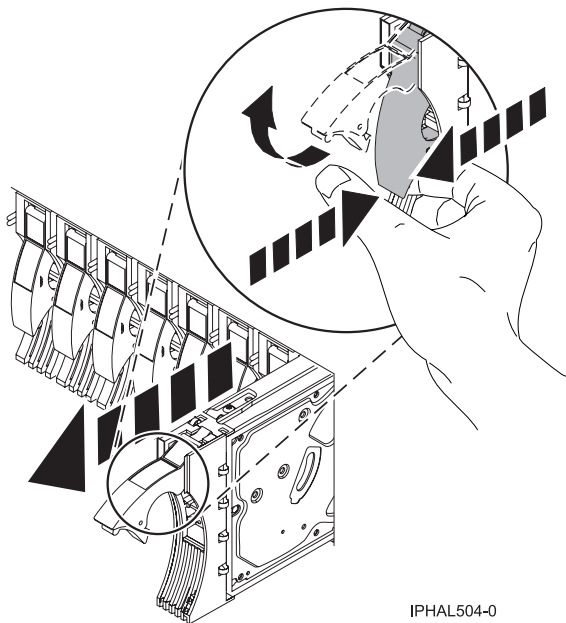
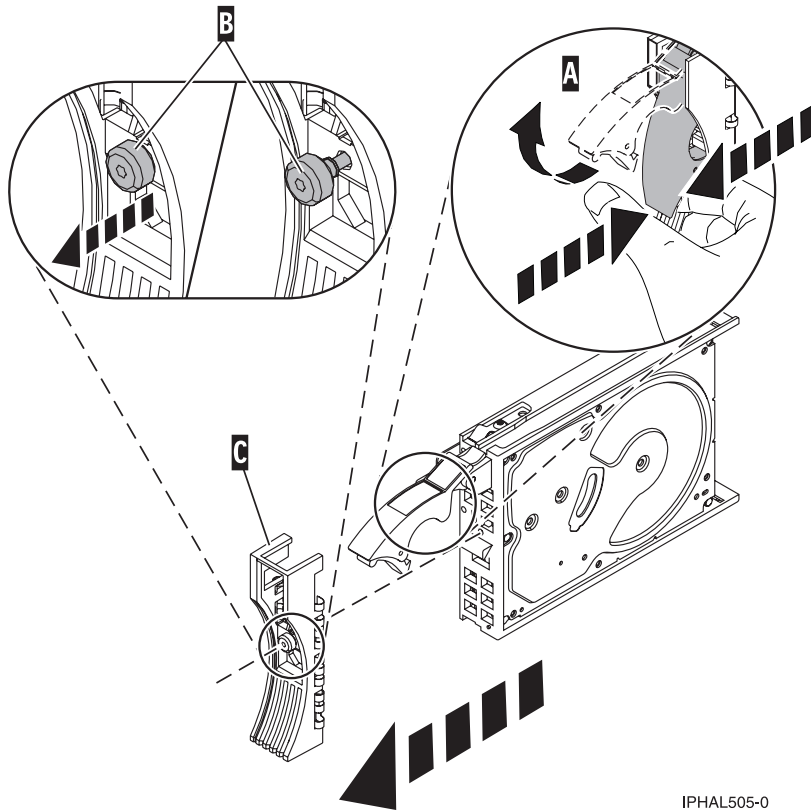


Figure 34. Removing a disk drive from a model or 11D/20

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

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

10. Press Enter.
11. If your replacement disk drive does not have a bezel preinstalled, then perform the following step. Loosen and pull out on the thumbscrew **B** to release the disk-drive bezel **C** from the disk drive, as shown in the following figure.

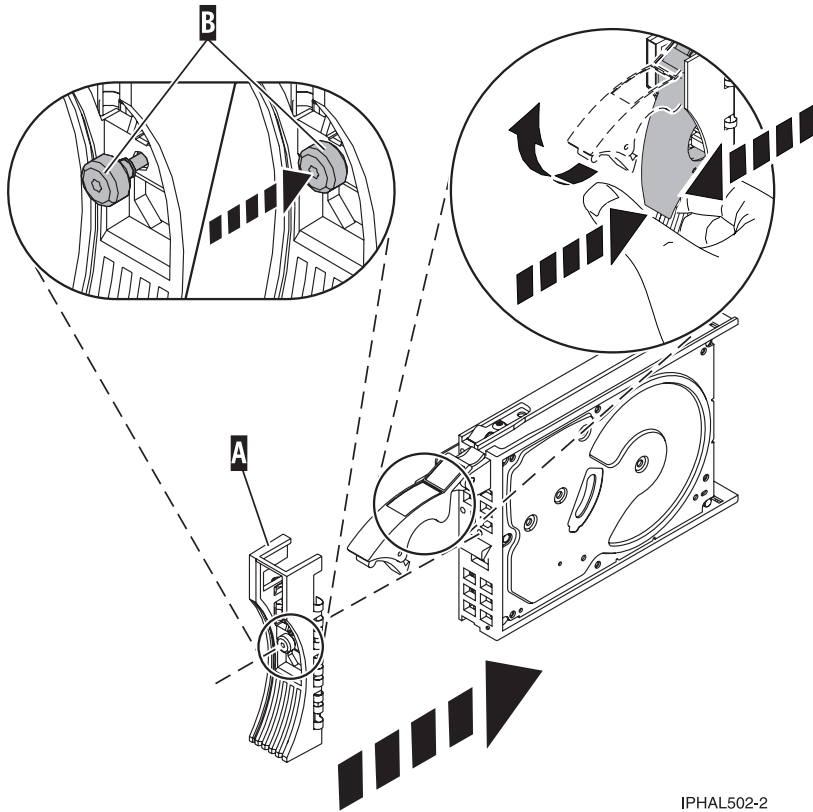


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Figure 35. Removing a disk-drive bezel

Replace the disk drive:

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



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Figure 36. Attaching a bezel to the disk drive

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

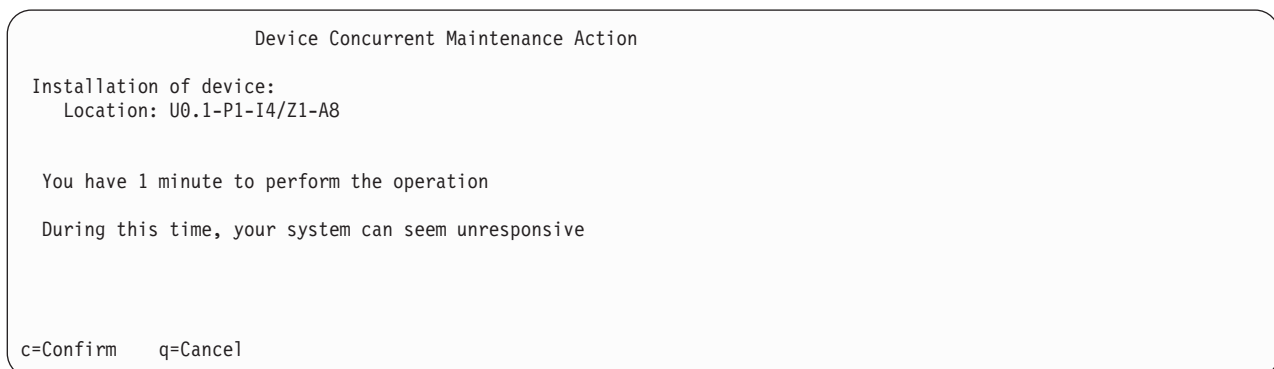


Figure 37. Example Device Concurrent Action Maintenance display

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

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

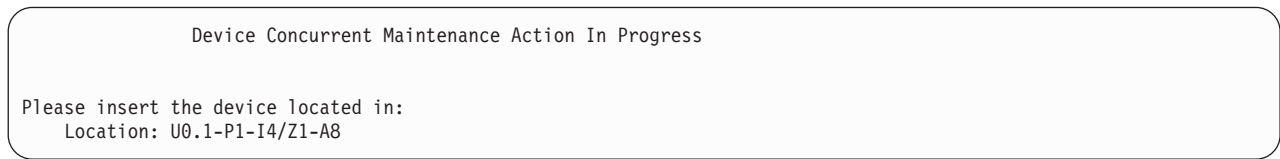


Figure 38. Example Device Concurrent Maintenance Action In Progress display

11. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
12. Slide the disk drive all the way in into the system or expansion unit and then lock it in place by pushing in the disk drive handle as shown in Figure 39.

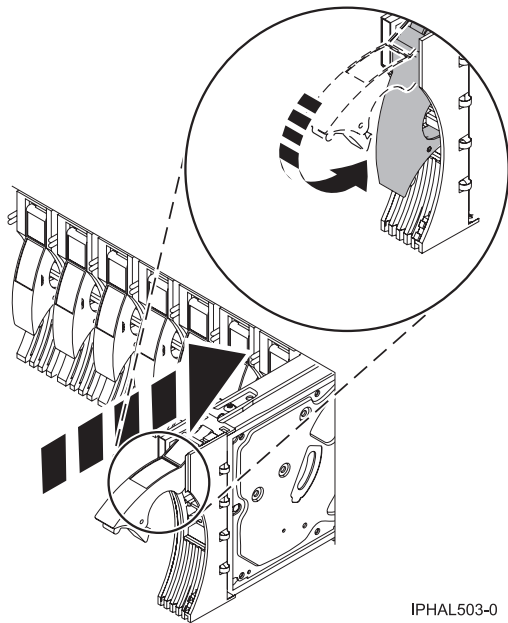


Figure 39. Installing a disk drive in a model or 11D/20

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

13. Rebuild the data on the replacement disk drive. For instructions, go to “Rebuild data on a replacement disk drive using Linux” on page 85.

Complete the procedure:

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have any other models, install the front cover.
2. Install or close the system, expansion unit, or rack front door.

Replace the disk drive using Linux kernel 2.6

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

Prepare to remove the disk drive:

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



Figure 40. Kernel Messages Log

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

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

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

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

10. Type `iprconfig` on the command line and press Enter. The 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
sdg       0001:61:01.0.2/          PCI-X SCSI RAID Adapter  Operational
          0001:61:01.0.2/0:3:0     Physical Disk       Active
          0001:61:01.0.2/0:6:0     Advanced Function Disk  Active
sdi       0001:61:01.0.2/0:9:0     Physical Disk       Active
sdh       0001:61:01.0.2/255:0:0    RAID 10 Disk Array   Failed
          0001:61:01.0.2/0:4:0     RAID 10 Array Member  Failed
          0001:61:01.0.2/0:5:0     RAID 10 Array Member  Failed

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

```

Figure 41. Example Display Hardware Status

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

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

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

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

```

Disk Unit Hardware Resource Information Details

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

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

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

Press Enter to Continue

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

```

Figure 42. Example Disk Hardware Resource Information Details display

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

Remove the disk drive:

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 remove device**. Press Enter. A Concurrent Device Remove display is shown, similar to the following display.

Concurrent Device Remove				
Choose a single location for remove operations				
1=Select				
OPT	Name	PCI/SCSI Location	Description	Status
	sdc	0000:41:01.0.1/0:8:0 0000:41:01.0.1/0:5:	Physical Disk	Active Empty
	sdb	0000:41:01.0.1/0:4:0	Physical Disk	Active
	sda	0000:41:01.0.1/0:3:0 0000:41:01.0.1/1:8:	Physical Disk	Active Empty
	sdf	0000:41:01.0.1/1:5:0	Physical Disk	Active
	sde	0000:41:01.0.1/1:4:0	Physical Disk	Active
	sdd	0000:41:01.0.1/1:3:0 0001:61:01.0.2/0:8:	Physical Disk	Active Empty
	sdh	0001:61:01.0.2/0:9:0	Physical Disk	Active
	sdg	0001:61:01.0.2/0:3:0	Physical Disk	Active

Figure 43. Example Concurrent Device Remove display

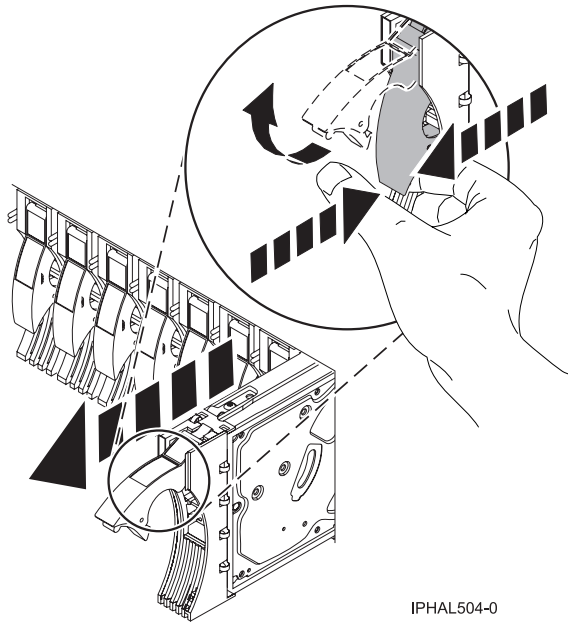
3. Type option 1 (Select) next to the location for the disk drive you want to replace. Press Enter.
4. The Verify Device Concurrent Remove display is shown. The concurrent maintenance light turns on for that disk drive slot. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:
 - “Disk-drive concurrent maintenance lights for models ” on page 82
 - “Disk-drive concurrent maintenance lights for model 11D/20” on page 83
 - “Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure” on page 83
5. On the Verify Device Concurrent Remove display, verify that the selected disk drive is the disk drive you want to replace, then press Enter. The identify light turns on for the disk drive.

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

6. The Complete Device Concurrent Remove display is shown.

Attention:

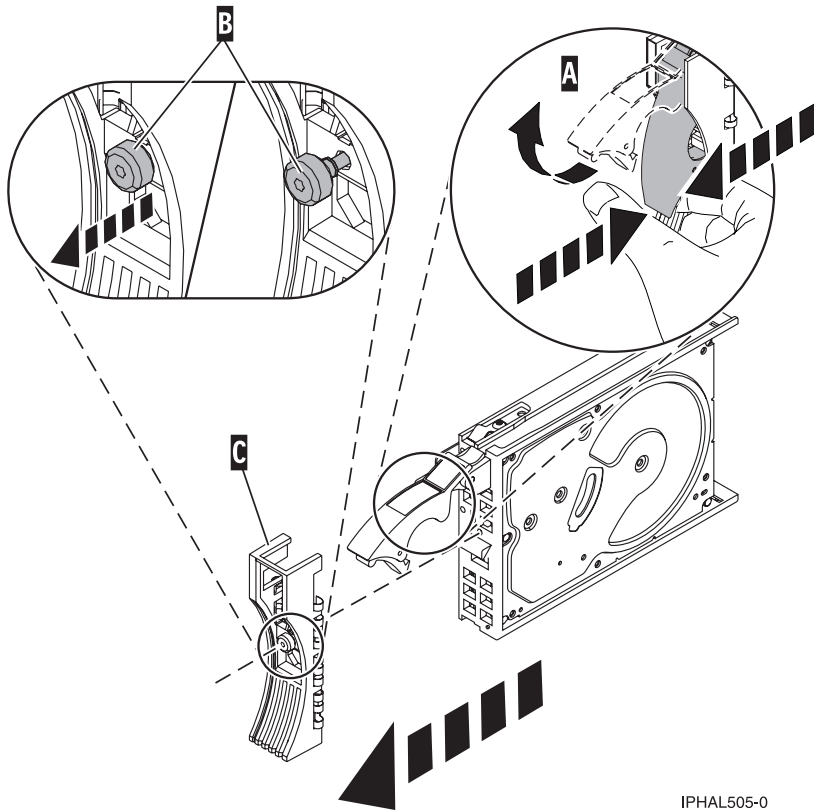
- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
7. Squeeze and pull the handle of the disk drive out toward you before you remove the disk drive as shown in Figure 44 on page 49. If the handle is not all the way out, the disk drive will not slide out of the system or expansion unit.



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Figure 44. Removing a disk drive from a model or 11D/20

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



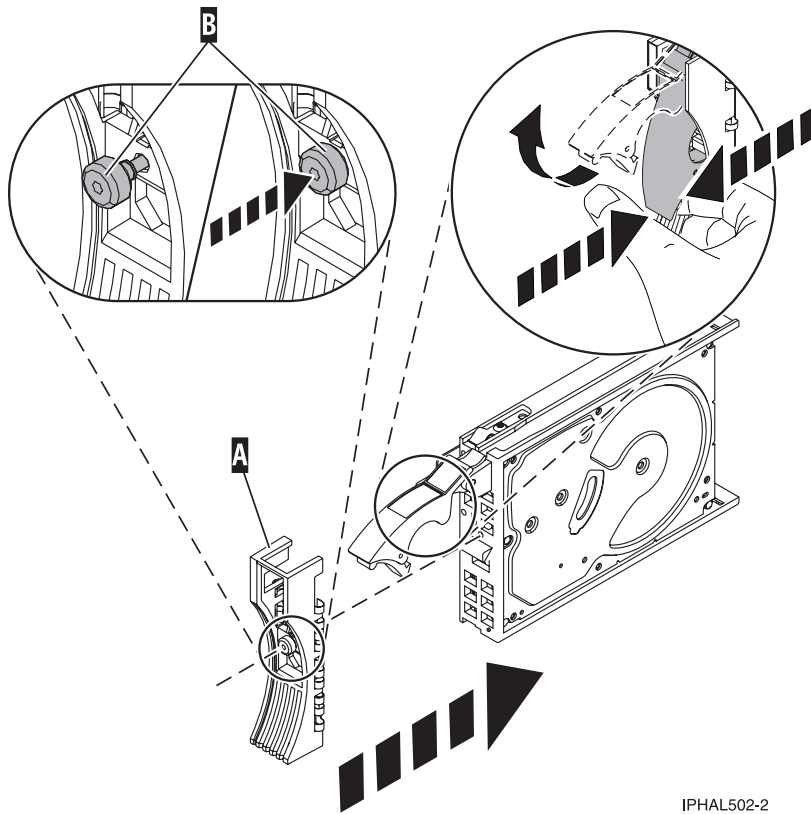
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Figure 45. Removing a disk-drive bezel

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

Replace the disk drive:

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



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Figure 46. Attaching a bezel to the disk drive

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

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

Figure 47. Example Concurrent Device Add display

7. Type option1 (Select) next to the location from which you removed the disk drive.
The Verify Device Concurrent Add display is shown.
8. Press Enter on the Verify Device Concurrent Add display. The Complete Device Concurrent Add display is shown.
9. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
10. Slide the disk drive all the way into the system or expansion unit and then lock it in place by pushing in the disk drive handle, as shown in Figure 48 on page 52.

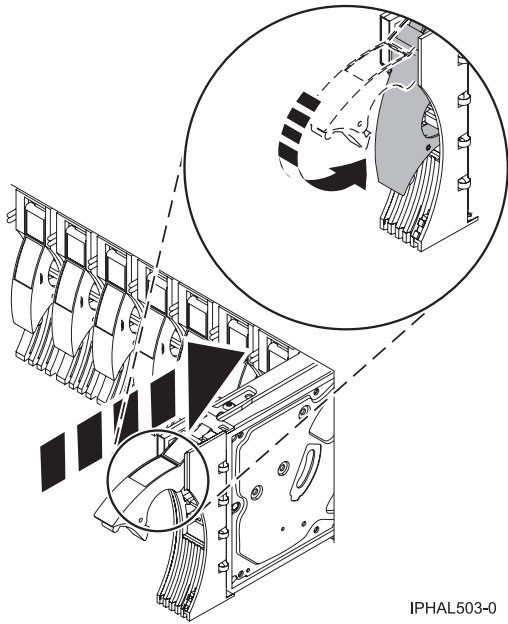


Figure 48. Installing a disk drive in a model or 11D/20

11. Press Enter on the Complete Device Concurrent Add display to indicate that the disk drive is installed.
12. Rebuild the data on the replacement disk drive. For instructions, go to “Rebuild data on a replacement disk drive using Linux” on page 85.

Complete the procedure:

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have any other models, install the front cover.
2. Install or close the system, expansion unit or rack front door.

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

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

DANGER

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

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

- Connect power to this unit only with the 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)

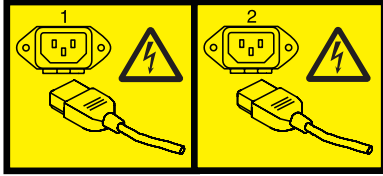
Prepare the system

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. If you cannot start the system or logical partition that controls the disk drive location, or if the system or logical partition are not powered on, go to step 6 on page 54.
3. Identify the disk drive to be replaced and record the location information. For information, see “Identify a failing part” on page 299.
4. Prepare to remove the disk drive from the system or expansion unit as follows:
 - If the system or logical partition that controls the disk drive location is running AIX, follow the steps in “Prepare to remove a disk drive from a system or expansion unit controlled by AIX” on page 84.
 - If the system or logical partition that controls the disk drive location is running Linux and the disk drive you want to replace is unprotected or in use, move the data from the disk drive before continuing with this procedure. For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.
5. Stop the system or logical partition that controls the disk drive location. For instructions, see “Stop the system or logical partition” on page 303.

6. If you stopped the logical partition, do not disconnect the power source. If you stopped the system, disconnect the power source from the system by unplugging the system.

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

(L003)



or



7. Remove the system unit door or expansion unit door or open the rack front door. For instructions, select the appropriate procedure from the following list:
 - “Expansion unit cover or door” on page 305
8. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - hwip2frontbezelloff.dita#hwip2frontbezelloff
 - “Remove the front cover from the model ” on page 311
 - “Remove the front cover from the 11D/20 expansion unit” on page 309
 - If you have a front cover from any other models, remove the front cover.

Remove the disk drive

1. Unlock the disk drive handle by squeezing it and pulling it out toward you, as shown in Figure 49 on page 55.

Attention:

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

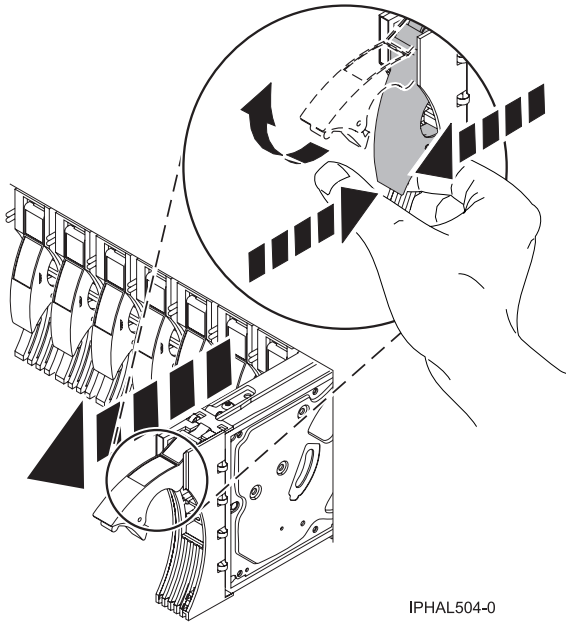
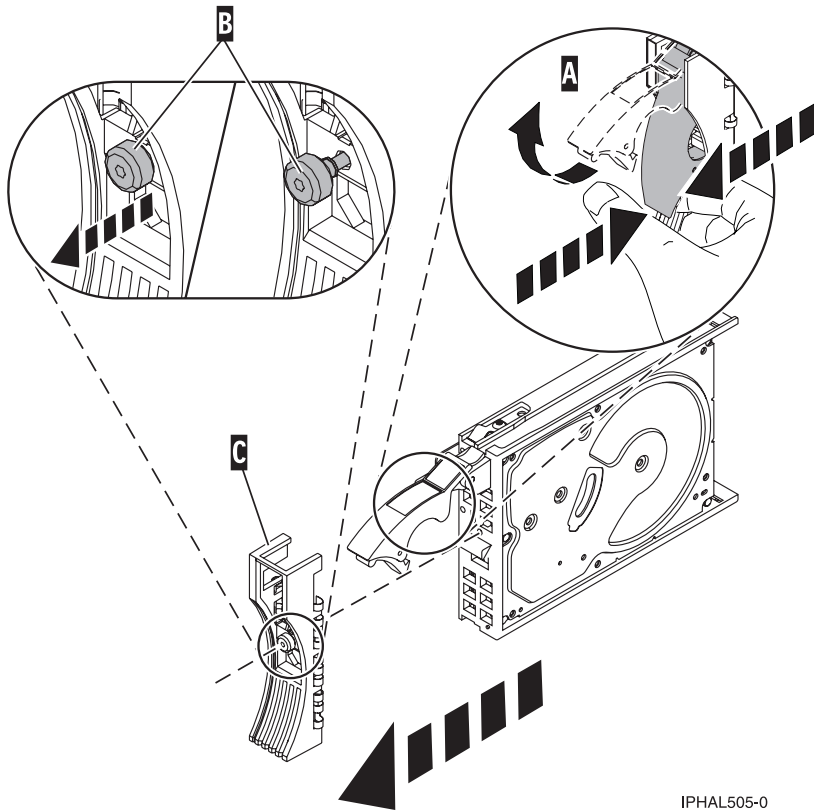


Figure 49. Removing a disk drive from a model or 11D/20

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

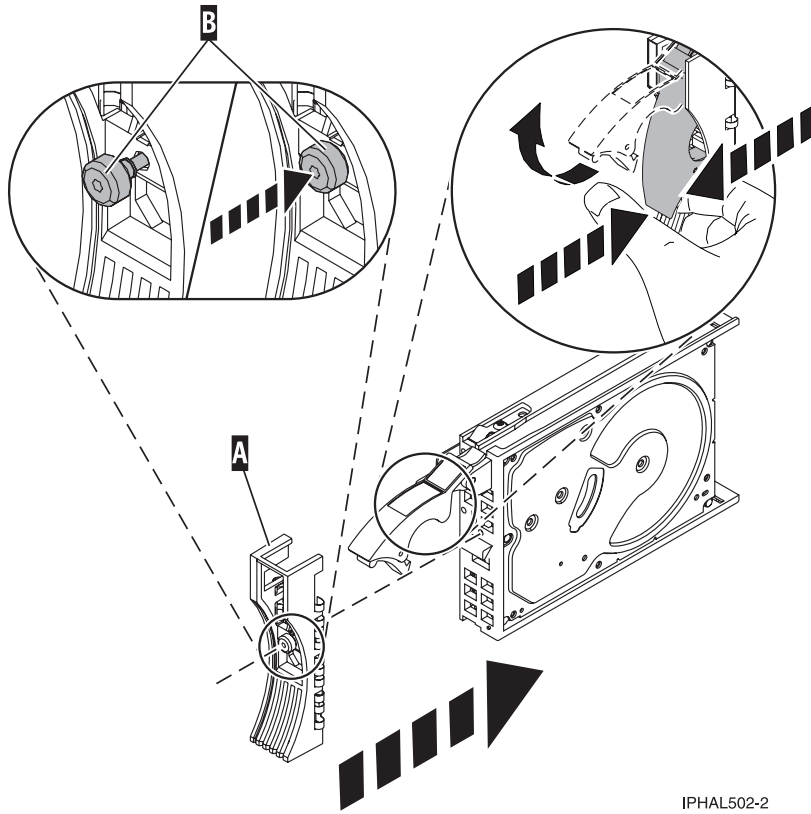


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Figure 50. Removing a disk-drive bezel

Replace the disk drive

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



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Figure 51. Attaching a disk-drive bezel

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

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

7. Push the disk drive handle in until it locks, as shown in Figure 52 on page 58.

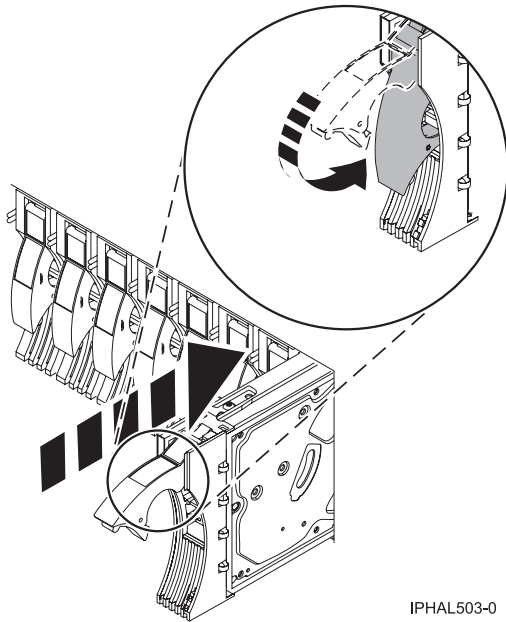


Figure 52. Installing a disk drive in a model or 11D/20

Complete the procedure

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - hwip2frontbezelon.dita#hwip2frontbezelon
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have a front cover from any other models, install the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Reconnect all system power cables.
4. Reconnect the system to the power supply by plugging it in.
5. Start the system or logical partition. For instructions, see “Start the system or logical partition” on page 300.
6. If the system or logical partition that controls the disk drive you replaced is running AIX, verify that the disk drive is working as described in “Verify an installed feature or replaced part on an AIX system or logical partition” on page 320. If it is not possible to run online diagnostics, for example if you replaced the root volume group (rootvg) disk drive, use standalone diagnostics as described in “Verify an installed part using stand-alone diagnostics” on page 324.
7. To rebuild the data on the replacement disk drive, select the operating system for the system or logical partition that controls the disk drive:
 - “Rebuild data on a replacement disk drive using AIX” on page 84
 - “Rebuild data on a replacement disk drive using Linux” on page 85

Replace a SCSI disk drive

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

Remove the disk drive

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

The disk drive slot enters the Identify state, indicated by the flashing concurrent maintenance light. To view the locations of the concurrent maintenance lights, select the appropriate model from the following list:

 - “Disk-drive concurrent maintenance lights for models ” on page 82
 - “Disk-drive concurrent maintenance lights for model 11D/20” on page 83
 - “Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure” on page 83
9. Exit to the SCSI and SCSI RAID Hot Plug Manager display.
10. On the SCSI and SCSI RAID Hot Plug Manager display, select **Replace/Remove a Device Attached to a SCSI Hot Swap Enclosure Device**. A list of all slots from which you can remove a disk drive is shown.
11. Select the slot that contains the disk drive you want to remove. The disk drive slot enters the Remove state and power is removed from the slot. The concurrent maintenance light for the slot begins flashing rapidly.
12. Unlock the disk drive. Unlock the disk drive handle by squeezing it and pulling it out toward you as shown in the following figures.

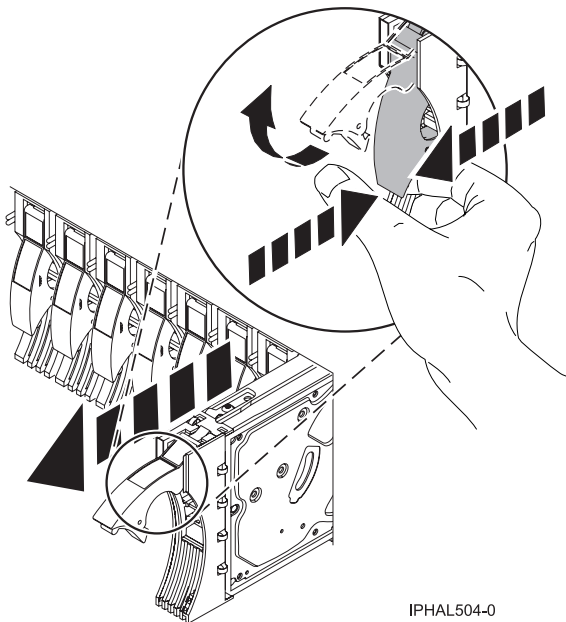
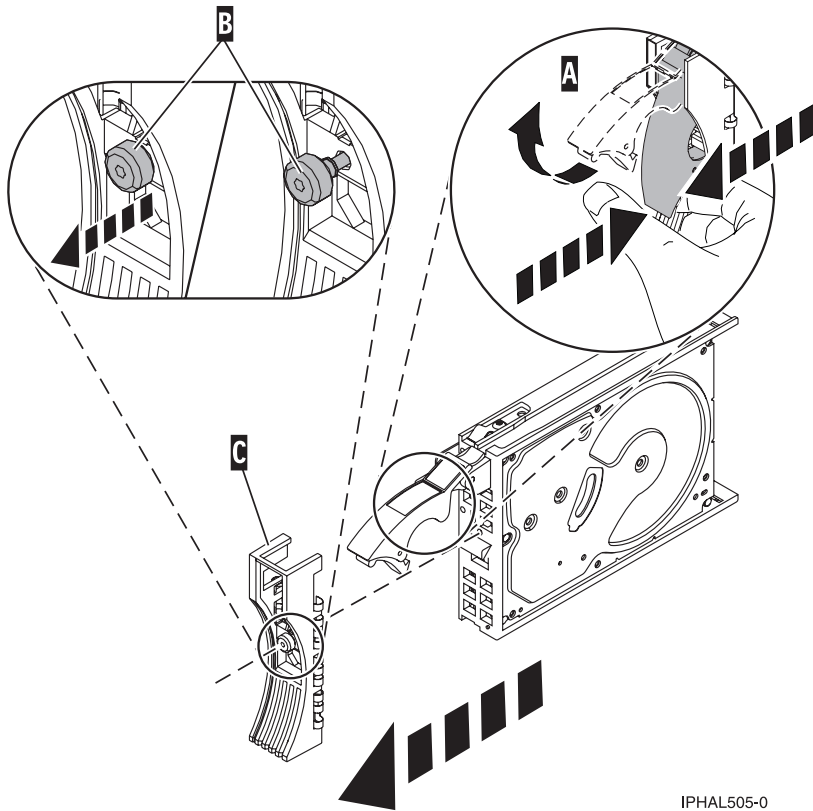


Figure 53. Removing a disk drive from a model or 11D/20

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

- Note:** The concurrent maintenance light for the slot turns off when you remove the disk drive.
- Loosen and pull out on the thumbscrew **B** to release the bezel **C** from the disk drive.

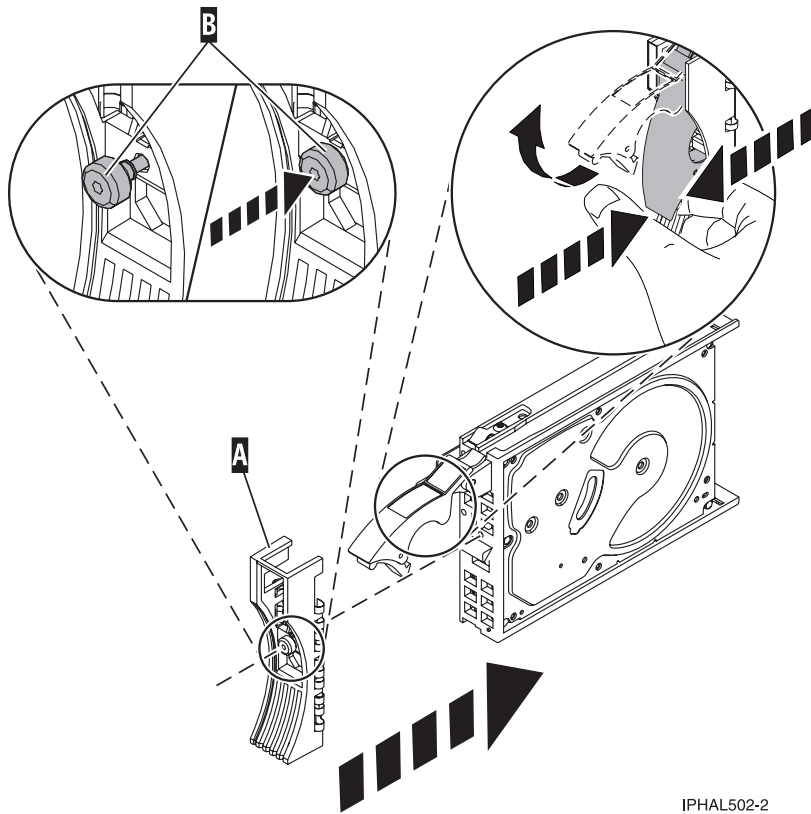


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Figure 54. Removing a disk-drive bezel

Replace the disk drive

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



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Figure 55. Attaching a disk-drive bezel

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

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

- c. Push the disk drive handle in until it locks, as shown in Figure 56 on page 62.

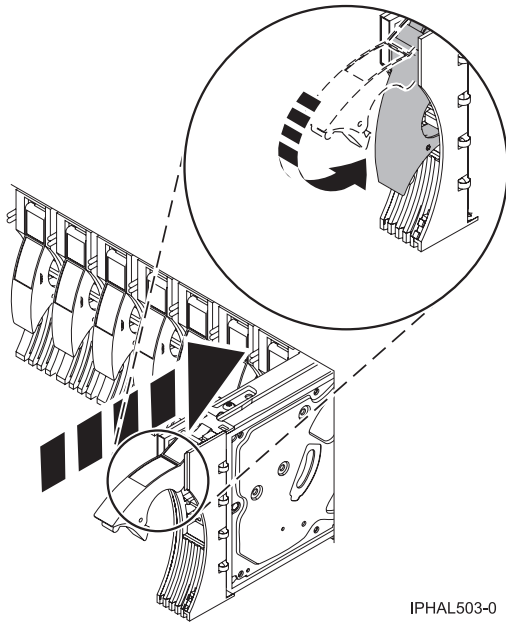


Figure 56. Installing a disk drive in a model a model or 11D/20

7. Press Enter.
8. Exit to the SCSI and SCSI RAID Hot-Plug Manager menu.
9. Select **Configure Added/Replaced Devices**. Press Enter.
10. Select the disk drive that you replaced and then press Enter.
The disk drive is now configured.
11. Exit to the Task Selection display.
12. Select **Log Repair Action**.
13. Select the disk drive that you replaced and then press Enter.
14. Select **Commit** after you have made your selection and then press Enter.
15. Exit to the command line.

Complete the procedure

1. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311
 - “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have a front cover from any other models, remove the front cover.
2. Install or close the system, expansion unit or rack front door.
3. Verify that the disk drive is working. For instructions, see “Verify an installed feature or replaced part on an AIX system or logical partition” on page 320. If it is not possible to run online AIX diagnostics, for example if you replaced the root volume group (rootvg) disk drive, use standalone diagnostics as described in “Verify an installed part using stand-alone diagnostics” on page 324.
4. To prepare the disk drive for use, go to “Rebuild data on a replacement disk drive using AIX” on page 84.

Remove or install a disk-drive filler

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

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

Remove a disk-drive filler

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

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

1. Remove the system unit door, expansion unit door, or open the rack front door. For instructions, select the appropriate procedure from the following list:
 - “Expansion unit cover or door” on page 305
2. Remove the front cover. For instructions on removing the cover, select the appropriate procedure from the following list:
 - “Remove the front cover from the model ” on page 311
 - “Remove the front cover from the 11D/20 expansion unit” on page 309
 - If you have a front cover from any other models, remove the front cover.
3. Identify the disk-drive filler you want to remove.
4. Pull the disk-drive filler from the slot. Pull the disk-drive filler from the slot that you want to use, as shown in Figure 57.

Attention:

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

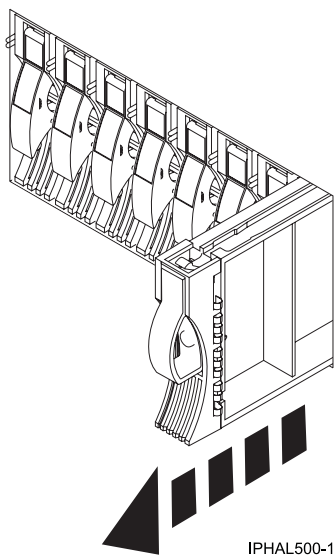
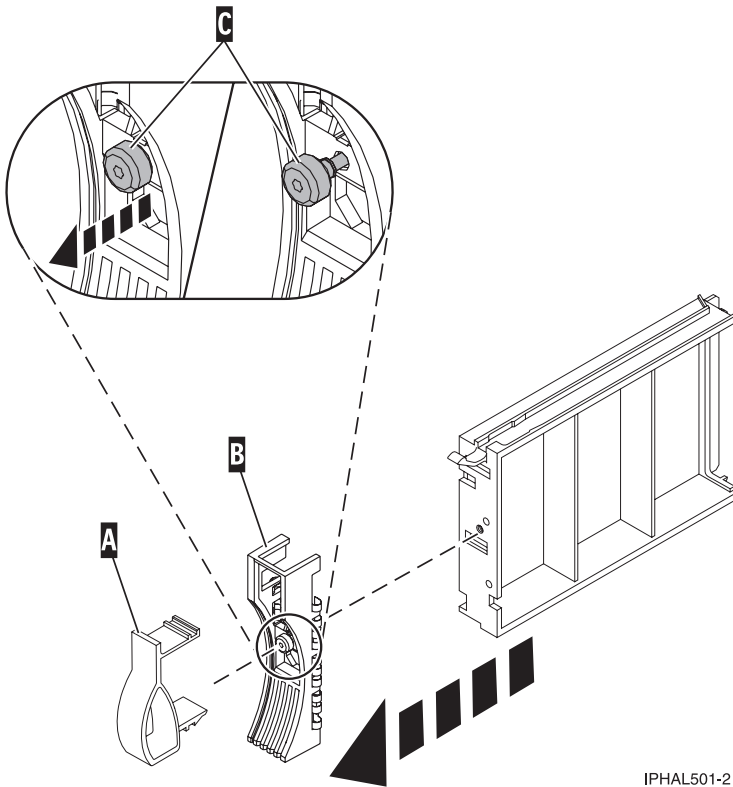


Figure 57. Removing a disk-drive filler from a model or 11D/20

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



IPHAL501-2

Figure 58. Removing a disk-drive bezel

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

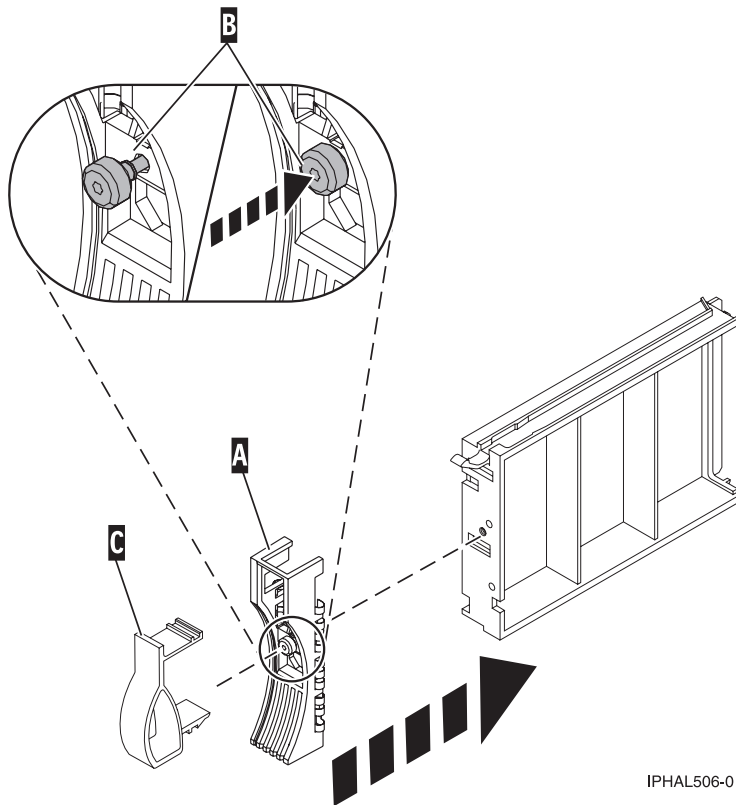
Install a disk-drive filler

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

1. Attach the disk drive bezel **A** to the filler.

Attention:

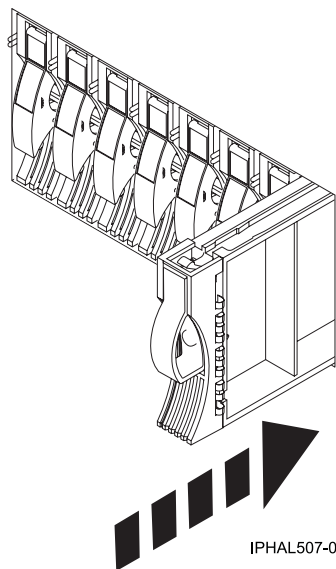
- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric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



IPHAL506-0

Figure 59. 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.



IPHAL507-0

Figure 60. Installing a disk-drive filler

5. Replace the front cover. For instructions on replacing the cover, select the appropriate procedure from the following list:
 - “Install the front cover on the model ” on page 311

- “Install the front cover on the 11D/20 expansion unit” on page 310
 - If you have a front cover from any other models, remove the front cover.
6. Install or close the system, expansion unit or rack front door.

Disk drive locations

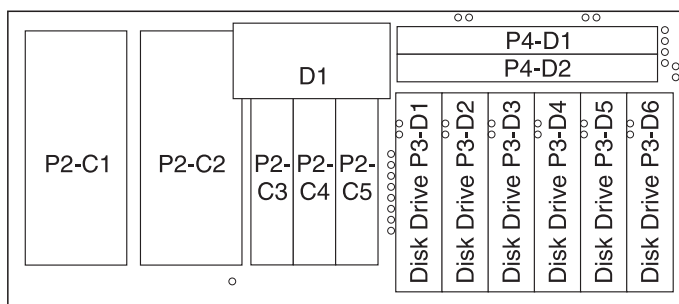
Find out where the disk drives are located on different models.

Locate your system or expansion unit to find the disk drive locations.

Disk drive locations for models

Learn the disk drive locations for your system.

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



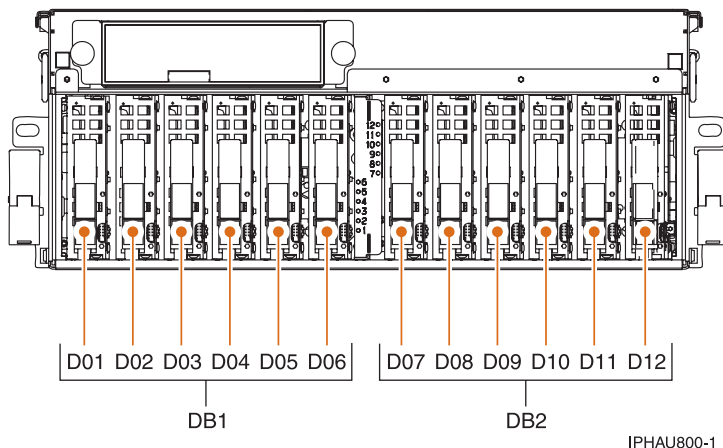
IPHAL650-2

Figure 61. Model disk drive locations

Disk drive locations for the 11D/20 expansion unit

Learn the disk drive locations for your expansion unit.

The following figure shows the disk drive locations for the 11D/20 expansion unit.



IPHAU800-1

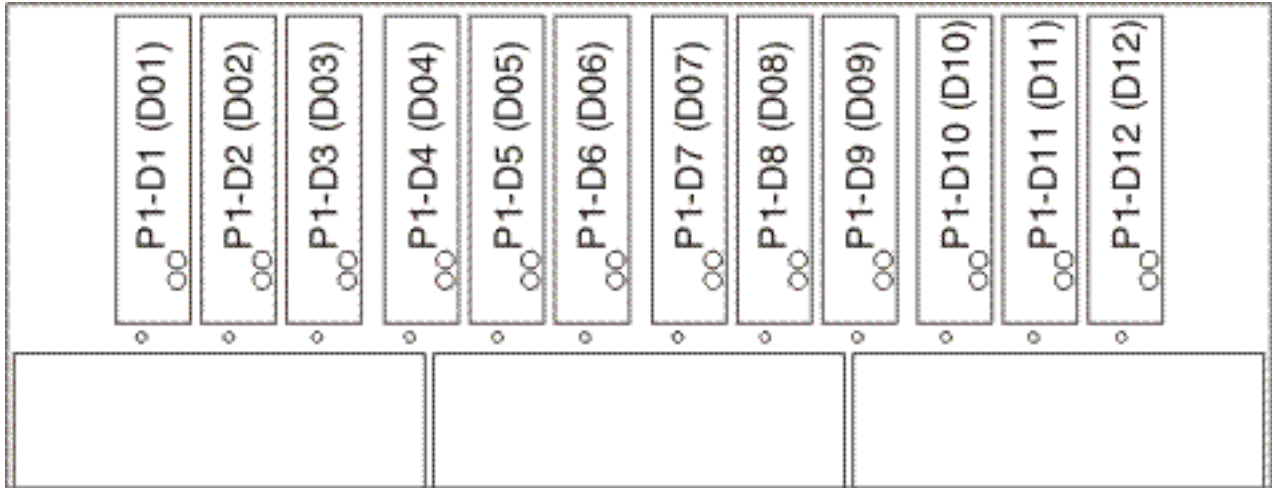
Figure 62. Disk drive locations for the 11D/20 expansion unit

Disk drive locations for the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure

Learn the disk drive locations for your disk-drive enclosure.

The available 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 shows the disk drive locations for the front and back of the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure.



IPHAL975-0

Figure 63. Front view of 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure.



IPHAL976-0

Figure 64. Back view of 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure

57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure

Learn about the SCSI disk-drive enclosure and how to assemble it.

This SCSI disk-drive enclosure can hold up to 24 disk drives. The enclosure is organized into 4 groups, with each group containing 6 disk drive slots. The enclosure can be used as a stand-alone tower or a rack-mounted drawer.

When connecting with your server, you can connect your SCSI cables to either a single initiator repeater card or to a dual initiator repeater card on your SCSI disk drive enclosure. The dual initiator repeater card allows for high availability and combining groups of disk drive slots.

Tip: Before you connect the enclosure you will need the following information:

- If you are installing the enclosure into a rack you will need to complete that task and return here. For instructions see, "Installing the model 31D/2457/86 into a rack" on page 213.
- You will want to install the SCSI adapter you will use to connect the enclosure to your system. Either print this task or complete it and return here. For instructions see, Chapter 4, "PCI adapter," on page 121 and select instructions for your model and adapter type.
- For systems or partitions with AIX or Linux as the operating system you will want to have the SCSI adapter information for your operating system. This will be critical information for configuring the disks after you have attached the enclosure you will want to print the information before you begin the procedure. This guide is available from the SCSI PCI Adapters (http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm) web page.

Connect and configure the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure to a system or partition with the AIX operating system

Use the information in this section to understand the cabling, SCSI addressing, and post connection requirements for the disk-drive enclosure.

1. Install the initiator repeater cards into the disk drive enclosure. For instructions, see "SCSI repeater card" on page 77.
2. Connect the SCSI cable to your repeater card. Choose one of the following based on your situation:
 - If you are using only single repeater cards or only dual repeater cards, install your SCSI cable **A** to the initiator repeater card **B**, as shown in the following figure.
 - **Single SCSI adapter connected to single repeater card:** if in this case you are not sharing resource (disk-drives) it is a simple attachment to each repeater card.

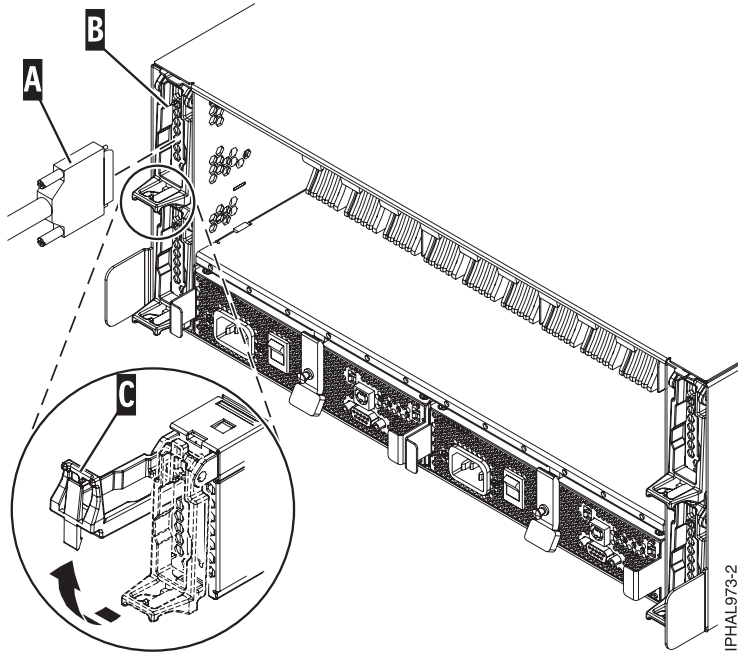


Figure 65. SCSI cable to single repeater card

- **Two SCSI adapters connected to dual repeater cards:** if in this case you are sharing resources (disk-drives) between systems or partitions ensure you understand the SCSI addressing and cabling order for more information see, "Connecting and configuring the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure in an AIX clustered environment" on page 72.

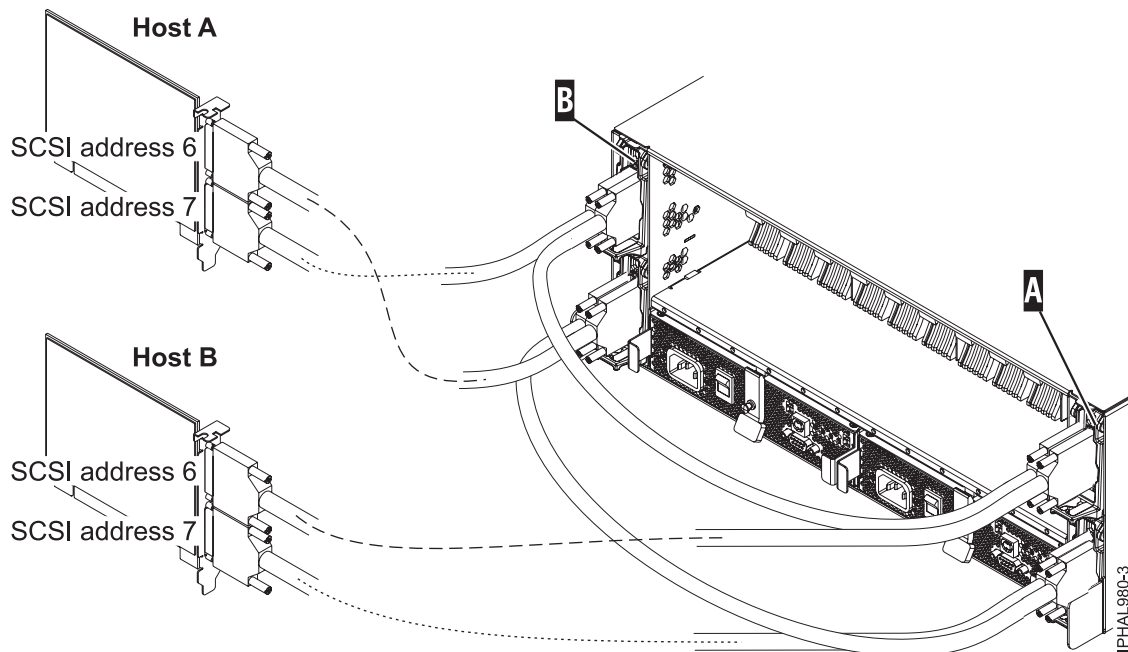
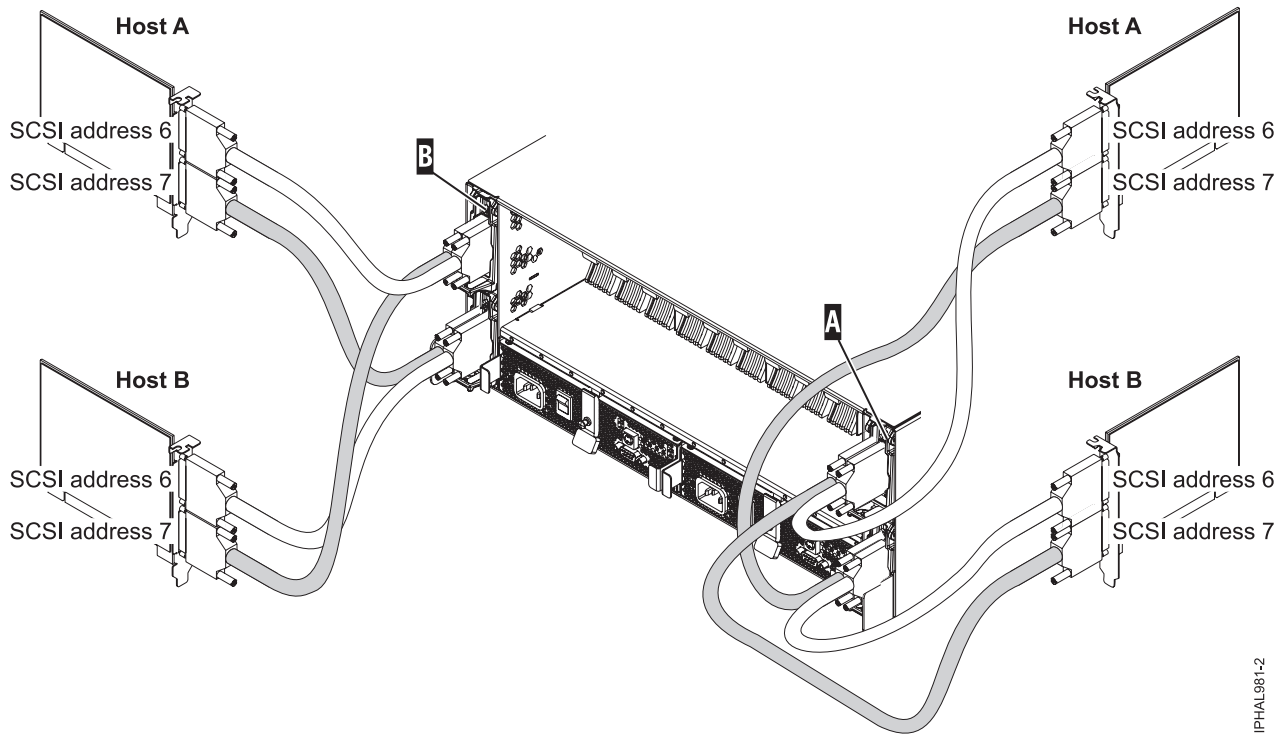


Figure 66. SCSI cable to dual repeater card connected with two SCSI cards

- **Four SCSI adapters connected to dual repeater cards:** if in this case you are sharing resources (disk-drives) between systems or partitions ensure you understand the SCSI addressing and cabling order for more information see, "Connecting and configuring the 57/86, 57/87, 31D/24 or 31T/24

SCSI disk-drive enclosure in an AIX clustered environment” on page 72.



IPHAL981-2

Figure 67. SCSI cable to dual repeater card connected with four SCSI cards

- **Single SCSI adapter connected to a combination of single and dual repeater cards:** if in this case you are sharing resources (disk-drives) between systems or partitions ensure you understand the SCSI addressing and cabling order for more information see, “Connecting and configuring the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure in an AIX clustered environment” on page 72.

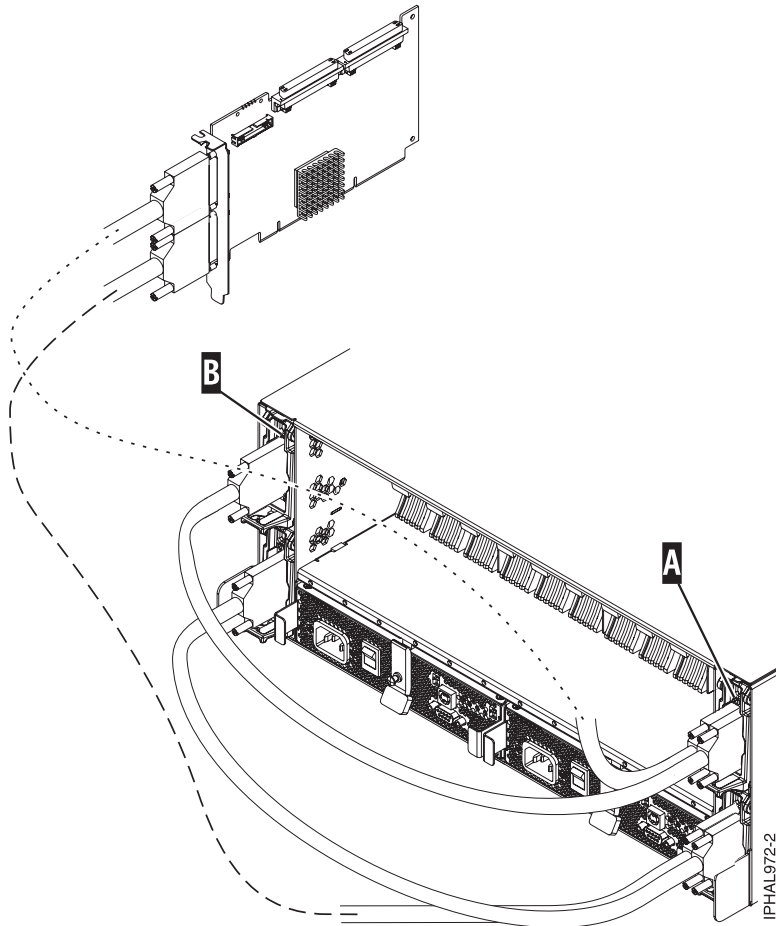


Figure 68. SCSI cable to dual repeater card connected to single repeater card

3. Use the information you printed for the SCSI adapter to complete the configuration of your disk drives. For more information see the SCSI PCI Adapters (http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.pseries.doc/hardware_docs/scsipciadapters.htm) web page and locate the file for the adapter you are using to attach the enclosure to your system.

Important: If you plan on using the disk enclosure in an AIX environment, it is critical that you set up an AIX CRON job so that if errors exist, they report to the attached system. The AIX CRON job needs to be setup during the initial install.

Note: Errors on disks in the enclosure will be found without this CRON job (script) through normal Automatic Error Log Analysis; however, other errors such as fan and power supply problems in the enclosure can only be found when running diagnostics manually, which is accomplished by using the following scripts.

To collect enclosure errors, add this CRON job SES Healthcheck to the system CRON table. Edit the system CRON with the `crontab -e` command. At the bottom of that file, enter:

```
* 3 * * * /usr/lpp/diagnostics/bin/run_ses_healthcheck 1>/dev/null 2>/dev/null
```

This CRON runs the script "run_ses_healthcheck" daily at 3 A.M. The script's contents depend on the configuration of the system that the enclosure is attached to.

Example 1

If the system the enclosure is attached to has either an HMC or is running Electronic Service Agent™, create the file named "run_ses_healthcheck" in the /usr/lpp/diagnostics/bin directory, with the following contents:

```

-----
#!/bin/ksh
#Name:run_ses_healthcheck
#Location:/usr/lpp/diagnostics/bin
#Function: SCSI SES hourly heathcheck
for i in `lsdev -Cc container -t ses -s scsi -F name -S available`
do
    diag -cd $i > /dev/null
done
#any registered "external notification" will be notified of errors
#(such as HMC or Electronic Service Agent)
-----

```

Note: On a partitioned system, it is only necessary to have the CRON job and script running on one partition associated with the enclosure, though it is acceptable to have the same CRON job and scripts on any partition associated with the enclosure.

Example 2

If the system the enclosure is attached to has neither an HMC nor is running Electronic Service Agent, create the file named "run_ses_healthcheck" in the /usr/lpp/diagnostics/bin directory, with the following contents:

```

-----
#!/bin/ksh
#Name:run_ses_healthcheck
#Location:/usr/lpp/diagnostics/bin
#Function: SCSI SES hourly heathcheck
for i in `lsdev -Cc container -t ses -s scsi -F name -S available`
do
    diag -cd $i > /dev/null
    if [ $? -ne 0 ]
    then
        /usr/lpp/diagnostics/bin/diagrpt -o >/tmp/ses.health.output
        #you might want to process the output prior to placing it in
        #a file
        #somhow notify the user of the error. A sample is shown
        #below.
        mail -s "7031 Health Check" root</tmp/ses.health.output
        rm /tmp/ses.health.output
    fi
done
-----

```

Note: You can customize the actual notification in the script based on your preferences. These scripts send mail to root user if there are errors that need attention. You can modify the script if needed to inform certain users about the errors.

In both examples, once you have created the "run_ses_healthcheck" file, make it executable by typing (at AIX command prompt):

```
chmod 544 /usr/lpp/diagnostics/bin/run_ses_healthcheck.
```

Connecting and configuring the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure in an AIX clustered environment

Special considerations exist for connecting the disk-drive enclosure in a clustered environment. The information in this section will help you meet these considerations.

Having any planning and cabling documentation for the system you are attaching available during this process will make some parts of this process much easier.

To assure that the SCSI disk-drive enclosure is ready to be connected to the cluster complete the following steps.

1. Ensure that each SCSI device connected to the shared SCSI bus has a unique ID. A common configuration is to set the SCSI ID of the adapters on the nodes to be higher than the SCSI IDs of the shared devices. (Devices with higher IDs take precedence in SCSI bus contention.)
 - a. Use the command: `lscfg | grep scsi` to determine and record the logical name of each adapter. In the command output, the first column lists the logical name of the SCSI adapter, such as + SCSI0.
 - b. Use the `lscfg -vpl` command and logical name of the adapter to record the I/O slot (physical slot) that each SCSI adapter uses. For example `lscfg -vpl scsi0` where `scsi0` is the logical name of the adapter.
 - c. Use the `lsattr` command, as in the following example to find the ID of the adapter `scsi0`: `lsattr -E -l scsi0 | grep id`

Note: Do not use wildcard characters or full pathnames on the command line for the device name designation.

In the resulting output, the first column lists the attribute names. The integer to the right of the `id` attribute is the adapter SCSI ID:

If a SCSI adapter address conflict exists move on to the next step, if no conflict exists return to the connection page for the operating system of the system you are connecting.

2. Examine the cabling to see if the proper ports on the system are connected to the proper ports on the repeater cards on the disk-drive enclosure. For example if you are connecting the system using two host adapter cards and dual repeater cards as shown in the following figure you will want to connect the systems as follows.

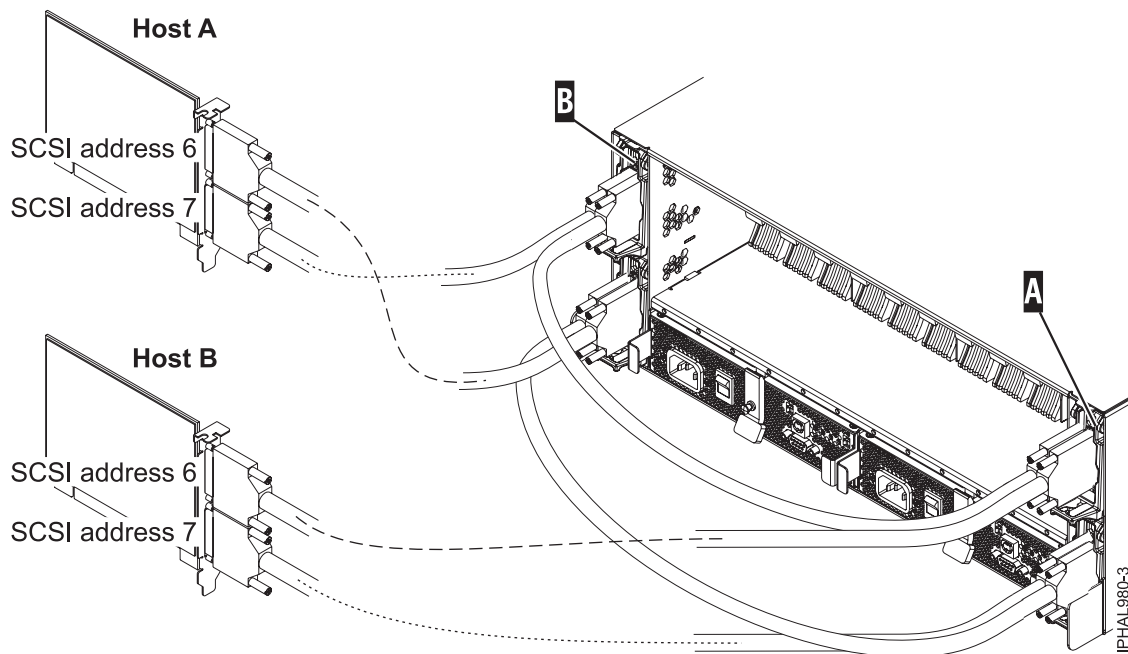


Figure 69. SCSI cable to dual repeater card connected with two SCSI cards

Cable the first SCSI bus or set of shared disks by doing the following:

- a. Connect the bottom port of the adapter on **Host A** (SCSI address 7) to the exterior port on the repeater card in slot C2 on the enclosure.
- b. Connect the top port of the adapter on **Host B** (SCSI address 6) to the exterior port on the repeater card in slot C3 on the enclosure.

This creates a set of shared disks and a shared SCSI bus (such as scsi0) between Host A and Host B. The important thing to consider at this point is that you connect the cables in descending order of the SCSI address on the host adapter. Connecting the cables in descending order of the Host SCSI address will reduce the potential for address conflicts.

Cable the second SCSI bus or set of shared disks by doing the following:

- a. Connect the bottom port of the adapter on **Host B** (SCSI address 7) to the interior port on the repeater card in slot C5 on the enclosure.
- b. Connect the top port of the adapter on **Host A** (SCSI address 6) to the interior port on the repeater card in slot C4 on the enclosure.

This creates a set of shared disks and a shared SCSI bus (such as scsi1) between Host A and Host B. The important thing to consider at this point is that this is an independent SCSI bus or set of shared disks from the first set. Ensuring that you do not mistakenly connect one of the cables from the either SCSI bus to another will reduce the potential for SCSI address conflicts.

Important: When adding, removing, or replacing SCSI adapters in Host systems you might want to disconnect the cabling at the enclosure first and reconnect the cabling to the enclosure last. This is because the new adapter may default to a SCSI ID of 7. You should ensure that the correct SCSI ID is set for the port you are cabling.

Connect and configure the disk drive enclosure in a system with the Linux operating system

Use the information in this section to understand the cabling, SCSI addressing, and post connection requirements for the disk-drive enclosure.

1. Install the initiator repeater cards into the disk drive enclosure. For instructions, see “SCSI repeater card” on page 77.
2. Connect the SCSI cable to your repeater card. Choose one of the following based on your situation:
 - If you are using only single repeater cards or only dual repeater cards, install your SCSI cable **A** to the initiator repeater card **B**. For more details, see Figure 70, Figure 71 on page 75, Figure 72 on page 75, depending upon your situation.

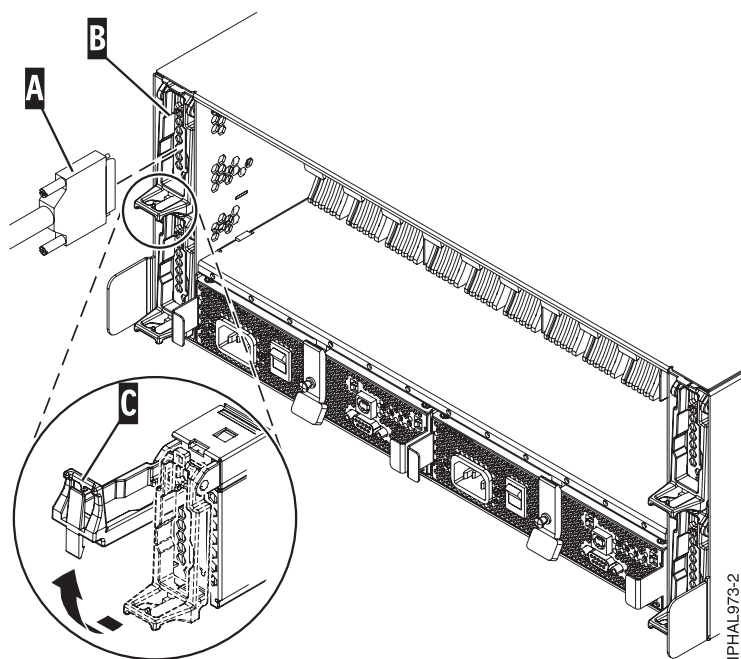


Figure 70. SCSI cable to single repeater card

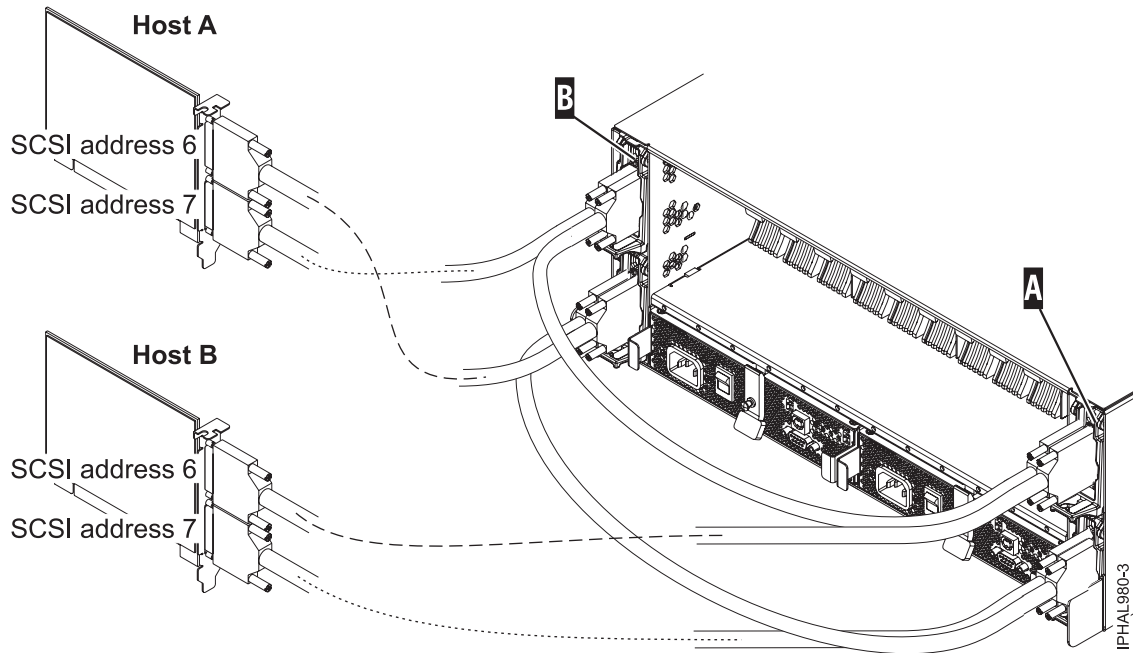


Figure 71. SCSI cable to dual repeater card connected with two SCSI cards

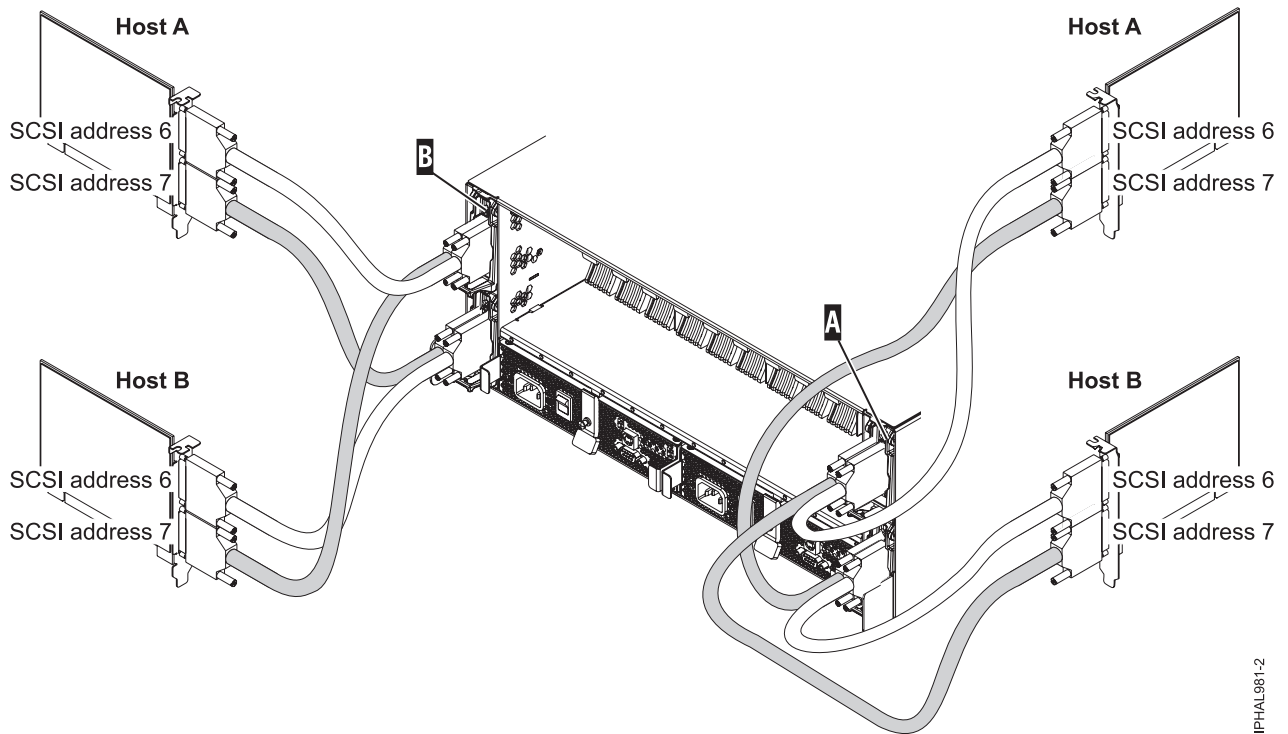


Figure 72. SCSI cable to dual repeater card connected with four SCSI cards

- If you are using a combination of single and dual repeater cards, install a SCSI cable to the dual initiator repeater card A. Then, connect the dual repeater card A to the single repeater card B with a different SCSI cable. For more information, see Figure 73 on page 76.

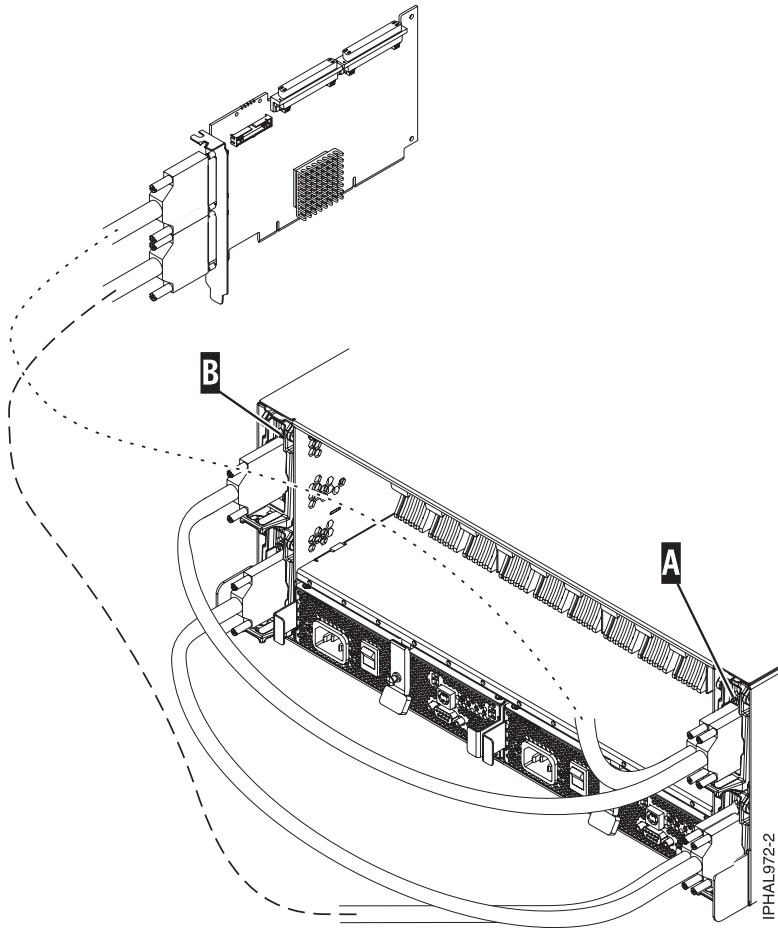


Figure 73. SCSI cable to dual repeater card connected to single repeater card

3. Install the other end of the SCSI cable C to the SCSI adapter D on the server. For more details, see Figure 74.

Important: The SCSI adapter or the system or partition must be powered off before making this connection.

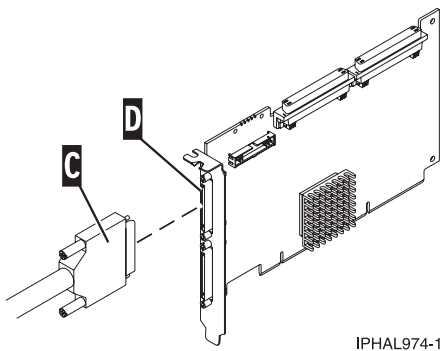


Figure 74. SCSI cable to SCSI interface card

4. Set up the Linux CRON job during the initial install of your SCSI disk-drive enclosure. Perform the following tasks to ensure that your Linux CRON job is setup.
 - a. Install the following RPMs from Service and productivity tools (<http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html>).

- librtas
 - lsvpd
 - ppc64-utils
 - diagela
- b. If your partitions are managed by a Hardware Management Console (HMC), install the `src`, `rsct.core.utils`, `rsct.core`, `csm.core`, `csm.client`, and `devices.chrp.base.ServiceRM` packages in order to report errors to the Service Focal Point on the attached HMC. Instructions for installing the packages are located on the previous Web site.

Note: Errors on hard disks within the enclosure will not be found using this CRON job. This diagnostic is limited to reporting errors with the fans, power supplies, VPD card, and repeater in the enclosure.

- c. Add a CRON job to execute enclosure diagnostics to the system CRON table. As root, edit the system CRON by running `crontab -e`. At the bottom of that file, enter:

```
* 3 * * * /usr/sbin/diag_encl -s 1>/dev/null 2>&1
```

- d. Adding this line causes the diagnostic application `/usr/sbin/diag_encl` to be run daily at 3:00 a.m. The `diag_encl` diagnostic application will read the contents of the `/etc/diagela/diagela.config` file to determine what applications have been registered to be notified of errors. To add additional notification methods or for more information, see that file. By default, the following notifications will occur.
- The Service Focal Point on the HMC will be notified if the system is managed by an HMC. If the system is not managed by an HMC, the root group will be notified.
 - If the system has Electronic Service Agent installed, it will be notified.
 - The error details will be printed to the console, to the end of the `/var/log/platform` log file, and to the `syslog` (`/var/log/messages`).

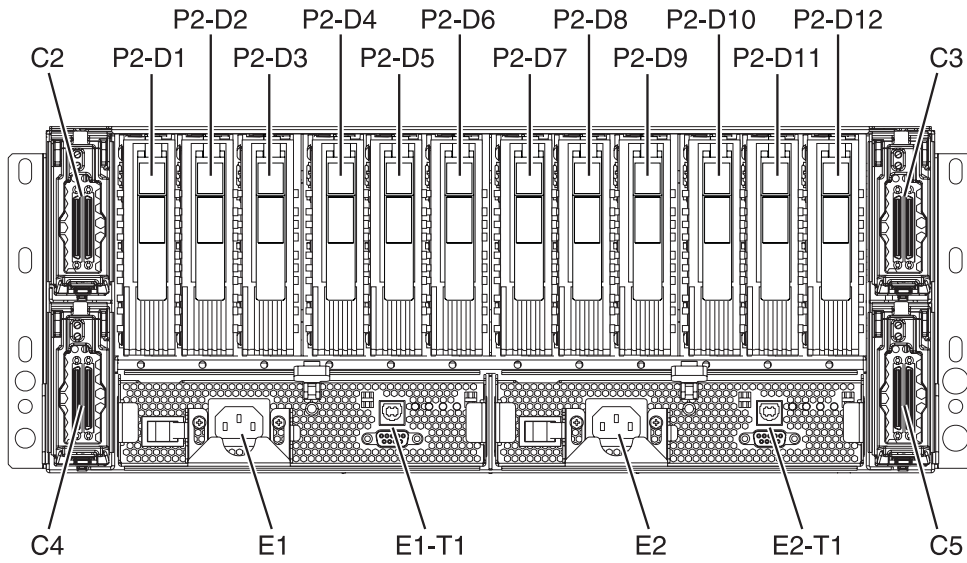
Notes:

- On a partitioned system, it is only necessary to have the CRON job on one partition associated with the enclosure. However, it is acceptable to have the same CRON job on all partitions.
- `/usr/sbin/diag_encl` might run at any time to diagnose enclosures attached to the system.

SCSI repeater card

Use this information to understand where to place your repeater card and how to install your repeater card.

Use the following figure and instructions to place your repeater cards.



IPHAL971-0

Figure 75. Repeater card location of 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure

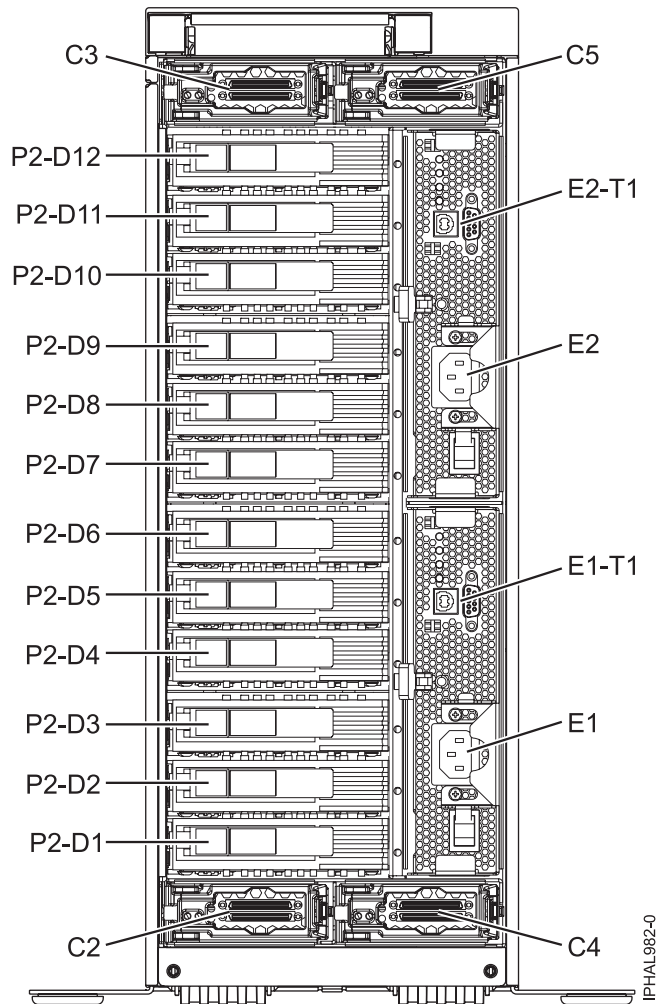


Figure 76. Repeater card location of tower 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure

If you only have dual repeater cards, place as follows:

Important: On tower models the locations C3 and C5 are located on top, C2 and C4 are located on bottom. Follow the location codes when placing repeater cards.

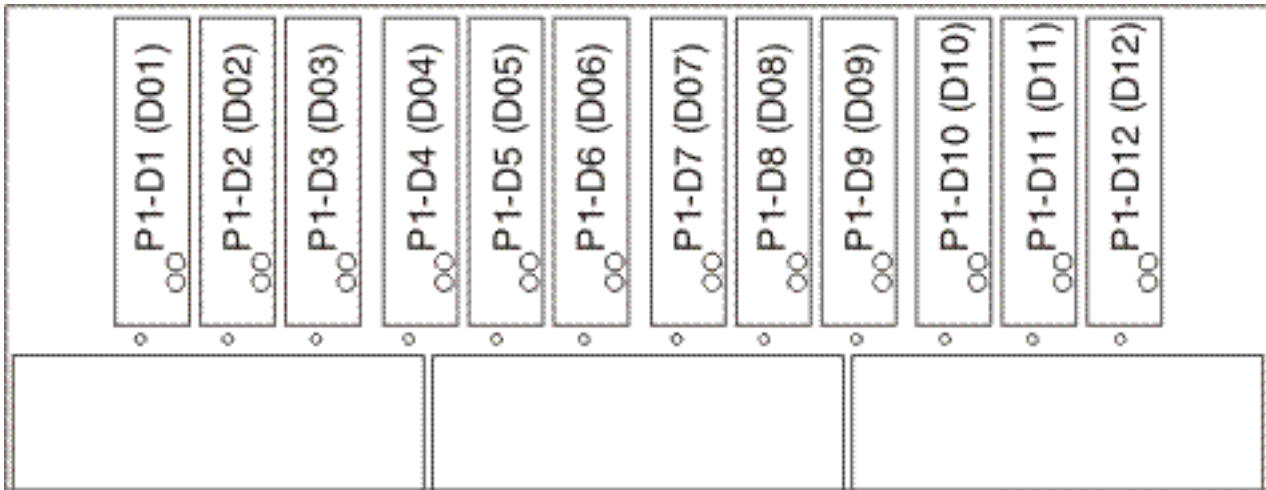
Table 1. Repeater card placement for

Type and number of repeater cards	Single repeater card placement	Dual repeater card placement
1 single repeater card and 0 dual repeater cards	C5	
2 single repeater cards and 0 dual repeater cards	Place in order C5 then C2	
3 single repeater cards and 0 dual repeater cards	Place in order C5, C2, then C4	
4 single repeater cards and 0 dual repeater cards	Place in order C5, C2, C4 then C3	
1 single repeater card and 1 dual repeater card	Place in C5 first then place dual repeater card	C4
1 single repeater card and 2 dual repeater cards	Place in C5 first then place dual repeater card	Place in order C4 then C3

Table 1. Repeater card placement for (continued)

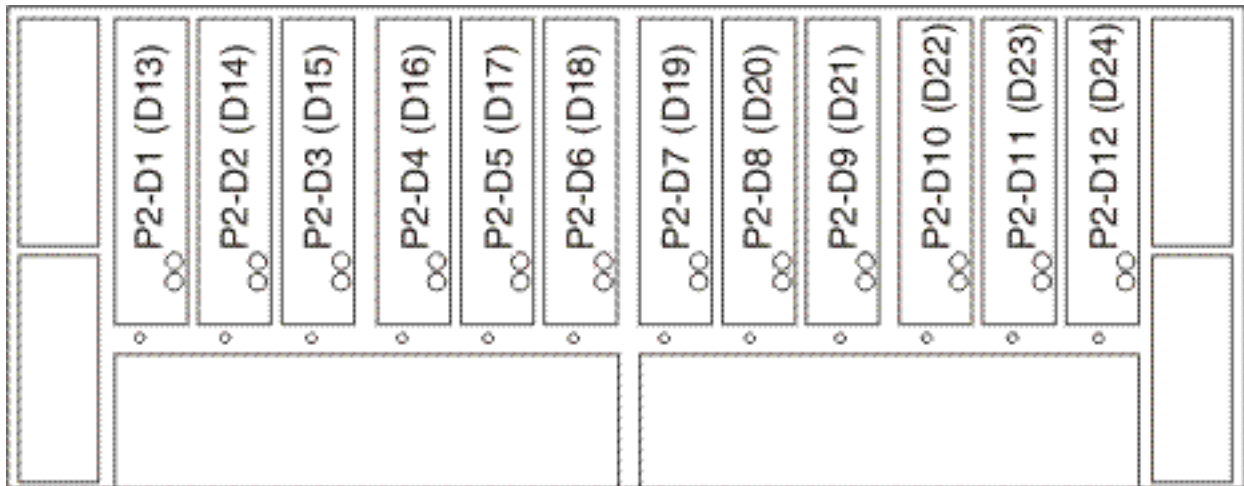
Type and number of repeater cards	Single repeater card placement	Dual repeater card placement
2 single repeater cards and 1 dual repeater cards	Place in C5 then C2 then place dual repeater card	C4
2 single repeater cards and 2 dual repeater cards	Place in C5 then C2 then place dual repeater card	Place in order C4 then C3
0 single repeater cards and 1 dual repeater card		C4
0 single repeater cards and 2 dual repeater cards		Place in order C4 then C5
0 single repeater card and 3 dual repeater cards		Place in order C4, C5, then C3
0 single repeater card and 4 dual repeater cards Restriction: This configuration is for servers only.		Place in order C4, C5, C3, then C2

The following figures show the locations of the disk drives for the front and back of the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure.



IPHAL975-0

Figure 77. Front view of 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure



IPHAL976-0

Figure 78. Back view of 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure

The following list describes how the repeater card locations affect the disk drive bays.

- The top left repeater card (C2) drives the front right 6 bays (D07 to D12). Figure 77 on page 80
- The top right repeater card (C3) drives the front left 6 bays (D01 to D06). Figure 77 on page 80
- The bottom left repeater card (C4) drives the back left 6 bays (D13 to D18). Figure 78
- The bottom right repeater card (C5) drives the back right 6 bays (D19 to D24). Figure 78

To install your repeater card, complete the following steps:

1. Remove the filler from the repeater card slot.
2. Install your new repeater card.

Remove and replace SCSI repeater card

You might need to remove and replace one of the Small Computer System Interface (SCSI) repeater cards to repair a failing device or as a part of another service action.

Before you remove and replace an SCSI repeater card you will want to follow the instructions for your operating system to save any jobs.

Restriction: You must replace the repeater card with the same type of card to continue. If you are changing card configurations from single to dual stop here and follow the instructions in “Connect and configure the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure to a system or partition with the AIX operating system” on page 68 or “Connect and configure the disk drive enclosure in a system with the Linux operating system” on page 74.

The disk drive enclosure SCSI repeater card can be removed and replaced with the system and enclosure power on. To avoid errors you can power off the adapter that connects the disk drive enclosure to your system, for instructions see Chapter 4, “PCI adapter,” on page 121.

1. Locate the repeater card you are replacing, for instructions see “Identify a failing part” on page 299.
2. Remove the cable **A** from the repeater card **B**.

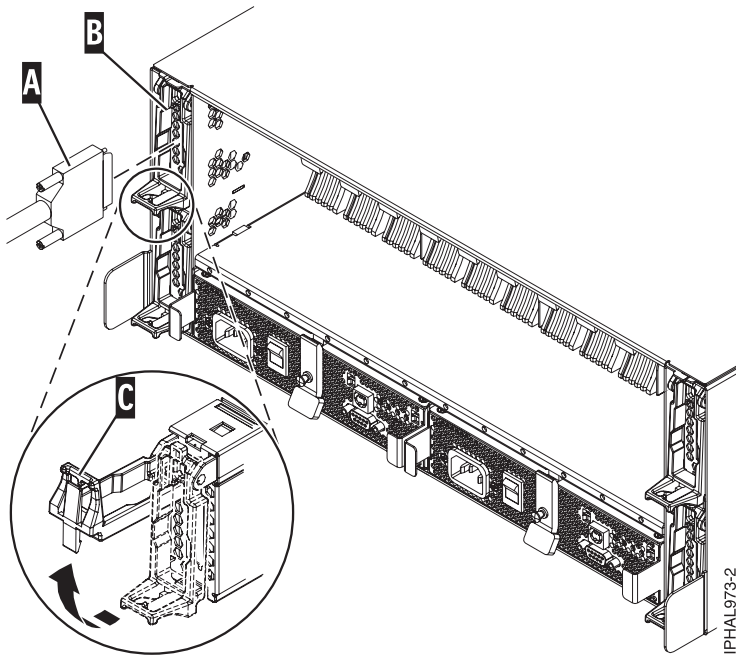


Figure 79. Removing SCSI cable from repeater card

3. Lift the handle C to unseat the repeater card from the enclosure.
4. Pull the repeater card out of the enclosure.
5. Align the replacement repeater card with the empty slot on the enclosure and insert the card until it is firmly seated.
6. Lower the handle to secure the repeater card into place.
7. Reattach the cable to the repeater card.
8. Restart the adapter, for instructions see Chapter 4, "PCI adapter," on page 121.

Related Information

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

Disk-drive concurrent maintenance lights

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

Locate your system or expansion unit to find the locations of the concurrent maintenance lights.

Disk-drive concurrent maintenance lights for models

Learn where the disk-drive concurrent maintenance lights are located on your system.

The following figure shows the locations of the disk-drive concurrent maintenance light A for the models

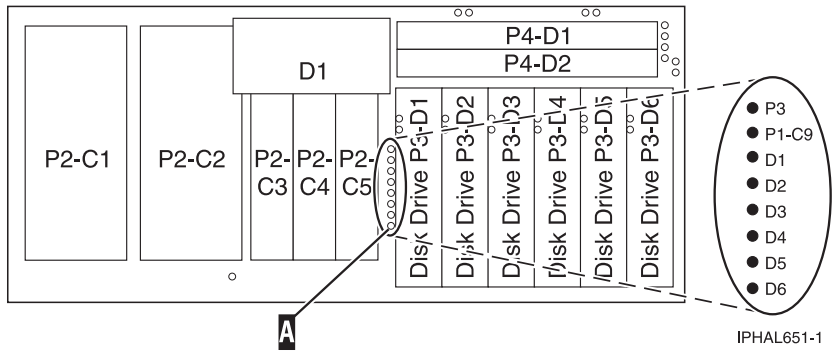


Figure 80. Model disk-drive concurrent maintenance lights

Disk-drive concurrent maintenance lights for model 11D/20

Learn where the disk-drive concurrent maintenance lights are located on your system.

The following figure shows the locations of the disk-drive concurrent maintenance light **A** for the model 11D/20.

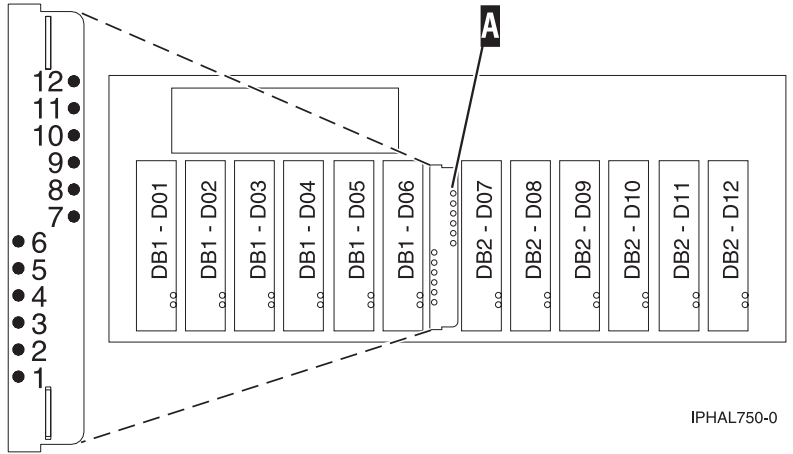


Figure 81. Model 11D/20 disk-drive concurrent maintenance lights

Disk-drive concurrent maintenance lights for models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure

Learn where the disk-drive concurrent maintenance lights are located on your system.

The following figures show the locations of the disk-drive concurrent maintenance light **A** for the models 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure.

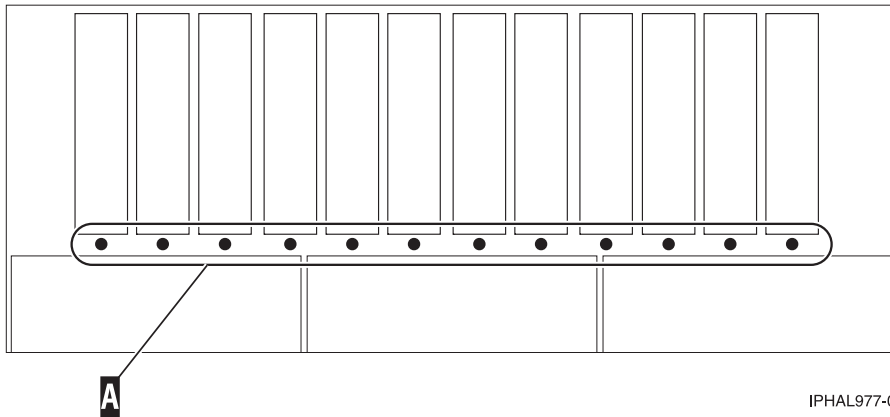


Figure 82. Front view of model 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure concurrent maintenance lights

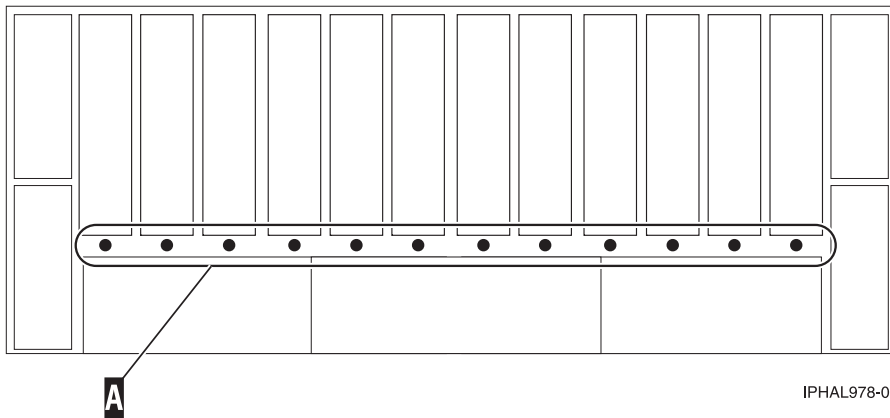


Figure 83. Back view of model 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure concurrent maintenance lights

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

Configure the newly installed disk drive for your environment.

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

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

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

Rebuild data on a replacement disk drive using AIX

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

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

For more information, see the *AIX System Management Guide: Operating System and Devices*.

Rebuild data on a replacement disk drive using Linux

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

For an unprotected disk drive

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

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

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

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

Rebuild data on a disk drive using Linux kernel 2.4

Complete the steps listed here to rebuild your data.

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

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

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

```
Rebuild Disk Unit Data

Select the units to be rebuilt

Type choice, press Enter.
1=Rebuild

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

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

Figure 84. Example Rebuild Disk Unit Data display

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

Note: Performing a rebuild on a disk drive overwrites the data currently on the disk drive.

A Confirm Rebuild Disk Unit Data display similar to the following figure shown below.

```
Confirm Rebuild Disk Unit Data

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

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

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

q=Cancel  f=PageDn  b=PageUp
```

Figure 85. Example Confirm Rebuild Disk Unit Data display

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

Rebuild data on a disk drive using Linux kernel 2.6

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

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

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

1. Log in as root user.
2. Type `iprconfig` on the command line of the Linux session and press Enter. The 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 86. Example Rebuild Disk Unit Data display

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

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

```

Confirm Rebuild Disk Unit Data

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

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

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

q=Cancel  t=Toggle

```

Figure 87. Example Confirm Rebuild Disk Unit Data display

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

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

Chapter 3. Expansion units

This topic provides information on setting up your expansion units, including connecting your expansion units with Remote Input/Output (High-Speed Link) (RIO) or InfiniBand™ cables to your system unit. RIO and InfiniBand adapters enable expansion units to be attached to system units. This topic collection refers to both the remote input/output (RIO) and high-speed link (HSL) as the RIO.

Note: You can add your expansion units concurrently. This means you can add/install the expansion units with the server at firmware running state. Active partitions do not have to be shut down. Only in the following situations must the server be shut down (powered off) to add expansion units:

- The expansion units are being added to a servers that is not managed by an HMC.
- GX adapters (I/O hub cards) must be added to accommodate the new expansion units.
- The existing RIO/HSL fabric must be redistributed across the GX adapters to accommodate the new expansion units as determined in the planning steps for adding the expansion units.

If you are migrating expansion units from an IBM iSeries® 8xx server which is running System Release V5R2M0 on the primary partition, the expansion unit resources will not be able to be allocated to partitions on the new server until a System Power Control Network (SPCN) firmware update is completed for the expansion units. This firmware update will be done over the serial SPCN interface and could take several hours to complete. Upgrading your primary partition to V5R3M0 or later prior to the migration will update the expansion unit SPCN firmware to a level that is fully supported on the new server. This can significantly reduce the time require to complete the migration.

If you are migrating expansion units from an IBM pSeries@ 6xx server, the expansion unit resources will not be able to be allocated to partitions on the new server until a System Power Control Network (SPCN) firmware update is completed for the expansion units. This firmware update will be done over the serial SPCN interface and could take several hours to complete.

RIO configuration changes such as moving existing expansion units to different GX adapters should not be performed at the same time as adding new expansion units. If these two tasks must be performed, first make configuration changes involving existing expansion units with server power off. After the configuration changes are complete, power the server up to firmware standby or running state and add the new expansion units using this procedure.

To install the expansion units, complete the following steps:

1. Go to “Prepare to connect your expansion units.”
2. Go to “Connect your expansion units” on page 95.

The following expansion units are available:

- 50/74 or 50/79
- 05/88 or 50/88
- 91/94, 50/94 or 52/94
- 05/95 or 50/95
- 50/96 or 52/96
- 57/9011D/20, or 11D/10
- 14G/30 57/96

Prepare to connect your expansion units

Use this information to plan the cable layout and to learn the configuration rules.

This topic collection provides information about connecting your expansion units with RIO (remote I/O or high-speed link), InfiniBand and system power control network (SPCN) cables. This is a customer task. You can perform this task yourself or contact a service provider for this service.

You should be familiar with the system, display, and keyboards. You should also know how to shut down and perform a system initial program load (power on). You should also know how to shut down system peripheral devices such as printers, monitors, and PCs.

To prepare to connect the expansion units, complete the following tasks:

1. "Plan where you will install the new expansion units."
2. Unpack the expansion units (refer to the unpacking instructions that came with the expansion units).
3. "Identify RIO, InfiniBand and SPCN cables."
4. "Plan your cable layout" on page 91.
5. Return to the procedure which sent you here

Plan where you will install the new expansion units

Plan where you will install the new expansion units before you begin the installation process.

Consider several elements that include size, security, and environmental factors. Refer to the System p hardware publications (<https://www-01.ibm.com/servers/resourcelink/lib03030.nsf/pagesByDocid/4E827BD9872008B88525726F006A7A18?OpenDocument&pathID=1&Start=1>) and select the Site and Hardware Planning Guide.

Note: If you are installing an expansion unit that uses a 12x communications adapter, the part number of the 12x adapter will determine where you can install the expansion unit:

- The 12X Short Run 5796 Attach (FC 6447) adapter does not contain a repeater and requires the use of shorter cables. An expansion unit containing this adapter must be placed in the same rack as the system unit.
- The 12X Long Run 5796 Attach (FC 6457) adapter contains a repeater and allows the use of longer cables. An expansion unit containing this adapter can be placed in a different rack than the system unit.

Identify RIO, InfiniBand and SPCN cables

You might need to identify the RIO, InfiniBand and SPCN cables for the expansion unit. This section includes reference tables for these types of cables.

The system uses RIO and InfiniBand to send and receive customer data and auxiliary control information to and from the expansion unit and to download expansion unit firmware. The SPCN network is used to control power to the expansion units and as a backup to the RIO and InfiniBand for auxiliary control and firmware control.

Table 2. RIO cables

Cable feature	CCIN	Cable type	Length	Part number

Table 3. InfiniBand cables

Cable feature	Cable type	Length	Part number
1829	12x InfiniBand	0.6 meters	42V2129
1830	12x InfiniBand	1.5 meters	42V2130
1834	12x InfiniBand	8 meters	42R6160

Table 3. InfiniBand cables (continued)

Cable feature	Cable type	Length	Part number
1840	12x InfiniBand	3.0 meters	42V2132

Table 4. SPCN cables

Cable feature	CCIN	Length	Part number						
6001	6001	2 meters	87G6235						
6006	6006	3 meters	09P1251						
6007	6007 </tr <tr> <td>6008</td> <td>6008</td> <td>6 meters</td> <td>21F9469</td> </tr> <tr> <td>6029</td> <td>6029</td> <td>30 meters</td> <td>21F9359</td> </tr>	6008	6008	6 meters	21F9469	6029	6029	30 meters	21F9359
6008	6008	6 meters	21F9469						
6029	6029	30 meters	21F9359						

Plan your cable layout

Learn about cable topologies, options and configuration rules.

When you decide where to place the cables, follow your site plan and keep the following items in mind:

- Avoid creating a safety hazard.
- Avoid damaging the cables.
- Avoid placing cables parallel to high-voltage lines.

Important: Expansion units with RIO adapters and expansion units with GX Dual-Port 12X Channel Attach adapter adapters cannot be in the same loop.

Example: Topologies of RIO loops

Link redundancy is achieved by cabling the RIO in a loop. This section provides examples of RIO loops.

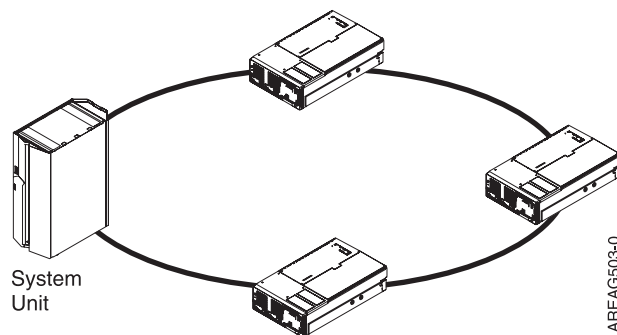


Figure 88. RIO loop example

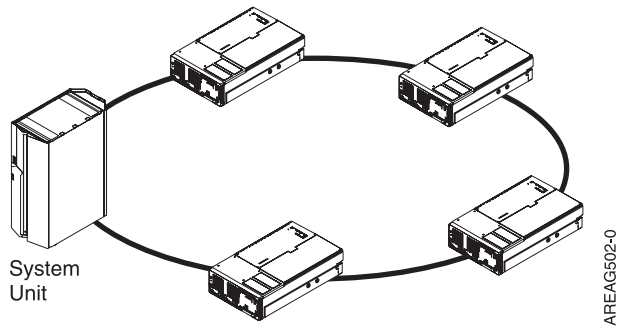


Figure 89. Maximum number of expansion units per loop

System unit cable options

Learn which RIO and InfiniBand cables are supported on which system units.

Use the following table to identify the RIO cables for the model numbers and machine types identified.

Table 5. System unit RIO cable options

Cable feature	
1482 (copper)	
1481 (copper)	X
1483 (copper)	X
1307 (copper)	X
1308 (copper)	X

Expansion unit cable options

Learn which RIO cables are available for which expansion units.

Use the following table to identify the RIO cables for the expansion units identified.

Table 6. Expansion unit RIO cable options

Cable feature	IXA card	50/74, 50/79	05/88, 50/88	50/94, 52/94, 0694, 91/94	50/95, 05/95	57/90
1307 (copper)			X	X	X	X
1308 (copper)			X	X	X	X
1460 (copper)	X	X	X	X	X	X
1461 (copper)	X	X	X	X	X	X
1462 (copper)	X	X	X	X	X	X
1470 (fiber optic)		X	X	X	X	X
1471 (fiber optic)		X	X	X	X	X
1472 (fiber optic)		X	X	X	X	X
1473 (fiber optic)		X	X	X	X	X
1474 (copper)	X	X	X	X	X	X
1475 (copper)	X	X	X	X	X	X
1481 (copper)			X	X	X	X

Table 6. Expansion unit RIO cable options (continued)

Cable feature	IXA card	50/74, 50/79	05/88, 50/88	50/94, 52/94, 0694, 91/94	50/95, 05/95	57/90
1482 (copper)			X	X	X	X
1483 (copper)			X	X	X	X
1485 (copper)			X	X	X	X
1832					X	
1833					X	
1834					X	
1835						
1836						
1837					X	
1838					X	
1839						
3146 (copper)						
3147 (copper)						
3148 (copper)						
3156 (copper)						
3168 (copper)						

Table 7. Expansion unit RIO cable options

Cable feature	IXA card	50/74, 50/79	05/88, 50/88	50/94, 52/94, 0694, 91/94	50/95, 05/95	57/90
1307 (copper)			X	X	X	X
1308 (copper)			X	X	X	X
1460 (copper)	X	X	X	X	X	X
1461 (copper)	X	X	X	X	X	X
1462 (copper)	X	X	X	X	X	X
1470 (fiber optic)		X	X	X	X	X
1471 (fiber optic)		X	X	X	X	X
1472 (fiber optic)		X	X	X	X	X
1473 (fiber optic)		X	X	X	X	X
1474 (copper)	X	X	X	X	X	X
1475 (copper)	X	X	X	X	X	X
1481 (copper)			X	X	X	X
1482 (copper)			X	X	X	X
1483 (copper)			X	X	X	X
1485 (copper)			X	X	X	X
1487 (copper)			X	X	X	X

Table 8. Expansion unit RIO cable options

Cable feature	HCA card	11D/11	11D/20
1307 (copper)			

Table 8. Expansion unit RIO cable options (continued)

Cable feature	HCA card	11D/11	11D/20
1308 (copper)			
1460 (copper)			
1461 (copper)			
1462 (copper)			
1470 (fiber optic)			
1471 (fiber optic)			
1472 (fiber optic)			
1473 (fiber optic)			
1474 (copper)			
1475 (copper)			
1481 (copper)			
1482 (copper)			
1483 (copper)			
1485 (copper)			
1832			
1833			
1834			
1835	X		
1836	X		
1837			
1838			
1839	X		
3146 (copper)		X	X
3147 (copper)		X	X
3148 (copper)		X	X
3156 (copper)			
3168 (copper)			

Table 9. Expansion unit InfiniBand cable options

Cable feature	14G/3057/96
1829 0.6M 12X	X
1830 1.5M 12X	X
1834 8.0M 12X	X
1840 3.0M 12X	X

Expansion unit configuration rules for RIO and InfiniBand

Learn about the configuration rules for RIO and InfiniBand.

When you set up the expansion unit, observe the configuration rules as shown in the following table.

Table 10. RIO and InfiniBand configuration rules for expansion units

Configuration	Maximum number of ports	Maximum number of loops	Maximum number of expansion units per loop	Maximum number of supported expansion units
11D/11 11D/20 (RIO) 57/90 50/95 05/95	16	8	6	48
(RIO-12X) 57/96	16	8	4	32

Connect your expansion units

Follow these instructions to verify readiness to add the expansion units and add the expansion units to the system.

1. You can install the expansion units with the system unit power on or off. In some cases, system unit power must be off. Go to Chapter 3, “Expansion units,” on page 89 for more information about when system unit power must be off.
 - a. If you are installing a new system unit and expansion units, go to 5 on page 96.
 - b. If you must power off the system to add the expansion units, or you are choosing to add the expansion units with the system power off and the system unit is not currently powered off, power it off now. Go to “Stop the system or logical partition” on page 303. After you have powered off your system unit, continue with 5 on page 96 to complete this procedure.
2. Verify the existing RIO configuration.

Important: When simultaneously adding multiple expansion units to an existing RIO/HSL loop, it is required that the units be adjacent to each other so the existing loop is broken at only one spot.

Tip: If multiple expansion units are to be added with the system power on, it is recommended to work with one RIO/HSL loop at a time. For example, if the plan is to add 3 expansion units to loop X and 2 to loop Y, follow the complete procedure to simultaneously add the 3 units to loop X. When the first procedure has been completed, then follow the procedure to complete the simultaneous add of the 2 units to loop Y. It is not necessary to complete the procedure for each expansion unit separately.

If problems with the RIO/HSL loops are discovered in this step, they must be corrected before continuing with the expansion unit add procedure. Follow the appropriate step below to determine if there are problems with the RIO/HSL loops.

If your system is HMC managed, refer to “Verify the RIO loops using an HMC” on page 101. You may choose to use the “Save” button to overwrite the existing “Last Valid RIO Topology”. This will allow you to compare the topology before and after the addition of the expansion units.

3. To verify the System Power Control Network (SPCN), go to “Verify the System Power Control Network (SPCN)” on page 103. If problems with the SPCN are discovered in this step, they must be corrected before continuing with the expansion unit add procedure.

Important: When simultaneously adding multiple expansion units to an existing SPCN loop, it is required that the units be adjacent to each other so the existing loop is broken at only one spot.

4. Set the SPCN Firmware Update Policy.

The SPCN Firmware Update Policy controls when and how SPCN firmware on expansion units will be updated. The default setting shipped with your system for the SPCN Firmware Update Policy is Enabled. This setting allows for firmware updates to be done over the RIO/HSL interface whenever an update is required and does not allow updates over the slower serial SPCN interface.

- a. Access the ASMI using an authority level of Administrator or Authorized service provider. See “Accessing the ASMI” on page 293 for more information.
- b. In the ASMI navigation area, expand **System Configuration** and select **Configure I/O Enclosures**.
- c. Verify there are no SPCN firmware updates in progress by looking at the **Power Control Network Firmware Update Status** column. This will show the words **In Progress** and a percent complete if an SPCN firmware update is in progress.

If there is an SPCN firmware update in progress, determine if the update is a Serial or HSL update by looking in the Power Control Network Firmware Update Status column for one of these words indicating the type of update.

If the SPCN firmware update is an HSL update, wait for the update to complete before continuing.

Tip: To determine when the update is complete, select **Configure I/O Enclosures** every 15 to 30 seconds until the words **Not Required** appear in the **Power Control Network Firmware Update Status** column. Do not use the **Back** or **Refresh** buttons on the browser to monitor the status.

If the SPCN firmware update is a Serial update, you may either wait for the update to complete or stop the update. If you choose to stop the update, the update will need to be restarted from the beginning after you have completed the procedure. To stop the update, after completing step 4d press the **Stop SPCN Firmware Update** button on the Configure I/O Enclosures panel. Select **Configure I/O Enclosures** every 15 to 30 seconds until the word **Pending** appears in the **Power Control Network Firmware Update Status** column. Do not use the **Back** or **Refresh** buttons on the browser to monitor the status.

- d. If your SPCN Firmware Update Policy is **Expanded**, record the current setting so it can be restored later and then change the setting to **Enabled**. If the SPCN Firmware Update Policy is **Enabled** or **Disabled** you may continue without changing the setting.

5. Remove or open the back of the system unit.

6. Find the connector locations. If you need help finding the connectors on your expansion units or system unit, see “Connector locations” on page 117.

7. Go to “Connect the expansion unit with RIO cables” on page 97.

8. Go to “Connect the expansion unit with SPCN cables” on page 114.

9. Connect the power cables for the expansion units that you are installing to the power source. Then connect them to the power supplies on the expansion units. If you installed the expansion units with the system unit power off, go to step 11 on page 97. If not, go to the next step.

Note: The power cable should be plugged into the power source prior to connecting it at the power supply of the expansion unit.

10. The expansion units will power on automatically. After the expansion units that you have installed are powered on and you have waited ten minutes for the hardware initialization to complete, go to 12 on page 97.

Tip: For each expansion unit, wait for the green power indicator to light on the control panel of the expansion unit that just powered on. This may take between one and ten minutes. During this time, the yellow attention indicator may be lit on the control panel of the expansion unit that just powered

on. After the green power indicators are lit on the control panels of all of the expansion units that were just powered on, wait ten additional minutes for hardware initialization to complete before proceeding to 12.

11. Go to “Start the system or logical partition” on page 300.
12. Go to “Verify the System Power Control Network (SPCN)” on page 103. When following these instructions, consider that the following errors logs are expected depending upon various factors in the system configuration and procedure.
 - 1000 9135 informational or permanent log entry due to an open SPCN loop.
 - 1000 9137 permanent log entry due to disruption to the RIO/HSL or InfiniBand loop.
 - 1000 9139 informational log entry for SPCN closed.
 - 1000 910A, 1000 91DE if SPCN firmware updates were required.
 - 1000 913B permanent log entry if an SPCN firmware update is required but not automatically started. If this error log entry is found, continue with the procedure and the error will be handled in step 14.
13. Verify the RIO/HSL Loops.

If your system is HMC managed, refer to “Verify the RIO loops using an HMC” on page 101. If you saved the original RIO/HSL topology before adding the expansion units, you may use this saved topology to compare the original and modified configurations.

When following these instructions, consider that the following errors log entries are expected depending upon various factors in the system configuration and procedure.

 - B700 6907 informational log entries for each new expansion unit that was added that has information in its non-volatile storage from a system which the expansion unit was previously attached to.
 - B700 6985 informational log entries before and after the B700 6907 informational log entries.
 - B700 6984 informational log entries to indicate a broken HSL loop.
14. Start necessary SPCN firmware updates.

If a 1000 913B error log entry was found in 12, this is an indication that SPCN firmware updates are needed but not allowed due to the current SPCN Firmware Update Policy. Follow the PWR1907 procedure to update the SPCN firmware. Wait for the SPCN firmware updates to complete before continuing to the next step. This could take several hours depending on the number of expansion units on the SPCN loop and the current level of the SPCN firmware in the expansion unit.
15. If you changed the SPCN Firmware Update Policy in 4 on page 96, change the policy back to the original setting.
 - a. Access the ASMI using an authority level of Administrator or Authorized service provider. See “Accessing the ASMI” on page 293 for more information.
 - b. In the ASMI navigation area, expand **System Configuration** and select **Configure I/O Enclosures**.
 - c. Change the **SPCN Firmware Update Policy** setting to the setting recorded in 4 on page 96. The default and recommended setting is **Enabled**.
16. Verify the new configuration. “Verify that the new configuration is functioning” on page 101.
17. If the system is partitioned, you can now assign the new hardware to a partition.

Connect the expansion unit with RIO cables

Connect the expansion unit with RIO cables in a new loop, or connect the expansion unit with RIO cables in an existing loop.

Review the “Examples: RIO expansion unit connections” on page 99 and then return here.

Add expansion units to a new RIO loop

Follow these instructions to add expansion units to a new RIO loop.

Unused RIO connectors might be covered with metal clips. Remove the clips before you install the RIO cables.

1. On the system unit to which you are going to connect the new RIO , identify connectors 0 and 1 of the RIO connector pair that you are going to use.
2. Find the RIO cables that were included with the expansion units.
3. Connect a RIO cable to connector 0 on an expansion unit.
4. Connect another RIO cable to connector 1 on the expansion unit.
5. If there is another expansion unit to add, do the following:
 - a. Connect the other end of the cable from connector 1 on the expansion unit just added to connector 0 on the next expansion unit.
 - b. Connect another cable to connector 1 on the expansion unit from step 5a.
 - c. Repeat step 5 for each additional expansion unit.
6. Connect the other end of the cable from connector 0 on the first expansion unit added to connector 0 on your system unit.
7. Connect the other end of the cable from connector 1 on the last expansion unit added to connector 1 on your system unit.
8. Return to the procedure which sent you here.

Add expansion units to an existing RIO loop

Follow these steps to add expansion units to an existing RIO loop.

Unused RIO/HSL connectors might be covered with metal clips. Remove the clips before you install the RIO/HSL cables.

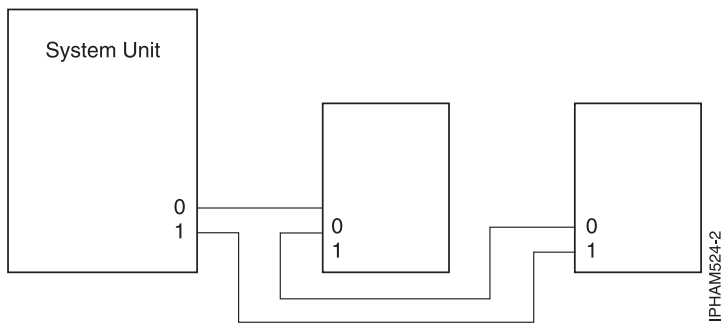
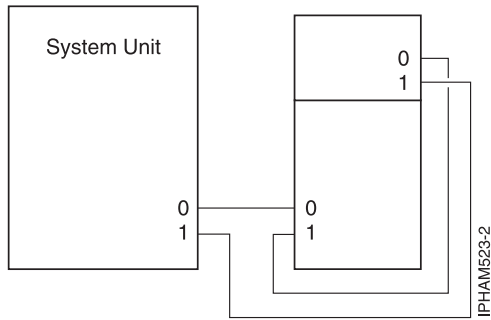
Before continuing this procedure, review “Examples: RIO expansion unit connections” on page 99.

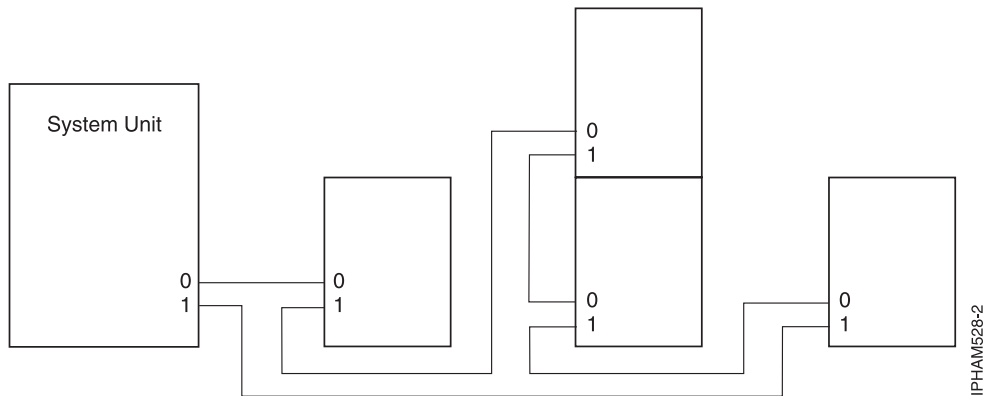
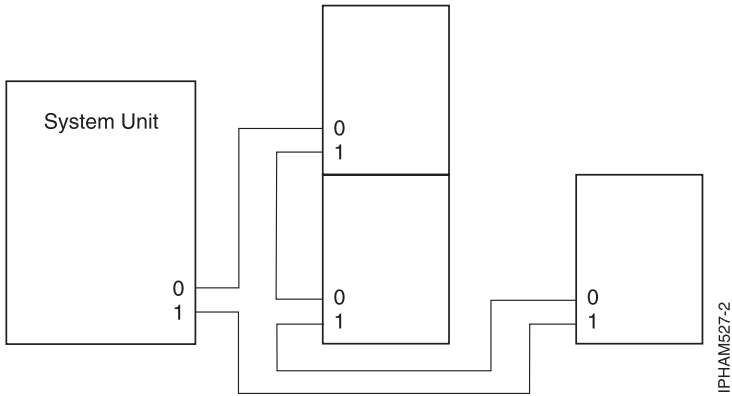
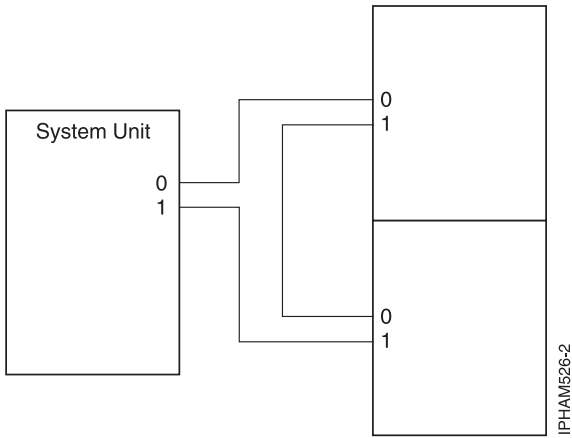
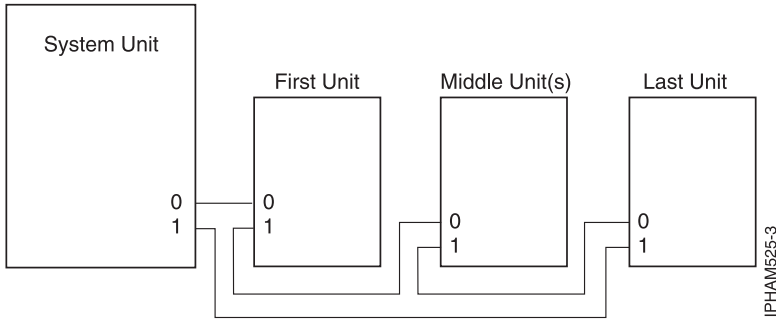
1. Identify the RIO/HSL loop to which you want to add the expansion units.
2. Identify connectors 0 and 1 of the RIO/HSL connector pair on the system unit that are associated with the loop identified in step 1.
3. Find the RIO/HSL cables that were included with the expansion units.
4. To add the expansion units to the beginning of the loop, go to 5. To add the expansion units to the middle of the loop, go to 6. To add the expansion units to the end of the loop, go to 7 on page 99.
5. To add the expansion units to the beginning of the loop, complete the following steps:
 - a. Move the RIO/HSL cable from connector 0 on the first expansion unit on the loop (the one connected to connector 0 on the system unit) to connector 0 on the new expansion unit.
 - b. Connect another RIO/HSL cable to connector 1 on the new expansion unit.
 - c. If there is another expansion unit to add, do the following:
 - 1) Connect the other end of the cable from connector 1 on the expansion unit just added to connector 0 on the next expansion unit.
 - 2) Connect another cable to connector 1 on the expansion unit from step 5c1.
 - 3) Repeat step 5c for each additional expansion unit.
 - d. Connect the other end of the cable from connector 1 on the last expansion unit added to connector 0 on the expansion unit that was disconnected in step 5a.
6. To add the expansion units to the middle of the loop, complete the following steps:
 - a. Move the RIO/HSL cable from connector 0 on the existing expansion unit that follows the location of the new expansion unit to connector 0 on the new expansion unit.
 - b. Connect another RIO/HSL cable to connector 1 on the new expansion unit.
 - c. If there is another expansion unit to add, do the following:
 - 1) Connect the other end of the cable from connector 1 on the expansion unit just added to connector 0 on the next expansion unit.

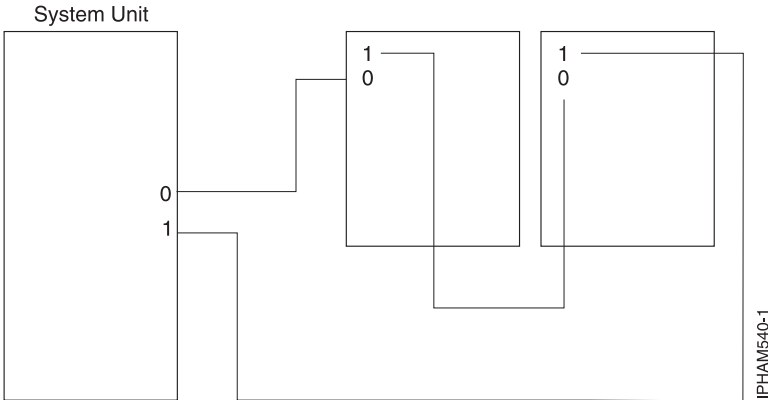
- 2) Connect another cable to connector 1 on the expansion unit from step 6c1 on page 98.
 - 3) Repeat step 6c on page 98 for each additional expansion unit.
 - d. Connect the other end of the cable from connector 1 on the last expansion unit added to connector 0 on the expansion unit that was disconnected in step 6a on page 98.
7. To add the expansion units to the end of the loop, complete the following steps:
- a. Move the RIO/HSL cable from connector 1 on the system unit to connector 0 on the new expansion unit.
 - b. Connect another RIO/HSL cable to connector 1 on the new expansion unit.
 - c. If there is another expansion unit to add, do the following:
 - 1) Connect the other end of the cable from connector 1 on the expansion unit just added to connector 0 on the next expansion unit.
 - 2) Connect another cable to connector 1 on the new expansion unit from step 7a.
 - 3) Repeat step 7c for each additional expansion unit.
 - d. Connect the other end of the cable from connector 1 on the last expansion unit added to connector 1 on the system unit.
8. Return to the procedure which sent you here.

Examples: RIO expansion unit connections

See examples of possible RIO connections.







Verify that the new configuration is functioning

Use the procedures in this section to verify that the new configuration is functioning.

To verify the new configuration is functioning for servers that are managed by an HMC, do the following:

1. "Viewing information about the managed system" on page 102
 - a. From the navigation area of the HMC, expand **Systems Management**.
 - b. Click **Servers**.
 - c. Select the server with which you want to work. Information about the system will be located under the Tasks section in the contents area.
2. View the properties of the managed system and verify the new expansion units by doing the following:
 - a. Select your server with which you want to work.
 - b. Click **Properties** under **Tasks**.
 - c. Select the **I/O** tab.
 - d. Verify that the new expansion unit appears in the list and that the unit ID information displayed on the panel for the I/O unit matches the label on the I/O unit.

Note: Wait up to ten minutes for the new expansion units to appear in the list. If they do not appear after ten minutes, go to the next step. If they do appear, go to 4.

Tip: To refresh the list of expansion units, you must completely exit and re-enter the function.

3. If the expansion units are not displayed on the I/O panel, verify the installation by performing the following steps:
 - a. Make sure the expansion units are powered on and the power cables are connected to the power source and the expansion units.
 - b. Make sure that the RIO/HSL and SPCN cables are installed correctly. See "Connect your expansion units" on page 95 for cabling information.
 - c. Make sure you verified the MTMS and Configuration ID of the new expansion units.
 - d. If the expansion units still are not displayed, contact your service provider for assistance.
4. Return to the procedure which sent you here.

Verify the RIO loops using an HMC

You might need to verify that the new configuration is functioning. Use the procedures in this section to perform this task using an HMC and the system unit power on.

Complete the following steps to verify the RIO loops using an HMC and the system unit power on:

1. Use the HMC to verify that there are no B700 69xx errors by completing the following steps:
 - a. In the navigation area of the HMC, select **Service Management**.
 - b. In the contents area, select **Manage Serviceable Events**.
 - c. In the Manage Serviceable Events – Select Serviceable Events window, select **Open** for the Serviceable Event Status, select the MTMS of the server you are working with for Reporting MTMS, and select **ALL** for all other fields.
 - d. Click **OK**.
 - e. Scan for any B700 69xx errors.
 - If there are no errors, click **Cancel** twice to exit Manage Serviceable Events. Go to step 2
 - If there are errors, they must be corrected before continuing. If you need assistance, contact your service provider.
2. Use the HMC to verify the existing RIO loops by completing the following steps:
 - a. In the navigation area of the HMC, expand **Systems Management**.
 - b. Click **Servers**, and then select the server you are working with.
 - c. In the contents area under **Tasks**, select **Hardware Information**.
 - d. Select **View Hardware Topology**.
 - e. Verify that all of the entries of type External (ignore Internal links) have a LeadingPortStatus and TrailingPortStatus of Operational. If the LeadingPortStatus and TrailingPortStatus for all of the external entries is operational, continue. If the LeadingPortStatus and TrailingPortStatus is not operational for any of the external entries, the links must be repaired before continuing. If you need assistance, contact your service provider.
3. Return to the procedure that sent you here.

Viewing information about the managed system

View information about the managed system's configuration and capabilities.

You can view the managed system's configuration and capabilities. Any user can view managed system properties. To view information about the managed system:

1. From the navigation area of the HMC, expand **Systems Management**.
2. Click **Servers** .
3. Select the server with which you want to work.
4. Select **Properties** under **Tasks** in the contents area to view information about the system.

The HMC displays the system's name, logical partition capability, state, serial number, model and type, and policy information. A system that is powered on using the Partition Standby option displays this information, as well as available and assigned processors, memory, I/O drawers and slots, power-on parameters, reference codes, and policy information. The HMC also displays power-on parameters and reference codes for a managed system in the power-off state.

The Processor tab displays information that is helpful when performing Dynamic Logical Partitioning processor tasks. Use the Processor tab to view processor usage data for partitions and determine whether a processor is assigned to a logical partition. The information in the Processor tab is also helpful when you need to know if processors are disabled and therefore cannot be used by any logical partition.

The Memory tab shows deconfigured resources, as well as information about available and configured memory. To view or change memory allocation on systems with huge page table support, use the Memory tab and select **Show details** in the Advanced Options area. To change the requested value for huge page memory, the system must be powered off.

The information provided in the memory tab (for example, deconfigured resources), along with the information provided on the I/O tab, is useful for planning for processors and dynamic logical partitions.

Verify the System Power Control Network (SPCN)

Use the procedures in this section to check for SPCN (System Power Control Network) errors, check for inactive enclosures, and fix any MTMS (Machine, Type, Model, and Serial Number) problems.

To verify the new configuration is functioning for an HMC managed system, go to step 1.

1. If your system is HMC managed, use the HMC to verify that there are no 1000 9xxx errors by completing the following steps:
 - a. In the navigation area of the HMC, select **Service Management**.
 - b. In the contents area, select **Manage Serviceable Events**.
 - c. In the Manage Serviceable Events – Select Serviceable Events window, select the following:
 - 1) **Open** for the Serviceable Event Status.
 - 2) The MTMS of the server you are working with for Reporting MTMS.
 - 3) **ALL** for all other fields
 - d. Click **OK**.
 - e. Scan for any 1000 9xxx errors, and do the following:
 - If there are no errors, click **Cancel** twice to exit Manage Serviceable Events.
 - If there are errors, they must be corrected before continuing. If you need assistance, contact your service provider.
 - f. Go to step 3.
2. If your system is not HMC managed, use the service action event log to verify that there are no 1000 9xxx errors by completing the following steps:
 - a. Be sure you are signed on with at least service level authority.
 - b. On the command line of the i5/OS[®] session, type `strsst` and press **Enter**.

Tip: If you cannot get to the System Service Tools display, use function 21 from the control panel.
 - c. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press **Enter**.

Tip: The service tools password is case-sensitive.
 - d. Select **Start a Service Tool** from the System Service Tools (SST) display. Press **Enter**.
 - e. Select **Hardware Service Manager** from the Start a Service Tool display. Press **Enter**.
 - f. Select **Work with Service Action Event Log** from the Hardware Service Manager display. Press **Enter**.
 - g. On the **Select Timeframe** display, change the **From: Date and Time** to the desired date and time range. The suggested range is 30 days.
 - h. Search for any 1000 9xxx errors, and do the following:
 - If there are no errors, press F3 to exit and return to the Hardware Service Manager display.
 - If there are errors, they must be corrected before continuing. If you need assistance, contact your service provider.
 - i. Go to step 3.
3. Verify that none of the existing expansion units with control panels have a 'C62E' code on the display area of the control panel. This indicates that the expansion unit is unable to communicate with the system. If one or more of them do, there is a problem with the SPCN cabling. Correct the problem before continuing.
4. To verify that there are no inactive expansion units in the SPCN, do the following:

- a. Access the ASMI using an authority level of Administrator or Authorized service provider. See “Managing the Advanced System Management Interface (ASMI)” on page 293 for information about using ASMI.
 - b. In the ASMI navigation area, expand **System Configuration** and select **Configure I/O Enclosures**.
 - c. Verify that each row has the word **Active** in the Status column. If any of the I/O enclosures have a status of **Inactive**, do one of the following:
 - 1) If you have already concurrently added expansion units to the system, do not invoke **Clear inactive enclosures**. Contact your service provider for assistance.
 - 2) If you are preparing to add expansion units but have not done so yet, click the **Clear inactive enclosures** button on this panel. Wait for the completion indication, then repeat steps 4b and 4c. If the problem persists, contact your service provider.
5. Correct any temporary configuration IDs and MTMS (Machine Type, Model, and Serial Numbers) for the expansion units. If you have already concurrently added expansion units to the system, go to step 6. If you are preparing to add expansion units, but have not yet done so, go to step 7.
 6. If you have already concurrently added expansion units to the system perform the tasks in “Setting I/O enclosure configuration ID and MTMS value.” Then go to step 8.
 7. If you are preparing to add expansion units but have not done so yet, complete the following steps for all expansion units on the system.
 - a. Access the ASMI using an authority level of Administrator or Authorized service provider.
 - b. In the ASMI navigation area, expand **System Configuration** and select **Configure I/O Enclosures**.
 - c. Verify that none of the values in the **Location code** column are of the form UTMPx.xxx.xxxxxx where ‘x’ may be any number 0-9 or character A-Z. If any of the expansion units have a Location Code with the format UTMPx.xxx.xxxxxx, perform the tasks in “Setting I/O enclosure configuration ID and MTMS value” to correct it.
 8. Return to the procedure which sent you here.

Related concepts

“Accessing the ASMI” on page 293

You can access the ASMI through a Web browser, an ASCII terminal, or the Hardware Management Console (HMC).

Setting I/O enclosure configuration ID and MTMS value

Provides instructions for setting important system values.

To set the configuration ID, use the Advanced System Management Interface (ASMI). However if the ASMI is not available you can use the physical control panel.

Set the machine type-model-serial (MTMS) value for the enclosure to match the original value, which can be found on a label affixed to the enclosure. Updating the MTMS value keeps the configuration and error information in sync, and is used by the system when creating the location codes. To update the MTMS values you *must* use ASMI, *not* with the control panel. However, if you do not have access to the ASMI, the system will still operate without updating this information

Note: For information about setting up the ASMI, go to Managing the Advanced System Management Interface (ASMI) chapter in your host server service guide. For information on using the ASMI, including updating the system configuration settings, go to the Managing your server using the Advanced System Management Interface chapter in your host server service guide.

Using the ASMI to verify and set the configuration ID and MTMS value:

Provides detailed instructions for setting the configuration ID and MTMS value.

To perform this operation, verify that the following prerequisites have been met:

- The server *must* be powered on to a firmware standby or a firmware running state.
 - The enclosure *must* have ac power and be correctly installed in the system power control network.
 - Your authority level *must* be one of the following:
 - Administrator
 - Authorized service provider
1. Log in to ASMI.
 2. Expand **System Configuration**.
 3. Select **Configure I/O Enclosures**.
 4. Select **Clear Inactive Enclosures**.
 5. If you were directed here from a FRU replacement procedure, the FRU that was replaced contained the non-volatile storage where the enclosure machine type-model-serial numbers (MTMS) was stored. It is necessary to restore the enclosure MTMS now. For information on restoring the MTMS values, see “Setting I/O enclosure configuration ID and MTMS value” on page 104.

Note: It might also be necessary to set or change the enclosure configuration ID (power control network identifier).

The non-volatile storage where the enclosure MTMS value is stored in a new replacement FRU is uninitialized. The system will detect the uninitialized value and assign an obvious, unique value of the form TMPx.xxx.xxxxxxx, where *x* can be any character 0-9 and A-Z. As a result, the location code for the enclosure will change to UTMPx.xxx.xxxxxxx. You must use the new UTMPx.xxx.xxxxxxx location code in the following instructions when selecting the enclosure to power off and selecting the enclosure to change its settings.

6. From the ASMI utility, expand **System Configuration**.
7. Select **Configure I/O Enclosures**.
8. Verify the configuration ID and MTMS data.
 - a. Compare the power control network identifier value shown for the enclosure you are working with to the power control network identifier (configuration ID) values in the following list.
 - 0x71 for 1519-100 or 1519-200 IXA
 - 0x81 for 5074, 5079, and 5097-002 enclosures
 - 0x89 for 5088 and 0588 enclosures
 - 0x8A for 5094, 5097-001, 5294, 8294, and 9094 enclosures
 - 0x8B for 5095 and 0595 enclosures
 - 0x88 for 7311-D10, 7311-D11, and 5790 enclosures
 - 0x8C for 7311-D20 enclosures
 - b. Compare the values shown on the Type-Model and Serial number columns for the enclosure you are servicing to the type, model, and serial values on the label located on the enclosure. The location code format for the enclosure will be either UTMPx.xxx.xxxxxxx or UTTTT.MMM.SSSSSS, where TTTT, MMM, and SSSSSS are the enclosure type (TTTT), model (MMM), and serial number (SSSSSS).

Note:

- A 10009132 information log will be produced following a platform IPL, or when an enclosure is added, indicating that a temporary MTMS was assigned to an enclosure. The temporary MTMS has the location code format of UTMPx.xxx.xxxxxxx. This is an indication that the MTMS should be updated.
 - Serial numbers are case sensitive. (All alphabetic characters contained in the serial number must be entered as a capital letter.)
- c. If any changes must be made, go to step 9 on page 106. Otherwise, go to step 21 on page 107.

9. If the server is powered on to the firmware running state, go to step 10. If the server is powered on to the firmware standby state, go to step 11.
10. If the configuration ID must be changed, see the following notes, and go to “Powering off an I/O enclosure” on page 107. Go to step 11. If the MTMS data must be changed and the system has partitions running AIX or Linux and any of the resources in the enclosure are owned by active partitions running AIX or Linux, see the notes below and go to “Start or stop the system or logical partition” on page 300. Go to step 11.

If neither of the above statements apply, go to step 11.

Note:

- Do not disconnect the AC power cables after powering off the enclosure.
 - If the enclosure does not immediately appear on the service utility used to power off the enclosure, refresh the utility periodically for up to ten minutes until it does. If it still does not appear, go step 1 on page 105 and repeat this procedure.
 - If you were directed here from a replacement procedure, use the new UTMPx.xxx.xxxxxxx location code when selecting the enclosure to power off .
 - If the procedure that directed you here involved powering off the enclosure and while powering off the enclosure, you were instructed to use panel function 69 to power on the enclosure, perform panel function 69 now (with the control panel set to manual mode) from the system unit control panel. Do this even though the enclosure is already on.
11. From the ASMI utility, expand **System Configuration**.
 12. Select **Configure I/O Enclosure**.
 13. Select the enclosure you are working with.
 14. Select **Change settings**.
 15. If in step 8 on page 105 you determined that the power control network identifier (configuration ID) value is not correct, enter the correct value now.
 16. If in step 8 on page 105 you determined that the Type-Model and Serial number values are not correct, enter the correct values now.

Note: Serial numbers are case sensitive. All alphabetic characters contained in the serial number must be entered as a capital letter.

17. Click **Save settings** to complete the operation.
18. Verify that the values you just entered are reflected in the Power Control Network Identifier, Type-Model, Serial number, and Location code columns for the enclosure you are servicing. Do not use the browser Back button to do this. Rather, expand System Configuration. Then select **Configure I/O Enclosures**.
19. If the server is powered on to a firmware standby state and you entered a new power control network identifier (Configuration ID) in step 15, the enclosure will power off and back on automatically. If this is the case, go to step 21 on page 107. Otherwise go to step 20.
20. If you powered off the enclosure in step 10, do the following:
 - a. If the system is not managed by a HMC, do the following:
 - 1) Disconnect all power to the enclosure by disconnecting the cables from the power supplies on the enclosure.
 - 2) Wait for the display panel to go off, wait an additional 30 seconds, and then reconnect the power cables.

The enclosure will power on automatically.
 - b. If the system is managed by a HMC, do the following:
 - 1) Power on the enclosure using the Power On/Off Unit utility under the service focal point application on the HMC.

- 2) If the values you just entered are not immediately reflected in the location code of the enclosure in the Power On/Off Unit utility, restart the utility periodically for up to ten minutes until the values you entered are reflected. Go to "Start or stop the system or logical partition" on page 300 for detailed instructions, then continue with step 21.

21. Log off and close ASMI.

22. Return to the procedure that sent you here.

Powering off an I/O enclosure:

Provides detailed instructions for powering off an enclosure.

Before beginning, read this entire procedure. If there are procedural steps that cannot be performed at this time, the procedure must be delayed until a later time.

Attention:

- If the server is not managed by an HMC and there is no service partition, the enclosure power cannot be turned off with the server power turned on.
- Do not use this procedure in either of the following situations:
 - To replace disk units that are supported under device concurrent maintenance. Use the device concurrent maintenance procedure instead.
 - On the system unit or the system unit's integrated I/O enclosure. For system units and system units integrated I/O enclosures, see the "Powering on or off a system". This procedure is located in your host system's service guide.

Notes:

1. References to the console in this procedure refer to the console of the logical partition in which you are working.
2. Throughout this procedure, the term *HSL I/O bridge* is interchangeable with *RIO adapter*.
3. Messages that may be generated on the HMC during the procedure refer to specific partitions by their partition IDs. A partition's ID is a numeric value that represents the order in which the partitions were created. The partitions listed in the Server Management content area are not necessarily listed in order of partition ID. A partition's ID is listed under the *General* tab in the Partition Properties.

Perform the following with the assistance of the customer:

1. If you have not already done so, record the enclosure's location code and machine type-model-serial numbers (MTMS).
2. Can the enclosure be powered off with the server powered on, and does the customer want to perform the procedure with the server powered on?
 - No:** The enclosure must be powered off by powering off the server. See your system's service guide for instructions on powering off the server, then return to the procedure that sent you here.
 - Yes:** Go to step 3.

Note: If the activated firmware level of the server to which the enclosure is attached is earlier than SF235, bus numbers for the PCI buses in the enclosure might change if the I/O backplane in the enclosure is replaced with the server powered off. If this occurs on a server with multiple logical partitions, the I/O slot resources in the enclosure must be reassigned to the appropriate partitions. Additionally, AIX logical resource names of the I/O resources in the enclosure might change, requiring some manual reconfiguration in the partition. If the I/O backplane is replaced with the server powered off, be prepared to perform these reconfiguration activities after the procedure. If the I/O backplane is replaced with the server powered on, either to firmware standby or firmware running, reconfiguration will not be required.

If you want to replace the I/O backplane with the server powered off, but configuration changes might be lost, powering off the server and then powering it on to firmware standby state before performing the procedure might be a satisfactory alternative.

The activated firmware level of the server is displayed in the upper-right corner of the ASMI utility.

3. Verify that the enclosure that is being powered off is the correct one. If the enclosure has an alphanumeric display on the control panel, verify that the type, model, and serial number of the enclosure displayed on the user interface match that shown on the control panel display. You can also verify that you are powering off the correct enclosure by activating the identify indicator on the enclosure. To activate the identify LED on the enclosure, do the following:
 - From the HMC display, do the following:
 - a. Expand **Systems Management** by selecting the +.
 - b. Select **Servers**.
 - c. Select the server you will be working from.
 - d. From the Task area, expand Operations by selecting the +.
 - e. Expand **LED Status** by selecting the +.
 - f. Select **Identify LED**.
 - g. Select the enclosure that you want to activate the identify LED.
 - Are you powering off the correct enclosure?
 - No:** Choose the correct enclosure. Then perform step 3 again.
 - Yes:** Go to step 4.

Note: The system will not allow the enclosure to be powered off if there are failed or inactive links in the HSL loop that the enclosure is on, other than the links adjacent to the enclosure. If an attempt is made to power off the enclosure under these circumstances, a descriptive error message will be presented.

4. Determine if there are failed or inactive links by performing one of the following procedures:

Note: To determine which procedure to follow, you must know if your system is managed by a HMC or is not managed by a HMC.

- “Verify the RIO loops using an HMC” on page 101
-

Are there external links that are not operational in the HSL loop, other than those adjacent to the enclosure being powered off?

No: Go to step 5.

Yes: Repair the failed or inactive links, except those adjacent to the enclosure being powered off. If you need assistance, contact your service provider. Then perform this procedure again.

5. Verify that the SPCN loop is complete. A complete SPCN loop is not required, however, powering off an enclosure with an incomplete SPCN loop could cause lost contact with other enclosures on the SPCN loop. The enclosures with which the system lost contact will continue to function; however, the system may log additional errors and will not be able to monitor those units. A 10009135 reference code in the error log indicates an incomplete SPCN loop. Work with the customer to determine whether the SPCN loop is complete, and whether correction is necessary, and then go to step 6.
6. If the system has only partitions running AIX or Linux, skip to step 10. If not, go to step 7.

Note: The system will not allow the enclosure to be powered off if the enclosure is configured as switchable and the system that owns the HSL I/O bridge (the logical owner of the enclosure) is not the system that provides power to the enclosure (the system in whose SPCN the enclosure is located, or SPCN system). If an attempt is made to power off the enclosure under these circumstances, a descriptive error message will be presented.

7. Determine if the enclosure is configured as a switchable unit, either by asking the customer or referring to Determining if an enclosure is configured as switchable under iSeries™ OptiConnect. Switchable enclosures exist only if the server makes use of Switchable Independent Disk Pools. Is the enclosure configured as switchable?
 - No:** The enclosure is configured as private to this system. Go to step 10.
 - Yes:** Go to step 8.
8. Determine if the logical owner of the enclosure is the SPCN system by asking the customer or referring to Determining if an enclosure is configured as switchable under iSeries OptiConnect. Is the logical owner of the enclosure also the SPCN system?
 - No:** Work with the customer to switch logical ownership of the HSL I/O bridge in the enclosure to the SPCN system. This should be done using the iSeries OptiConnect user interface. If that is not successful due to problems with the iSeries OptiConnect user interface, it may be attempted as described in switchowner.dita. However, this should be used only as a final alternative it might result in Cluster Resource Group (CRG) problems. If the switch cannot be performed, contact your service provider for assistance. Otherwise, continue with step 9 from the SPCN system.
 - Yes:** Go to step 9.
9. The system will not allow the enclosure to be powered off if it contains resources included in an active Cluster Resource Group (CRG). If an attempt is made to power off the enclosure under these circumstances, a descriptive error message is displayed. Determine if the enclosure contains resources included in an active CRG, ask the customer.
 - Does the enclosure contain resources included in an active CRG?
 - No:** Go to step 10.
 - Yes:** Work with the customer to end each active CRG that contains resources in the enclosure.
10. Determine if any of the I/O resources in the enclosure are owned by partitions running Linux. Are any of the I/O resources in the enclosure owned by partitions running Linux?
 - No:** Go to step 11.
 - Yes:** Power off the partitions running Linux and go to step 11.
11. Determine if any of the I/O resources in the enclosure are owned by partitions running AIX. Are any of the I/O resources in the enclosure owned by partitions running AIX?
 - **No:** Go to step 12.
 - **Yes:** Do the partitions have a code level that supports the powering off and on of an enclosure with the partition running? The required level for AIX 5.2 is 5.2.0.61 or later and the required level for AIX 5.3 is 5.3.0.22 or later. To determine the level of AIX, run the command **lslpp -l devices.chrp.base.rte** from the AIX command line.
 - **Yes:** Does the HMC have a code level that supports power off and on of an enclosure with I/O resources assigned to active partitions running AIX? The required HMC code level is version 7, release 3.1.0 or later. To determine the HMC code level, select **Updates** from the HMC welcome navigation bar, located on the left side of your HMC display. The code level is displayed in the Updates window under HMC Code Level.
 - Yes:** Go to step 12.
 - No:** Power off the partitions that are running AIX and that own I/O resources in the enclosure, then go to step 12.
 - **No:** Power off the partitions that are running AIX and that own I/O resources in the enclosure, then go to step 12.
12. Work with the customer to end I/O activity to the enclosure by performing the following. If all partitions that own I/O resources in the enclosure have been powered off, skip this step and go to step 13.
 - In partitions:

- Work with the customer to vary off all configuration descriptions (for example, ctl, device, line, network server, and so on) that use resources in the enclosure. Use the **vrycfg** command. The system will not allow the enclosure to be powered off unless all configuration descriptions that use resources in the enclosure are varied off. If an attempt is made to power off the enclosure when there are configuration descriptions that use resources in the enclosure that are varied on, a descriptive error message is displayed.

Note: If configuration descriptions that use resources in the enclosure cannot be varied off, the procedure must be delayed until they can be varied off or the partitions that have such configuration descriptions must be powered off.

- If the enclosure contains disk unit input/output ports (IOPs) or input/output adapters (IOAs), and the disk units are not mirrored to disk units in other enclosures, work with the customer to end all communications activities to these disk units by ending all subsystems.

Attention: The system allows you to power off the enclosure even if you have not ended the communication activities to other disk units. However, doing so might result in a disk unit attention SRC and a partial or complete hang of the partition until the enclosure is powered on.

- If the enclosure contains disk unit IOPs or IOAs and these disk units are mirrored to disk units in other enclosures, you do not need to end all subsystems. Mirroring will assist during the service action.
- In AIX partitions:
 - Work with the customer to unconfigure all logical device resources that use resources in the enclosure. Use the **rmdev** command. The system will not allow the enclosure to be powered off unless all logical device resources that use resources in the enclosure are unconfigured. If an attempt is made to power off the enclosure when there are configured logical device resources that use resources in the enclosure, a descriptive error message is displayed.
 - If logical device resources that use resources in the enclosure cannot be unconfigured, the procedure must be delayed until they can be unconfigured or the partitions that have such resources must be powered off.
 - The following illustration is an example of two messages that might be displayed if there are logical AIX resources that must be unconfigured. The first message indicates that logical device resource **pci11** with physical name **U5294.001.23B2424-CB1-C01** must be unconfigured. To unconfigure this resource run the AIX command **rmdev -R -l pci11**. The second message indicates that logical device resources **pci6** and **ent0** with physical name **U0595.001.435DF30-CB1-C02** must be unconfigured. To unconfigure these resources run the AIX command **rmdev -R -l pci6**.

```
Reporting partition type: RPA
```

```
Return code type: Failure (hard stop or user intervention required).
```

```
Message:
```

```
com.ibm.hsc.client.rmc.HSCRMCEException: Query operation for slot
resource has failed on partition 2.
```

```
The partition command is:
```

```
drmgr -Q -c slot -s U5294.001.23B2424-CB1-C01 -w 0 -d 3
```

```
The partition standard output is:
```

```
drslot_chrp_slot: slot_type=1 all slots=0x20042d68
```

```
The partition standard error is:
```

```
0931-029 The specified slot contains a device or devices that are currently
configured. Unconfigure the following device or devices and try again.
```

```
pci11
```

```
The RMC return code is 0. The AIX return code is 1.
```

```

Reporting partition type: RPA

Return code type: Failure (hard stop or user intervention required).

Message:
com.ibm.hsc.client.rmc.HSCRMCEException: Query operation for slot resource
has failed on partition 2.

The partition command is:
drmgr -Q -c slot -s U0595.001.435DF30-CB1-C02 -w 0 -d 3

The partition standard output is:
drsloc_chrp_slot: slot_type=1 all slots=0x20042ca8

The partition standard error is:
0931-029 The specified slot contains a device or devices that are currently
configured. Unconfigure the following device or devices and try again.

ent0
pci6
The RMC return code is 0. The AIX return code is 1.

```

- You can use the following AIX commands to determine which logical device resources use an enclosure. In the following examples, U0595.001.435DF30 is the location code of the enclosure that is being powered off.

Displays information about logical device resource pci5:
`lscfg -l pci5`

Displays all logical resources in U0595.001.435DF30:

```

lscfg | grep U0595.001.435DF30
* pci5          U0595.001.435DF30-CB1          PCI Bus
+ sisioa0      U0595.001.435DF30-CB1-C01      PCI-X Dual Channel U320 SCSI RAID Adapter
+ scsi0        U0595.001.435DF30-CB1-C01-T1   PCI-X U320 SCSI RAID Adapter Physical bus
+ hdisk0       U0595.001.435DF30-CB1-C01-T1-L6-L0 16 Bit LVD SCSI Disk Drive (36400 MB)
* ses0         U0595.001.435DF30-CB1-C01-T1-L15-L0 SCSI Enclosure Services Device
+ scsi1        U0595.001.435DF30-CB1-C01-T2   PCI-X U320 SCSI RAID Adapter Physical bus
+ sisraid0     U0595.001.435DF30-CB1-C01-C1-T1  PCI-X U320 SCSI RAID Adapter Logical bus

```

Displays the rootvg hdisk(s):
`lsvg -o`

- The resources representing the partition's LAN connection to the HMC, such as ent0 and en0, must not be unconfigured or the procedure will not work. If these resources use the enclosure, the partition must be powered off to continue with the procedure.

Attention: If resources in the enclosure are assigned to I/O server partitions and are being used by I/O server partitions (also known as virtual I/O servers), work with the customer to determine whether powering off the enclosure will negatively impact the client partitions. If so, power off the client partitions before continuing.

13. Power off all external DVD-RAM storage devices (containing their own power supplies) connected to resources in the enclosure, then go to step 14.
14. Use one of the following procedures to power off the enclosure.

Attention: If the server is not managed by an HMC and there is no service partition, the enclosure power cannot be turned off with the server power turned on.

To turn off the power in an enclosure with the server power on, perform one of the following procedures:

- If the server is managed by an HMC, the power off and power on functions must be performed using the Power On/Off Unit utility on the HMC. Do the following:

Attention:

- Before beginning, read this entire procedure. If there are procedural steps that cannot be performed at this time, the entire procedure must be delayed until a later time.
- If the server is managed by a HMC, the power off and power on functions must be performed using the Power On/Off Unit utility on the HMC. To use the Power On/Off Unit utility. From the HMC display , do the following:
 - a. Expand **Systems Management** by selecting the +.
 - b. Select **Servers**
 - c. From the Select column, select the server you are working on.
 - d. In the Tasks area select the following:
 - 1) Select **Serviceability**.
 - 2) Select **Hardware**.
 - 3) Select **Power on/off I/O unit**.
 - 4) Select **Power off**.
- If the server is not managed by an HMC, the power off and power on functions must be performed using the Packaging Hardware Resources utility from the service partition. Do the following:
 - a. Access the System Service Tools or the Dedicated Service Tools on the service partition.
 - b. Select **Start a service tool**
 - c. Select **Hardware service manager**
 - d. Select **Packaging hardware resources**
 - e. Select **Concurrent maintenance**

Notes:

- a. If the procedure is being done from an partition, you can not perform this procedure from a console or terminal session that is connected through the enclosure that is being powered off. A different console or terminal session that is not connected through the enclosure being powered off must be found, or the server must be powered off. Go to the "Powering on and powering off" topic in your host system's service guide for instruction on powering off the server, then return to the procedure that sent you here.
 - b. If I/O activity to resources in the enclosure was not ended as described in step 12, the power off can not be performed. Messages are displayed that indicate which partition resources need to be varied off or unconfigured.
 - c. Follow all instructions provided by the utility. For instance, you might be informed that critical disk resources exist in the enclosure and that panel function 69 must be used to power the enclosure back on.
 - d. Wait for the enclosure to power off. This might take up to 15 minutes depending on the configuration.
 - e. When the utility indicates that the power off has completed, ensure that the enclosure is actually powered off by verifying that one of the two air moving devices (AMDs) in the enclosure has stopped and that the power LED on the enclosure control panel is off.
 - f. If the enclosure does not power off after more than 15 minutes, the system may be hung. If this occurs, contact your service provider for assistance.
15. Were you directed here to power off the enclosure to set the enclosure configuration ID or the machine type-model-serial numbers (MTMS)?
- No:** Go to step 16.
- Yes:** Return to the procedure that sent you here.
16. Does the procedure that sent you here instruct you to remove the ac power from the enclosure?
- No:** Return to the procedure that sent you here.

Yes: Go to step 17.

17. Is this an enclosure with ac power cords connected from this unit's ac module or the battery charger to an SPCN controlled enclosure (for example: a 7311 I/O enclosure)?

No: This enclosure can be serviced without affecting an SPCN controlled enclosure. Return to the procedure that sent you here.

Yes: Servicing this enclosure may affect an SPCN controlled enclosure that is receiving ac power from this enclosure. Go to step 18.

18. You may be able to maintain ac power to the enclosure that is receiving ac power from this enclosure and remove power from this enclosure so that you can service it. Were you directed to this procedure as part of a procedure to exchange the ac module, battery charger, any of the device boards, or the power board?

No: You can maintain ac power to the enclosure that is receiving ac power from this enclosure while you are servicing this enclosure. When the enclosure is powered off, do the following:

- Open the back cover and trace the ac jumper cords from the three power supplies to the ac module or the battery charger.
- Disconnect them at the ac charger. Power is now removed from the components that you will be working with.
- Return to the procedure that sent you here.

Yes: You must search for an alternate ac power source for the enclosure that is receiving ac power from this enclosure. Go to step 19.

19. Can you find an alternate ac power source for the enclosure that is receiving ac power from this enclosure?

No: You must power off the system to service this enclosure. Go to the "Powering on and powering off" topic in your host system's service guide for instruction on powering off the server, then return to the procedure that sent you here.

Yes: Move each of the enclosure's ac power cords one at a time to the alternate ac power source to prevent the enclosure from losing ac power. Return to the procedure that sent you here.

Using the control panel to set the configuration ID:

Use this procedure when setting the configuration ID or to display the frame address of an I/O enclosure from the control panel.

Before performing this procedure, verify that the following prerequisites have been met:

- The server *must* be powered on.
- The enclosure *must* be correctly installed in the system configuration and have ac power.

If you were directed here from a FRU replacement procedure, the FRU that was replaced contained the non-volatile storage where the enclosure's machine type-model-serial number (MTMS) was stored. The non-volatile storage where the enclosure MTMS value is stored in a replacement FRU is uninitialized. The system will detect the uninitialized value and assign an obvious, unique value. For example, TMPx.xxx.xxxxxxx, where x can be any character 0-9 and A-Z. As a result, the location code of the enclosure changes to UTMPx.xxx.xxxxxxx.

To set the configuration ID from the control panel, do the following:

- Power off the enclosure using the new UTMPx.xxx.xxxxxxx location code. For information on powering off the enclosure, see "Start or stop the system or logical partition" on page 300. *Do not* remove the ac power cord from the enclosure.
- Select function **07** on the control panel and press Enter.

Note: Use control panel function 07 to query and set the configuration ID and to display the frame address of an enclosure connected to the SPCN network.

3. Select subfunction A6 to display the address of all attached units. The frame address is displayed on all units for 30 seconds. Make a note of the frame address on the enclosure that you are servicing.

Note: If the enclosure does not immediately appear on the service utility used to power off the enclosure, refresh the utility periodically until it does. If a code update is occurring to the enclosure, which is likely during a FRU replacement procedure that directs you here, it could take an extended period for the enclosure to appear (possibly several hours on a large system).

4. Select sub function A9 to set the ID of a enclosure.
5. Use the arrow keys to increment or decrement to the first two digits of the frame address noted above. Press Enter
6. Use the arrow keys to increment or decrement to the last two digits of the frame address noted above. Press Enter
7. Using the arrow keys again, increment or decrement to a configuration ID for the type of unit you are servicing:
 - 81 for 50/74 and 50/79 enclosures
 - 89 for 50/88 and 05/88 enclosures
 - 8A for 50/94 and 52/94 enclosures
 - 8B for 50/95 and 05/95 enclosures
 - 88 for 11D/10, 11D/11, and 57/90 enclosures
 - 8C for 11D/20 enclosure
8. Press Enter (078x 00 will be displayed).
9. Use the arrow keys to increment or decrement until 07** is shown.
10. Press Enter to return the panel to 07.
11. Disconnect all ac power to the unit, wait for the display panel to go off, and then reconnect the ac power.

Note: The enclosure will automatically power on.

Connect the expansion unit with SPCN cables

This section describes how to connect expansion units to system units with SPCN cables. System units use SPCN cables to control the power to expansion units.

Review the “Examples: RIO SPCN connections” on page 115 and then return here and continue with the instructions.

If you encounter difficulties during the procedure, contact your service provider for assistance.

If you are installing an expansion unit in an existing SPCN loop with the system-unit power on, errors are logged when you disconnect and reconnect cables. You can ignore these error messages.

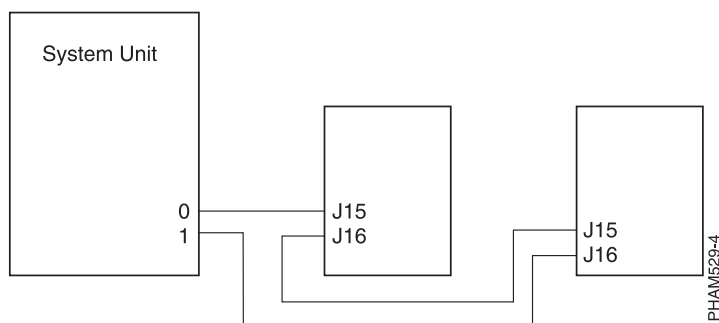
To connect SPCN cables when there is not already an SPCN loop, go to step 1. To connect SPCN cables to the beginning of an existing SPCN loop, go to step 2 on page 115. To connect SPCN cables to the middle of an existing SPCN loop, go to step 3 on page 115.

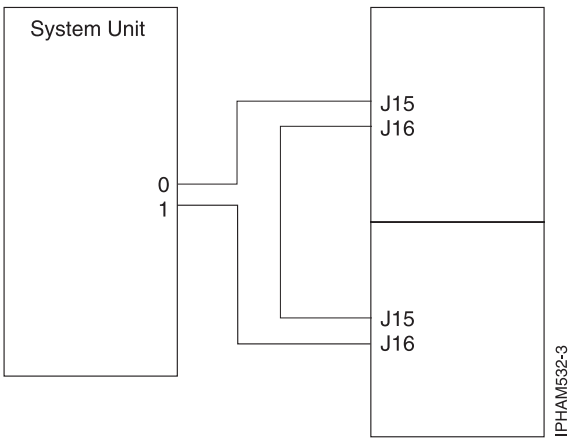
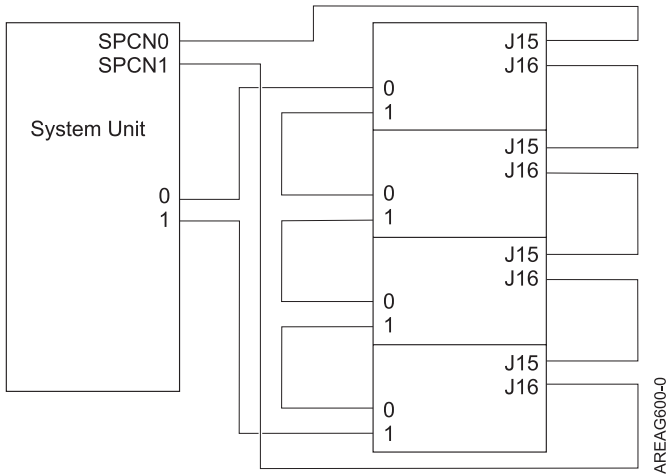
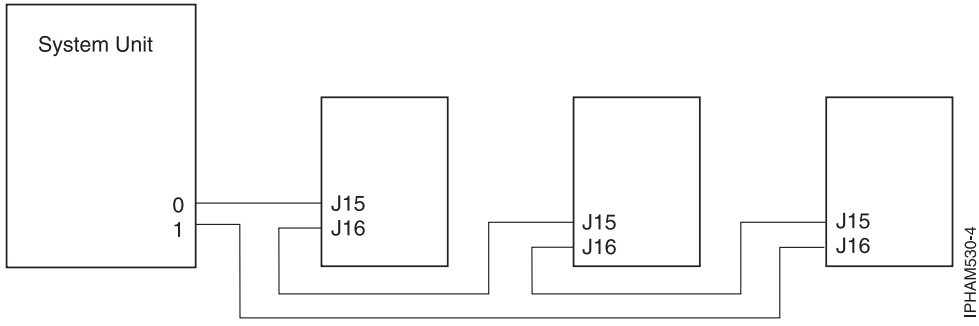
1. To connect SPCN cables when there is not already an SPCN loop, do the following:
 - a. Find the SPCN cables that were included with your expansion units.
 - b. Connect an SPCN cable to connector 0 on your system unit.
 - c. Connect the other end of the SPCN cable to connector J15 on one of the new expansion units.
 - d. Connect another cable to connector J16 on the new expansion unit.
 - e. If there is another expansion unit to add, do the following:

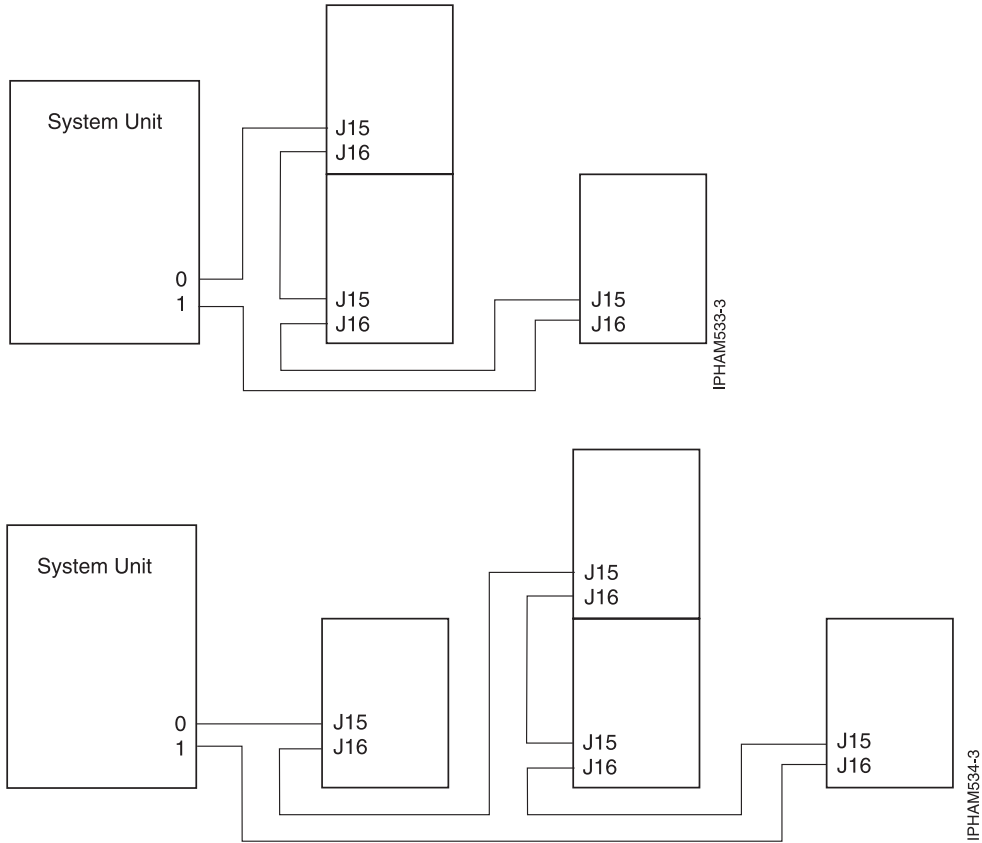
- 1) Connect the other end of the cable from connector J16 on the expansion unit just added to connector J15 on the next expansion unit.
 - 2) Connect another cable to connector J16 on the expansion unit from step 1e1.
 - 3) Repeat step 1e for each additional expansion unit.
- f. Connect the other end of the cable from connector J16 on the last expansion unit added to connector 1 on your system unit.
- g. Return to the procedure which sent you here.
2. To connect SPCN cables to the beginning of an existing SPCN loop, do the following:
- a. Find the SPCN cables that were included with your expansion units.
 - b. Move the SPCN cable from the J15 connector on the first expansion unit (the one connected to connector 0 on the system unit) to the J15 connector on one of the new expansion unit.
 - c. Connect another SPCN cable to connector J16 on the new expansion unit.
 - d. If there is another expansion unit to add, do the following:
 - 1) Connect the other end of the cable from connector J16 on the expansion unit just added to connector J15 on the next expansion unit.
 - 2) Connect another cable to connector J16 on the expansion unit from step 2d1.
 - 3) Repeat step 2d for each additional expansion unit.
 - e. Connect the other end of the cable from connector J16 on the last expansion unit added to connector J15 on the expansion unit that was disconnected in step 2b.
 - f. Return to the procedure which sent you here.
3. To connect SPCN cables to the middle of an existing SPCN loop, do the following:
- a. Find the SPCN cables that were included with your expansion units.
 - b. Move the SPCN cable from the J15 connector on the expansion unit to follow the expansion units which are being added to the J15 connector on the new expansion unit.
 - c. Connect another SPCN cable to connector J16 on one of the new expansion units.
 - d. If there is another expansion unit to add, do the following:
 - 1) Connect the other end of the cable from connector J16 on the expansion unit just added to connector J15 on the next expansion unit.
 - 2) Connect another cable to connector J16 on the expansion unit from step 3d1.
 - 3) Repeat step 3d for each additional expansion unit.
 - e. Connect the other end of the cable from connector J16 on the last expansion unit added to connector J15 on the expansion unit that was disconnected in step 3b.
 - f. Return to the procedure which sent you here.

Examples: RIO SPCN connections

See examples that show possible RIO SPCN connections.







Connector locations

Learn about RIO and SPCN connector locations.

Model connector locations

Learn about connector locations.

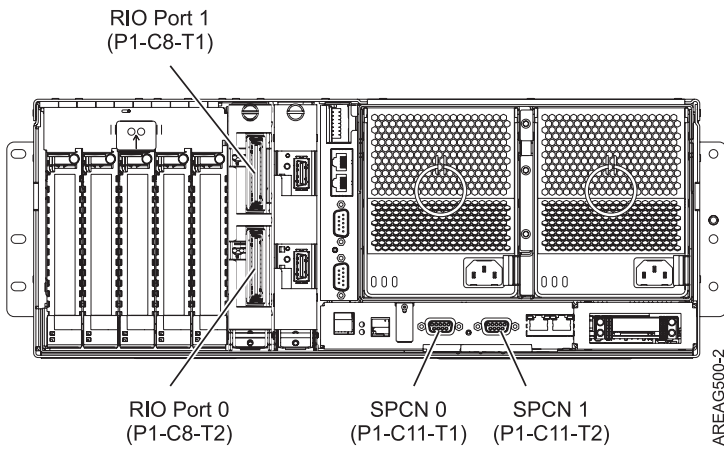


Figure 90. Model connector locations

Model 57/9011D/11 or 11D/10 connector locations

Learn about connector locations.

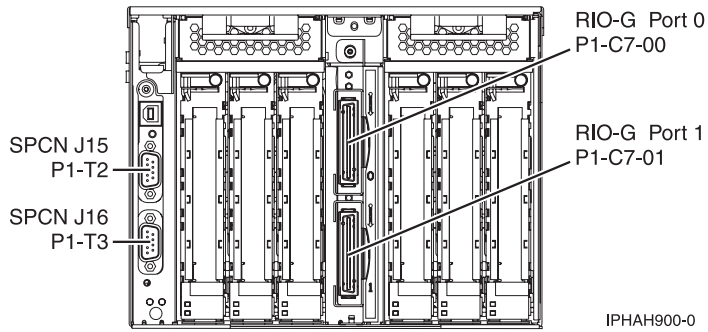


Figure 91. Model 57/9011D/11 or 11D/10 connector locations

Model 05/9511D/20 connector locations

Learn about connector locations.

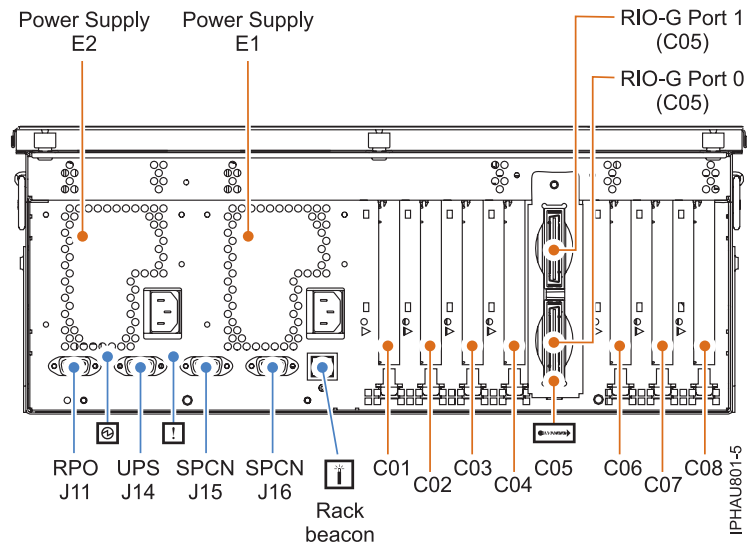


Figure 92. Model 05/9511D/20 connector locations

Model 14G/30 connector locations

Learn about connector locations.

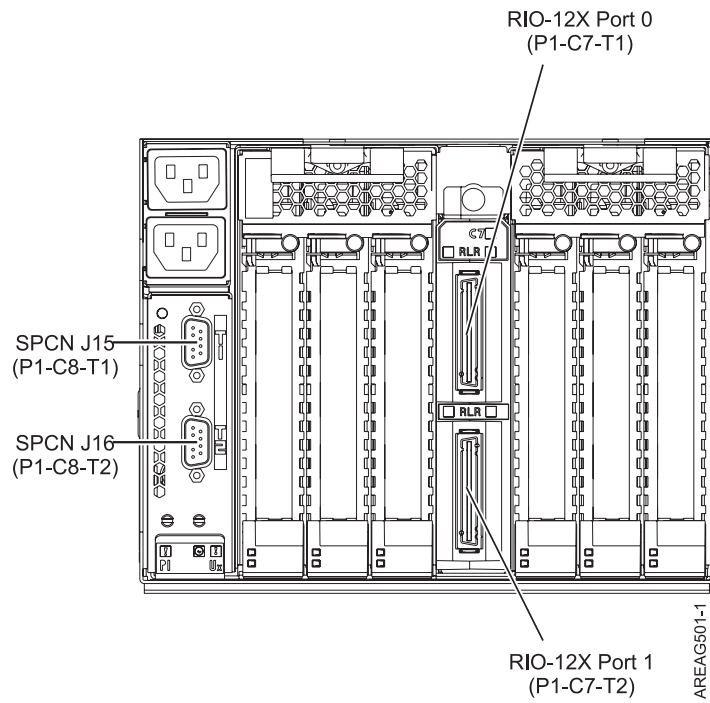


Figure 93. Model 14G/30 connector locations

Chapter 4. PCI adapter

You might need to place, install or remove Peripheral Component Interconnect (PCI), PCI-E, or PCI-X features. Use the procedures in this section to perform these tasks.

Important:

- If you are exchanging a 2766, 2787, or 280E Fibre Channel IOA, the external storage subsystem must be updated to use the world-wide port name of the new 2766, 2787, or 280E IOA. For instructions, see `rrcardsupdateport.dita`.
- If you are replacing a 2748, 2757, 2763, 2767, 2778, 2780, 2782, 5702, 5709, or 570B storage IOA, take note of the following: Depending on the configuration of the system, the storage IOA cache might have been disabled to allow the attachment of OEM storage that emulates a load source drive. If you are replacing a storage IOA that has its cache disabled, configure the replacement IOA the same way as the IOA that you removed. If you remove hardware from the replacement IOA, return that hardware with the failed IOA.

Model , and attached expansion units, PCI adapters and cassettes

You might need to remove, replace, or install PCI adapter cassettes. Use the procedures in this section to perform these tasks.

If you are installing a PCI adapter in an expansion unit that does not use cassettes, see the expansion-unit procedures for the “Attached expansion-unit PCI adapters” on page 145. Those same procedures can be used for an expansion unit attached to a .

Important:

- If you are exchanging a 2766, 2787, or 280E Fibre Channel IOA, the external storage subsystem must be updated to use the world-wide port name of the new 2766, 2787, or 280E IOA. For instructions, see `rrcardsupdateport.dita`.
- If you are replacing a 2748, 2757, 2763, 2767, 2778, 2780, 2782, 5702, 5709, or 570B storage IOA, take note of the following: Depending on the configuration of the system, the storage IOA cache might have been disabled to allow the attachment of OEM storage that emulates a load source drive. If you are replacing a storage IOA that has its cache disabled, configure the replacement IOA the same way as the IOA that you removed. If you remove hardware from the replacement IOA, return that hardware with the failed IOA.

Install a PCI adapter contained in a cassette

You might need to install a PCI adapter. Use the procedure in this section to perform this task.

Install a PCI adapter contained in a cassette with the power on in AIX

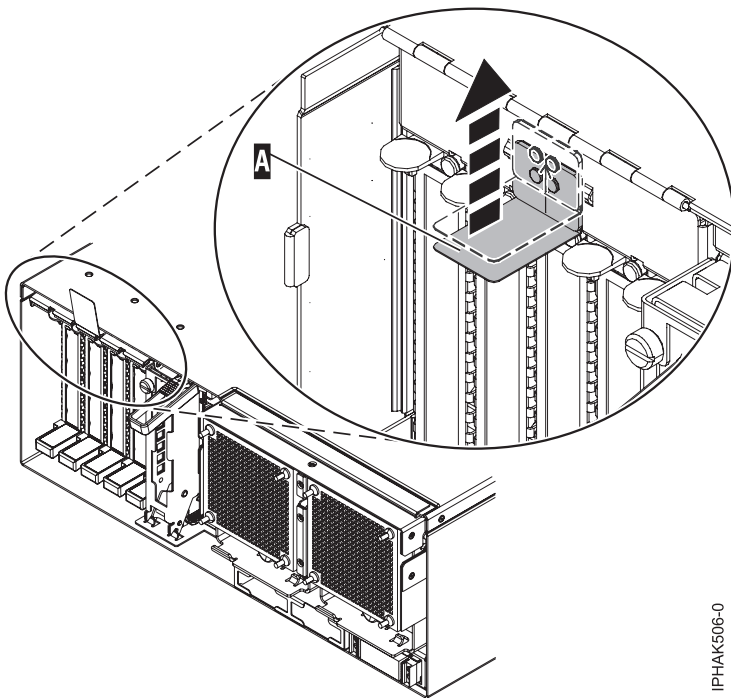
You might need to install a PCI adapter. Use the procedure in this section to perform this task.

Note: If the system is partitioned, see Logical Partitioning Guide (SA76-0098) ([https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf](https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf)) before installing a new PCI adapter and then return here to continue the procedure.

To install an adapter with the system power on in AIX, do the following:

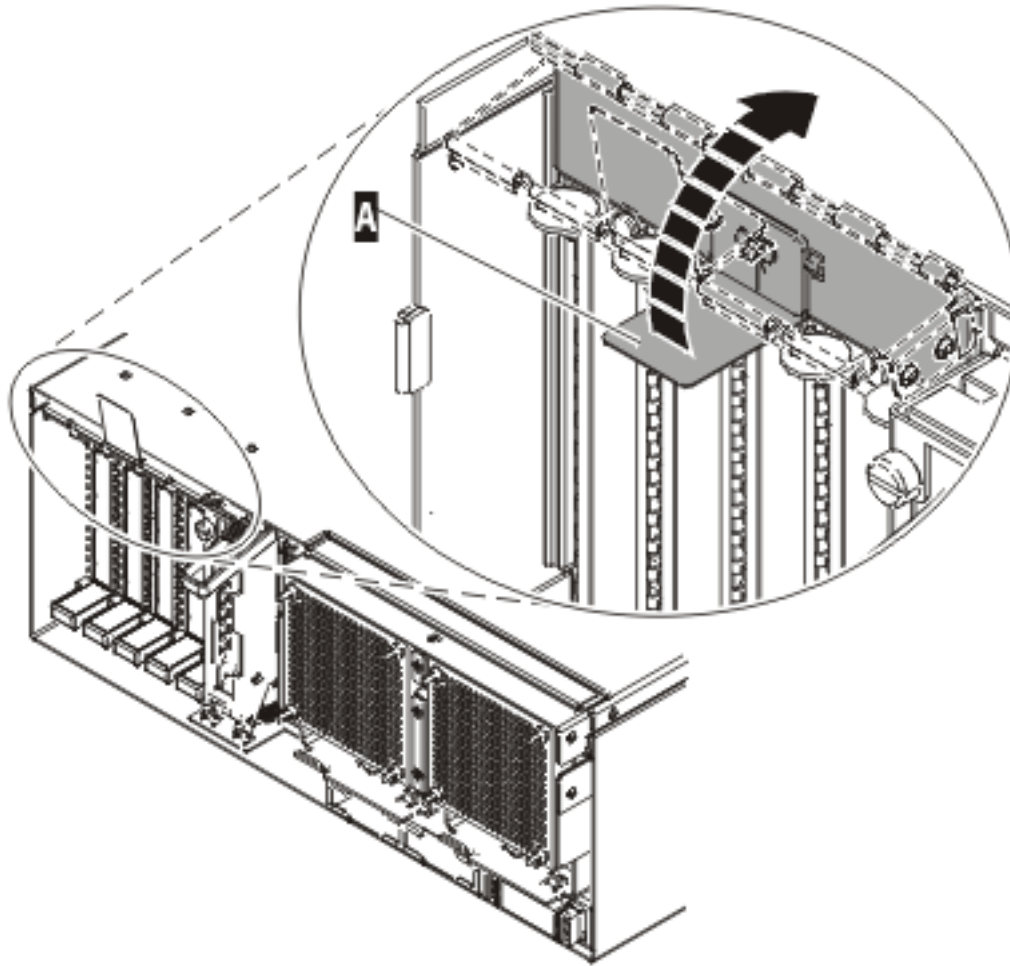
1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.

3. To determine in which slot to place the PCI adapter, refer to arebdhowtodecide.dita for information regarding slot restrictions for the adapters that can be used in this system.
4. If you are installing a PCI adapter in a rack-mounted system or expansion unit, follow these steps:
 - a. Open the rear rack door.
 - b. Remove the units cover or covers if applicable.
5. Refer to “PCI hot-plug manager access for AIX” on page 191, and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
6. From the PCI Hot-Plug Manager menu, select **Add a PCI Hot-Plug Adapter** and press Enter. The Add a Hot-Plug Adapter window displays.
7. Select the appropriate PCI slot from the ones listed on the screen, and press Enter.
8. Locate the PCI adapter slot and cassette you want to use.
9. If the cassette you want to use does not contain a PCI adapter, continue to the next step. If the cassette you want to use does contain an active PCI adapter, see “Remove a PCI adapter contained in a cassette from the system with the power on in AIX” on page 136.
10. Lift up the PCI adapter EMC shield **A** as shown in Figure 94 and then rotate it up and away from the cassette as shown in Figure 95 on page 123.



IPHAK506-0

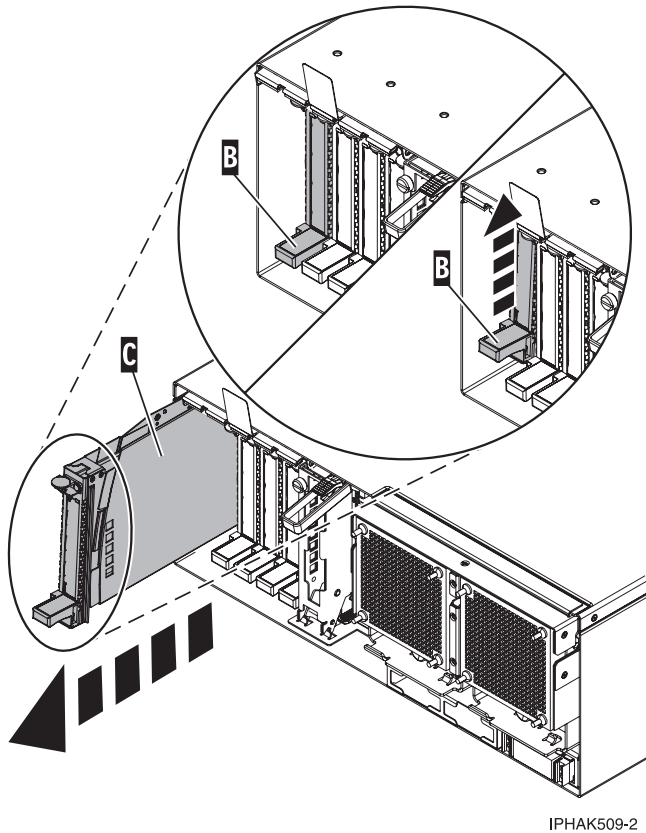
Figure 94. Lift up the EMC shield



IPHAK907-0

Figure 95. Rotate the EMC shield into the open position

11. Lift up the lower cassette handle **B** as shown in the following figure. Pull the PCI cassette **C** out of the system.



IPHAK509-2

Figure 96. PCI adapter cassette removed from the system unit.

12. Install the adapter into the PCI adapter cassette using the following instructions:
 - “Place a PCI adapter in a single-width cassette” on page 171
 - “Remove an adapter from the PCI adapter single-width cassette” on page 177
13. Ensure the lower cassette handle is pressed up toward the retainer clip. This places the adapter in the correct position to be docked in the system.
14. Lift and hold the PCI adapter EMC shield in the open position. See Figure 94 on page 122 and Figure 95 on page 123.
15. Follow the instructions on the screen to install the adapter until the LED for the specified PCI slot is set to the Action state. See “Component LEDs” on page 192.
16. Slide the cassette **C** into the cassette slot as shown in the following figure.
17. When the cassette is fully inserted into the system, firmly press downward on the lower cassette handle **B** to lock the adapter in its connector.

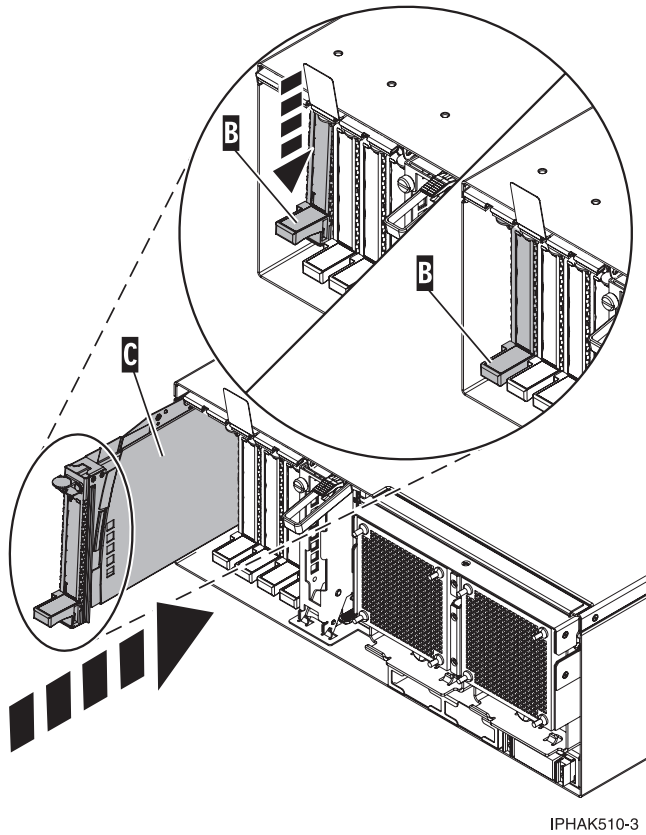
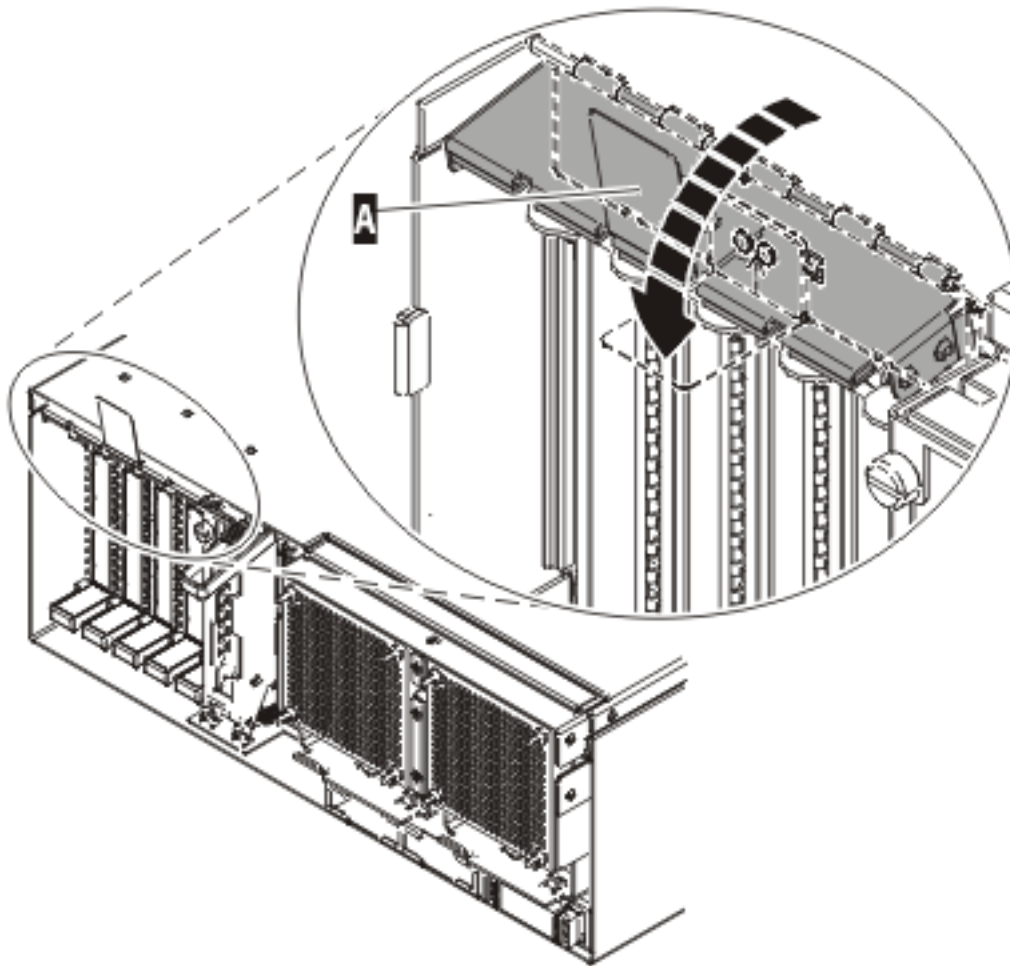


Figure 97. PCI adapter cassette removed from the system unit

18. Lower the PCI adapter EMC shield **A** into the closed position, close the shield latch, then close the rear rack door.



IPHAK508-0

Figure 98. PCI adapter EMC shield in the closed position

19. Verify that the new resource is functional. Refer to “Verify the installed part” on page 319.

Install a PCI adapter contained in a cassette with the power on in Linux

You might need to install a PCI adapter. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for installing a PCI adapter. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

Note: If the system is partitioned, see Logical Partitioning Guide (SA76-0098) ([https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf](https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf)) before installing a new PCI adapter and then return here to continue the procedure.

To install an adapter with the system power on in Linux, do the following:

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
3. To determine in which slot to place the PCI adapter, refer to arebdhowtodecide.dita for information regarding slot restrictions for the adapters that can be used in this system.

4. If you are installing a PCI adapter in a rack-mounted system or expansion unit, follow these steps:
 - a. Open the rear rack door.
 - b. Remove the units cover or covers if applicable.
5. Log in to the system console as the root user.
6. Use the lsslot tool to list the hot-plug PCI slots that are available in the server or partition:

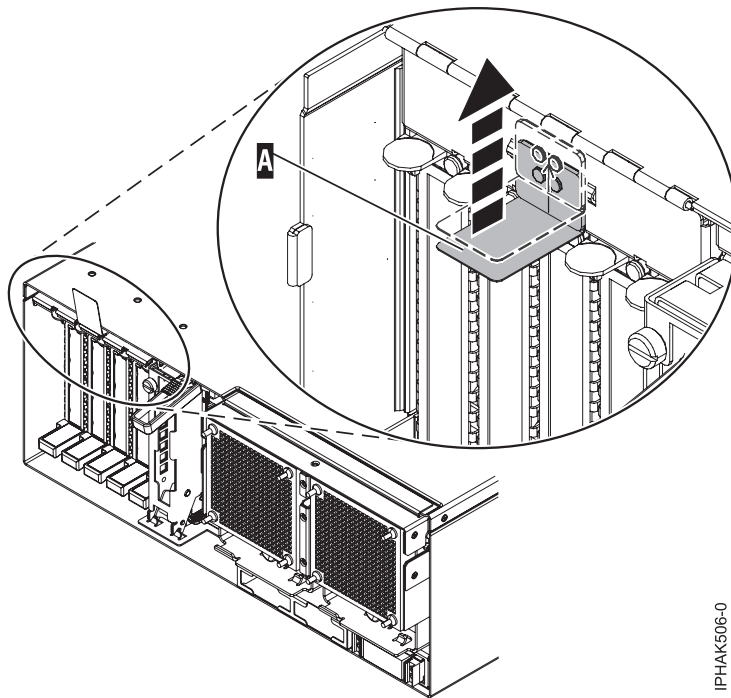
```
lsslot -c pci -a
```

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

# Slot	Description	Device(s)
U7879.001.DQD014E-P1-C1	PCI-X capable, 64 bit, 133MHz slot	Empty
U7879.001.DQD014E-P1-C4	PCI-X capable, 64 bit, 133MHz slot	Empty
U7879.001.DQD014E-P1-C5	PCI-X capable, 64 bit, 133MHz slot	Empty

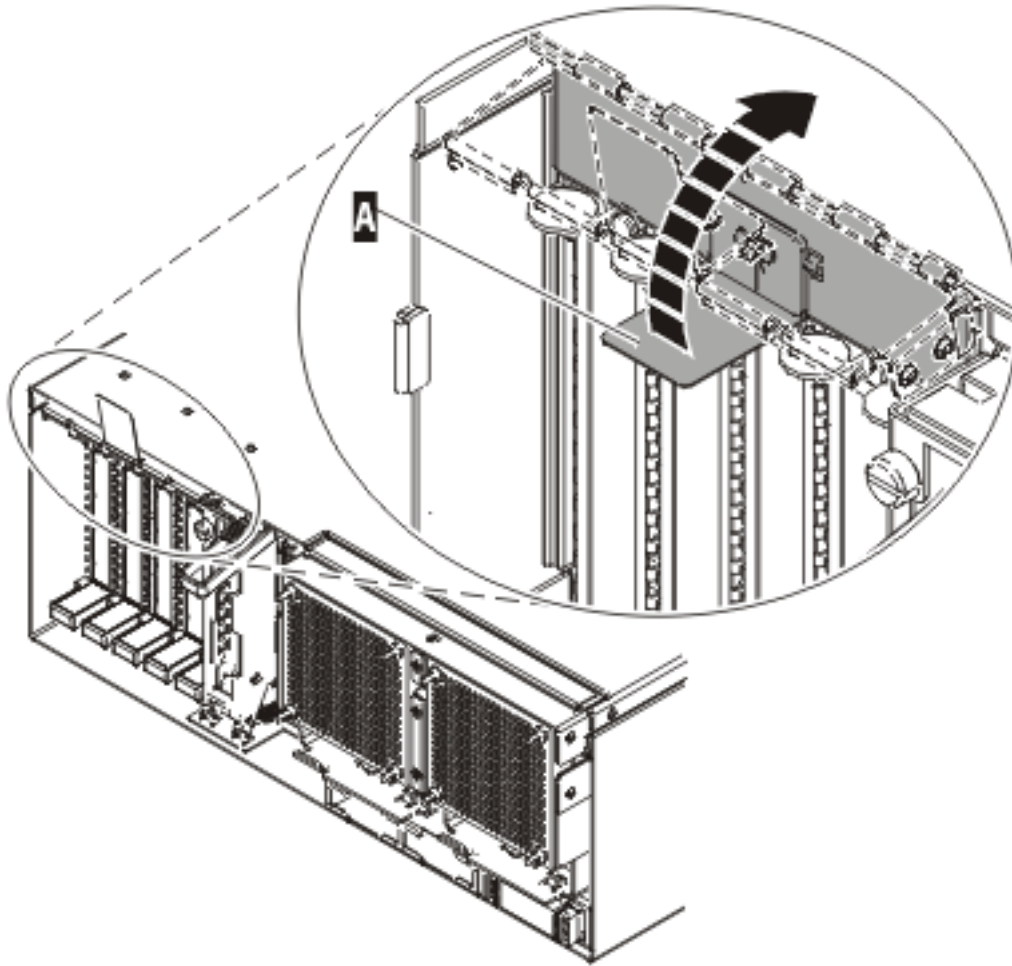
Select the appropriate empty PCI slot from the ones listed by the command.

7. Lift up the PCI adapter EMC shield **A** as shown in Figure 99 and then rotate it up and away from the cassette as shown in Figure 100 on page 128.



IPHAK506-0

Figure 99. Lift up the EMC shield



IPHAK907-0

Figure 100. Rotate the EMC shield into the open position

8. Remove the cassette. Lift up the lower cassette handle **B** as shown in the following figure. Pull the PCI cassette **C** out of the system.

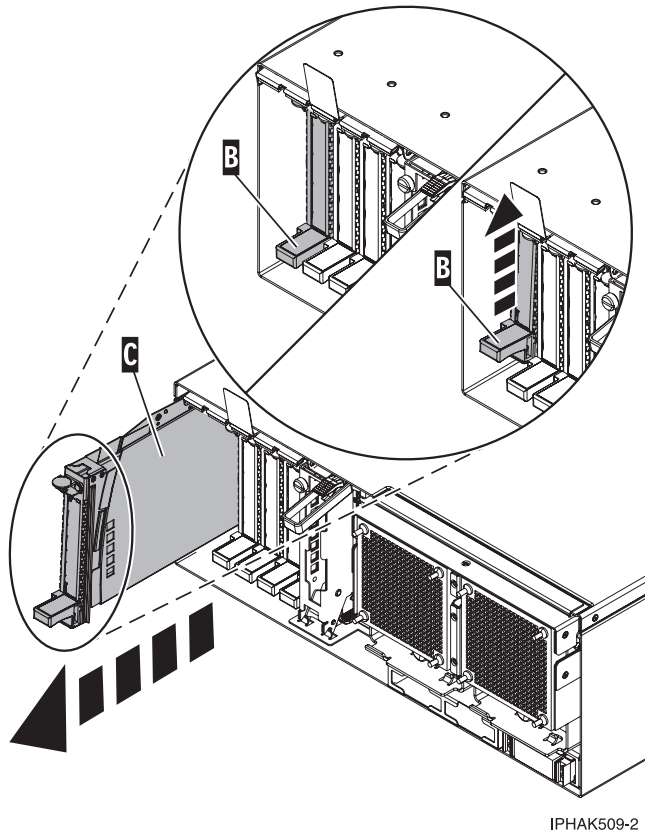


Figure 101. PCI adapter cassette removed from the system unit

9. Install the adapter into the PCI adapter cassette using the following instructions:
 - “Place a PCI adapter in a single-width cassette” on page 171
 - “Remove an adapter from the PCI adapter single-width cassette” on page 177
10. Ensure the lower cassette handle is pressed up toward the retainer clip. This places the adapter in the correct position to be locked in the system.
11. Run the `drslot_chrp_pci` command to enable an adapter to be installed.
For example, to install an adapter in slot U7879.001.DQD014E-P1-C3, run:
`drslot_chrp_pci -a -s U7879.001.DQD014E-P1-C3`

The following displays:

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

12. Press Enter.
The following displays:
The visual indicator for the specified PCI slot has been set to the action state. Insert the PCI card into the identified slot, connect any devices to be configured and press Enter to continue. Enter x to exit.
13. Lift and hold the PCI adapter EMC shield in the open position. See Figure 99 on page 127 and Figure 100 on page 128.
14. Slide the cassette **C** into the cassette slot as shown in the following figure.
15. When the cassette is fully inserted into the system, firmly press downward on the lower cassette handle **B** to lock the adapter in its connector.

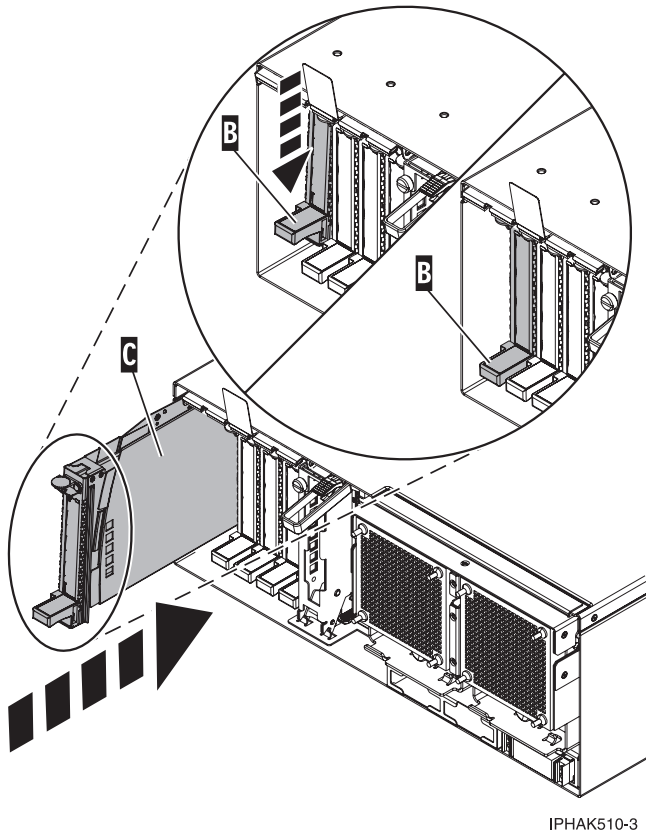
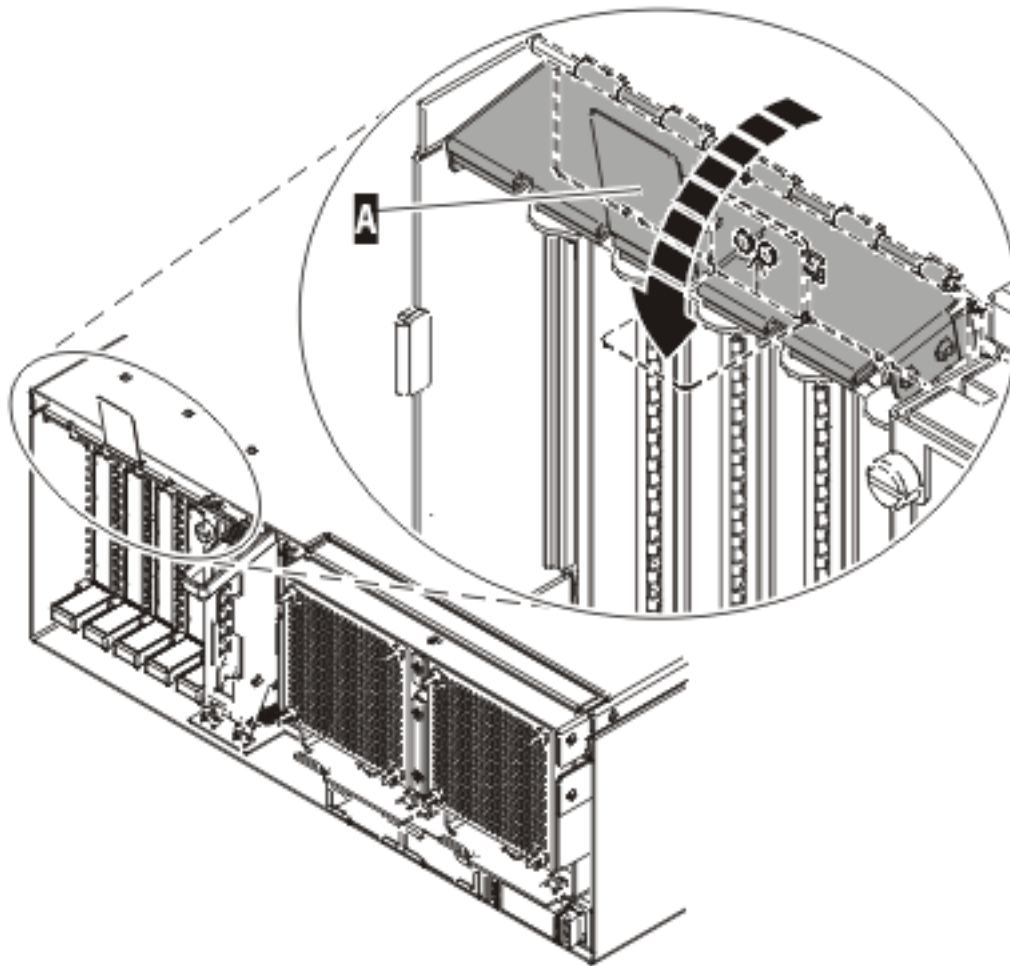


Figure 102. PCI adapter cassette removed from the system unit

16. Lower the PCI adapter EMC shield **A** into the closed position, close the shield latch, then close the rear rack door.



IPHAK508-0

Figure 103. PCI adapter EMC shield in the closed position

17. Use the `lsslot` command to verify that U7879.001.DQD014E-P1-C3 is occupied.

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

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

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

Install a PCI adapter contained in a cassette with the power off

You might need to install a PCI adapter. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for installing a PCI adapter. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

Note: If the system is partitioned, see Logical Partitioning Guide (SA76-0098) ([https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf](https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf)) before installing a new PCI adapter and then return here to continue the procedure.

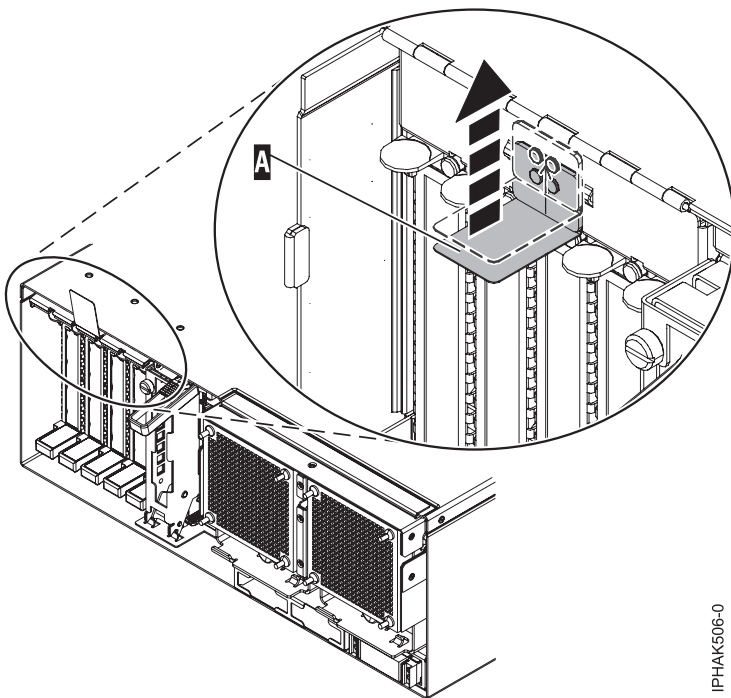
To install an adapter with the system power off, do the following:

1. Perform prerequisite tasks as described in “Before you begin” on page 291.

2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
3. To determine in which slot to place the PCI adapter, refer to arebdhowtodecide.dita for information regarding slot restrictions for the adapters that can be used in this system.
4. “Stop the system or logical partition” on page 303.
5. Disconnect the power source from the system by unplugging the system.

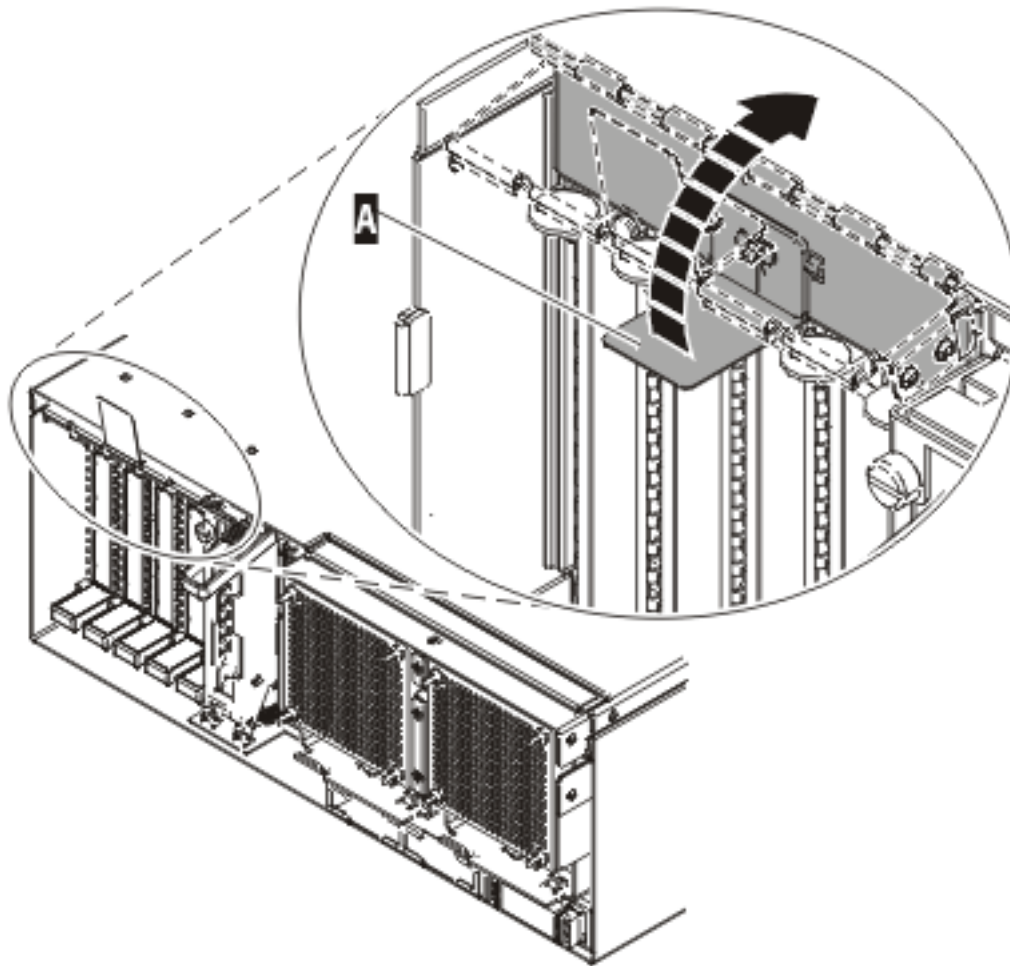
Note: This system might be equipped with a second power supply. Before continuing with this procedure, ensure that the power source to the system has been completely disconnected.

6. If you are installing a PCI adapter in a rack-mounted system or expansion unit, follow these steps:
 - a. Open the rear rack door.
 - b. Remove the units cover or covers if applicable.
7. If you are installing a PCI adapter in a stand-alone expansion unit, remove the unit’s back cover, if applicable.
8. Determine the location of PCI adapter in the system.
9. Lift up the PCI adapter EMC shield **A** as shown in Figure 104 and then rotate it up and away from the cassette as shown in Figure 105 on page 133.



IPHAK506-0

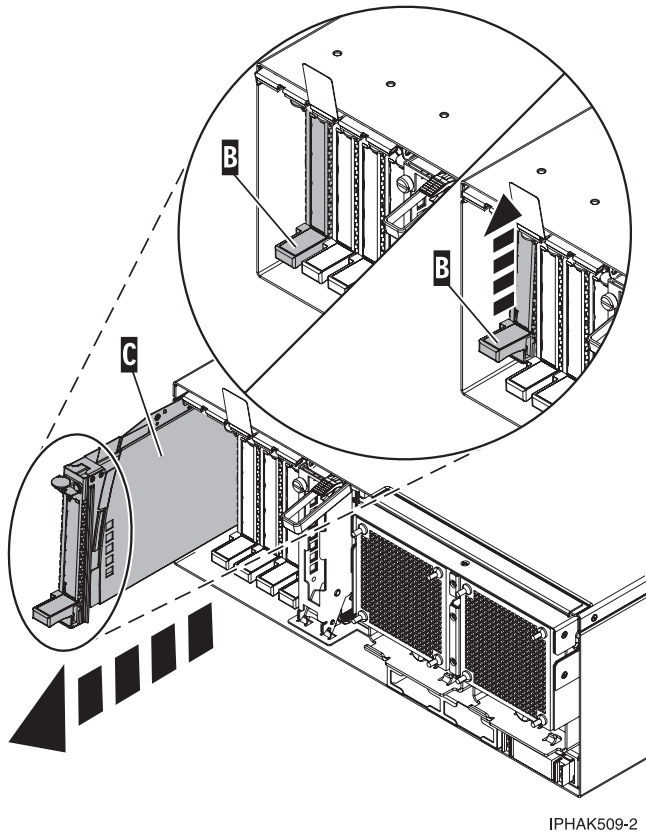
Figure 104. Lift up the EMC shield



IPHAK907-0

Figure 105. Rotate the EMC shield into the open position

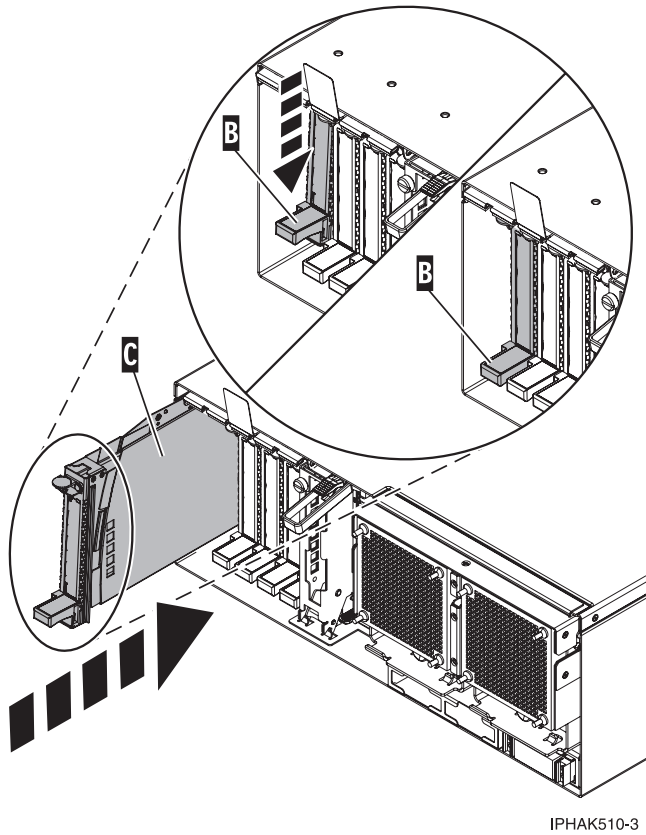
10. Lift up the lower cassette handle **B** as shown in the following figure. Pull the PCI cassette **C** out of the system.



IPHAK509-2

Figure 106. PCI adapter cassette removed from the system unit

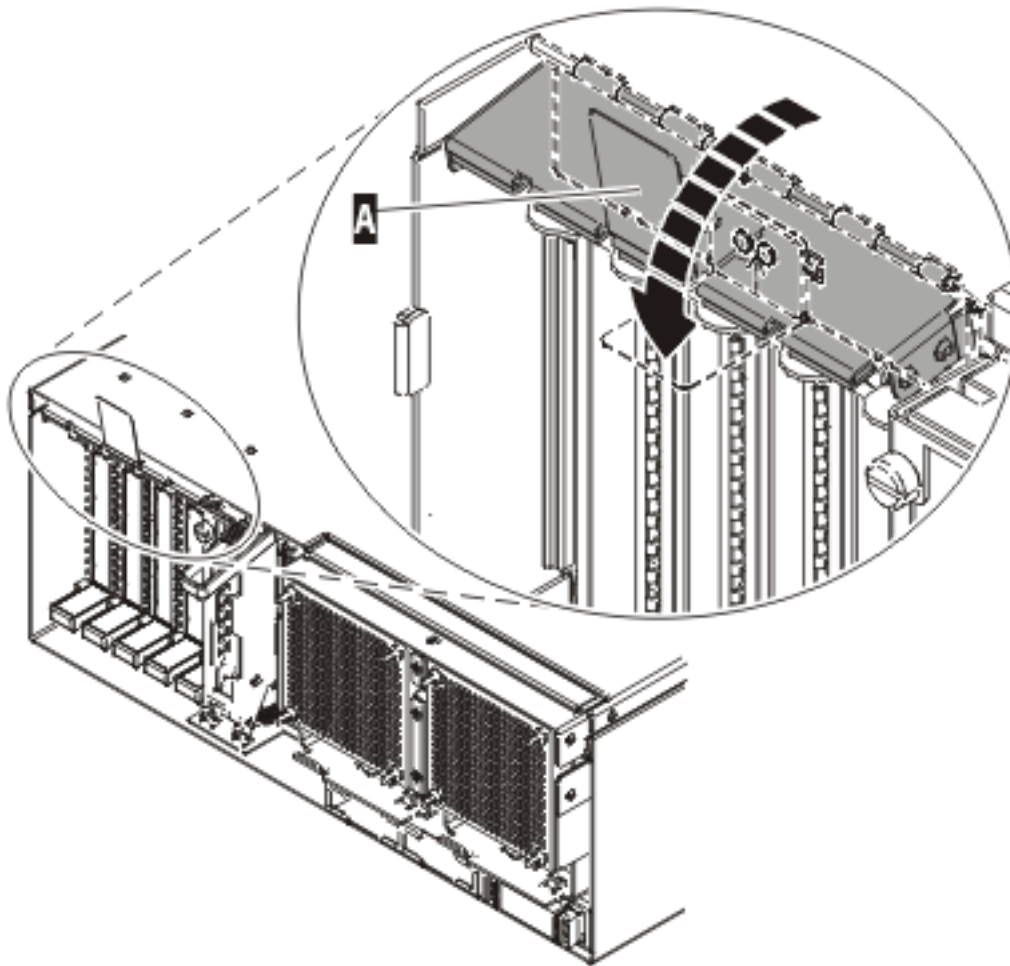
11. Install the adapter into the PCI adapter cassette using the following instructions:
 - “Place a PCI adapter in a single-width cassette” on page 171
 - “Remove an adapter from the PCI adapter single-width cassette” on page 177
12. Ensure the lower cassette handle is pressed up toward the retainer clip. This places the adapter in the correct position to be locked in the system.
13. Lift and hold the PCI adapter EMC shield in the open position. See Figure 104 on page 132 and Figure 105 on page 133.
14. Slide the cassette **C** into the cassette slot as shown in the following figure.
15. When the cassette is fully inserted into the system, firmly press downward on the lower cassette handle **B** to lock the adapter in its connector.



IPHAK510-3

Figure 107. PCI adapter cassette removed from the system unit

16. Lower the PCI adapter EMC shield **A** into the closed position, close the shield latch, then close the rear rack door.



IPHAK508-0

Figure 108. PCI adapter EMC shield in the closed position

17. "Start the system or logical partition" on page 300.
18. Verify that the new resource is functional. Refer to "Verify the installed part" on page 319.

Remove a PCI adapter contained in a cassette from the system

You might need to remove a PCI adapter. Use the procedure in this section to perform this task.

Remove a PCI adapter contained in a cassette from the system with the power on in AIX

You might need to remove a PCI adapter. Use the procedure in this section to perform this task.

Read the following notes to determine if this is the correct procedure for the task to be performed.

Note:

1. Use this procedure to remove a PCI adapter and leave the slot in the system unit empty.
2. If the adapter that is removed will be placed into a different slot or system, complete this removal procedure, then install the adapter as described in "Install a PCI adapter contained in a cassette with the power on in AIX" on page 121.
3. Procedures performed on a PCI adapter with the system power on in AIX, also known as hot-plug procedures, require the system administrator to take the PCI adapter offline prior to performing the

operation. Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

To remove an adapter, do the following:

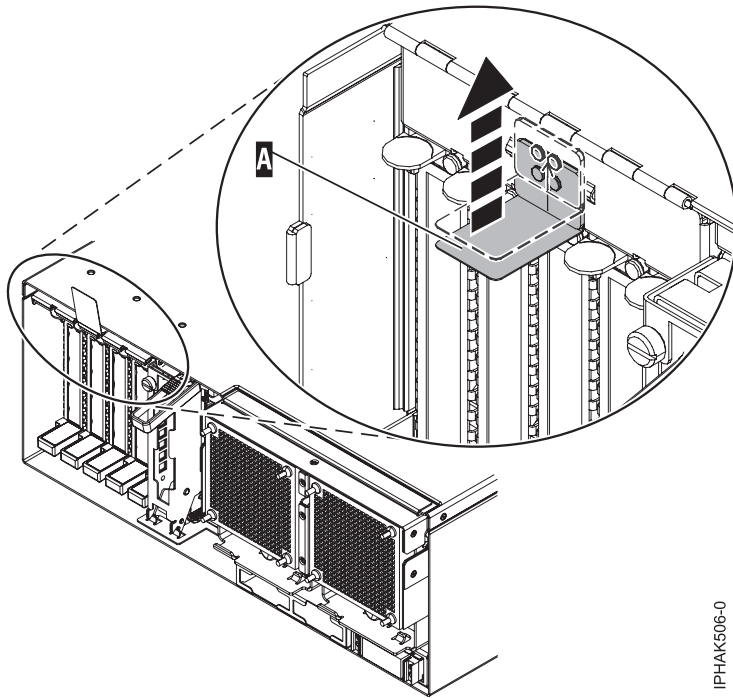
1. Perform the prerequisite tasks as described in “Before you begin” on page 291.
2. If you are removing a PCI adapter in a rack-mounted system or expansion unit, follow these steps:
 - a. Open the rear rack door.
 - b. Remove the units cover or covers if applicable.
3. If you are removing a PCI adapter in a stand-alone expansion unit, remove the unit’s back cover, if applicable.
4. Determine the location of PCI adapter in the system.
5. Record the slot number and location of each adapter being removed.

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

6. Ensure that any processes or applications that might use the adapter are stopped.
7. Enter the system diagnostics by logging in as root user or as the celogin user, type **diag** at AIX command line.
8. When the DIAGNOSTIC OPERATING INSTRUCTIONS menu displays, press Enter.
9. At the FUNCTION SELECTION menu, select **Task Selection**, then press enter.
10. At the Task Selection list, select **PCI Hot Plug Manager**.
11. Select **Unconfigure a Device**, then press Enter.
12. Press F4 (or Esc +4) to display the **Device Names** menu.
13. Select the adapter you are removing in the **Device Names** menu.
14. Use the Tab key to answer N0 to **Keep Definition**. Use the Tab key again to answer YES to **Unconfigure Child Devices**, then press Enter.
15. The **ARE YOU SURE** screen displays. Press Enter to verify the information. Successful unconfiguration is indicated by the OK message displayed next to the Command field at the top of the screen.
16. Press F4 (or Esc +4) twice to return to the **Hot Plug Manager** menu.
17. Select **replace/remove PCI Hot Plug adapter**.
18. Select the slot that has the device to be removed from the system.
19. Select **remove**.

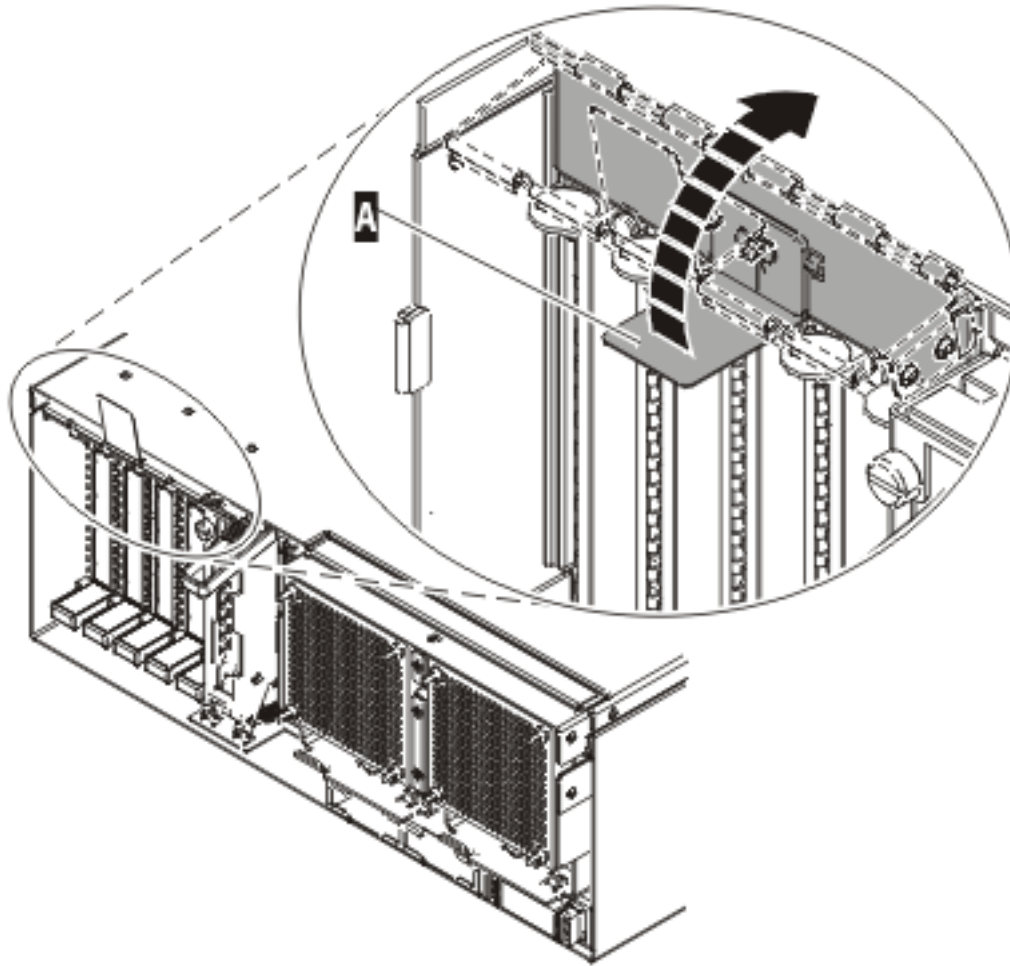
Note: A fast-blinking amber LED located at the back of the machine near the adapter indicates that the slot has been identified.

20. Press Enter. This places the adapter in the action state, meaning it is ready to be removed from the system.
21. Label, and then disconnect all cables attached to the adapter you plan to remove.
22. Before handling any PCI adapter, see “Handling static-sensitive devices” on page 191.
23. Lift up the PCI adapter EMC shield **A** as shown in Figure 109 on page 138 and then rotate it up and away from the cassette as shown in Figure 110 on page 139.



IPHAK506-0

Figure 109. Lift up the EMC shield

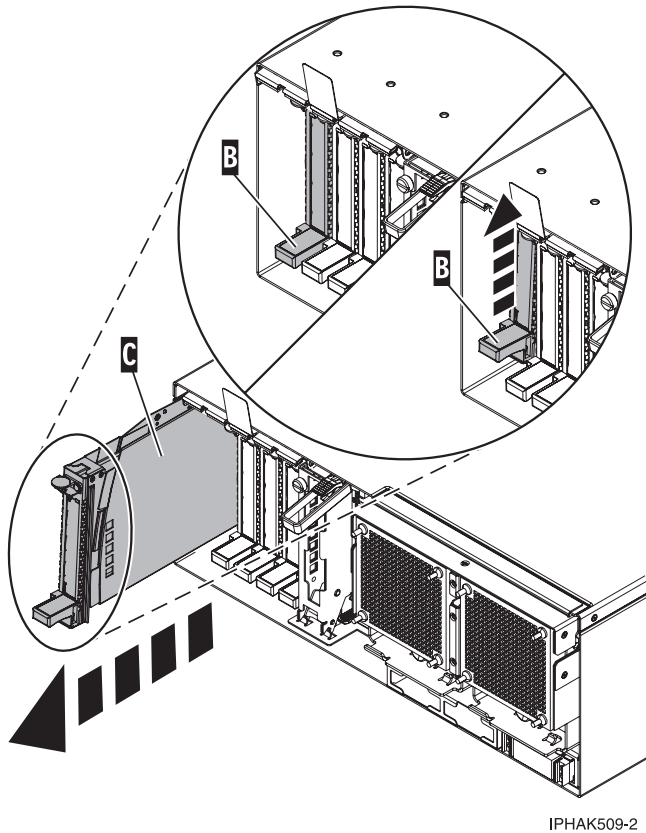


IPHAK907-0

Figure 110. Rotate the EMC shield into the open position

24. Remove the cassette. Lift up the lower cassette handle **B** as shown in the following figure. Pull the PCI cassette **C** out of the system.

Attention: A cassette containing either a PCI adapter or filler panel must be placed in the PCI adapter slot of the system unit for proper air flow and cooling.



IPHAK509-2

Figure 111. PCI adapter cassette removed from the system unit

25. Place the cassette with the cover facing up on an approved ESD surface.

Note: The cover will have a label on it.

26. Continue to follow the screen instructions until you receive a message that the adapter removal is successful. Successful removal is indicated by the OK message displayed next to the Command field at the top of the screen.
27. If you have other adapters to remove, press the F3 key to return to the PCI Hot-Plug Manager menu and then return to step 21 on page 137.

OR

If you do not have other adapters to remove, continue with the next step.

28. Press F10 to exit the Hot-Plug Manager.
29. Run the **diag -a** command. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.
30. Place an empty cassette into the unused PCI slot for proper air flow. The procedure is complete.
 - To remove the adapter from the PCI adapter cassette, see “Remove an adapter from the PCI adapter single-width cassette” on page 177.
 - To install an adapter in the system, see “Install a PCI adapter contained in a cassette with the power on in AIX” on page 121.

Remove a PCI adapter contained in a cassette from the system with the power on in Linux

You might need to remove a PCI adapter. Use the procedure in this section to perform this task.

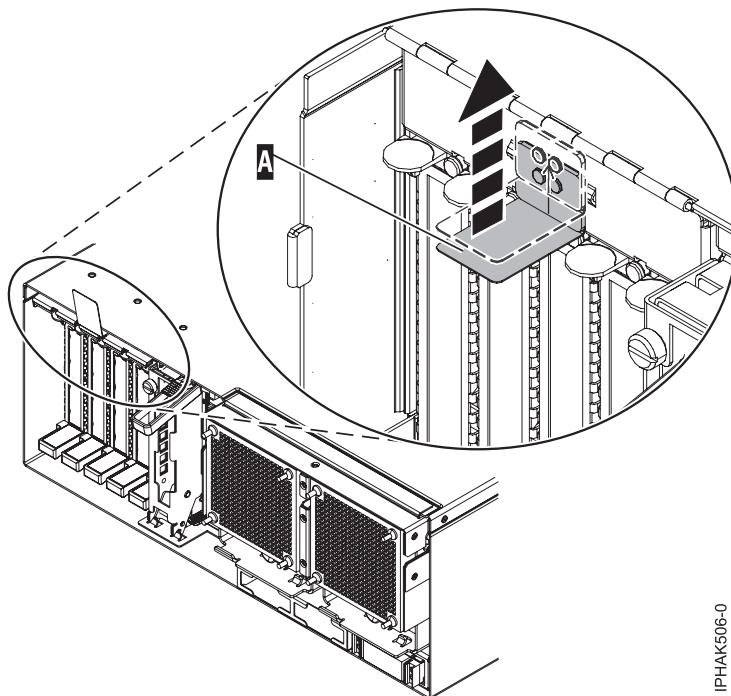
If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a PCI adapter. For instructions, see “Remove a part using the Hardware Management Console” on page 318.

To remove an adapter do the following:

1. Ensure that the system meets the “Prerequisites for hot-plugging PCI adapters in Linux” on page 192.
2. “Verify that the Linux, hot-plug PCI tools are installed” on page 192.
3. Perform the prerequisite tasks as described in “Before you begin” on page 291.
4. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
5. If you are removing a PCI adapter in a rack-mounted system or expansion unit, follow these steps:
 - a. Open the rear rack door.
 - b. Remove the units cover or covers if applicable.
6. If you are removing a PCI adapter in a stand-alone expansion unit, remove the unit’s back cover, if applicable.
7. Determine the location of PCI adapter in the system.
8. Label, and then disconnect all cables attached to the adapter you plan to remove.
9. Run the `drslot_chrp_pci` command to enable an adapter to be removed:
For example, to remove the PCI adapter in slot U7879.001.DQD014E-P1-C3 run this command:

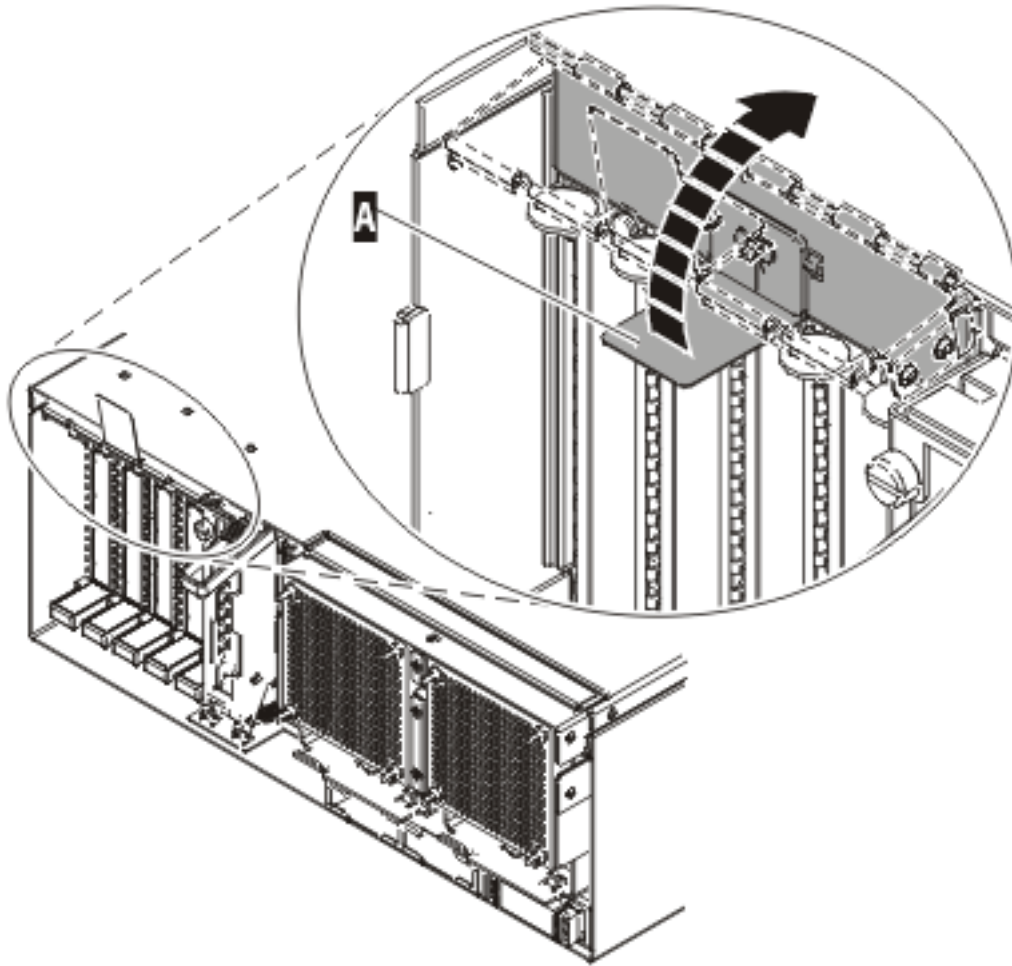
```
drslot_chrp_pci -r -s U7879.001.DQD014E-P1-C3
```


Follow the instructions on the display to complete the task.
10. Lift up the PCI adapter EMC shield **A** as shown in Figure 112 and then rotate it up and away from the cassette as shown in Figure 113 on page 142.



IPHAK506-0

Figure 112. Lift up the EMC shield

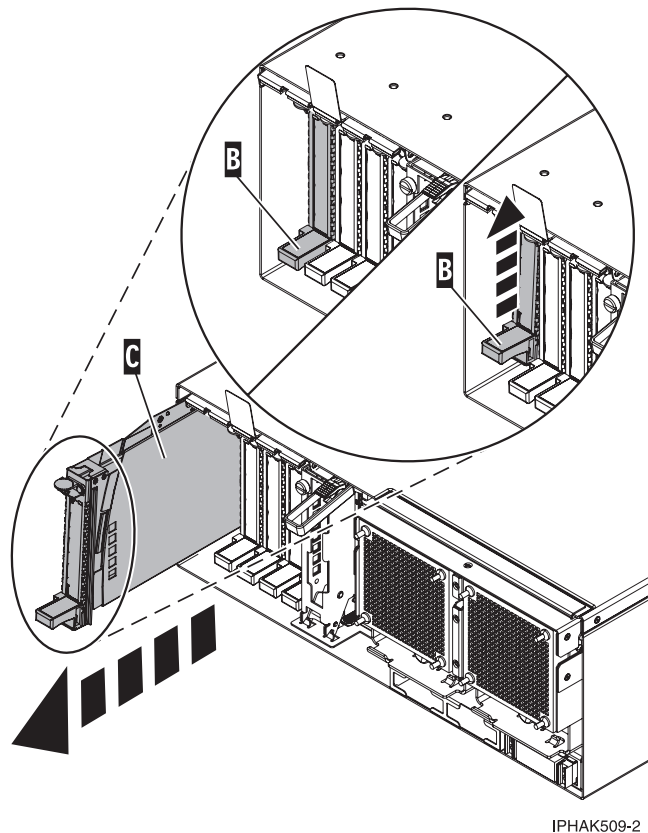


IPHAKR07-0

Figure 113. Rotate the EMC shield into the open position

11. Lift up the lower cassette handle **B** as shown in the following figure. Pull the PCI cassette **C** out of the system.

Attention: A cassette containing either a PCI adapter or filler panel must be placed in the PCI adapter slot of the system unit for proper air flow and cooling.



IPHAK509-2

Figure 114. PCI adapter cassette removed from the system unit

12. Place the cassette with the cover facing up on an approved ESD surface.

Note: The cover will have a label on it.

13. “Remove an adapter from the PCI adapter single-width cassette” on page 177.

Remove a PCI adapter contained in a cassette from the system with the system power off

You might need to remove a PCI adapter. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a PCI adapter. For instructions, see “Remove a part using the Hardware Management Console” on page 318.

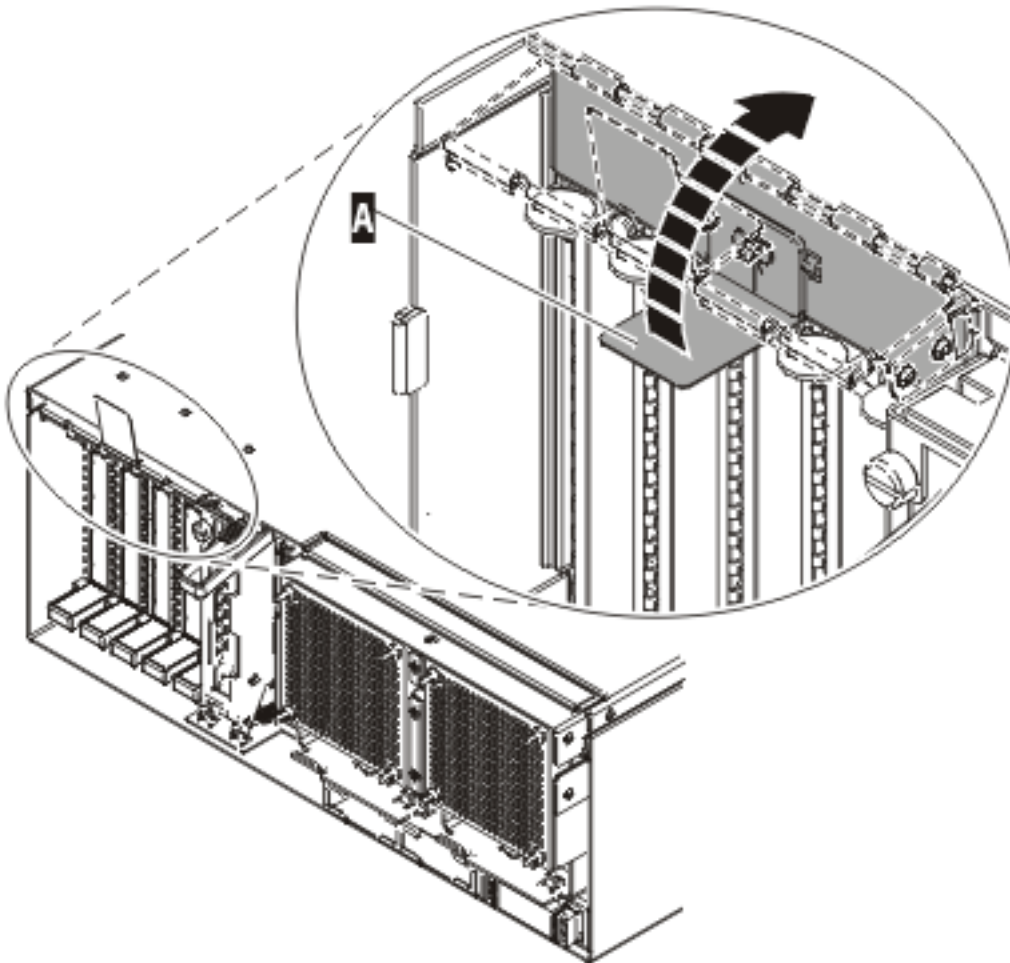
To remove an adapter, do the following:

1. Perform the prerequisite tasks as described in “Before you begin” on page 291.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
3. “Stop the system or logical partition” on page 303.
4. Disconnect the power source from the system by unplugging the system.

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

5. If you are removing a PCI adapter in a rack-mounted system or expansion unit, follow these steps:
 - a. Open the rear rack door.

- b. Remove the units cover or covers if applicable.
6. If you are removing a PCI adapter in a stand-alone expansion unit, remove the units back cover, if applicable.
7. Determine the location of PCI adapter in the system.
8. Lift and hold the PCI adapter EMC shield **A** in the open position.

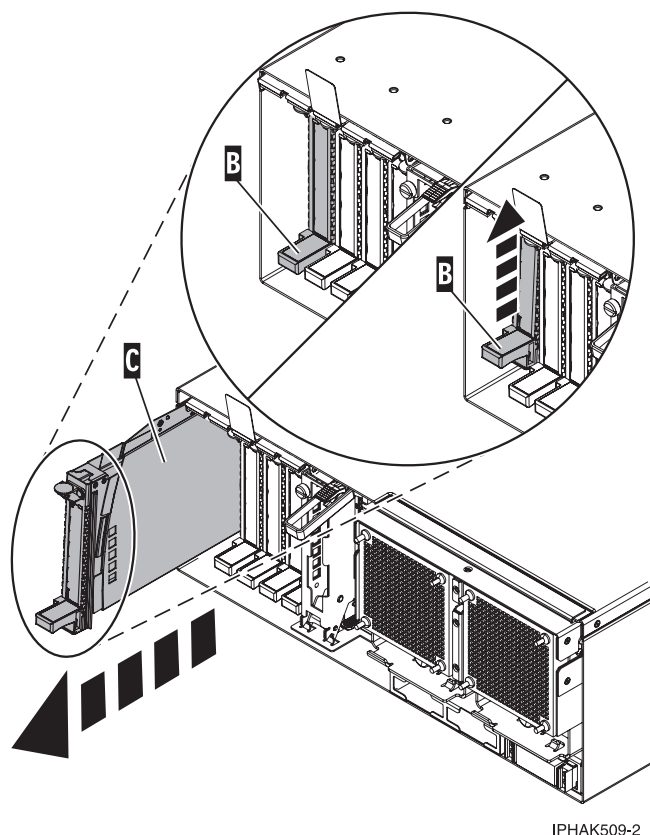


IPHAK507-0

Figure 115. PCI adapter EMC shield in the open position

9. Lift up the lower cassette handle **B** as shown in the following figure. Pull the PCI cassette **C** out of the system.

Attention: A cassette containing either a PCI adapter or filler panel must be placed in the PCI adapter slot of the system unit for proper air flow and cooling.



IPHAK509-2

Figure 116. PCI adapter cassette removed from the system unit

10. Place the cassette with the cover facing up on an approved ESD surface.

Note: The cover will have a label on it.

11. “Remove an adapter from the PCI adapter single-width cassette” on page 177.

Attached expansion-unit PCI adapters

You might need to remove, replace, or install PCI adapters. Use the procedures in this section to perform these tasks.

Important:

- If you are exchanging a 2766, 2787, or 280E Fibre Channel IOA, the external storage subsystem must be updated to use the world-wide port name of the new 2766, 2787, or 280E IOA. For instructions, see `rrcardsupdateport.dita`.
- If you are replacing a 2748, 2757, 2763, 2767, 2778, 2780, 2782, 5702, 5709, or 570B storage IOA, take note of the following: Depending on the configuration of the system, the storage IOA cache might have been disabled to allow the attachment of OEM storage that emulates a load source drive. If you are replacing a storage IOA that has its cache disabled, configure the replacement IOA the same way as the IOA that you removed. If you remove hardware from the replacement IOA, return that hardware with the failed IOA.

Install attached expansion-unit PCI adapters

You might need to install a PCI adapter. Use the procedure in this section to perform this task.

Install attached expansion-unit PCI adapters with system power on in AIX:

You might need to install a PCI adapter. Use the procedure in this section to perform this task.

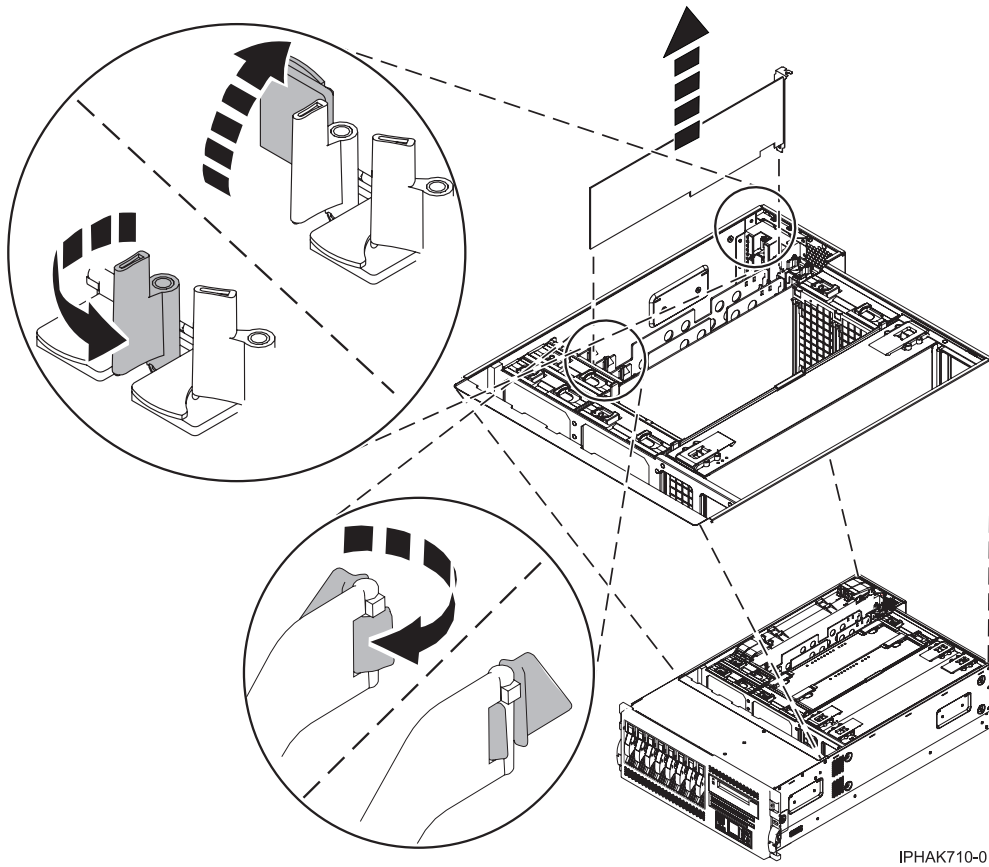
If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for installing a PCI adapter. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

To install a PCI adapter with the system power on in AIX, do the following:

1. Determine in which slot to place the PCI adapter by doing the following:
 - Refer to “PCI adapter placement for servers system units and expansion units” on page 180 for information regarding slot restrictions for adapters used in this system.
 - Determine if the adapter will be placed in the base system unit or an expansion unit.
 - If the adapter is to be placed into the base system unit, continue with this procedure by going to the next numbered step.
 - If the adapter is to be placed into an expansion unit that does not contain PCI adapter cassettes, continue with this procedure by going to the next numbered step.
 - If the adapter is to be placed into an expansion unit that contains PCI adapter cassettes, go to the procedures for adapters in adapter cassettes. See “Model , and attached expansion units, PCI adapters and cassettes” on page 121.
2. Perform the prerequisite tasks described in “Before you begin” on page 291.
3. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
4. If you are installing a PCI adapter in a rack-mounted system or expansion unit, follow these steps.
 - For the 05/95 or 50/9511D/20 expansion unit, follow these steps:
 - a. Open the front rack door.
 - b. Place the system or expansion unit in the service position. See “Place the rack-mounted system or expansion unit in the service position” on page 312.
 - c. Remove or open the service access cover. For instructions, see “Open the model 05/95 or 50/9511D/20 service access cover” on page 193.
 - For all other rack-mounted expansion units, follow these steps:
 - a. Open the back rack door.
 - b. Remove the cover or covers. For instructions on removing covers, select the appropriate procedure from the following:
 - eu5054.dita#eu5054. These steps also apply to the 52/94, 82/94, and 91/94 expansion units. When the cover is removed, remove the PCI adapter access plate.
 - eu5078.dita#eu5078. These steps also apply to the model 50/88.
 - “Open the model 05/95 or 50/9511D/20 service access cover” on page 193
5. If necessary, remove the adapter expansion slot shield.
6. If necessary, remove the adapter from the antistatic package.

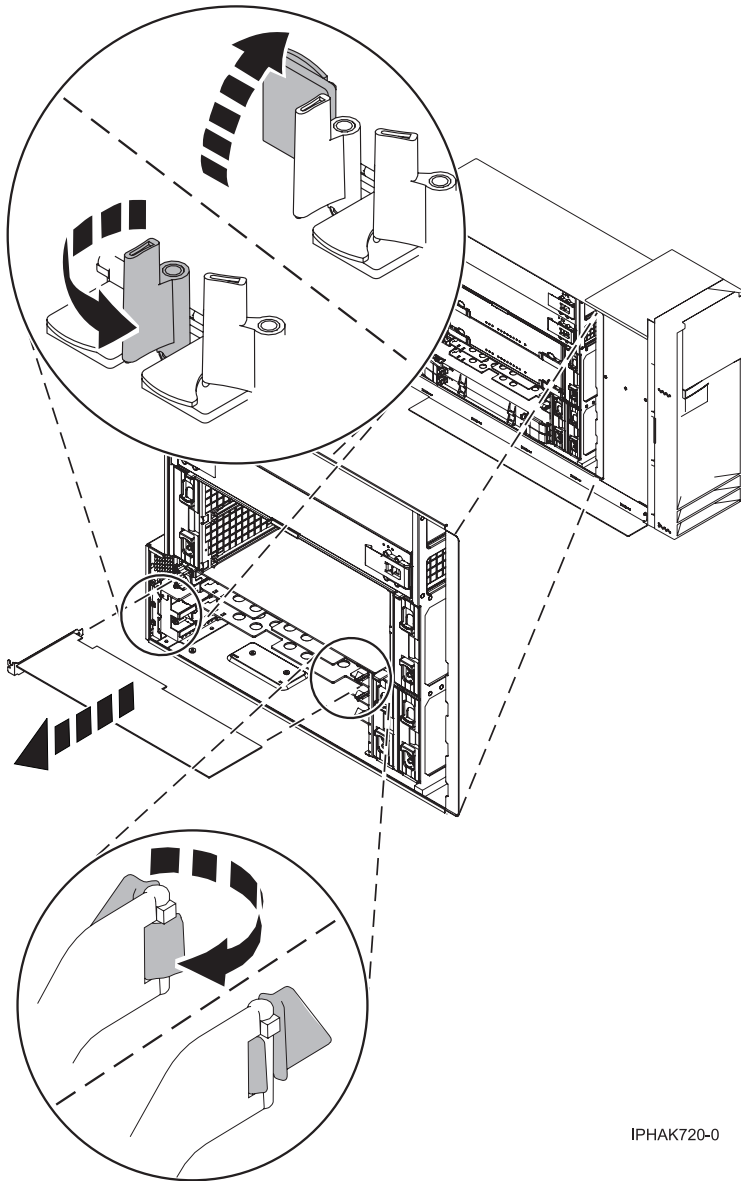
Attention: Avoid touching the components and gold-edge connectors on the adapter.
7. Place the adapter, component-side up, on a flat, antistatic surface.
8. Some PCI adapter cards are shipped from the manufacturer with a blue handle or support bracket along the back edge of the card. To use adapters of this type in this system, you must remove the blue handle or support bracket from the card.
9. Refer to “PCI hot-plug manager access for AIX” on page 191, and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
10. From the PCI Hot-Plug Manager menu, select **Add a PCI Hot-Plug Adapter** and press Enter. The Add a Hot-Plug Adapter window displays.
11. Select the appropriate empty PCI slot from the ones listed on the screen, and press Enter.

12. Rotate the adapter locking latches counterclockwise as shown in Figure 117 or Figure 118 on page 148.
13. Lift the black tab attached to the adapter retainer assembly, and keep the black tab in a vertical position.
14. Remove the adapter filler plate if one is present.



IPHAK710-0

Figure 117. PCI adapter or filler plate removed from the rack-mounted system unit



IPHAK720-0

Figure 118. PCI adapter or filler plate removed from the stand-alone unit

15. Follow the instructions on the screen to install the adapter until the LED for the specified PCI slot is set to the Action state. See "Component LEDs" on page 192.
16. When you are instructed to install the adapter in the adapter slot, carefully grasp the adapter by the edges and align the adapter in the slot guides. Insert the adapter fully into the adapter slot connector. If you are installing a full-length adapter, ensure that both ends of the adapter engage the card guides.
17. Press the adapter firmly into its connector.
18. Secure the adapter. Lower the tab onto the PCI adapter faceplate. Rotate the adapter locking latches clockwise as shown in Figure 119 on page 149 or Figure 120 on page 150.

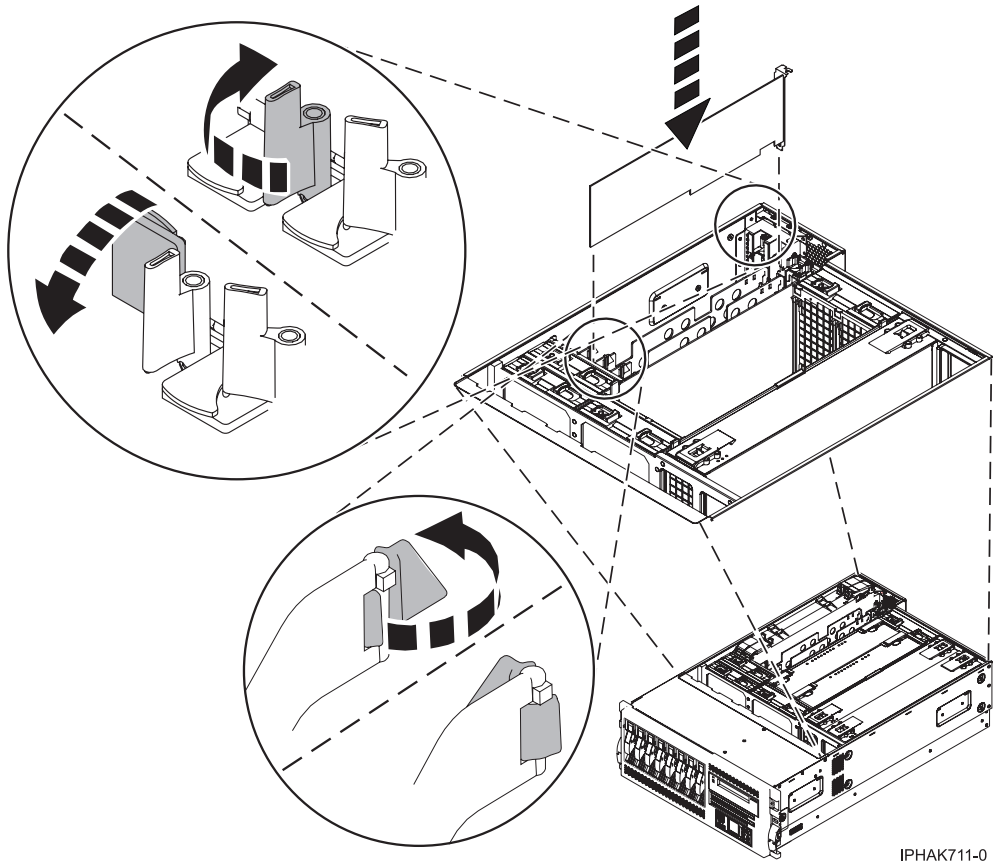
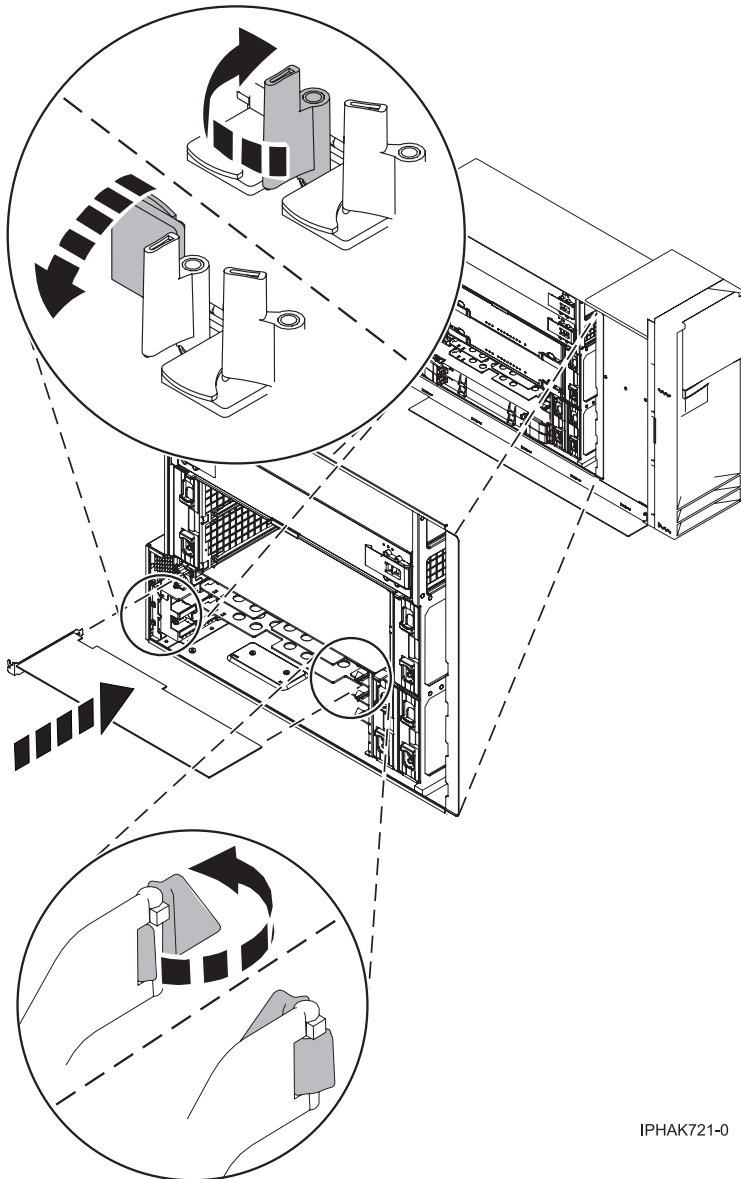


Figure 119. PCI adapter replaced in the rack-mounted system unit



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Figure 120. PCI adapter replaced in the stand-alone unit

19. Connect any adapter cables.
20. Replace or close the covers.
21. “Place the rack-mounted system or expansion unit in the operating position” on page 316 if you are servicing a rack-mounted system.
22. On a rack-mounted system, close the rear rack door.
23. Verify that the new resource is functional. Refer to “Verify the installed part” on page 319.

Install attached expansion-unit PCI adapter with system power on in Linux:

You might need to install a PCI adapter. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for installing a PCI adapter. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

To install a PCI adapter with the system power on in Linux, do the following:

1. Ensure that the system meets the “Prerequisites for hot-plugging PCI adapters in Linux” on page 192.
2. “Verify that the Linux, hot-plug PCI tools are installed” on page 192.
3. Determine in which slot to place the PCI adapter by doing the following:
 - Refer to “PCI adapter placement for servers system units and expansion units” on page 180 for information regarding slot restrictions for adapters used in this system.
 - Determine if the adapter will be placed in the base system unit or an expansion unit.
 - If the adapter is to be placed into the base system unit, continue with this procedure by going to the next numbered step.
 - If the adapter is to be placed into an expansion unit that does not contain PCI adapter cassettes, continue with this procedure by going to the next numbered step.
 - If the adapter is to be placed into an expansion unit that contains PCI adapter cassettes, go to the procedures for adapters in adapter cassettes. See “Model , and attached expansion units, PCI adapters and cassettes” on page 121.
4. Perform the prerequisite tasks described in “Before you begin” on page 291.
5. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
6. If you are installing a PCI adapter in a rack-mounted system or expansion unit, follow these steps.
 - For the 05/95 or 50/9511D/20 expansion unit, follow these steps:
 - a. Open the front rack door.
 - b. Place the system or expansion unit in the service position. See “Place the rack-mounted system or expansion unit in the service position” on page 312.
 - c. Remove or open the service access cover. For instructions, see “Open the model 05/95 or 50/9511D/20 service access cover” on page 193.
 - For all other rack-mounted expansion units, follow these steps:
 - a. Open the back rack door.
 - b. Remove the cover or covers. For instructions on removing covers, select the appropriate procedure from the following:
 - eu5054.dita#eu5054. These steps also apply to the 52/94, 82/94, and 91/94 expansion units. When the cover is removed, remove the PCI adapter access plate.
 - eu5078.dita#eu5078. These steps also apply to the model 50/88.
 - “Open the model 05/95 or 50/9511D/20 service access cover” on page 193
7. If necessary, remove the adapter expansion slot shield.
8. If necessary, remove the adapter from the antistatic package.

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

9. Place the adapter, component-side up, on a flat, antistatic surface.
10. Log in to the system console as the root user.
11. Run the `lsslot` tool to list the hot-plug PCI slots that are available in the server or partition:

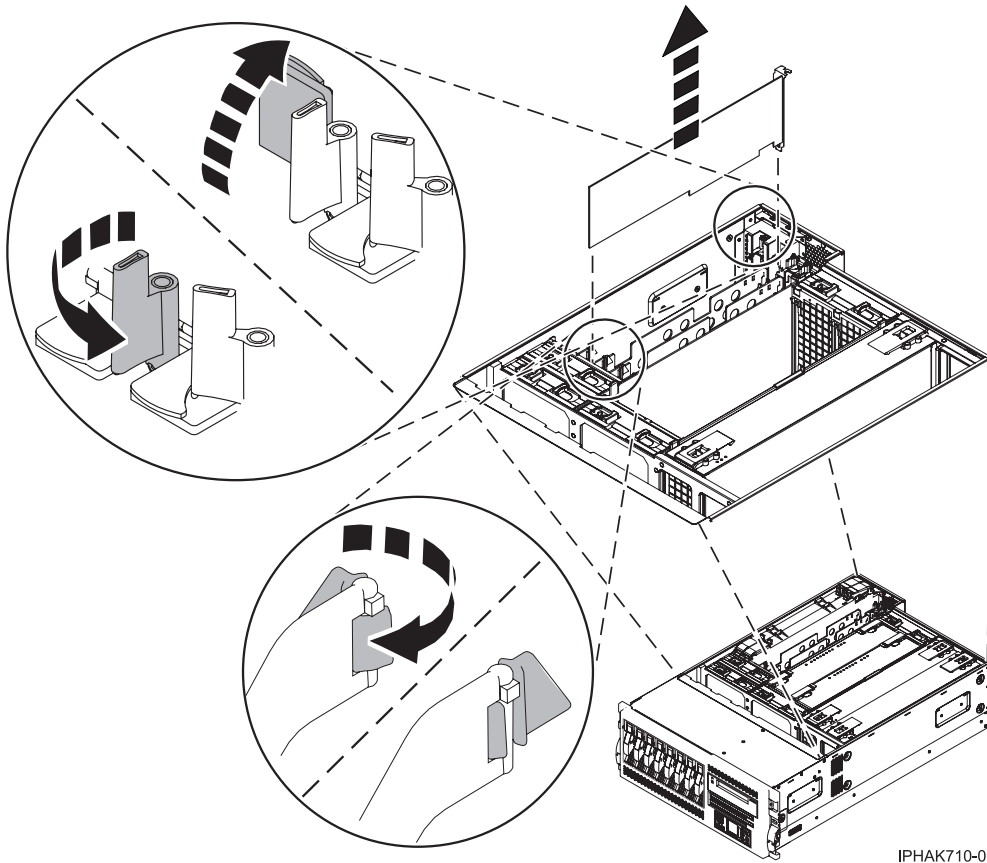
```
lsslot -c pci -a
```

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

```
# Slot          Description          Device(s)
U7879.001.DQD014E-P1-C1 PCI-X capable, 64 bit, 133MHz slot Empty
U7879.001.DQD014E-P1-C4 PCI-X capable, 64 bit, 133MHz slot Empty
U7879.001.DQD014E-P1-C5 PCI-X capable, 64 bit, 133MHz slot Empty
```

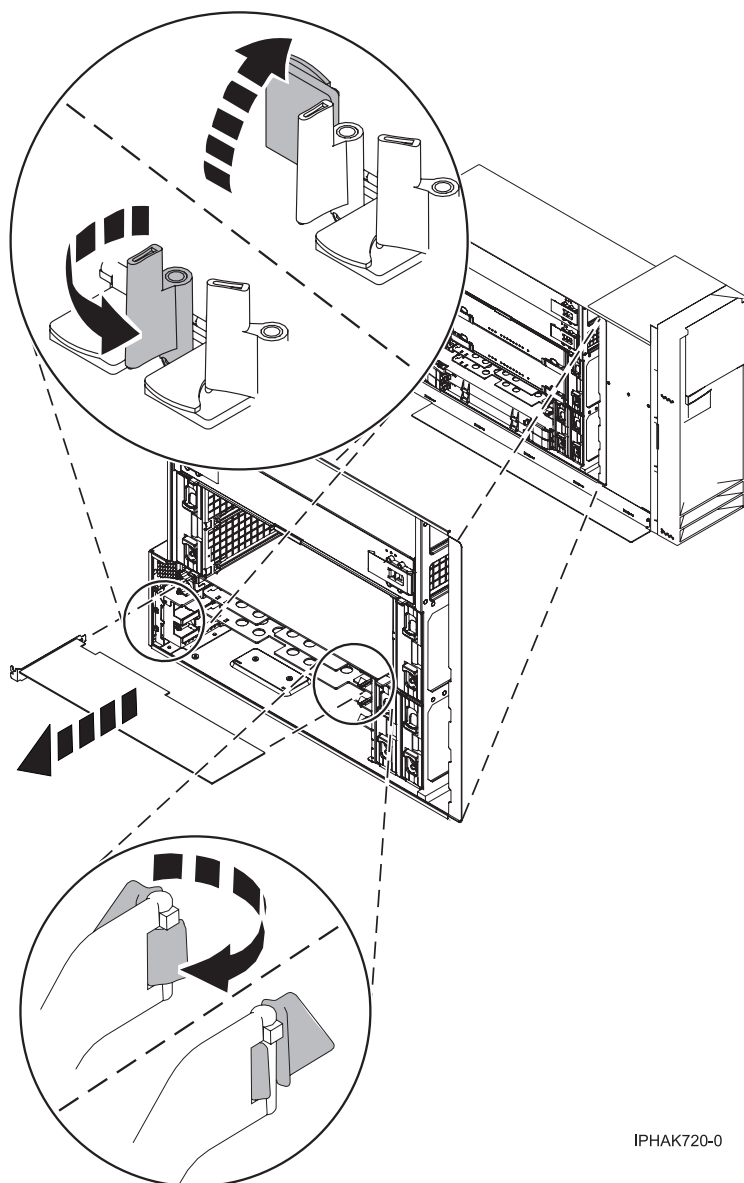
Select the appropriate empty PCI slot from the ones listed by the command.

12. Rotate the adapter locking latch **A** counterclockwise as shown in Figure 121 or Figure 122 on page 153.
13. Lift the black tab **B** attached to the adapter retainer assembly, and keep the black tab in a vertical position.
14. Ensure the slot is empty. Remove the adapter filler plate if one is present.



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Figure 121. PCI adapter or filler plate removed from the rack-mounted system unit



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Figure 122. PCI adapter or filler plate removed from the stand-alone unit

15. Run the `drslot_chrp_pci` command to enable an adapter to be installed. For example, to install an adapter into PCI slot U7879.001.DQD014E-P1-C3, enter the following command:

```
drslot_chrp_pci -a -s U7879.001.DQD014E-P1-C3
```

The following displays:

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

16. Press Enter.

The following displays:

The visual indicator for the specified PCI slot has been set to the action state. Insert the PCI card into the identified slot, connect any devices to be configured and press Enter to continue. Enter x to exit.

17. When you are instructed to install the adapter in the adapter slot, carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
18. Press the adapter firmly into its connector.

Attention: When you install an adapter into the system, be sure that it is completely and correctly seated in its connector.

- Secure the adapter. Lower the tab onto the PCI adapter faceplate. Rotate the adapter locking latches clockwise as shown in Figure 123 or Figure 124 on page 155.

- Connect any adapter cables.

- Run the `lsslot` command to verify that the slot is occupied.

For example, enter `lsslot -c pci -s U7879.001.DQD014E-P1-C3`

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

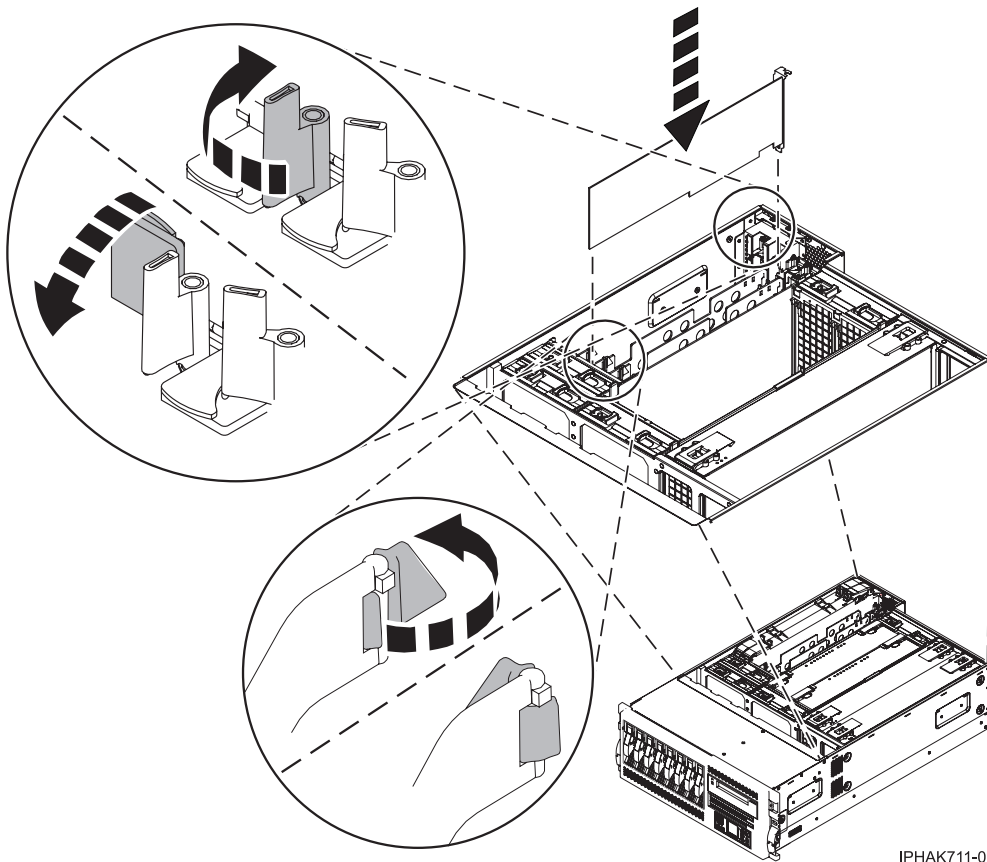
# Slot	Description	Device(s)
U7879.001.DQD014E-P1-C3	PCI-X capable, 64 bit, 133MHz slot	0001:40:01.0

- If you are servicing a rack-mounted system, route the cables through the cable-management arm.

- Replace or close the covers.

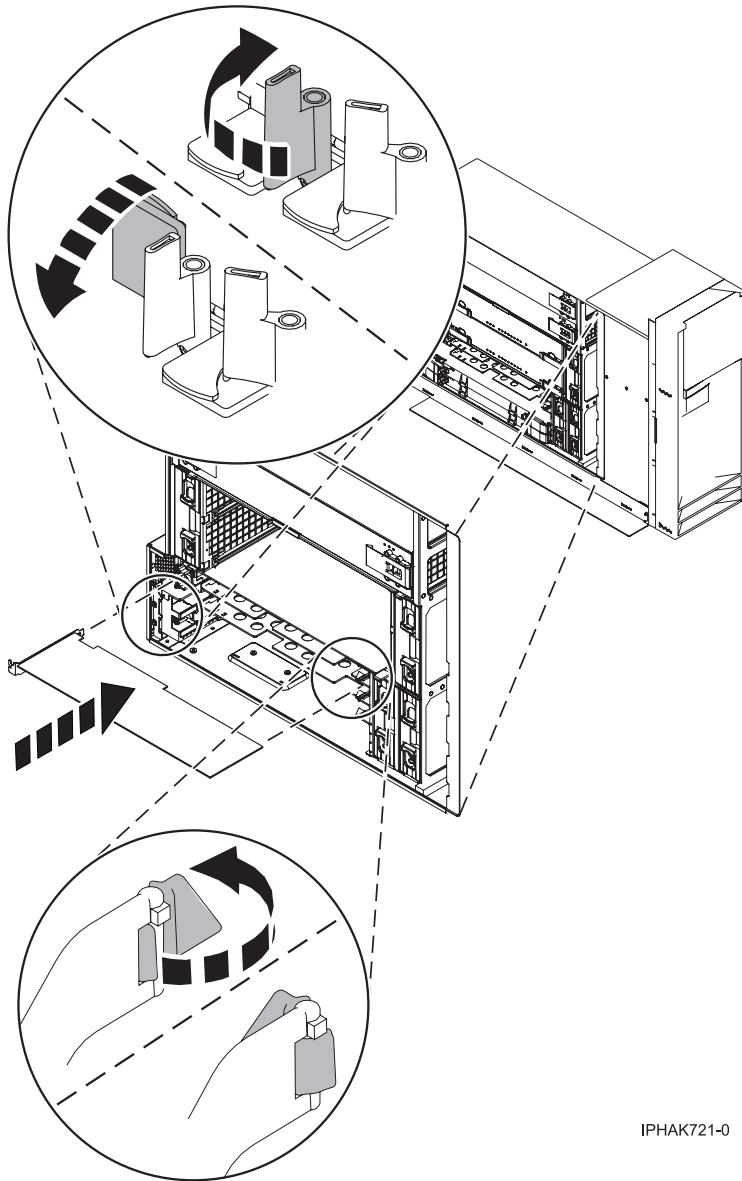
- On a rack-mounted system, close the rear rack door.

- “Place the rack-mounted system or expansion unit in the operating position” on page 316 if you are servicing a rack-mounted system.



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Figure 123. PCI adapter replaced in the rack-mounted system unit



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Figure 124. PCI adapter replaced in the stand-alone unit

Install attached expansion-unit PCI adapters with the system power off:

You might need to install a PCI adapter. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for installing a PCI adapter. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

To install a PCI adapter with the system power off, do the following:

1. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
2. Determine in which slot to place the PCI adapter by doing the following:
 - Refer to “PCI adapter placement for servers system units and expansion units” on page 180 for information regarding slot restrictions for adapters used in this system.

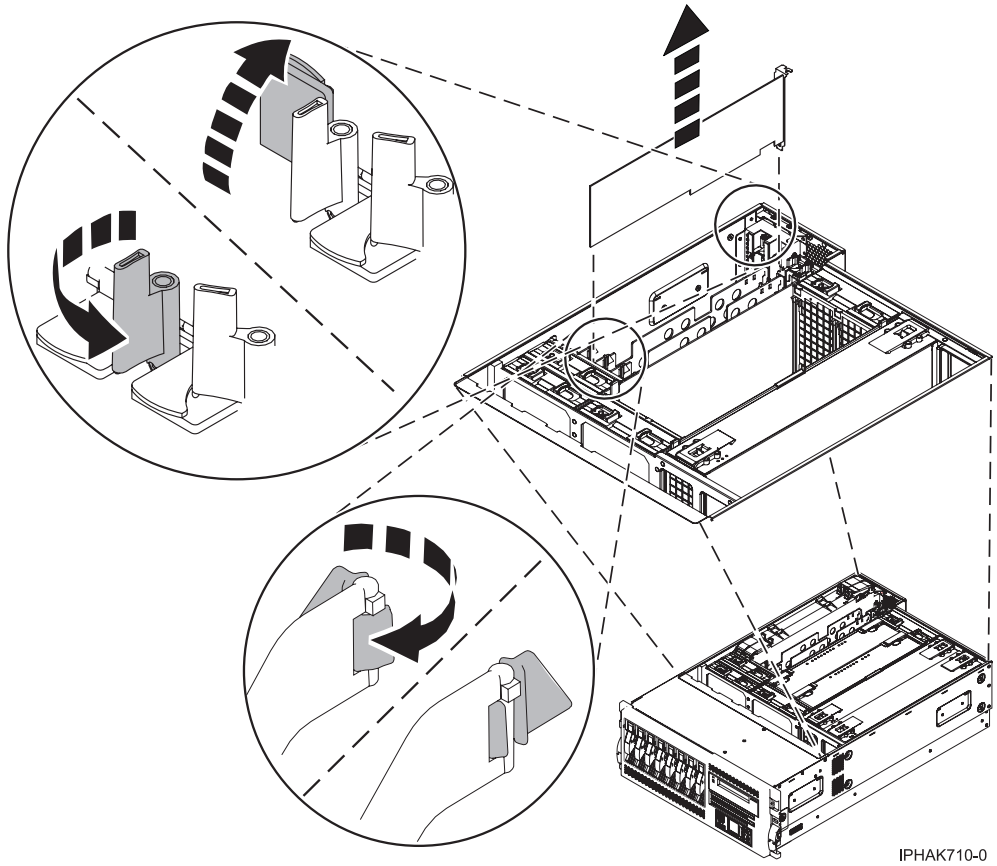
- Determine if the adapter will be placed in the base system unit or an expansion unit.
 - If the adapter is to be placed into the base system unit, continue with this procedure by going to the next numbered step.
 - If the adapter is to be placed into an expansion unit that does not contain PCI adapter cassettes, continue with this procedure by going to the next numbered step.
 - If the adapter is to be placed into an expansion unit that contains PCI adapter cassettes, go to the procedures for adapters in adapter cassettes. See “Model , and attached expansion units, PCI adapters and cassettes” on page 121.
- 3. Perform the prerequisite tasks described in “Before you begin” on page 291.
- 4. “Stop the system or logical partition” on page 303.
- 5. Disconnect the power source from the system by unplugging the system.

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

- 6. If you are installing a PCI adapter in a rack-mounted system or expansion unit, follow these steps.
 - If you are placing an adapter in a model 57/9011D/11, use the PCI adapter cassette procedures. See “Model , and attached expansion units, PCI adapters and cassettes” on page 121.
 - Installing, removing, or replacing a PCI adapter in a 11D/1057/91 or 57/94 expansion unit is not a customer procedure. Contact your service provider.
 - For the 05/95 or 50/9511D/20 expansion unit, follow these steps:
 - a. Open the front rack door.
 - b. Place the system or expansion unit in the service position. See “Place the rack-mounted system or expansion unit in the service position” on page 312.
 - c. Remove or open the service access cover. For instructions, see “Open the model 05/95 or 50/9511D/20 service access cover” on page 193.
 - For all other rack-mounted expansion units, follow these steps:
 - a. Open the back rack door.
 - b. Remove the cover or covers. For instructions on removing covers, select the appropriate procedure from the following:
 - eu5054.dita#eu5054. These steps also apply to the 52/94, 82/94, and 91/94 expansion units. When the cover is removed, remove the PCI adapter access plate.
 - eu5078.dita#eu5078. These steps also apply to the model 50/88.
 - “Open the model 05/95 or 50/9511D/20 service access cover” on page 193
- 7. If necessary, remove the adapter expansion slot shield.
- 8. If necessary, remove the adapter from the antistatic package.

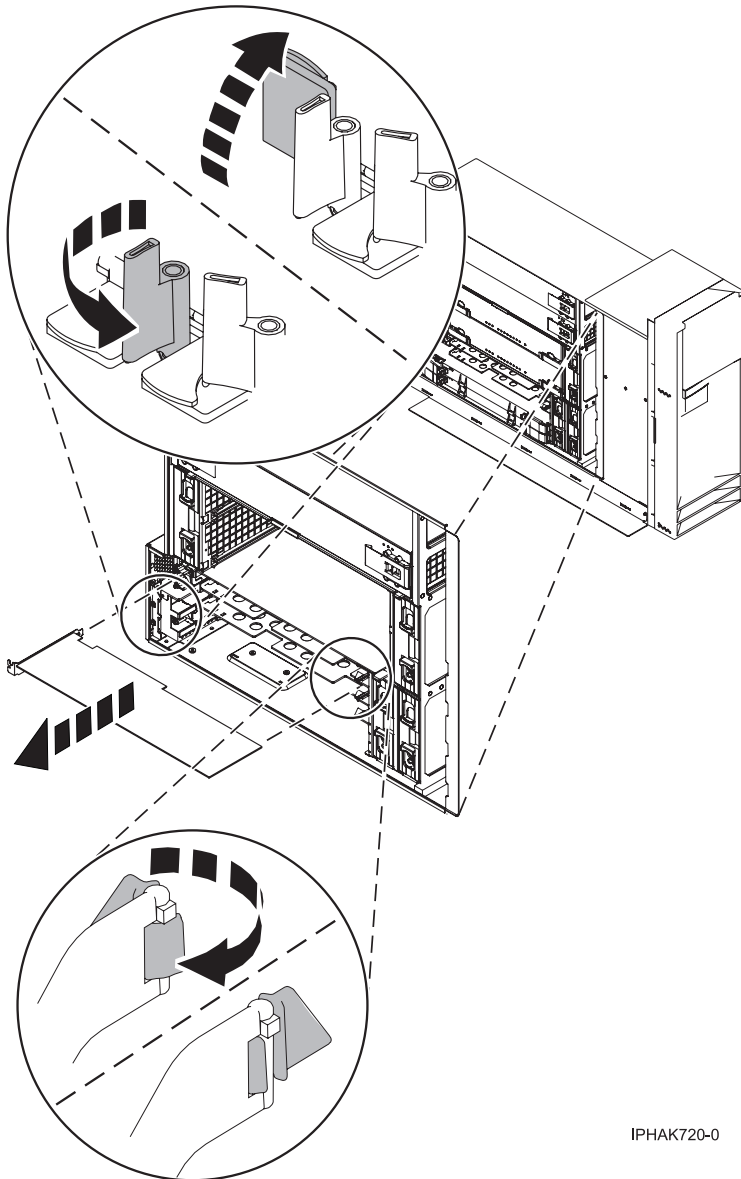
Attention: Avoid touching the components and gold-edge connectors on the adapter.

- 9. Place the adapter, component-side up, on a flat, antistatic surface.
- 10. Some PCI adapter cards are shipped from the manufacturer with a blue handle or support bracket along the back edge of the card. To use adapters of this type in this system, you must remove the blue handle or support bracket from the card.
- 11. Rotate the adapter locking latch **A** counterclockwise as shown in Figure 125 on page 157 or Figure 126 on page 158.
- 12. Lift the black tab **B** attached to the adapter retainer assembly, and keep the black tab in a vertical position.
- 13. Ensure the slot is empty. Remove the adapter filler plate if one is present. If an adapter is present in the slot you want to use, see the instructions in “Remove attached expansion-unit PCI adapters” on page 160 and then return here.



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Figure 125. PCI adapter or filler plate removed from the rack-mounted system unit



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Figure 126. PCI adapter or filler plate removed from the stand-alone system unit

14. Carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
15. Press the adapter firmly into its connector.
16. Secure the adapter. Lower the tab onto the PCI adapter faceplate. Rotate the adapter locking latches clockwise as shown in Figure 127 on page 159 or Figure 128 on page 160.

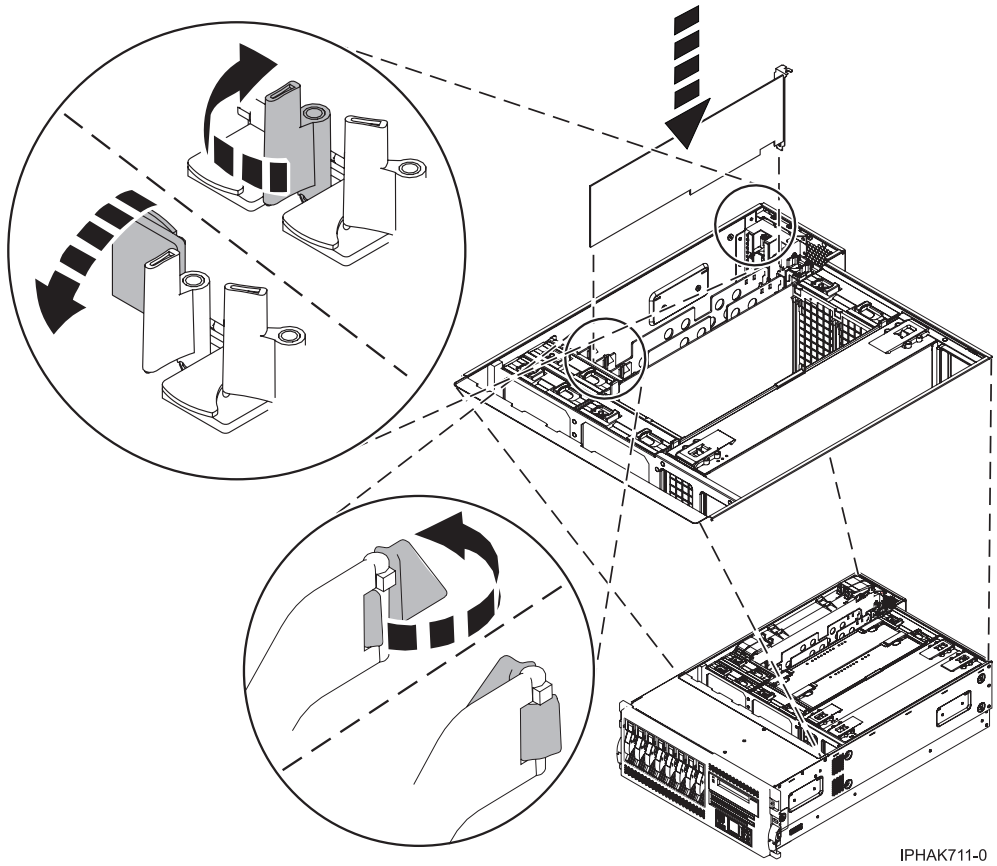


Figure 127. PCI adapter replaced in the rack-mounted system unit

- If you are exchanging a 2766, 2787, or 280E Fibre Channel IOA, the external storage subsystem must be updated to use the world-wide port name of the new 2766, 2787, or 280E IOA. For instructions, see `rrcardsupdateport.dita`.
- If you are replacing a 2748, 2757, 2763, 2767, 2778, 2780, 2782, 5702, 5709, or 570B storage IOA, take note of the following: Depending on the configuration of the system, the storage IOA cache might have been disabled to allow the attachment of OEM storage that emulates a load source drive. If you are replacing a storage IOA that has its cache disabled, configure the replacement IOA the same way as the IOA that you removed. If you remove hardware from the replacement IOA, return that hardware with the failed IOA.

Remove attached expansion-unit PCI adapters with the system power on in AIX:

You might need to remove a PCI adapter. Use the procedure in this section to perform this task.

If the adapter that is removed will be placed into a different slot or system, complete this removal procedure, then install the adapter as described in “Install attached expansion-unit PCI adapters with system power on in AIX” on page 145.

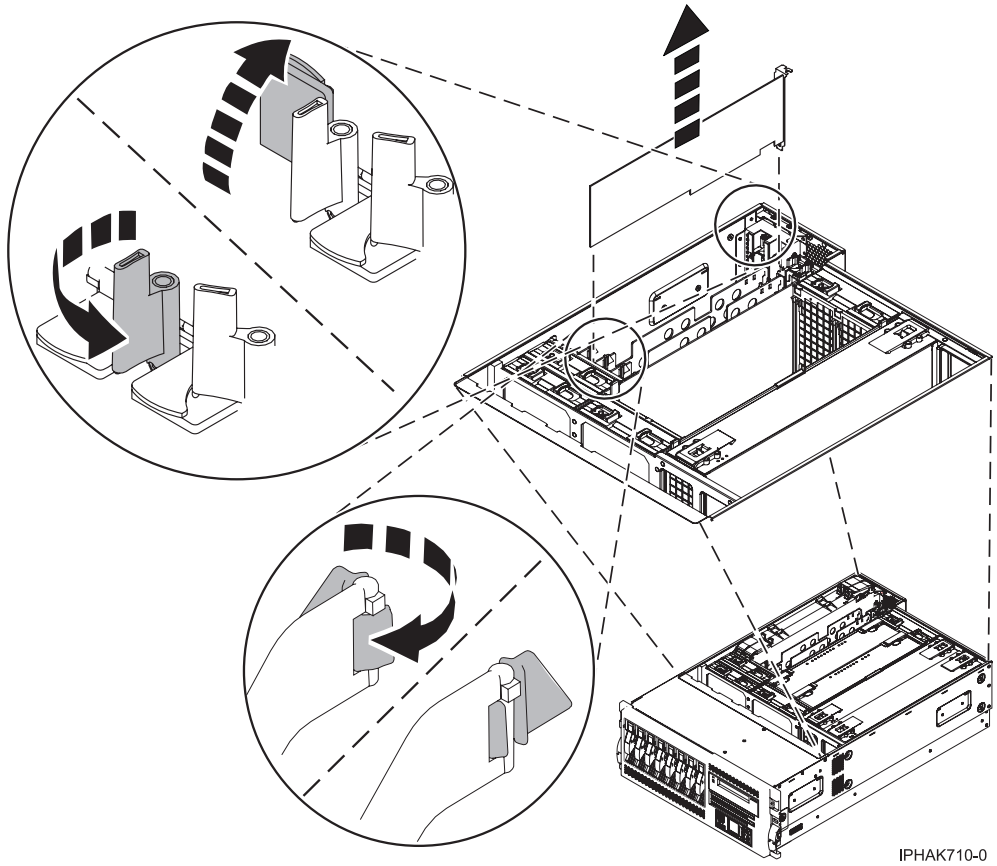
If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a PCI adapter. For instructions, see “Remove a part using the Hardware Management Console” on page 318.

Note: Procedures performed on a PCI adapter with the system power on in AIX, also known as hot-plug procedures, require the system administrator to take the PCI adapter offline prior to performing the operation. Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

To remove a PCI adapter with the system power on in AIX, do the following:

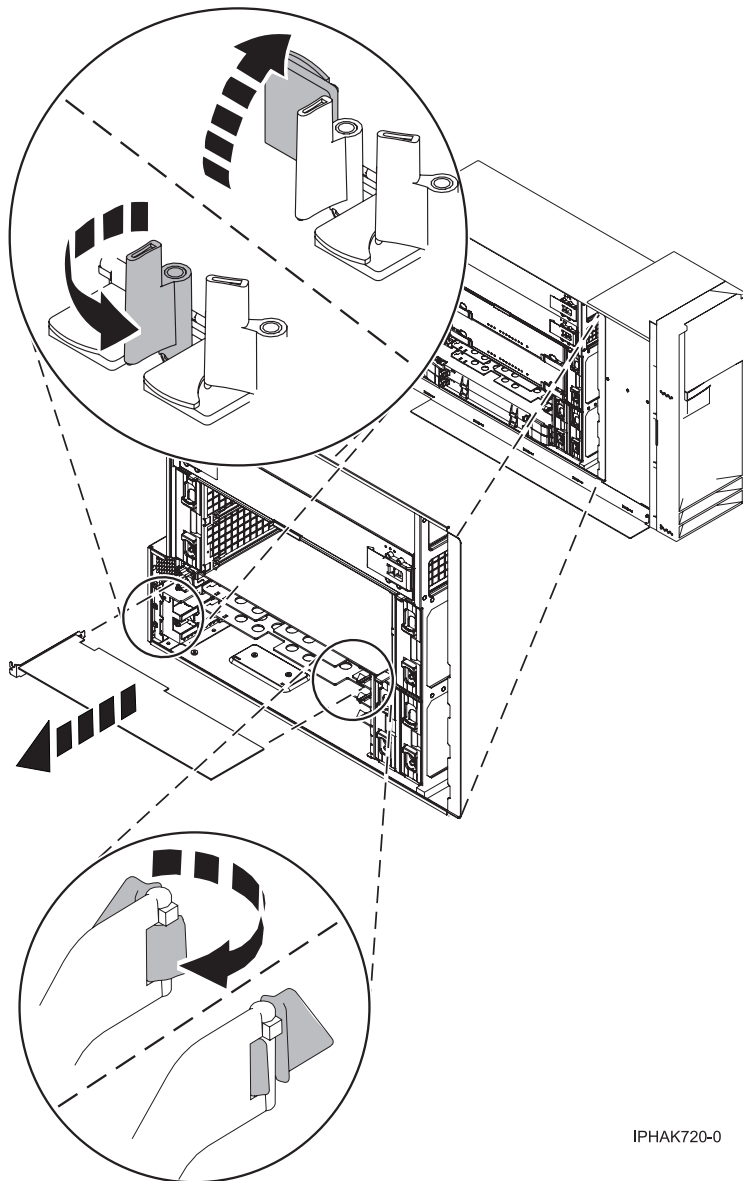
1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
3. If you are removing a PCI adapter in a rack-mounted system or expansion unit, follow these steps.
 - For the 05/95 or 50/9511D/20 expansion unit, follow these steps:
 - a. Open the front rack door.
 - b. Place the system or expansion unit in the service position. See “Place the rack-mounted system or expansion unit in the service position” on page 312.
 - c. Remove or open the service access cover. For instructions, see “Open the model 05/95 or 50/9511D/20 service access cover” on page 193.
 - For all other rack-mounted expansion units, follow these steps:
 - a. Open the back rack door.
 - b. Remove the cover or covers. For instructions on removing covers, select the appropriate procedure from the following:
 - `eu5054.dita#eu5054`. These steps also apply to the 52/94, 82/94, and 91/94 expansion units. When the cover is removed, remove the PCI adapter access plate.
 - `eu5078.dita#eu5078`. These steps also apply to the model 50/88.
 - “Open the model 05/95 or 50/9511D/20 service access cover” on page 193
4. Determine which adapters you plan to remove.
5. Record the slot number and location of each adapter being removed. Adapter slots are numbered on the rear of the system unit.
6. Ensure that any processes or applications that might use the adapter are stopped.

7. Follow these steps to place the adapter in the action state using the PCI Hot-Plug Manager:
 - a. Enter the system diagnostics by logging in as root user or as the celogin user, type **diag** at the AIX command line.
 - b. When the DIAGNOSTIC OPERATING INSTRUCTIONS menu displays, press Enter.
 - c. At the FUNCTION SELECTION menu, select **Task Selection**, then press Enter.
 - d. At the Task Selection list, select **PCI Hot Plug Manager**.
 - e. Select **Unconfigure a Device**, then press Enter.
 - f. Press F4 (or Esc +4) to display the **Device Names** menu.
 - g. Select the adapter you are removing in the **Device Names** menu.
 - h. Use the Tab key to answer NO to **Keep Definition**. Use the Tab key again to answer YES to **Unconfigure Child Devices**, then press Enter. The ARE YOU SURE window displays.
 - i. Press Enter to verify the information. Successful unconfiguration is indicated by the OK message displayed next to the Command field at the top of the screen.
 - j. Press F4 (or Esc +4) twice to return to the Hot Plug Manager menu.
 - k. Select **replace/remove PCI Hot Plug adapter**.
 - l. Select the slot that has the device to be removed from the system.
 - m. Select **remove**. A fast-blinking amber LED located at the back of the machine near the adapter indicates that the slot has been identified.
 - n. Press Enter. This places the adapter in the action state, meaning it is ready to be removed from the system.
8. Label, and then disconnect all cables attached to the adapter you plan to remove.
9. Rotate the adapter locking latch **A** counterclockwise.
10. Lift the black tab **B** attached to the adapter retainer assembly, and keep the black tab in a vertical position.
11. Carefully grasp the PCI adapter by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.



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Figure 129. PCI adapter removed from the rack-mounted system unit



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Figure 130. PCI adapter removed from the stand-alone system unit

12. Seal the expansion slot using an expansion-slot cover.
13. Lower the plastic retainer seat over the PCI adapter faceplate.
14. Rotate the locking latch clockwise until it clicks into the locked position.
15. Continue to follow the screen instructions until you receive a message that the adapter removal is successful. Successful removal is indicated by the OK message displayed next to the Command field at the top of the screen.
16. If you have other adapters to remove, press the F3 key to return to the PCI Hot-Plug Manager menu and then return to step 8 on page 162.
OR
If you do not have other adapters to remove, continue with the next step.
17. Press F10 to exit the Hot-Plug Manager.
18. Run the `diag -a` command. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.
19. Replace or close the covers.

20. On a rack-mounted system, close the rear rack door.
21. “Place the rack-mounted system or expansion unit in the operating position” on page 316 if you are servicing a rack-mounted system. If you are servicing a stand-alone system, continue to the next step.

Remove attached expansion-unit PCI adapters with the system power on in Linux:

You might need to remove a PCI adapter. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a PCI adapter. For instructions, see “Remove a part using the Hardware Management Console” on page 318.

To remove a PCI adapter with the system power on in Linux, do the following:

1. Ensure that the system meets the “Prerequisites for hot-plugging PCI adapters in Linux” on page 192.
2. “Verify that the Linux, hot-plug PCI tools are installed” on page 192.
3. Perform the prerequisite tasks described in “Before you begin” on page 291.
4. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
5. If you are removing a PCI adapter in a rack-mounted system or expansion unit, follow these steps:
 - For the 05/95 or 50/9511D/20 expansion unit, follow these steps:
 - a. Open the front rack door.
 - b. Place the system or expansion unit in the service position. See “Place the rack-mounted system or expansion unit in the service position” on page 312.
 - c. Remove or open the service access cover. For instructions, see “Open the model 05/95 or 50/9511D/20 service access cover” on page 193.
 - For all other rack-mounted expansion units, follow these steps:
 - a. Open the back rack door.
 - b. Remove the cover or covers. For instructions on removing covers, select the appropriate procedure from the following:
 - eu5054.dita#eu5054. These steps also apply to the 52/94, 82/94, and 91/94 expansion units. When the cover is removed, remove the PCI adapter access plate.
 - eu5078.dita#eu5078. These steps also apply to the model 50/88.
 - “Open the model 05/95 or 50/9511D/20 service access cover” on page 193
6. Determine which adapter you plan to remove, then label and disconnect all cables attached to that adapter.
7. Record the slot number and location of each adapter being removed.

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

8. Label, and then disconnect all cables attached to the adapter you plan to remove.

Note: Before performing a PCI hot-plug removal of storage devices, ensure file systems on those devices are unmounted.

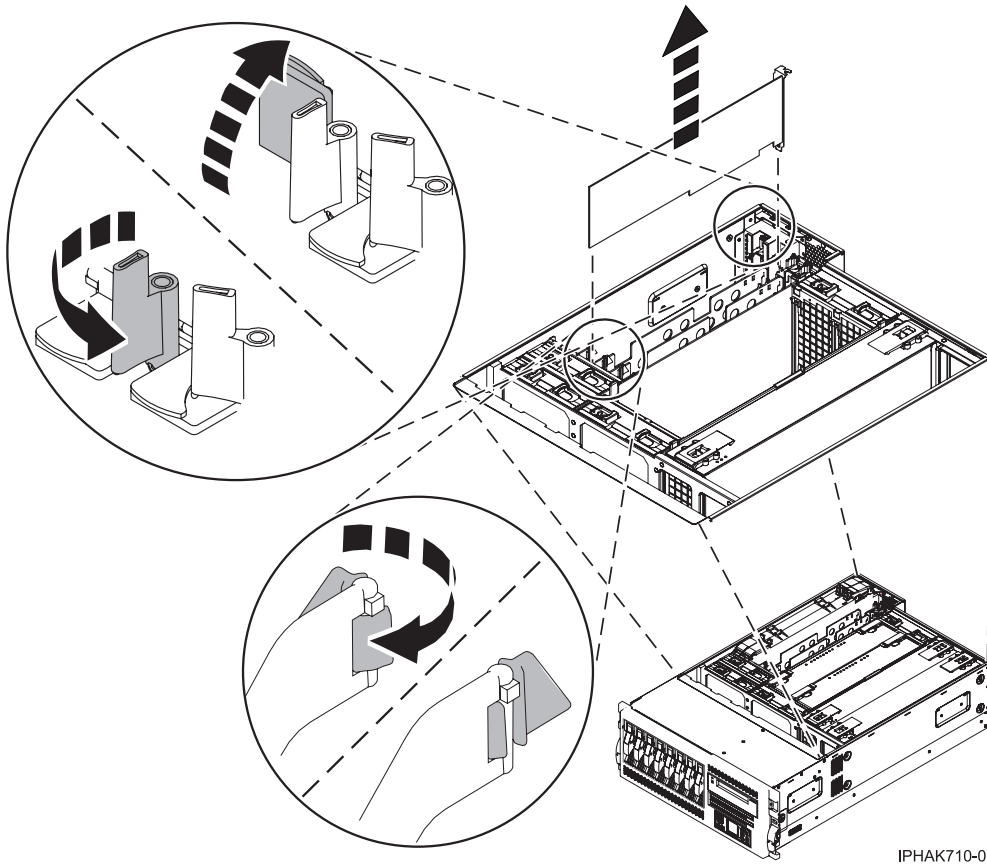
9. Run the `drslot_chrp_pci` command to enable an adapter to be removed:

For example, to remove the PCI adapter in slot U7879.001.DQD014E-P1-C3, run this command:

```
drslot_chrp_pci -r -s U7879.001.DQD014E-P1-C3
```

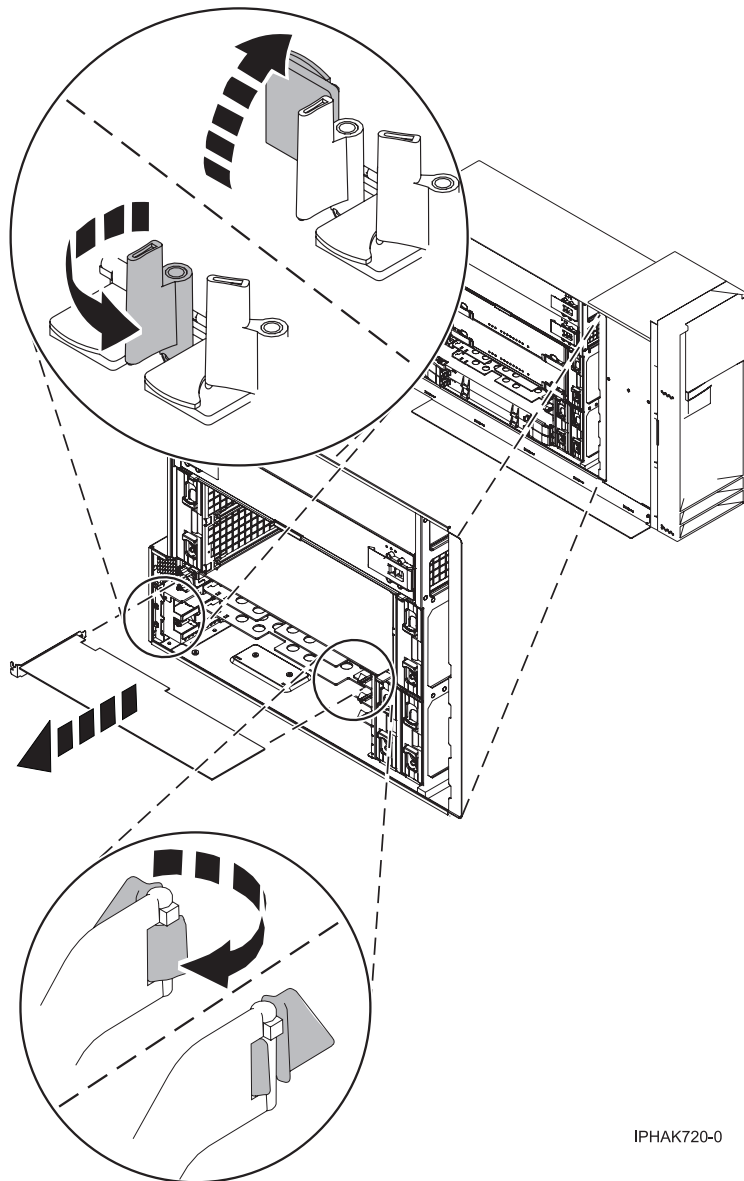
Follow the instructions on the display to complete the task.

10. Rotate the adapter locking latch **A** counterclockwise as shown in Figure 131 or Figure 132 on page 167.
11. Lift the black tab **B** attached to the adapter retainer assembly, and keep the black tab in a vertical position.
12. Carefully grasp the PCI adapter by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.



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Figure 131. PCI adapter removed from the rack-mounted system unit



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Figure 132. PCI adapter removed from the stand-alone system unit

13. If you are removing a PCI adapter as part of another procedure, return to that procedure. If not, continue to the next step.
14. Seal the expansion slot using an expansion-slot cover.
15. Replace or close the covers.
16. Reconnect the power source to the system.
17. "Place the rack-mounted system or expansion unit in the operating position" on page 316 if you are servicing a rack-mounted system. If you are servicing a stand-alone system, continue to the next step.
18. On a rack-mounted system, close the rear rack door.
19. "Start the system or logical partition" on page 300.

Remove attached expansion-unit PCI adapters with the system power off:

You might need to remove a PCI adapter. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing a PCI adapter. For instructions, see “Remove a part using the Hardware Management Console” on page 318.

To remove a PCI adapter with the system power off, do the following:

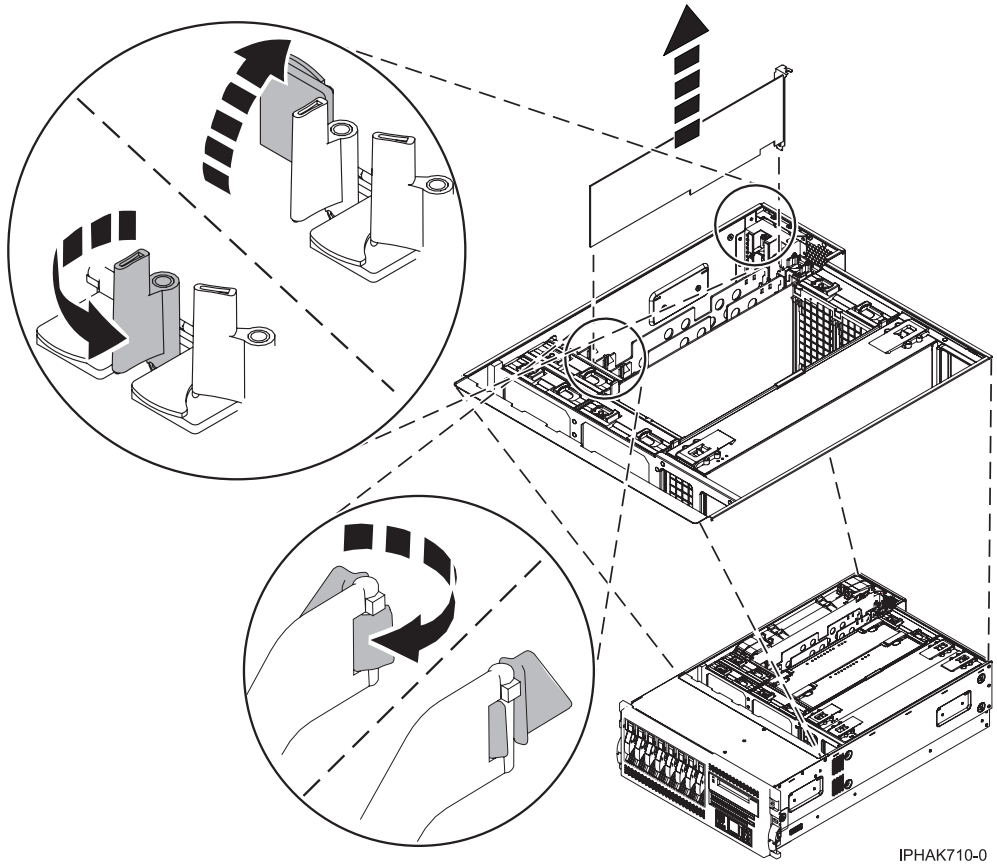
1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
3. “Stop the system or logical partition” on page 303.
4. Disconnect the power source from the system by unplugging the system.

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

5. If you are removing a PCI adapter in a rack-mounted system or expansion unit, follow these steps.
 - If you are placing an adapter in a model 11D/1157/90, use the PCI adapter cassette procedures. See “Model , and attached expansion units, PCI adapters and cassettes” on page 121.
 - Installing, removing, or replacing a PCI adapter in a 11D/1057/91 or 57/94 expansion unit is not a customer procedure. Contact your service provider.
 - For the 05/95 or 50/9511D/20 expansion unit, follow these steps:
 - a. Open the front rack door.
 - b. Place the system or expansion unit in the service position. See “Place the rack-mounted system or expansion unit in the service position” on page 312.
 - c. Remove or open the service access cover. For instructions, see “Open the model 05/95 or 50/9511D/20 service access cover” on page 193.
 - For all other rack-mounted expansion units, follow these steps:
 - a. Open the back rack door.
 - b. Remove the cover or covers. For instructions on removing covers, select the appropriate procedure from the following:
 - eu5054.dita#eu5054. These steps also apply to the 52/94, 82/94, and 91/94 expansion units. When the cover is removed, remove the PCI adapter access plate.
 - eu5078.dita#eu5078. These steps also apply to the model 50/88.
 - “Open the model 05/95 or 50/9511D/20 service access cover” on page 193
6. Determine which adapter you plan to remove, then label and disconnect all cables attached to that adapter.
7. Record the slot number and location of each adapter being removed.

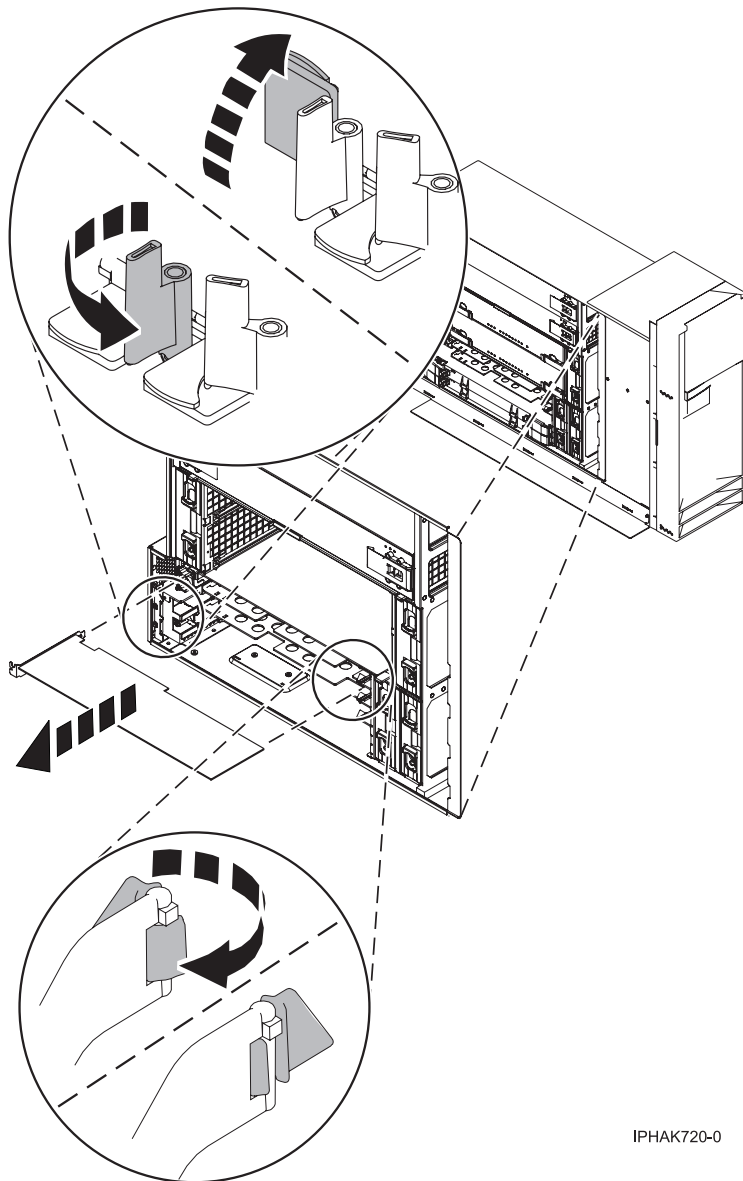
Note: Adapter slots are numbered on the rear of the system.

8. Rotate the adapter locking latch **A** counterclockwise as shown in Figure 133 on page 169 or Figure 134 on page 170.
9. Lift the black tab **B** attached to the adapter retainer assembly, and keep the black tab in a vertical position.
10. Carefully grasp the PCI adapter by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.



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Figure 133. PCI adapter removed from the rack-mounted system unit



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Figure 134. PCI adapter removed from the stand-alone system unit

11. If you are removing a PCI adapter as part of another procedure, return to that procedure. If not, continue to the next step.
12. Seal the expansion slot using an expansion-slot cover.
13. Replace or close the covers.
14. Reconnect the power source to the system.
15. "Place the rack-mounted system or expansion unit in the operating position" on page 316 if you are servicing a rack-mounted system. If you are servicing a stand-alone system, continue to the next step.
16. On a rack-mounted system, close the rear rack door.
17. "Start the system or logical partition" on page 300.

PCI adapter single-width cassette

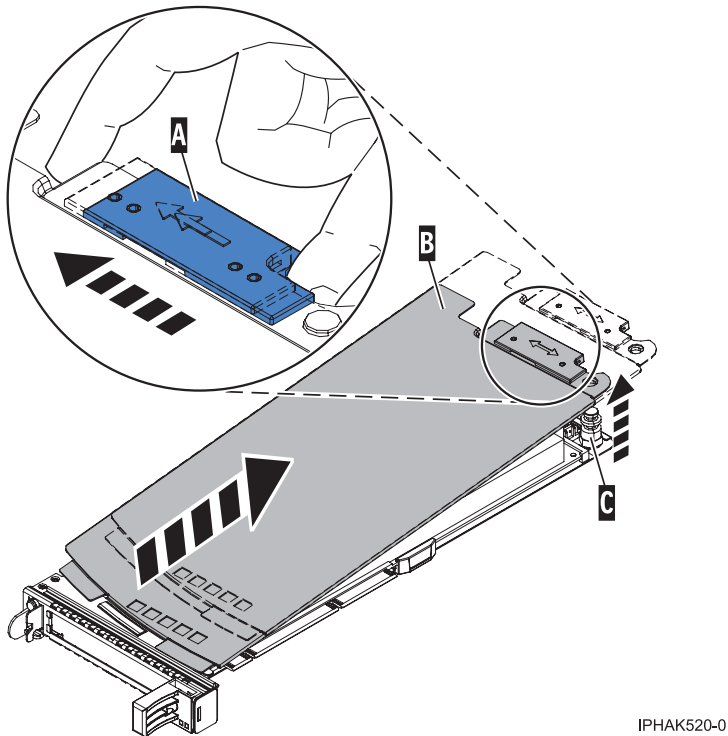
You might need to remove, replace, or install PCI adapters in a single-width cassette. Use the procedures in this section to perform these tasks.

Place a PCI adapter in a single-width cassette

You might need to place a PCI adapter in a single-width cassette. Use the procedure in this section to perform this task.

To place a PCI adapter in a cassette, do the following:

1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
3. Remove any shipping handles or brackets attached to the adapter.
4. Remove the cassette cover by doing the following:
 - a. Slide the cover latch **A** to disengage it from the pivot pin **C** as shown in the following figure.
 - b. Lift the cover **B** off of the pivot pin.
 - c. Slide the cover off of the cassette.



IPHAK520-0

Figure 135. PCI adapter single-width cassette cover removed

5. Ensure the cassette is prepared to receive an adapter by doing the following:
 - a. Ensure the cassette is empty by doing one of the following:
 - “Remove an adapter from the PCI adapter single-width cassette” on page 177.
 - Remove the adapter filler panel from the cassette.
 - b. Ensure that all of the adapter retainers **A** have been pushed out to the edges of the cassette to allow the placement of the adapter. See Figure 136 on page 172.

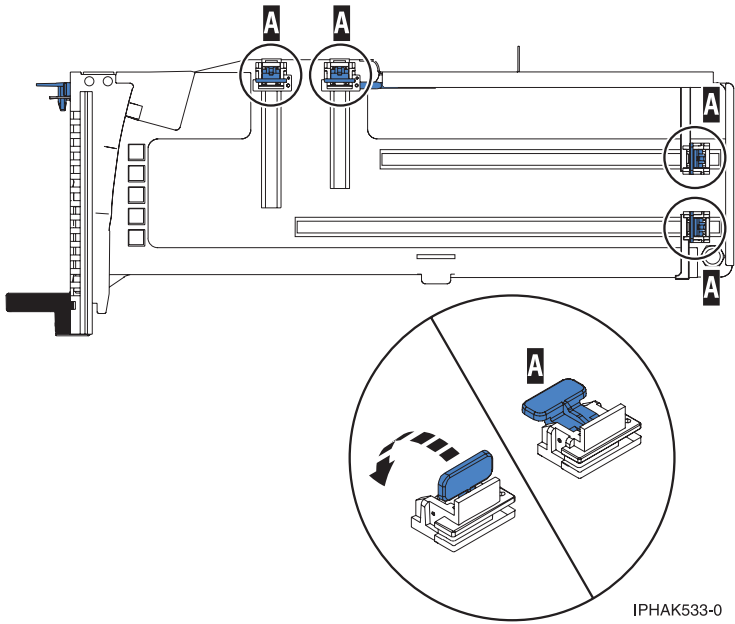


Figure 136. Adapter retainers

- c. Place the tailstock clamp in the open position by rotating the tailstock clamp into the open position.

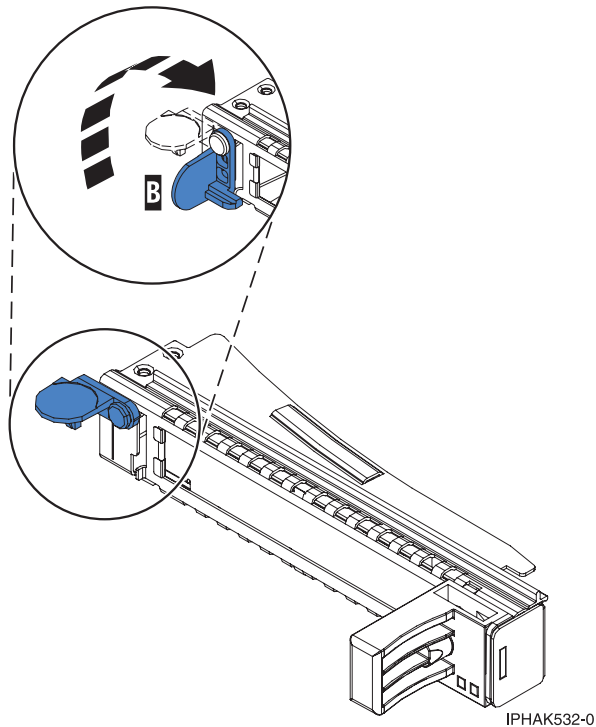
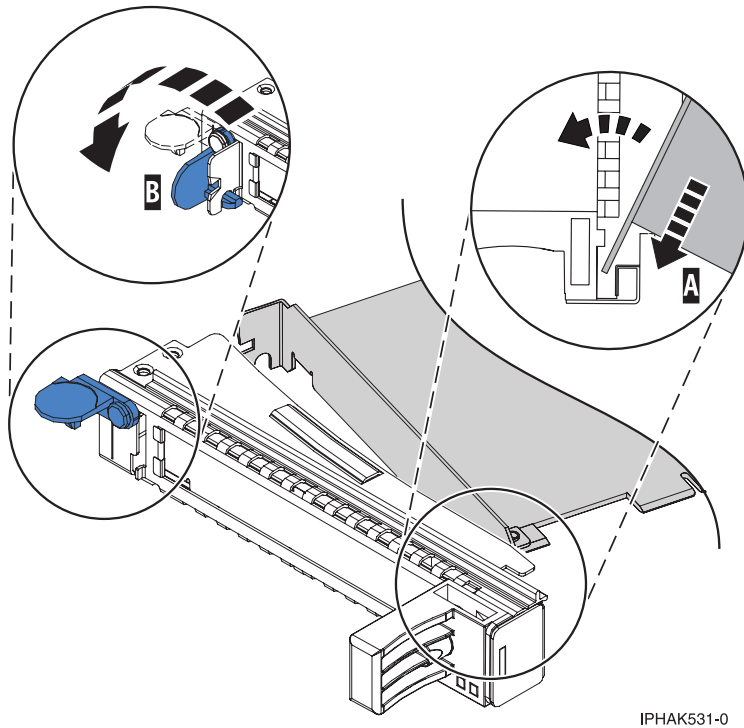


Figure 137. Tailstock clamp in the open position

- 6. Place the adapter in the cassette by doing the following:
 - a. With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel **A**. See Figure 138 on page 173.
 - b. Rotate the adapter toward the top of the cassette and into place.

c. Close the tailstock clamp **B**. See Figure 138.



IPHAK531-0

Figure 138. Adapter removed from the PCI adapter single-width cassette

d. Position the adapter retainers to support the adapter, and then rotate the retainer clip into the closed position.

Note:

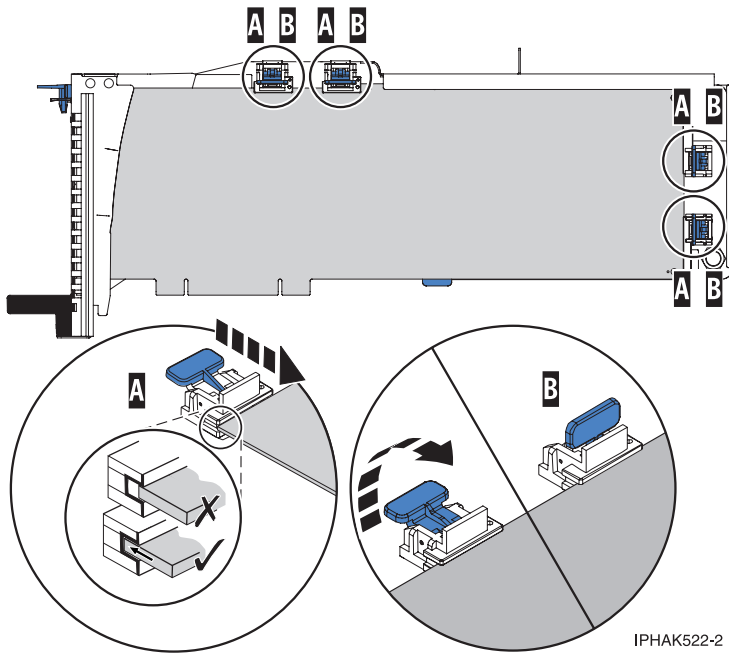
- 1) Two retainers are located at the top of the cassette, along the top edge of the adapter. Two more retainers are located at the edge of the cassette opposite of the adapter tailstock.
- 2) When the adapter retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide toward the adapter.
- 3) Place the retainers on the adapter according to the length of the adapter being used. Select the appropriate instructions:

Adapter-cassette retainer placement for large adapters

- a) Place and lock the retainers **B**. See Figure 139 on page 174.

Attention: Use of the lower corner support retainer might interfere with the docking of the PCI card when positioned within the system. Ensure the retainer does not interfere with the adapter connectors on the system backplane.

- b) Ensure the adapter edge is seated in each retainer groove **A**. If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.

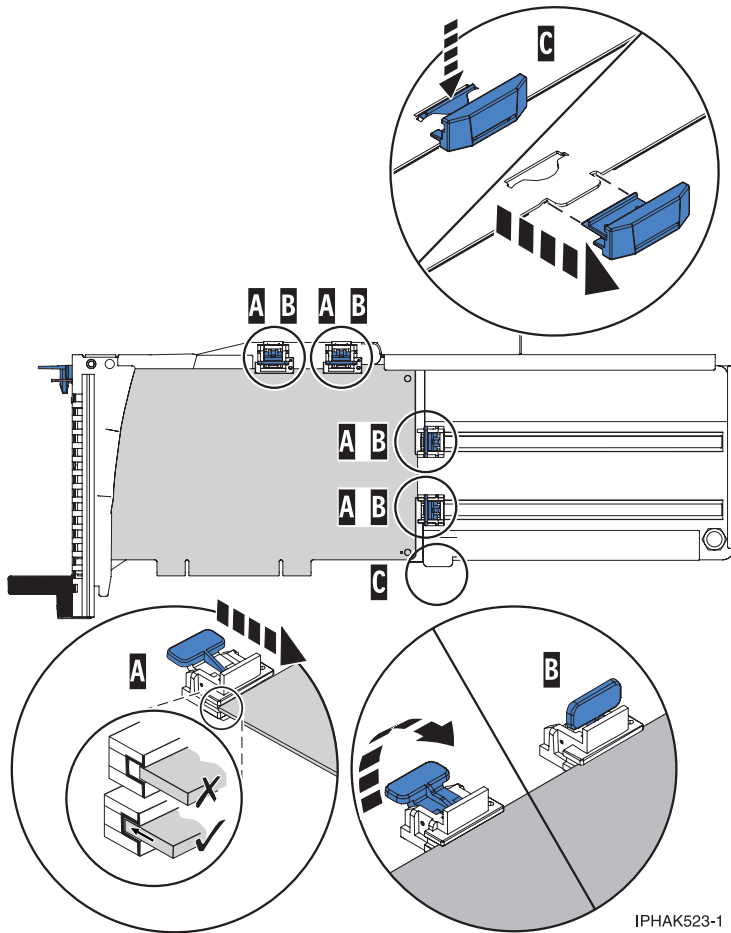


IPHA522-2

Figure 139. Long adapter in the PCI adapter cassette with the supports and stabilizer in place

Adapter-cassette retainer placement for mid-sized adapters

- a) Remove the adapter stabilizer **C**. See Figure 140 on page 175.
- b) Place and lock the retainers **B**.
- c) Ensure the adapter edge is seated in each retainer groove **A**. If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.

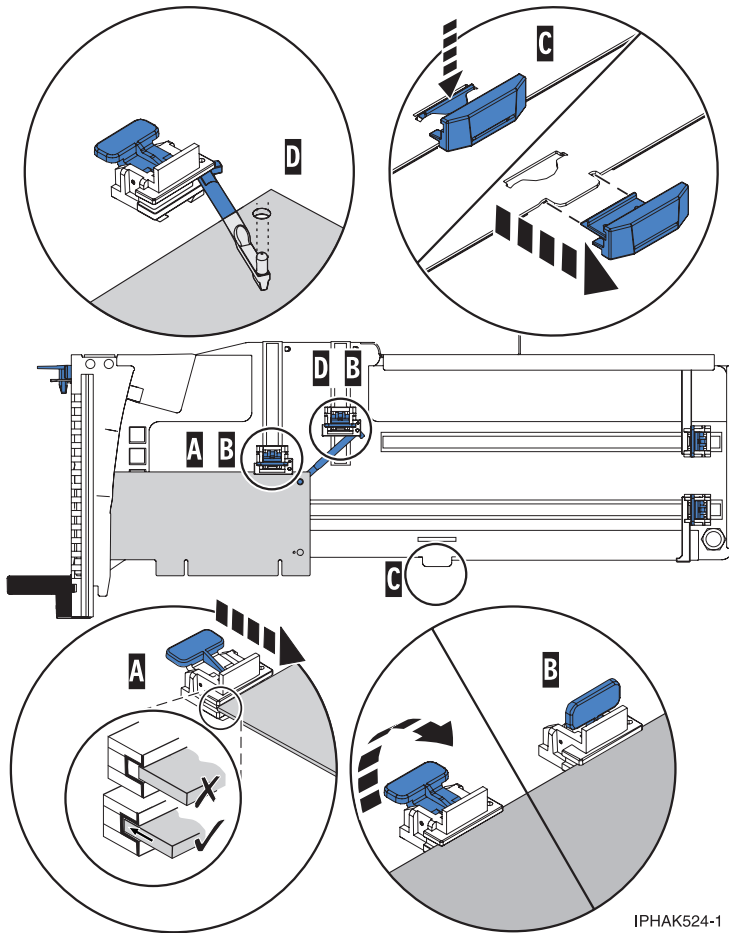


IPHAK523-1

Figure 140. Medium-length adapter in the PCI adapter cassette with the supports in place

Adapter-cassette retainer placement for small adapters

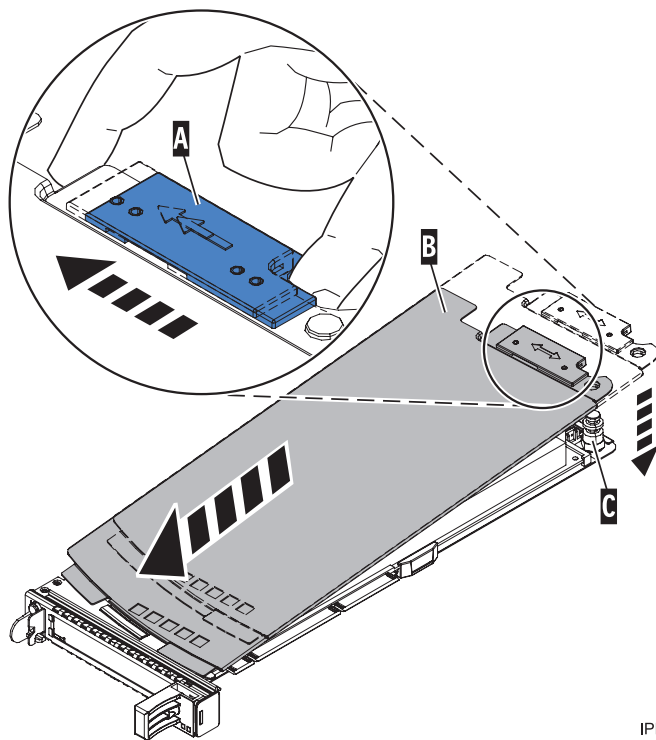
- Remove the adapter stabilizer **C**. See Figure 141 on page 176.
- Place the hookarm **D** into the hole in the corner of the adapter. This supports the card when it is undocked from the connector on the system backplane.
- Place and lock the retainers **B**.
- Ensure the adapter edge is seated in each retainer groove **A**. If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.



IPHA524-1

Figure 141. Short adapter in the PCI adapter cassette with the supports and the hookarm in place

7. Replace the cassette cover by doing the following:
 - a. Slide the cover **B** into position on the cassette as shown in the following figure.
 - b. While holding the cover latch **A** in the open position, place the cover over the pivot pin **C**.
 - c. Release the cover latch to lock the cover into place.



IPHA530-0

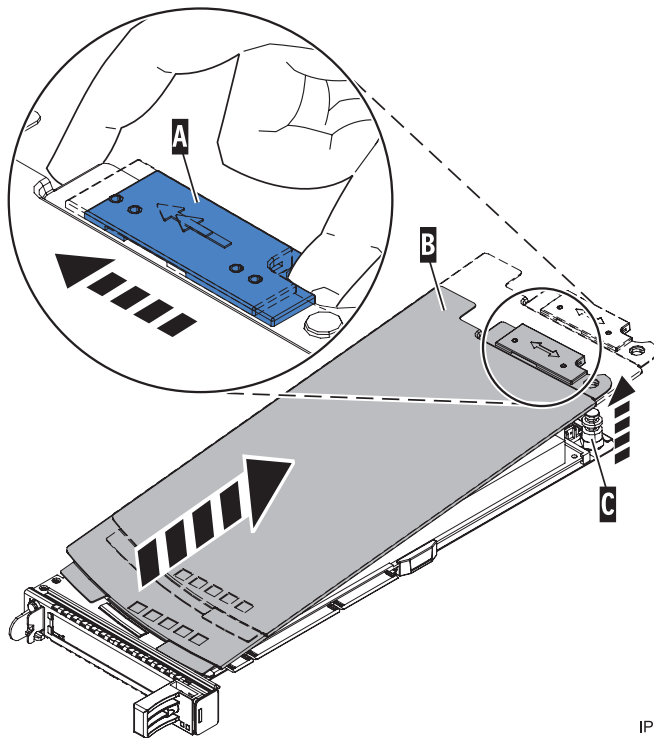
Figure 142. PCI adapter cassette cover replaced

Remove an adapter from the PCI adapter single-width cassette

You might need to remove a PCI adapter from a single-width cassette. Use the procedure in this section to perform this task.

To remove an adapter from the single-width cassette, do the following:

1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see “Avoiding electric shock” on page 190 and “Handling static-sensitive devices” on page 191.
3. “Remove a PCI adapter contained in a cassette from the system” on page 136.
4. Remove the cassette cover by doing the following:
 - a. Slide the cover latch **A** to disengage it from the pivot pin **C** as shown in the following figure.
 - b. Lift the cover **B** off the pivot pin.
 - c. Slide the cover off the cassette.



IPHAK520-0

Figure 143. PCI adapter cassette cover removed

5. Remove the adapter from the cassette by doing the following:

- a. Unlock the adapter retainers by rotating the retainer clip **A** into the horizontal position. See Figure 144 on page 179.

Note:

- 1) The edge of the adapter located at the end of the cassette that contains the cassette handles is called the adapter **tailstock**.
 - 2) Two retainers are located at the top of the cassette, along the top edge of the adapter. Two more retainers are located at the edge of the cassette opposite of the adapter tailstock.
 - 3) When the retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide away from the card.
 - 4) If the corner support retainer is used, unlock it, and then slide the corner support retainer away from the card.
- b. Push the adapter retainers **B** away from the adapter.
 - c. Unlock the adapter tailstock clamp **C**.
 - d. Rotate the adapter out of the cassette by grasping the edge of the adapter opposite the tailstock, and then firmly rotate the adapter toward the bottom of the cassette.
 - e. Lift the adapter out of the tailstock retaining channel.

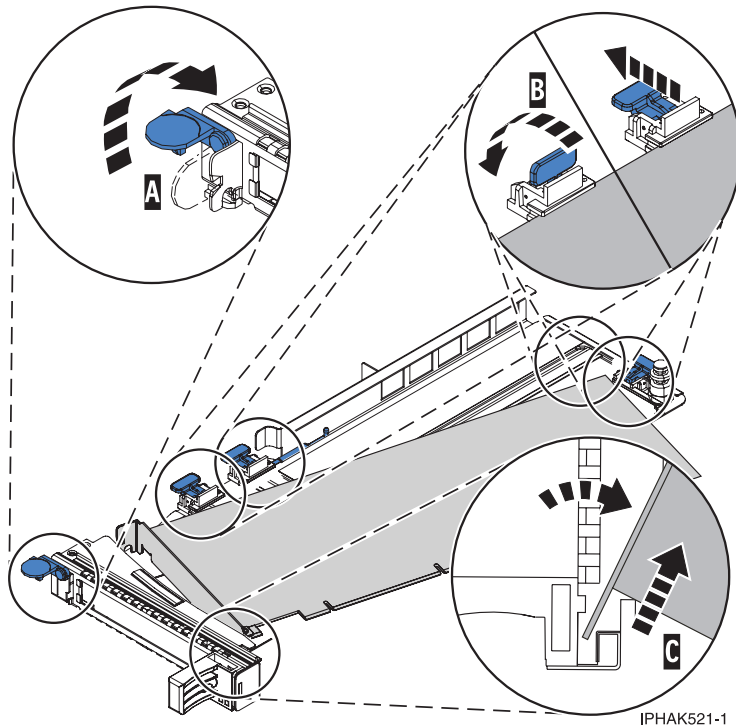


Figure 144. Adapter removed from the PCI adapter cassette

- f. Put the adapter in a safe place.

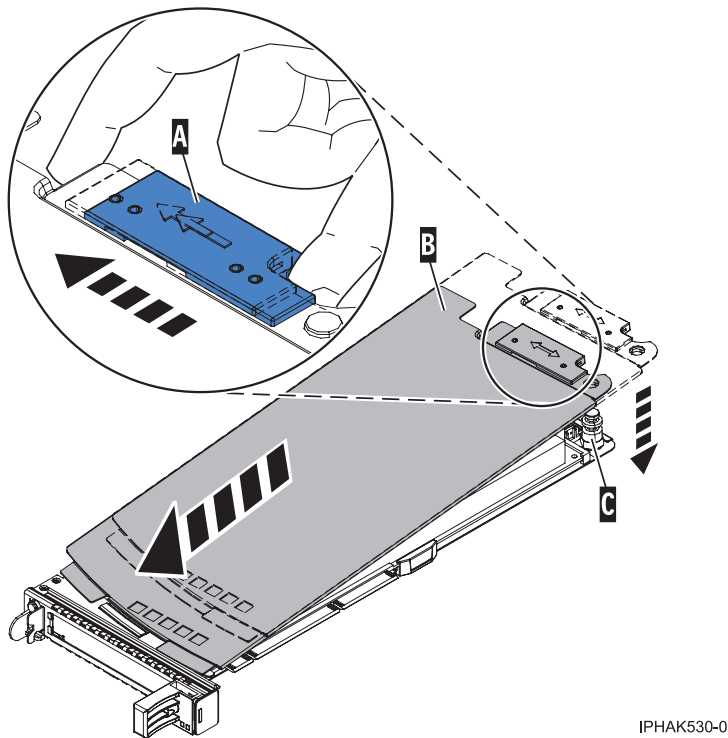
Attention: A cassette containing either a PCI adapter or filler panel must be placed in the PCI adapter slot of the system unit for proper air flow and cooling.

- g. “Place a PCI adapter in a single-width cassette” on page 171.

Note: If the cassette is not going to contain a PCI adapter, use this same procedure to place an adapter filler panel in the cassette.

- h. Replace the cassette cover by doing the following:

- 1) Slide the cover **B** into position on the cassette.
- 2) While holding the cover latch **A** in the open position, place the cover over the pivot pin **C**.
- 3) Release the cover latch to lock the cover into place.



IPHA530-0

Figure 145. PCI adapter cassette cover replaced

PCI adapter placement for servers system units and expansion units

Some adapters must be placed in specific PCI slots to function correctly or perform optimally. Use this information to determine where to install PCI adapters.

Model 17M/MA server

Some adapters must be placed in specific PCI, Peripheral Component Interconnect-X (PCI-X), or PCI Express (PCIe) slots in order to function correctly or perform optimally. Use this information to determine where to install PCI adapters.

PCI slot descriptions:

Figure 146 shows the back view of the system unit enclosure with the location codes for the PCI and GX+ slots. Table 11 on page 181 describes the slots. Each PCI-X DDR or PCIe is a separate PCI host bridge (PHB).

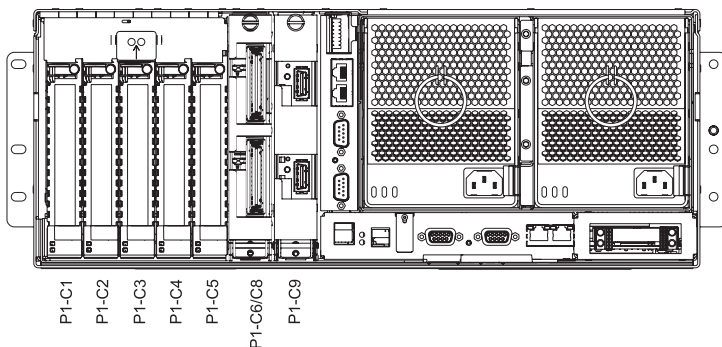


Figure 146. Back view of enclosure with location codes.

Table 11. PCI slot locations and descriptions

Slot #	Location code	Description	PHB	Adapter size
Slot 1	P1-C1	PCIe x8	PCIe PHB0	long
Slot 2	P1-C2	PCIe x8	PCIe PHB1	long
Slot 3	P1-C3	PCIe x8	PCIe PHB2	long
Slot 4	P1-C4	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB0	long
Slot 5	P1-C5	PCI-X DDR, 64-bit, 266 MHz	PCI-X PHB1	long
Slot 6	P1-C6	PCIe x8	PCIe PHB3	short
	P1-C8	GX+	NA	NA
Slot 7	P1-C9	GX+	NA	NA

- Slot 6 can be used for either a PCIe x8 adapter in connector P1-C6, or a GX+ adapter in connector P1-C8.
- All slots support Enhanced Error Handling (EEH).
- This system uses generation 3, blind swap cassettes to manage the installation and removal of adapters. Cassettes can be installed and removed without removing the drawer from the rack. Because of the cassettes, internal SCSI connectors on PCI storage adapters are not supported for use in this system.

Expansion units:

Each system unit enclosure supports up to eight I/O expansion units; models 11D/11, 11D/20, and 14G/30. I/O expansion units are usually required to achieve the maximum number of adapters listed in Table 12 on page 182.

The 7314-G30 attaches to a 12X Channel Adapter installed in one of the two GX slots available in each system unit enclosure.

The 7311 drawers attach to a RIO-2 Adapter installed in one of the two GX slots available in each system unit enclosure.

7311-D20 I/O drawers with RIO Ports to I/O Planer Riser Card (#6413) must be upgraded to RIO-2 Ports to I/O Planer Riser Card (#6417) before they can be attached to a servers server with POWER6 processors.

Some I/O adapters supported in the 7311-D11 and the 7311-D20 I/O drawers when attached to a server server will not be supported when attached to an servers server with POWER6 processors.

The maximum number of attached remote I/O drawers depends on the number of system unit enclosures in the system and the I/O attachment type.

- For RIO-2 attached I/O drawers:
 - Systems with one system unit enclosure:
 - With two processors, the enclosure supports up to 4 I/O drawers.
 - With four processors, the enclosure supports up to 8 I/O drawers.
 - Systems with two system unit enclosures support up to 12 I/O drawers.
 - Systems with three system unit enclosures support up to 16 I/O drawers.
 - Systems with four system unit enclosures support up to 20 I/O drawers.
- For 12X Host Channel attached I/O drawers:
 - Systems with one system unit enclosure:
 - With two processors, the system unit enclosure supports up to 4 I/O drawers.

- With four processors, the system unit enclosure supports up to 8 I/O drawers.
- Systems with two system unit enclosures support up to 16 I/O drawers.
- Systems with three system unit enclosures support up to 24 I/O drawers.
- Systems with four system unit enclosures support up to 32 I/O drawers.

PCI and PCI-X adapters:

Use this information to identify slot placement priorities and the maximum number of specified adapters allowed.

Up to four system units can be cabled together in a rack to form one system. The maximum number of adapters that are allowed can vary depending on whether the system is configured as a 4, 8, 12, or 16-way system. For example, if the maximum number of adapters allowed is 18 for a 4-way system, 28 for an 8-way system, 38 for a 12-way system, and 48 for a 16-way system, those maximums are expressed in the table as 18/28/38/48 per system. If only one number is listed per system, it means the maximum number of adapters allowed is the same for all configurations of the system.

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters

Feature	Description	System unit enclosure slot priority	Maximum number of adapters allowed
5721**	10 Gb-SR Ethernet PCI-X 2.0 DDR Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 18/28/38/48 per system
5722**	10 Gb-LR Ethernet PCI-X 2.0 DDR Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 18/28/38/48 per system
5719**	10 Gigabit-LR Ethernet PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 18/28/38/48 per system
5718**	10 Gigabit-SR Ethernet PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 18/28/38/48 per system
5740*	4-Port 10/100/1000 Base-TX PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 16/32/48/64 per system
5707*	2-Port Gigabit Ethernet-SX PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 32/64/96/128 per system
5706*	2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 32/64/96/128 per system
5701*	10/100/1000 Base-TX Ethernet PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 32/64/96/128 per system
5700*	Gigabit Ethernet-SX PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 32/64/96/128 per system
5759**	4 Gb Dual-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 38/76/102/128 per system
5758*	4 Gb Single-Port Fibre Channel PCI-X 2.0 DDR Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 38/76/102/128 per system
5716*	2 Gigabit Fibre Channel PCI-X Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 58/88/118/148 per system

Table 12. Adapter slot priorities and maximums for PCI and PCI-X adapters (continued)

Feature	Description	System unit enclosure slot priority	Maximum number of adapters allowed
5736*	PCI-X DDR 2.0 Dual Channel Ultra320 SCSI Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 58/88/118/148 per system
5712*	PCI-X Dual Channel Ultra 320 SCSI Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 62 per system
4764	PCI-X Cryptographic Coprocessor	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 16 per system
2737	Keyboard or mouse attachment adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 8 per system
2738	2 Port USB PCI Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 8 per system
2849	POWER™ GXT135P Graphics Accelerator with Digital Support	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 8 per system
2943	8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 18/26/34/42 per system
2947	ARTIC960Hx 4-Port Multiprotocol PCI Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 8/12/16/20 per system
5723	2-Port EIA-232 Asynch PCI Adapter	4, 5	<ul style="list-style-type: none"> • 2 per system unit enclosure (internal) • 18/26/34/42 per system
* High bandwidth adapter. See the “Performance notes” on page 184 before installing this adapter.			
**Extra-high bandwidth adapter. See the “Performance notes” on page 184 before installing this adapter.			

PCIe adapters:

Use this information to identify slot placement priorities and the maximum number of specified adapters allowed.

Up to four system units can be cabled together in a rack to form one system. Each system unit enclosure has four PCIe slots. Unless stated otherwise, the maximum number of PCIe adapters allowed is 4 for a 4-way system, 8 for an 8-way system, 12 for a 12-way system, and 16 for a 16-way system. Those maximums are expressed in the table as 4/8/12/16 per system. If only one number is listed per system, it means the maximum number of adapters allowed is the same for all configurations of the system.

Table 13. Adapter slot priorities and maximums for PCIe adapters

Feature	Description	System unit enclosure slot priority	Maximum number of adapters allowed
5767*	2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	1, 2, 3, 6	<ul style="list-style-type: none"> • 4 per system unit enclosure (internal) • 4/8/12/16 per system
5768*	2-Port Gigabit Ethernet-SX PCI Express Adapter	1, 2, 3, 6	<ul style="list-style-type: none"> • 4 per system unit enclosure (internal) • 4/8/12/16 per system

Table 13. Adapter slot priorities and maximums for PCIe adapters (continued)

Feature	Description	System unit enclosure slot priority	Maximum number of adapters allowed
5773*	4 Gigabit PCI Express Single Port Fibre Channel Adapter	1, 2, 3, 6	<ul style="list-style-type: none"> • 4 per system unit enclosure (internal) • 4/8/12/16 per system
5774**	4 Gigabit PCI Express Dual Port Fibre Channel Adapter	1, 2, 3, 6	<ul style="list-style-type: none"> • 4 per system unit enclosure (internal) • 4/8/12/16 per system
5748	POWER GXT145 PCI Express Graphics Accelerator	1, 2, 3, 6	<ul style="list-style-type: none"> • 4 per system unit enclosure (internal) • 4/8/8/8 per system
* High bandwidth adapter. See the “Performance notes” before installing this adapter.			
** Extra-high bandwidth adapter. See the “Performance notes” before installing this adapter.			

Performance notes:

Table 12 on page 182 and Table 13 on page 183 identify the slot placement priorities and the maximum number of specified adapters allowed for connectivity.

For optimum performance, you might want to further limit the total number of high bandwidth and extra-high bandwidth adapters. If you need to expand the system unit enclosures I/O capacity for extra-high bandwidth adapters, consider using high-performance I/O expansion units like the 14G/30, connected to the system unit enclosures using 12x host channel adapters.

The following four tables provide guidelines on the maximum number of high bandwidth and extra-high bandwidth adapters you can use and still maintain optimum performance. The expansion units can be 11D/11, 11D/20, or 14G/30, except where the 14G/30 is specifically called for.

Extra-high bandwidth storage adapters

Table 14. Maximum number of extra-high bandwidth storage adapters for best performance

System configuration	Adapters in system unit enclosures including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system unit enclosures plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in 14G/30 I/O expansion units connected to a GX adapter on slot P1-C9**	System maximum
2-way	6	3	6	NA	6
4-way	6	3	6	4	10
8-way	12	6	12	8	20
12-way	18	9	18	12	30
16-way	24	12	24	16	40
* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit’s internal slots.					
** Requires a GX Host Channel adapter in P1-C9 for each 4U system unit and one or more 14G/30 drawers per GX adapter.					

High bandwidth storage adapters

Table 15. Maximum number of high bandwidth storage adapters for best performance

System configuration	Adapters in system unit enclosures including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system unit enclosures plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in 14G/30 I/O expansion units connected to a GX adapter on slot P1-C9**	System maximum
2-way	6	6	12	NA	12
4-way	6	6	12	8	20
8-way	12	12	24	16	40
12-way	18	18	36	24	60
16-way	24	24	48	32	80

* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.

** Requires a GX Host Channel adapter in P1-C9 for each 4U system unit and one or more 14G/30 drawers per GX adapter.

Extra-high bandwidth Ethernet adapters

Table 16. Maximum number of extra-high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit enclosures including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system unit enclosures plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
2-way	2	2	2	NA	2
4-way	4	3	4	4	4
8-way	8	6	8	8	8
12-way	12	9	12	12	12
16-way	16	12	14	16	16

* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.

High bandwidth Ethernet adapters

Table 17. Maximum number of high bandwidth Ethernet adapters for best performance

System configuration	Adapters in system unit enclosures including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system unit enclosures plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
2-way	4	4	4	NA	4
4-way	6	6	6	6	8
8-way	12	12	12	12	16
12-way	18	18	18	18	24

Table 17. Maximum number of high bandwidth Ethernet adapters for best performance (continued)

System configuration	Adapters in system unit enclosures including both PCI-X and PCIe slots	Adapters in I/O expansion units connected to a GX adapter on slot P1-C8	Adapters in system unit enclosures plus I/O expansion units connected to a GX adapter on slot P1-C8*	Adapters in I/O expansion units connected to a GX adapter on slot P1-C9	System maximum
16-way	24	24	24	24	32
* The GX adapter in P1-C8 shares overall I/O bandwidth with the system unit's internal slots.					

11D/11 expansion unit

Use this information to learn about the PCI slots in the 11D/11 expansion unit.

PCI slot descriptions:

The following figure shows the back view of the expansion unit.

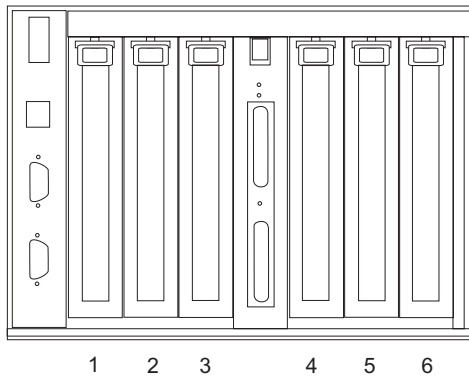


Figure 147. Back view

The following table describes the PCI slots and the PCI host bus (PHB) connections.

Table 18. PCI slot descriptions

PHB1			PHB2		
Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Long	Long	Long	Long	Long	Long
64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz
Un-P1-C1	Un-P1-C2	Un-P1-C3	Un-P1-C4	Un-P1-C5	Un-P1-C6
<ul style="list-style-type: none"> The 11D/11 can accommodate 6, generation 3 blind swap adapter cassettes. Cassettes can be installed and removed without removing the drawer from the rack. All slots are compatible with PCI and PCI-X adapters. Short adapters can go in short or long slots. All slots support Enhanced Error Handling (EEH). 					

Slot priorities:

Slot priority for all adapters is 1, 4, 2, 5, 3, and 6. For a list of supported adapters, refer to the placement information for the base system unit to which the expansion unit is attached. If the adapter is supported by the base unit, it is supported by the expansion unit. If the adapter is not supported by the base unit, it is not supported by the expansion unit.

11D/20 expansion unit

Use this information to learn about the PCI slots in the 11D/20 expansion unit.

PCI slot descriptions:

The following figure shows the back view of the expansion unit.

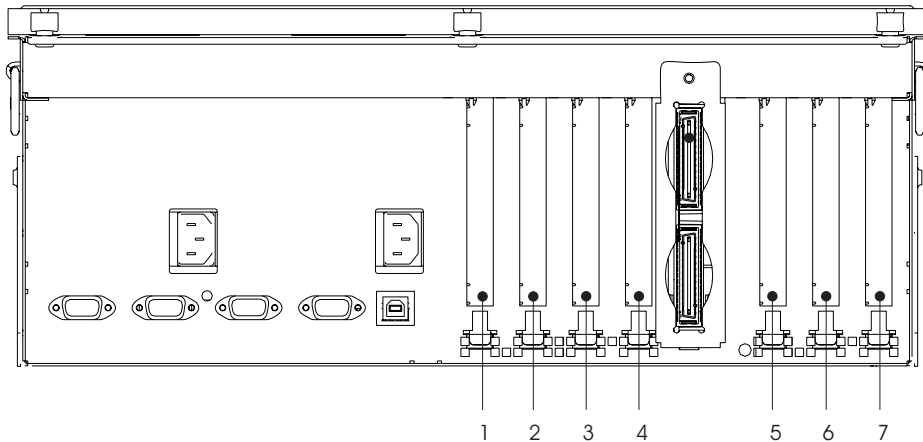


Figure 148. Back view

PCI slot description

The following table describes the PCI slots and the PCI host bus (PHB) connections.

Table 19. PCI slot descriptions

PHB1				PHB2		
Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7
Long	Long	Long	Long	Long	Long	Long
64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz	64-bit 3.3V, 133 MHz
Un-P1-C1	Un-P1-C2	Un-P1-C3	Un-P1-C4	Un-P1-C5	Un-P1-C6	Un-P1-C7

- All slots are compatible with PCI and PCI-X adapters.
- Short adapters can go in short or long slots.
- All slots support Enhanced Error Handling (EEH).

Slot Priorities:

Slot priority for all adapters is 1, 5, 2, 6, 3, 7, and 4. For a list of supported adapters, refer to the placement information for the base system unit to which the expansion unit is attached. If the adapter is supported by the base unit, it is supported by the expansion unit. If the adapter is not supported by the base unit, it is not supported by the expansion unit.

14G/30 expansion unit

Use this information to learn about the PCI slots in the 14G/30 expansion unit.

System description:

The 14G/30 expansion unit is a rack-mountable, I/O expansion drawer that is designed to be attached to the system unit using the InfiniBand bus and InfiniBand cables.

The 14G/30 can accommodate 6, generation 3 blind swap adapter cassettes. Cassettes can be installed and removed without removing the drawer from the rack.

The following figure shows the back view of the expansion unit.

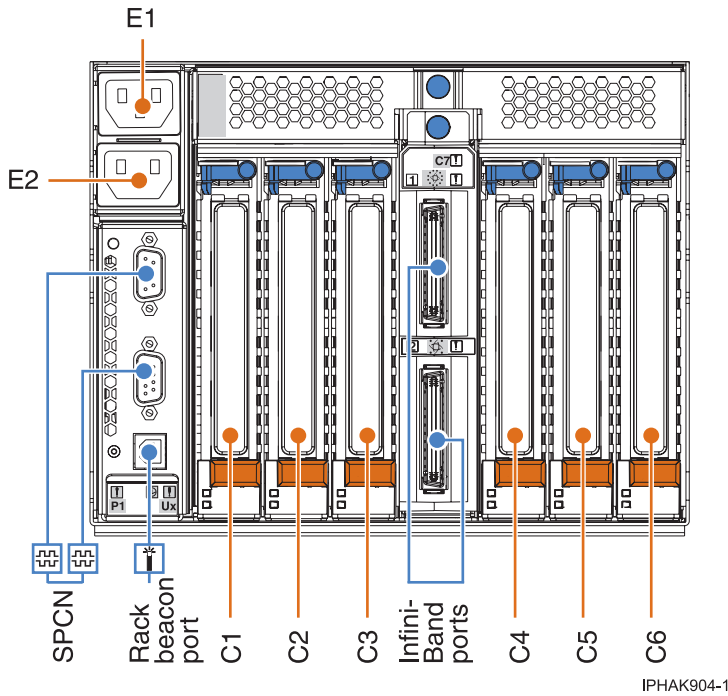


Figure 149. Back view

Table 20 describes the location codes that are shown in Figure 149.

Table 20. Location code descriptions

Location code	Description
C1, C2, C3, C4, C5, and C6	PCI-X DDR slots. See also “PCI slot descriptions.”
C7-T1 and C7-T2	12X Channel remote I/O ports
C8-T1 and C8-T2	Dual port SPCN connectors.
E1 and E2	Power supply connectors.

PCI slot descriptions:

The following table describes the PCI-X DDR slots.

Table 21. Slot properties

PHB2 A	PHB3 A	PHB4 A	PHB1 B	PHB2 B	PHB3 B
--------	--------	--------	--------	--------	--------

Table 21. Slot properties (continued)

Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
Long	Long	Long	Long	Long	Long
64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz	64-bit 3.3V, 266 MHz
C1	C2	C3	C4	C5	C6
<ul style="list-style-type: none"> • Each PCI-X DDR slot is a separate PCI host bus (PHB). • All slots are compatible with PCI and PCI-X DDR adapters. • Short adapters can go in long slots. 					

Slot priorities:

Slot priority for all adapters is 1, 2, 3, 4, 5, and 6. For a list of supported adapters, refer to the placement information for the base system unit to which the expansion unit is attached. If the adapter is supported by the base unit, it is supported by the expansion unit. If the adapter is not supported by the base unit, it is not supported by the expansion unit.

Common PCI Adapter procedures

This section contains all the common procedures related to installing, removing and replacing PCI Adapters.

Avoiding electric shock

Observe the follow precautions in order to avoid electric shock when working on or around the 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.

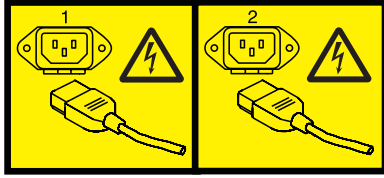
(D005a)

DANGER

To prevent a possible shock from touching two surfaces with different protective ground (earth), use one hand, when possible, to connect or disconnect signal cables. (D001)

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

(L003)



or



Handling static-sensitive devices

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

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
- When 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.
- Do not remove the device from the antistatic bag until you are ready to install the device in the system.
- With the device still in its antistatic bag, touch it to the metal frame of the system.
- Grasp cards and boards by the edges. Avoid touching the components and gold-edge connectors on the adapter.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system at the same time.
- Handle the devices carefully to prevent permanent damage.

PCI hot-plug manager access for AIX

You might need to service PCI adapters with the system power on in AIX. Use the procedures in this section to perform this task.

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

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

- *PCI Adapter Placement Guide*

Component LEDs

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

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

Green LEDs indicate either of the following:

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

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

Prerequisites for hot-plugging PCI adapters in Linux

In the course of installing, removing, or replacing a PCI adapter with the system power on in Linux you might need complete some prerequisite tasks. Use the information in this section to identify those prerequisites.

The Linux, system administrator needs to take the PCI adapter offline prior to removing, replacing, or installing a PCI adapter with the system power on (hot-plugging). Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

Before hot-plugging adapters for storage devices, ensure file systems on those devices are unmounted. After hot-plugging adapters for storage devices, ensure the file systems on those devices are remounted.

Before hot-plugging an adapter, ensure that the server or partition is at the correct level of the Linux operating system (Linux 2.6 or later).

Install the POWER Linux Service Aids. These service aids enable system serviceability, as well to improve system management.

If you are using a Linux on POWER distribution with Linux kernel version 2.6 or greater, you can install the Service Aids that gives you access to more capabilities, which can help you diagnose problems on your system.

This software is available at the Service and productivity tools for Linux on POWER Web site.

Verify that the Linux, hot-plug PCI tools are installed

In the course of installing, removing, or replacing a PCI adapter with the system power on in Linux you might need use the hot-plug PCI tools. Use the procedure in this section to verify that you have the hot-plug PCI tools installed.

1. Enter the following command to verify that the hot-plug PCI tools are installed:

```
rpm -aq | grep rpa-pci-hotplug
```

If the command does not list any rpa-pci-hotplug packages, the PCI Hot Plug tools are not installed.

2. Enter the following command to ensure that the rpaphp driver is loaded:

```
ls -l /sys/bus/pci/slots/
```

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

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

If the directory does not exist, run the following command to mount the filesystem:

```
mount -t sysfs sysfs /sys
```

3. Ensure the following tools are available in the `/usr/sbin` directory.
 - `lsslot`
 - `drslot_chrp_pci`
4. Return to the procedure that sent you here.

Open the model 05/95 or 50/9511D/20 service access cover

Learn how to open the service access cover to service the system unit.

The following procedure describes how to open the service access cover for the model 05/95 or 50/9511D/20 expansion units.

To open the service access cover, do the following:

1. Ensure the expansion unit in the service position as described in “Place the rack-mounted system or expansion unit in the service position” on page 312.
2. Loosen the three thumbscrews located on the cover at the back of the system.
3. Lift the cover into the open position.

Chapter 5. Media device

Learn how to install, or remove and replace a media device to add a device, replace a failed device, or as a part of another service action. Select the appropriate procedure from the instructions in this section.

Installing or replacing these features is a customer task. You can perform these tasks yourself, or contact a service provider to perform the task for you. You might be charged a fee by the service provider for these services.

Install a Slimline media device for model with the system powered off

You might want to install a media device with the power off. Use the procedure in this section to accomplish this task.

If your system is managed by the Hardware Management Console (HMC), you can use the HMC to complete the steps for installing a Slimline media device. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

To install a Slimline media device for models with the system or partition powered off, follow these steps from the system or partition that controls the media device:

Note: The only supports 1 Slimline media device per CEC.

1. Stop the system. For instructions, see “Stop the system or logical partition” on page 303.

Attention: Media devices are fragile. Handle with care.

2. Remove the system unit front cover. For instructions, see “Remove the front cover from the model ” on page 311.

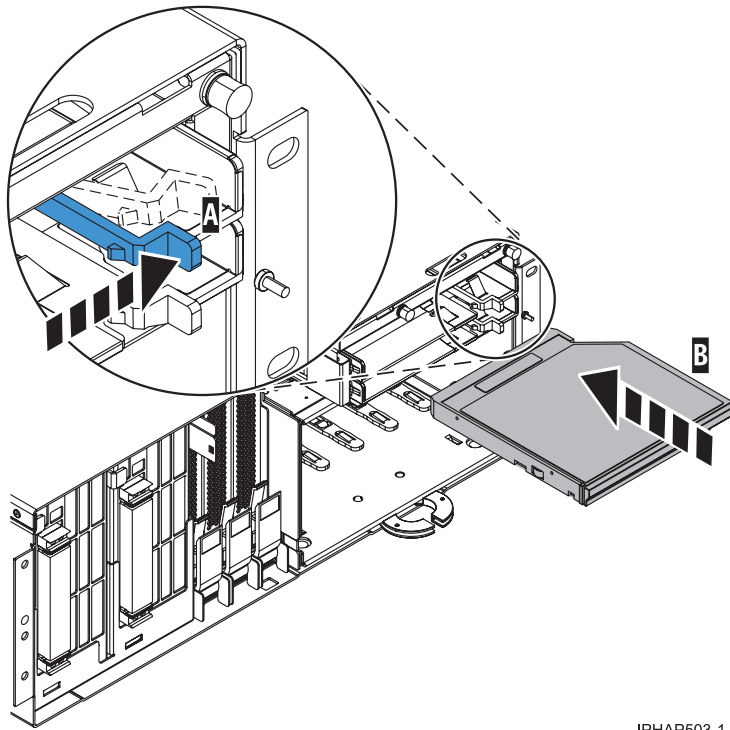
3. Find the package that contains the new media device and remove it from the static-protective package.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge 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.

4. Align the media device with the Slimline media bay and support the bottom of the device as you slide it halfway into the system unit.

5. While holding the retaining tab **A**, push the device **B** fully into the system as shown in the following figure.



IPHAP503-1

Figure 150. Slimline media-device installation

6. Start the system. For instructions on starting the system, see “Start the system or logical partition” on page 300.
7. Verify that the new resource is functional. Refer to “Verify the installed part” on page 319.
8. Replace the system unit front cover. For instructions, see “Install the front cover on the model ” on page 311.
9. Close the front rack door.

Chapter 6. Installing rack features

You might need to install a rack feature. This section includes procedures so that you can perform these tasks.

You can perform these tasks or contact a service provider to perform the tasks for you. You might be charged a fee by the service provider for this service.

Installing the rack

You might need to install the rack. Use the procedure in this section to perform this task.

Installing the 14T/00, 14T/42 0551, and 0553 racks

You might need to install the rack. Use the procedure in this section to perform this task.

If you are installing a rack security kit in this rack, see “Installing the rack security kit” on page 247 after you have installed the rack.

Before installing a rack, read the “Rack Safety Notices” on page 245.

Completing a parts inventory

You might need to complete a parts inventory. Use the procedure in this section to perform this task.

If you have not done so, complete a parts inventory before installing the system unit in the rack:

1. Locate the kitting report in an accessory box.
2. Ensure that you received all of the features that you ordered and all of the parts on the kitting report.

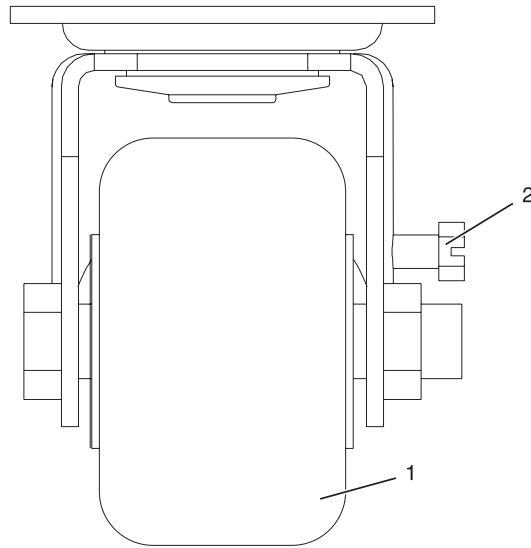
If there are incorrect, missing, or damaged parts then contact:

- Your reseller

Positioning the rack

You might need to position the rack. Use the procedure in this section to perform this task.

After the rack has been placed into its location on the floor, lock each caster by tightening the locking screw. See the following illustration for the locking screw location. Remove all of the tape and packing materials from the rack.



- 1 Caster
- 2 Locking screw

Figure 151. Tightening the locking screw.

Use the following to determine the next step:

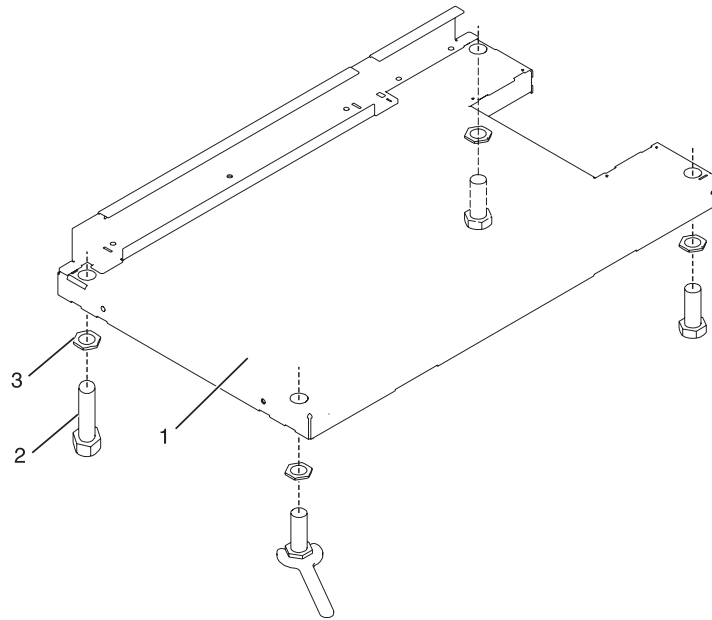
- If the rack is being bolted to a concrete floor, go to “Attaching the rack to a concrete floor” on page 200.
- If the rack is being bolted to a concrete floor beneath a raised floor, go to “Attaching the rack to the concrete floor beneath a raised floor” on page 205.
- If the rack is not being attached to the floor, go to “Leveling the rack.”

Leveling the rack

You might need to level the rack. Use the procedure in this section to perform this task.

To level the rack, complete the following steps:

1. Loosen the jam nut on each leveling foot.
2. Rotate each leveling foot downward until it contacts the surface on which the rack is placed.
3. Adjust the leveling feet downward as needed until the rack is level. When the rack is level, tighten the jam nuts against the base.



- 1 Rack Front (base)
- 2 Leveling Foot (quantity 4)
- 3 Jam Nut (quantity 4)

Figure 152. Adjusting the leveling feet.

Attaching the stabilizer brackets

You might need to attach the stabilizer brackets to the rack. Use the procedure in this section to perform this task.

If the front or back ac electrical outlets are going to be installed in the rack, you cannot attach the stabilizer brackets. The rack must be bolted to the floor.

Stabilizer brackets are used only if you will not be bolting the rack to the floor. If you are going to bolt the rack to the floor, go to “Attaching the rack to a concrete floor” on page 200.

To attach the stabilizer brackets to the bottom of the rack, do the following:

Note: Before installing the stabilizer brackets, refer to “Attaching the front or back ac electrical outlet” on page 209 for instruction on installing the ac outlet-mounting plates.

1. Align the slots of one of the stabilizer brackets with the mounting holes at the bottom front of the rack.
2. Install the two mounting screws.
3. Ensure that the base of the stabilizer bracket rests firmly on the floor. Use the Allen wrench that was supplied with the rack to tighten the mounting screws alternately until they are tight.

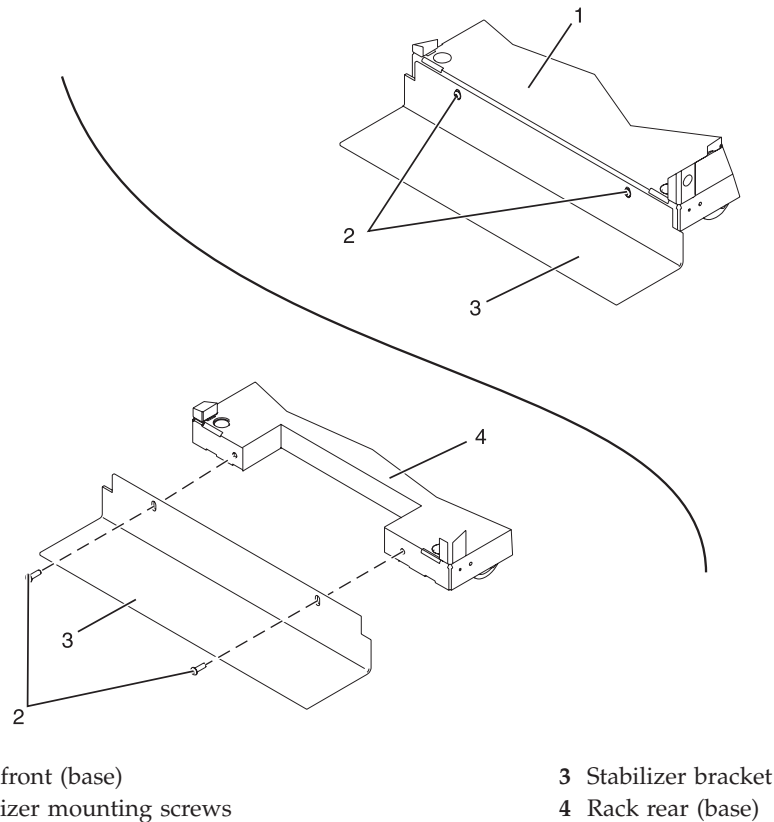


Figure 153. Attaching the stabilizer brackets.

4. To install the second stabilizer bracket on the back of the rack, repeat steps 1 through 3.

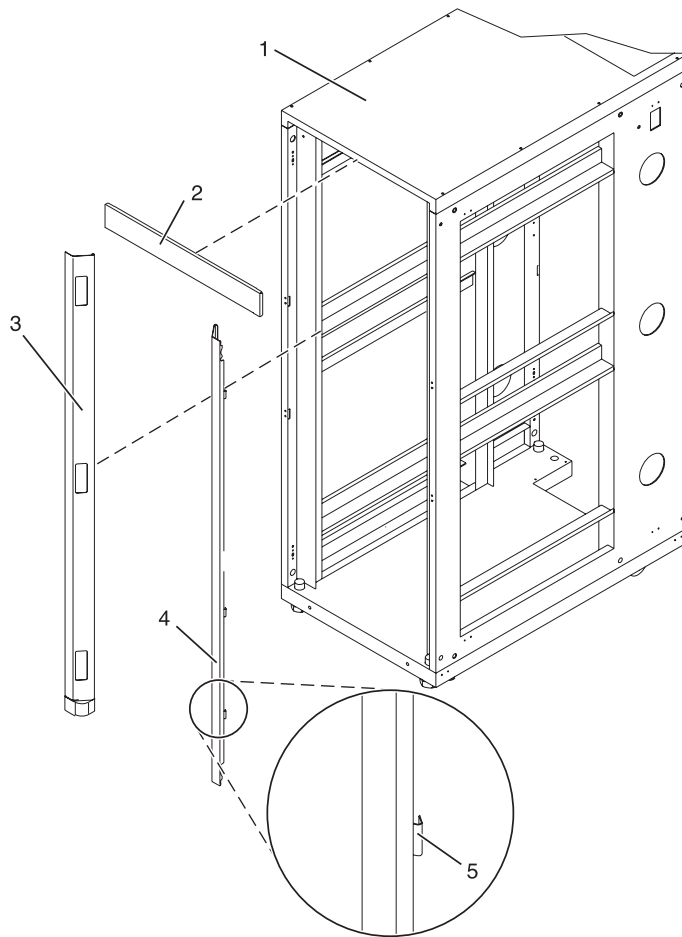
Attaching the rack to a concrete floor

You might need to attach the rack to a concrete floor. Use the procedure in this section to perform this task.

Obtain the services of a mechanical contractor to attach the rack-mounting plates to the concrete floor. The mechanical contractor needs to determine that the hardware being used to secure the rack-mounting plates to the concrete floor is sufficient to meet the requirements for the installation.

To attach the rack to a concrete floor, do the following:

1. Put the rack in its predetermined location, and tighten the locking screws on the casters.
2. If installed, remove the top, left, and right trim panels. The trim panels are held in place with spring clips. See the following illustration.



- 1 Rack chassis
- 2 Top trim panel
- 3 Left-side trim panel

- 4 Right-side trim panel
- 5 Spring clip

Figure 154. Removing the trim panels.

3. If installed, remove the front and back doors. To remove a rack door, go to “Attaching the rack doors” on page 244. After the rack doors have been removed, go to the next substep.
4. Locate the hardware mounting kit and the two mounting plates. Refer to the following illustration when reviewing the contents of the hardware mounting kit. The mounting hardware kit contains the following:
 - 4 Rack-mounting bolts
 - 4 Thin washers
 - 8 Plastic isolator bushings
 - 4 Thick washers
 - 4 Spacers
5. If you are installing an ac-powered rack, temporarily install the lower plastic isolator bushings to help you locate the mounting locations for the stabilizer bracket. After the stabilizer bracket has been correctly located, remove the lower plastic isolator bushings.

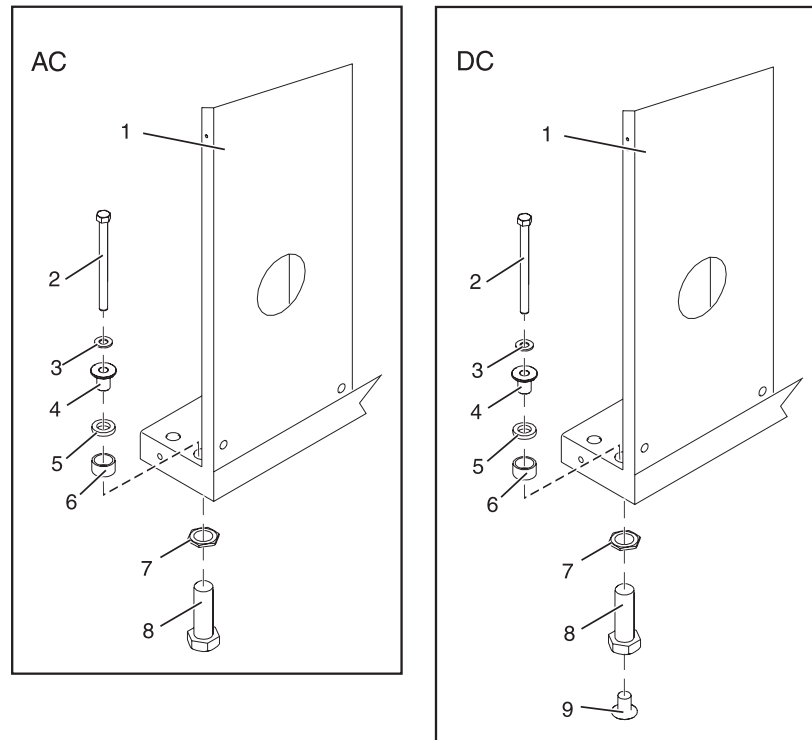
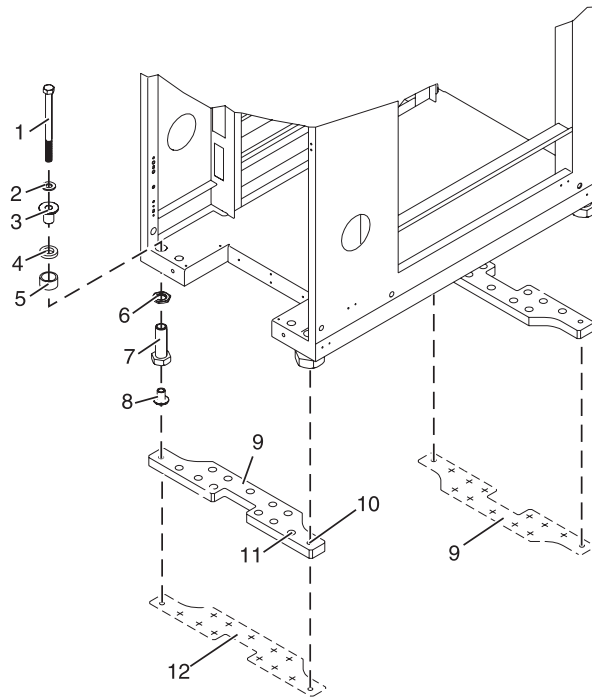


Figure 155. Installing ac-power mounting plates

- 1 Rack chassis
- 2 Rack-mounting bolt
- 3 Thin washer
- 4 Top plastic isolator bushing
- 5 Thick washer
- 6 Spacer

- 7 Jam nut
- 8 Leveling foot
- 9 Lower plastic isolator bushing (used only on dc powered systems)
- AC Typical leveling foot installation for an ac-powered rack
- DC Typical leveling foot installation for a dc-powered rack

6. Position the two mounting plates in the approximate mounting location under the rack.
7. Create a rack-mounting bolt assembly by adding the following items, in the order listed, to each rack-mounting bolt.
 - a. Thin flat washer
 - b. Top plastic isolator bushing
 - c. Thick flat washer
 - d. Spacer
8. Insert a rack-mounting bolt assembly through each of the leveling feet.
9. Reposition the rack-mounting plates under the four rack-mounting bolts so that the mounting bolts are centered directly over the threaded bolt holes.
10. Turn the rack-mounting bolts four complete turns into the mounting plate's threaded bolt holes.



- | | |
|--------------------------------|--|
| 1 Rack-mounting bolt | 7 Leveling foot |
| 2 Thin washer | 8 Lower plastic isolator bushing (Used only on dc powered systems) |
| 3 Top plastic isolator bushing | 9 Mounting plate |
| 4 Thick washer | 10 Threaded hole (Used to secure the rack to stabilizer bracket.) |
| 5 Spacer | 11 Anchor bolt hole |
| 6 Jam nut | 12 Traced pattern (Pattern to be traced onto the floor using the stabilizer bracket as a template) |

Figure 156. Securing the rack to the floor.

11. Mark the floor around the edges of both stabilizer brackets.
12. Mark the plate bolt-down holes that are accessible through the opening in the rear of the rack.
13. Remove the rack-mounting bolt assemblies.
14. If you are installing an ac-powered rack, remove the bottom isolator bushing from each of the leveling feet.
15. Remove the stabilizer brackets from the marked locations.
16. Loosen each of the locking screws on the casters.
17. Move the rack so that it is clear of both areas that were marked on the floor for the stabilizer brackets locations.
18. Reposition the stabilizer brackets within the marked areas.
19. Mark the floor at the center of all holes in both stabilizer brackets.
20. Remove the two rack-mounting plates from the marked areas.
21. At the marked location of the threaded rack-mounting bolt holes, drill four clearance holes into the concrete floor. Each clearance hole should be approximately 1-inch deep. This allows the rack-mounting bolts enough room to protrude past the thickness of the stabilizer brackets.

Note: You *must* use a minimum of two anchor bolts for each rack-mounting plate to securely attach the plate to the concrete floor. Because some of the holes in each rack-mounting plate may align with concrete reinforcement rods embedded in the concrete, some of the rack-mounting plate holes may not be usable.

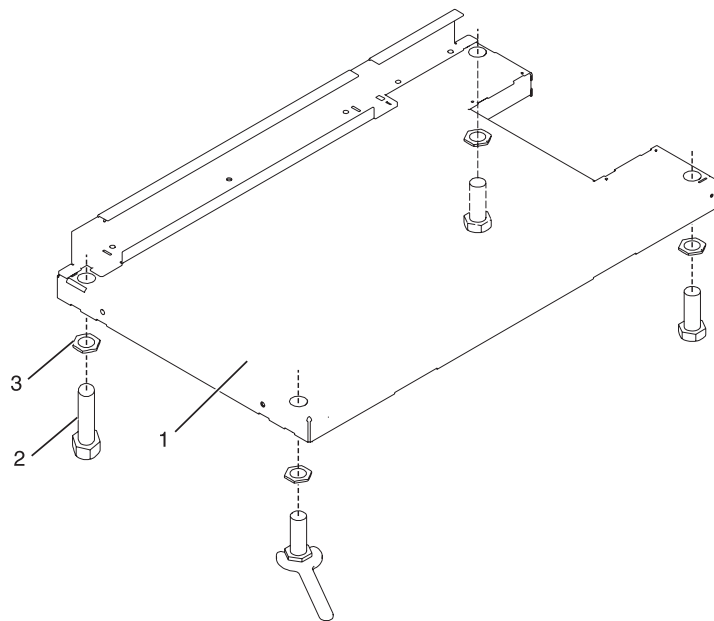
22. Select at least two suitable hole locations for each stabilizer bracket bolt. The selected locations should be as close to the threaded bolt holes as possible. Be sure that the holes selected at the back of the rack are accessible. Drill holes at the selected locations into the concrete floor.

Note: The size of the anchor bolts and concrete anchors *must* be determined by the mechanical contractor doing the installation.

23. Position the stabilizer brackets over the concrete anchors.
24. Securely bolt the front stabilizer bracket to the concrete floor.
25. Position the stabilizer bracket over the concrete anchors.
26. Securely bolt the back stabilizer bracket to the concrete floor.

Note: The size of the anchor bolts and concrete anchors *must* be determined by the mechanical contractor doing the rack-mounting plate installation.

27. Position the rack over the stabilizer bracket.
28. Insert each of the stabilizer bracket bolts through a flat washer, a plastic isolator bushing and a thick washer, and through a leveling foot.
29. Align the four stabilizer brackets bolts with the four tapped holes in the two mounting plates and turn three to four rotations.
30. Tighten the locking screw on each caster.
31. Adjust the leveling feet downward as needed until the rack is level. When the rack is level, tighten the jam nuts against the base of the rack.



- 1 Rack front (base)
- 2 Leveling foot (quantity 4)
- 3 Jam nut (quantity 4)

Figure 157. Adjusting the leveling feet.

32. If you have multiple racks that are connected in a suite (bolted to each other), go to “Connecting multiple racks with rack-to-rack attachment kit” on page 253. Otherwise, torque the four bolts to 40-50 ft-lbs (54-67 nm).
33. If you are not installing doors on your rack, install the top, left, and right trim panel.
34. Connect the power distribution system as described in “Connecting the power distribution system” on page 209.
35. After all racks are bolted down, go to “Attaching the front or back ac electrical outlet” on page 209.
36. If you are not going to attach a front electrical outlet and you are installing rack doors, go to “Attaching the rack doors” on page 244

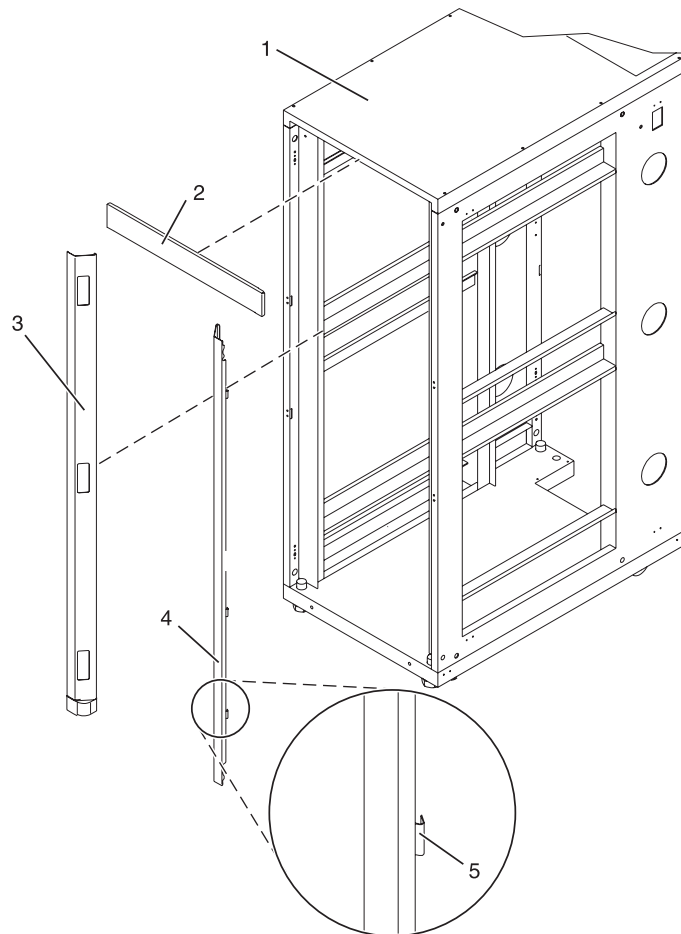
Attaching the rack to the concrete floor beneath a raised floor

You might need to attach the rack to the floor. Use the procedure in this section to perform this task.

Obtain the services of a mechanical contractor to attach the rack-mounting plates to the concrete floor. The mechanical contractor needs to determine that the hardware being used to secure the rack-mounting plates to the concrete floor is sufficient to meet the requirements for the installation.

To attach the rack to a concrete floor beneath a raised floor, do the following:

1. Put your rack in its predetermined location and tighten the locking screws on the casters.
2. If installed, remove the top, left and right trim panels. The trim panels are held in place with spring clips. See the following illustration.



1 Rack chassis
2 Top trim panel

4 Right-side trim panel
5 Spring clip

3 Left-side trim panel

Figure 158. Removing the trim panels.

3. If installed, remove the front and rear doors. To remove a rack door, go to “Attaching the rack doors” on page 244. After the rack doors have been removed, go to the next substep.
4. Locate the hardware mounting kit and the two mounting plates. Refer to the following illustration when reviewing the contents of the hardware mounting kit. The mounting hardware kit contains the following:
 - Four rack-mounting bolts
 - Four thin washers
 - Eight plastic isolator bushings
 - Four thick washers
 - Four spacers
5. If you are installing an ac-powered rack, temporarily install the lower plastic isolator bushings to help you locate the rack-mounting plate. After the mounting plate has been correctly located, remove the lower plastic isolator bushings.

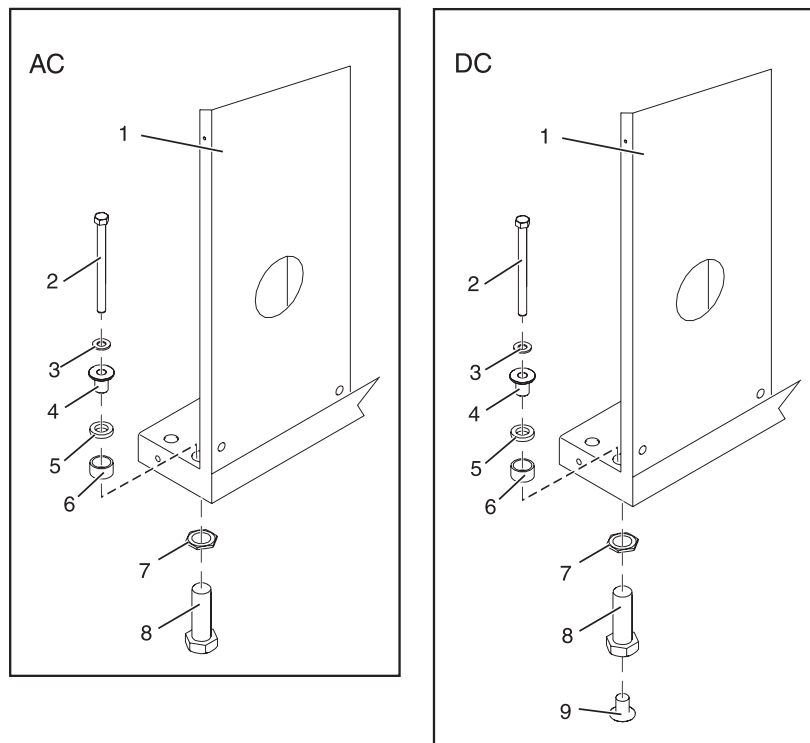


Figure 159. Installing the ac power-mounting plates.

- 1 Rack chassis
- 2 Rack-mounting bolt
- 3 Thin washer
- 4 Top plastic isolator bushing
- 5 Thick washer

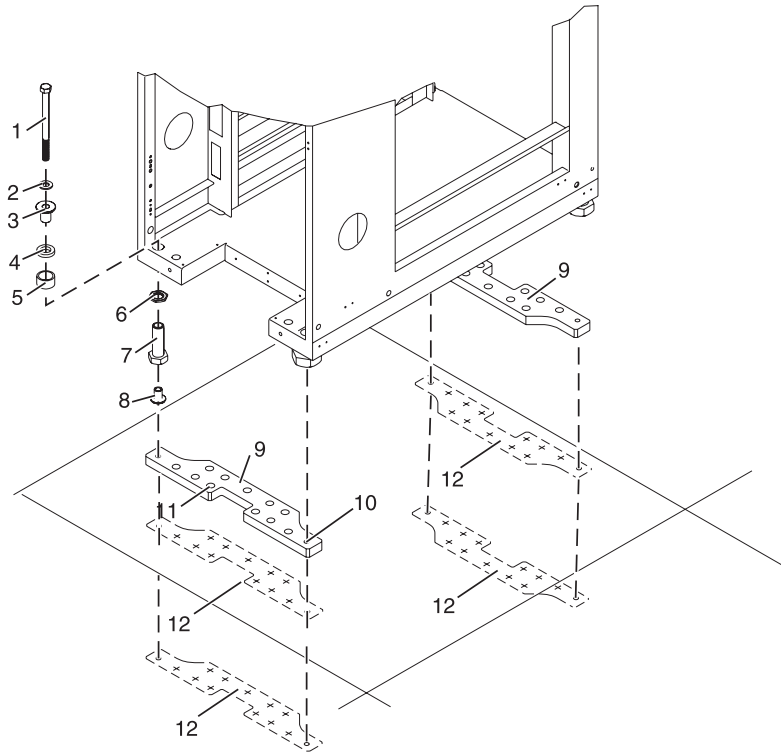
- 7 Jam nut
 - 8 Leveling foot
 - 9 Lower plastic isolator bushing (used only on dc powered systems)
- AC Typical leveling foot installation for an ac-powered rack
- DC Typical leveling foot installation for a dc-powered rack

6 Spacer

6. Position the two mounting plates in the approximate mounting location under the rack.
7. Create a rack-mounting bolt assembly by adding the following items, in the order listed, to each rack-mounting bolt.
 - a. Thin flat washer
 - b. Top plastic isolator bushing
 - c. Thick flat washer
 - d. Spacer
8. Insert a rack-mounting bolt assembly through each of the leveling feet.
9. Reposition the rack-mounting plates under the four rack-mounting bolts so that the mounting bolts are centered directly over the threaded bolt holes.
10. Turn the rack-mounting bolts four complete turns into the mounting plate's threaded bolt holes.
11. Mark the raised-floor panel around the edges of front and back rack-mounting plates.
12. Mark the plate bolt-down holes that are accessible through the opening in the back of the rack.
13. Remove the rack-mounting bolt assemblies.
14. If you are installing an ac-powered rack, remove the bottom isolator bushing from each of the leveling feet.
15. Remove the rack-mounting plates from the marked locations.
16. Loosen each of the locking screws on the casters.
17. Move the rack so that it is clear of both areas that were marked on the floor for the rack-mounting plate locations.
18. Reposition the mounting plates within the marked areas.
19. Mark the raised-floor panel at the center of each hole in the rack-mounting plates (including the tapped holes).
20. Remove the two rack-mounting plates from the marked locations on the raised floor panel.
21. Drill two clearance holes on each end of each rack-mounting plate. The drilled holes should be approximately 1-inch deep. This will accommodate any rack-mounting bolt extending past the rack-mounting plate when securing the rack to the rack-mounting plate.
22. For each rack-mounting plate, select at least two suitable hole locations. Select the hole locations as close to the threaded hole areas as possible. Be sure the hole locations selected at the back of the rack are accessible.
23. Drill pass-through holes in the raised-floor panel. The pass-through holes allow the anchor bolts to be inserted into the rack-mounting plate and pass through the raised floor panel to the concrete floor.

Note: You *must* use a minimum of two anchor bolts for each rack-mounting plate to securely attach the rack-mounting plate through the raised-floor panel to the concrete floor. Because some of the holes in each rack-mounting plate may align with concrete reinforcement rods imbedded in the concrete, some of the rack-mounting plate holes may not be usable.

24. Transfer the locations of the anchor bolt holes (exclude the clearance holes drilled for the rack-mounting bolts) from the raised-floor panel to the concrete floor directly beneath, and mark the hole locations on the concrete floor.
25. Drill holes in the concrete floor to secure the anchor bolts.
26. Position the raised-floor panel back into position over the anchor bolt holes.
27. Position the front stabilizer bracket within the marked area on the raised-floor panel.
28. Using your anchor bolts, secure the front stabilizer brackets on top of the raised floor and through to the concrete floor.
29. Position the rear stabilizer brackets within the marked area on the raised-floor panel.



- | | |
|--------------------------------|--|
| 1 Rack-mounting bolt | 7 Leveling foot |
| 2 Thin washer | 8 Lower plastic isolator bushing (used only on dc-powered systems) |
| 3 Top plastic isolator bushing | 9 Stabilizer brackets |
| 4 Thick washer | 10 Threaded hole (used to secure the rack to mounting plate.) |
| 5 Spacer | 11 Anchor bolt hole |
| 6 Jam nut | 12 Traced pattern (pattern to be traced onto the floor using the mounting plate as a template) |

Figure 160. Securing the rack to the floor.

30. Using your anchor bolts, secure the back stabilizer bracket on top of the raised floor and through to the concrete floor.
31. Replace all raised-floor panels that may have been removed when aligning and securing the anchor bolts to the concrete floor.
32. Align the rack over the front and back stabilizer brackets.
33. Insert each of the bolt assemblies through a leveling foot.
34. Align the rack-mounting bolts with the threaded holes in each stabilizer bracket. Turn each bolt three to four rotations.
35. Tighten the locking screw on each caster.
36. Adjust the leveling feet downward as needed until the rack is level. When the rack is level, tighten the jam nuts against the base of the rack.
37. If you have multiple racks that are connected as a suite (bolted to each other), go to “Connecting multiple racks with rack-to-rack attachment kit” on page 253. Otherwise, torque the four bolts to 40-50 ft-lbs (54-67 nm).
38. If you are not installing doors on your rack, install the top, left, and right trim panel.

39. Connect the power distribution system as described in “Connecting the power distribution system.”
40. After the rack is bolted down and you are going to attach a front electrical outlet, go to “Attaching the front or back ac electrical outlet.”
41. If you are not going to attach a front electrical outlet and you are installing rack doors, go to “Attaching the rack doors” on page 244.

Connecting the power distribution system

You might need to connect a power distribution system. Use the procedure in this section to perform this task.

Checking the ac outlets

You might need to check the ac outlets. Use the procedure in this section to perform this task.

Before plugging the rack into the ac power source, complete the following checks on the ac power source.

1. Turn off the branch circuit breaker for the ac power outlet that the rack will plug into. To the circuit breaker switch, attach tag S229-0237, which reads “Do Not Operate.”

Note: All measurements are made with the receptacle faceplate in the usual installed position.

2. Some receptacles are enclosed in metal housings. For this type of receptacle, do the following:
 - a. Check for less than 1 volt from the receptacle case to any grounded metal structure in the building, such as a raised-floor metal structure, water pipe, building steel, or similar structure.
 - b. Check for less than 1 volt from the receptacle ground pin to a grounded point in the building.

Note: If the receptacle case or faceplate is painted, be sure the probe tip penetrates the paint and makes good electrical contact with the metal.

- c. Check the resistance from the receptacle ground pin to the receptacle case. Check resistance from the ground pin to the building ground. The readings should be less than 1.0 ohm, which indicates the presence of a continuous grounding conductor.
3. If any of the three checks made in substep 2 are not correct, ask the customer to remove the power from the branch circuit and make the wiring corrections; then check the receptacle again.

Note: Do not use a digital multimeter to measure grounding resistance in the following steps.

4. Check for infinite resistance between the ground pin of the receptacle and each of the phase pins. This is a check for a wiring short to ground or a wiring reversal.
5. Check for infinite resistance between the phase pins. This is a check for a wiring short.
6. Turn on the branch circuit breaker. Measure for the appropriate voltages between phases. If no voltage is present on the receptacle case or grounded pin, the receptacle is safe to touch.
7. With an appropriate meter, verify that the voltage at the ac outlet is correct.
8. Verify that the grounding impedance is correct by using the ECOS 1020, 1023, B7106, C7106, or an appropriately approved ground-impedance tester.

Attaching the front or back ac electrical outlet

You might need to attach an ac outlet. Use the procedure in this section to perform this task.

Attention: The front and back ac outlet-mounting plates mount through the same mounting holes in that secure the stabilizer brackets to the rack chassis. Therefore, if the rack must be bolted to the floor, the stabilizer brackets must be removed.

Install the ac outlet-mounting plates only after the rack has been bolted to the floor and the stabilizer brackets have been removed.

The following items are installed at the customer’s site:

- The ac outlet-mounting plates for installing customer-supplied ac electrical outlets on the front or back of the rack. The ac outlet-mounting plate provides the mounting location for an ac electrical outlet.
- The brass ground lug for an electrostatic discharge (ESD) connection.

Note: The customer is responsible for providing both the outlets and the power cables that attach to the power source. The customer is also responsible for connecting the ac outlet correctly. These items are not field-replaceable units (FRUs).

Installing the ac outlet-mounting plates with ac outlets:

You might need to install ac mounting plates. Use the procedure in this section to perform this task.

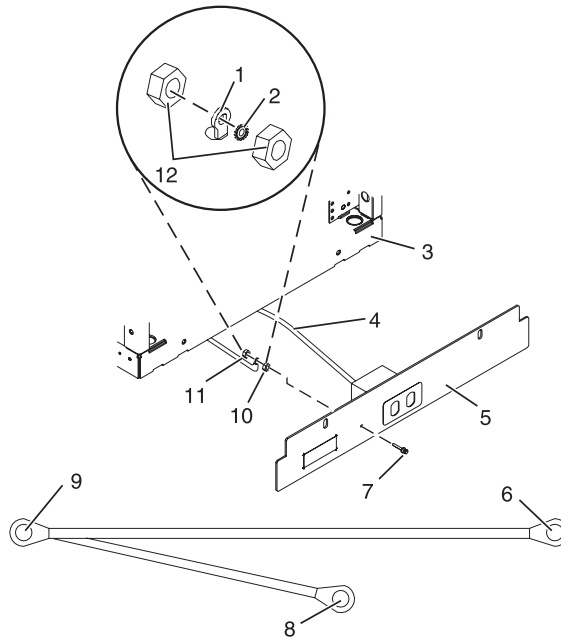
If you do not want ac outlets installed on the rack, go to “Installing the ac outlet-mounting plate without ac outlets” on page 212.

If you want ac outlets installed on the front or back ac outlet-mounting plate, do the following:

1. Determine the number of ac outlets that you are installing.
2. Confirm with your contractor that the number and location of ac outlets to be installed are correct.
3. Remove the blank filler plates from the ac outlet-mounting plates for the number of ac outlets being installed.
4. Install the ac outlets on the ac outlet-mounting plate.
5. Install the ground lug in the ac outlet-mounting plate using only one nut, as shown in the following illustration.
6. Securely tighten the one nut on the ground lug.
7. Locate the “Y”-shaped ground cable supplied with the mounting plate.

Note: The following steps can be used to install ac outlets on the front or the back of the rack.

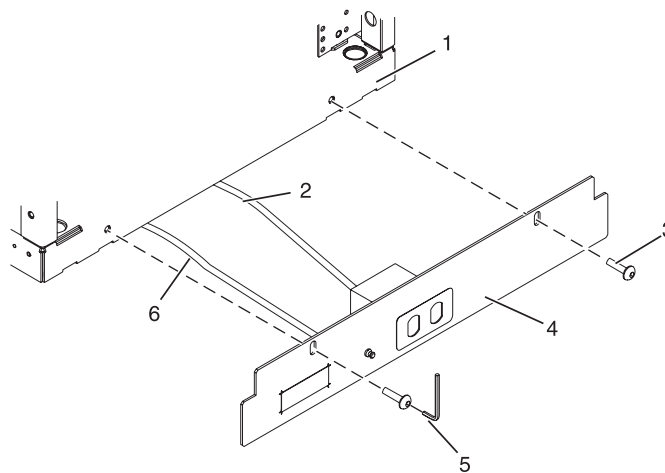
8. Place the star washer onto the ground lug of the front ac outlet-mounting plate.
9. Place the lug on the long end of the ground cable onto the ground lug.
10. Place a ground lug nut onto the ground lug and securely tighten it.
11. Position the front ac outlet-mounting plate onto the rack frame with the ground lug fully inserted through the mounting holes in the rack.
12. Route the cable under the rack.
13. Place the star washer onto the ground lug of the back ac outlet-mounting plate.
14. Place the lug on the short end of the ground cable onto the ground lug.
15. Place a ground lug nut onto the ground lug and securely tighten it.



- | | |
|-------------------------------------|--|
| 1 Ground cable lug | 7 Ground lug |
| 2 Star washer | 8 Ground connector (short end of ground cable) |
| 3 Front of rack | 9 "Y" End of ground cable |
| 4 Power cable from the power source | 10 Ground lug nut (quantity 2) |
| 5 Mounting plate | 11 Long end of ground cable |
| 6 Long end of ground cable | 12 Ground lug nut (quantity 2) |

Figure 161. Installing the ground lug.

16. Position the back ac outlet-mounting plate onto the rack frame with the ground lug fully inserted through the mounting holes in the rack.
17. Install the front ac outlet-mounting plate screws (stabilizer mounting screws) into the mounting plate and through the mounting holes in the rack. Securely tighten the screws.



- | | |
|---|------------------|
| 1 Front or back of rack (as applicable) | 4 Mounting plate |
| 2 Power cable from power source | 5 Allen wrench |

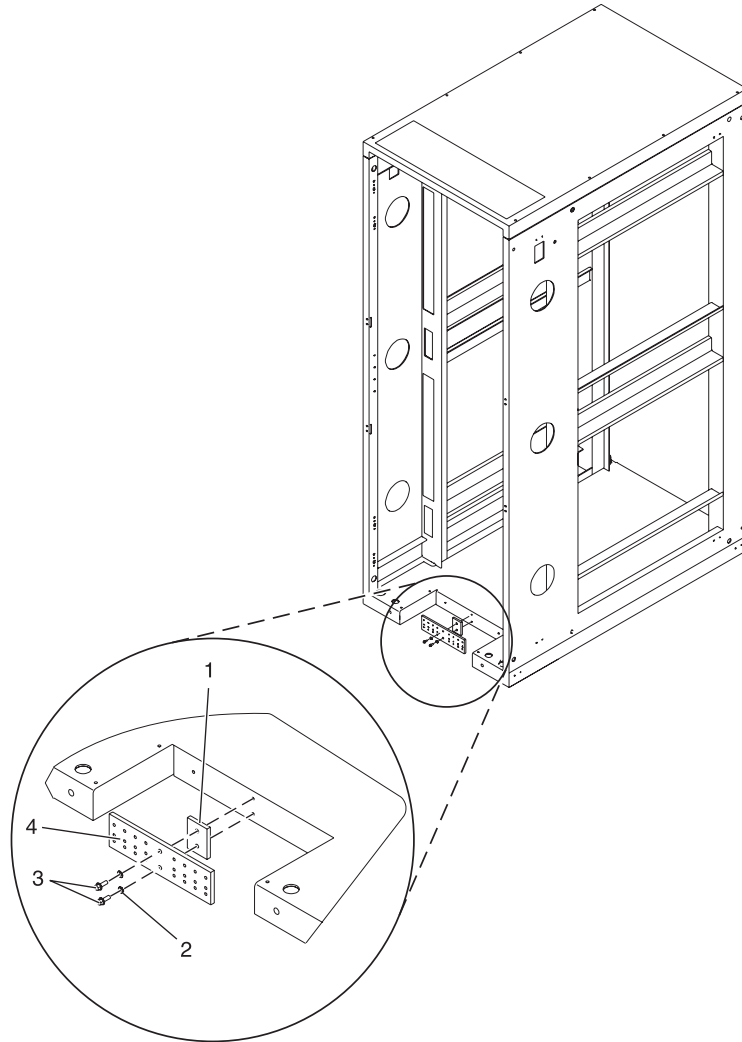
3 Button-head screw

6 Long end of ground cable

Figure 162. Installing the front mounting plate.

18. Connect the "Y"-shaped end of the ground cable to the rack frame, either near the center in the back of the rack or to the ground bus bar at the back of the rack.
19. Install the back ac outlet-mounting plate screws (stabilizer mounting screws) into the mounting plate and through the mounting holes in the rack. Securely tighten the screws.

Note: The bus bar might be located at either the top or bottom of the rack.



1 Bus bar mounting plate
2 Lock washer (quantity 2)

3 Hex screws (M5 x 20) (quantity 2)
4 Ground bus bar

Figure 163. Installing the back mounting plate.

Installing the ac outlet-mounting plate without ac outlets:

You might need to install an outlet plate without the outlets. Use the procedure in this section to perform this task.

If you do not want any ac outlets installed on the front or rear ac outlet-mounting plate, perform only “Attaching the rack to the concrete floor beneath a raised floor” on page 205 through “Connecting the power distribution system” on page 209.

For front or rear ac outlet-mounting plates, refer to “Installing the ac outlet-mounting plates with ac outlets” on page 210.

Installing the model 31D/2457/86 into a rack

You might need to install the system into a rack. This section includes procedures so that you can perform these tasks.

This procedure assumes that you are installing the system into an existing rack. If the rack is not installed, go to the instructions for “Installing the rack” on page 197 and then return to this procedure for instructions on installing the system unit into the rack.

When you have installed the system into the rack, you will need the instructions in Chapter 2, “Disk Drive,” on page 9 to connect and configure the 31D/2457/86.

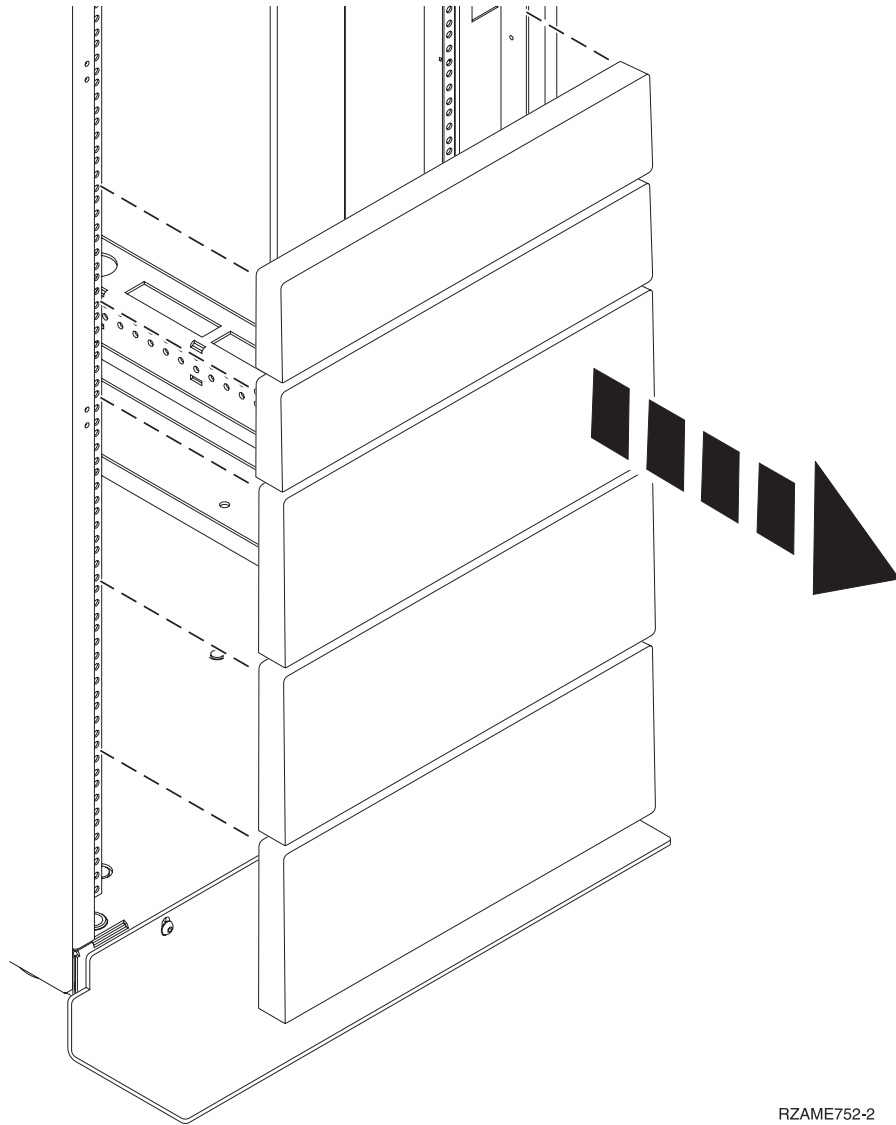
Note: This procedure applies only to the models that are designed to be mounted into a rack.

To install the system into a rack, perform the following tasks:

Attention: Installing the rails in the rack is a complex procedure. To install the rails correctly, you must perform each task in order. Failure to do so might cause rail failure and potential danger to yourself and the system unit.

1. Read the “Rack Safety Notices” on page 245. Failure to read these notices could cause damage to the equipment or injury to the installer.
2. Complete a parts inventory (See “Completing a parts inventory” on page 214).
3. Locate the rack-mounting template **A**, the rack-mounting hardware kit **B**, and the system rail assemblies **C** that were included with your system unit. The system rails are identical.

Note: An 8-mm nut driver and a flat-blade screwdriver, represented in the following diagram, are not listed in the inventory or included in the parts shipped, but these tools will assist you in completing the installation.



RZAME752-2

Figure 165. Removing the filler panels.

4. Remove the front and back rack doors if necessary.
5. Use the rack-mounting template to mark the location (see Mark location using rack-mounting template). If you do not have a rack-mounting template, follow the instructions for marking the location without a template (see Mark location without rack-mounting template).

Marking the location without a rack-mounting template

You might need to mark the location without a template. Use the procedure in this section to perform this task.

If you do not have a rack-mounting template, complete the following steps:

1. Determine where in the rack to place the system. Record the EIA location.
2. Note the following:
 - Each EIA unit consists of three holes.
 - The expansion unit is 4 EIA units high.

- Facing the front of the rack and working from the left side, place a supplied self-adhesive dot next to the top hole **B** of the first EIA unit that you selected.

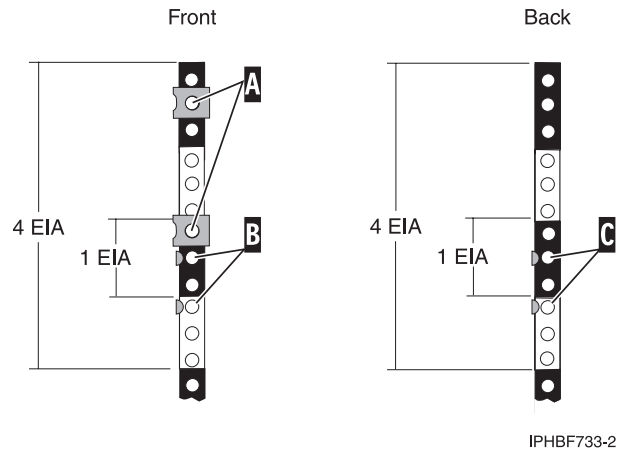


Figure 166. Marking the installation locations.

Note: The self-adhesive dots are used to aid in identifying locations on the rack. If do not have any of the dots, use some other form of marking tool to aid you in identifying hole locations (for example, tape, a marker, or pencil).

- On the left rail, place another self-adhesive dot next to the middle hole **B** of the second (EIA unit above) EIA unit. There will be one hole between the dots.
- Repeat these steps to place the two adhesive dots on the front-right rail.
- Go to the back of the rack. On the left side, find the EIA unit that corresponds to the bottom EIA unit marked on the front of the rack.
- Place a self-adhesive dot at the top hole **C** of the bottom EIA unit.
- Place a self-adhesive dot at the middle hole **C** of the second (above) EIA unit.
- Mark the corresponding holes on the right side of the rack.

Marking the location using rack-mounting template

You might need to mark the installation location using a rack-mounting template. Use the procedure in this section to perform this task.

- Using the rack-mounting template, determine where in the rack to place the system unit. Install units in the lower part of the rack first. Place larger and heavier units in the lower part of the rack.

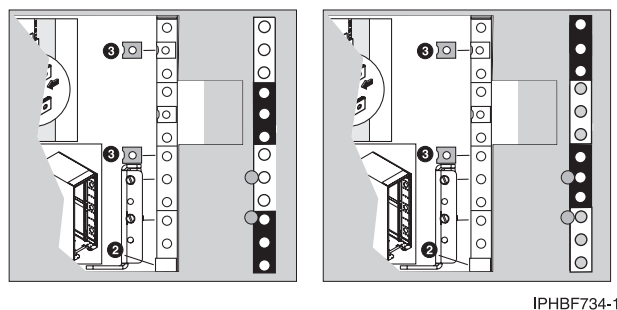


Figure 167. Example of a rack-mounting template.

Note: The front of the rack-mounting template has printed illustrations designed to help you identify the EIA location holes to be used when you add units to the rack. *Do not* use the rack-mounting template without completing the following steps.

2. Note the following when using the rack-mounting template:
 - Each black or white unit on the template is equal to one EIA unit.
 - Each EIA unit consists of three holes.
 - The EIA units illustrated on the template must be aligned with the EIA units located on the rack.
 - It is not necessary to align like-colored EIA units. For example, a black EIA unit on the rack-mounting template can be aligned with a white EIA unit located on the rack.
 - The template is two-sided. When using the template, ensure that the appropriate side of the template is facing out.

Figure 168 shows one EIA unit and four EIA units. Depending on the rack manufacturer, the EIA units might be separated either by color or by a line. Notice that the holes along the rail are not evenly spaced. If your rack has no color or line separation between EIA units, assume that each EIA unit begins where the hole spacing **A** is closest together.

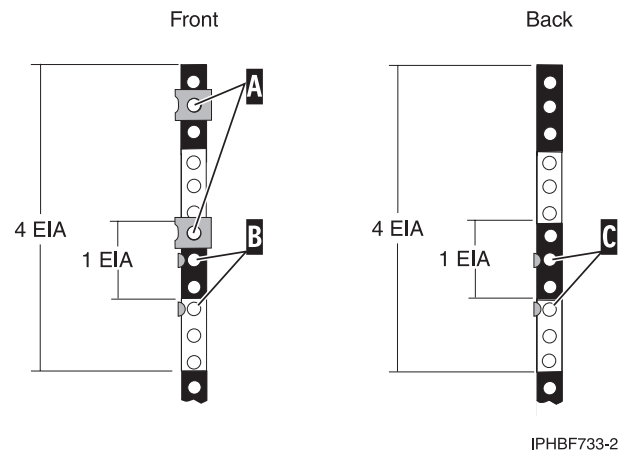


Figure 168. EIA units example.

To use the rack-mounting template, follow these steps:

- a. Remove the protective coating from each adhesive strip located on the back of the rack-mounting template. Lightly press the template into position on the rack. Ensure that both the left and right sides are at the corresponding EIA locations.
- Note:** The tabs on each side of the template show a notch to indicate the proper spacing between the front flanges.
- b. Locate the dots, printed on the left and right side of the template. Place a self-adhesive dot directly across from the template's printed dots on or near the rack's EIA numbering strip. You will be using these dots to aid in correctly positioning the rail-alignment pins located on the front of each rail.
 - c. Remove the rack-mounting template from the front of the rack. The front of your rack should now contain dots.
 - d. Mount the rack-mounting template to the rack's back EIA frame. Place the rack-mounting template at the same EIA-numbered location that was used on the front of the rack.
 - e. Wrap a self-adhesive dot directly across from the template's printed dots. Ensure that a portion of the self-adhesive dot wraps around the rack frame so that it can be seen from the front of the rack.
 - f. Remove the rack-mounting template from the back of the rack. The back of your rack should now contain dots that have been partially wrapped around the frame.

Attaching the mounting hardware to the rack

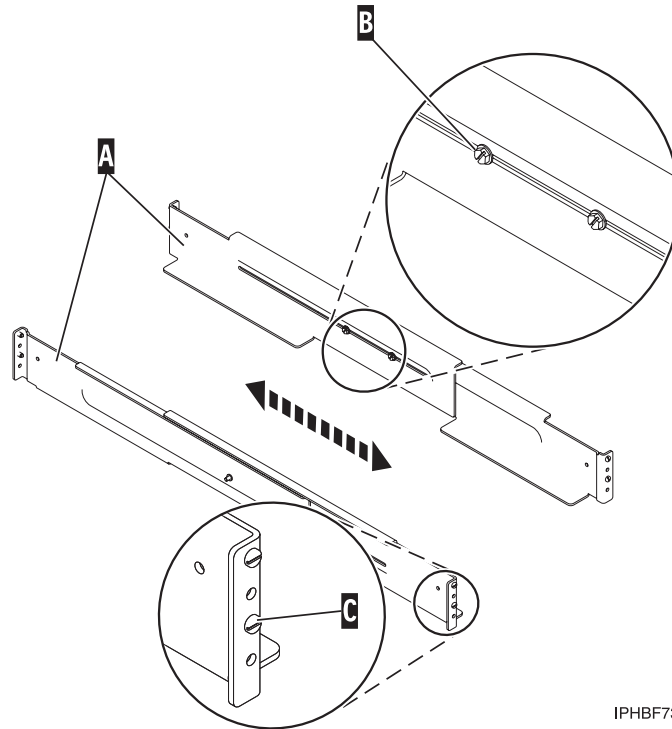
You might need to attach mounting hardware to the rack. Use the procedure in this section to perform this task.

CAUTION:

Installing the rails in the rack is a complex procedure. To install the rails correctly, you must perform each task in the following order. Failure to do so might cause rail failure and potential danger to yourself and the system unit.

To install the mounting hardware into the rack, follow these steps:

1. Loosen the two screws **B** in the middle of both rails **A** to allow each rail to extend.



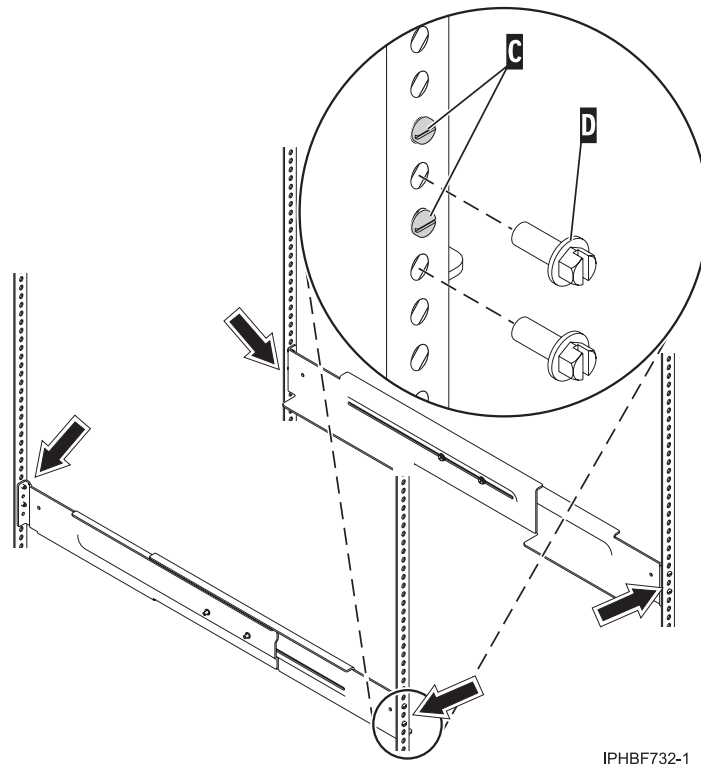
IPHBF731-0

Figure 169. Extending the system rails.

2. Starting at the back of the rack, extend the left rail and insert the rail pins **C** into the marked locations the rack so that the rail is facing upward.

Note: Although the rail installation can be completed by one person, the installation will be easier if one person is positioned at the front of the rack and one person is positioned at the back of the rack.

3. From the back of the rack, extend the right rail and insert the rail pins **C** into the marked locations.
4. Moving to the front of the rack, extend the left rail and insert the rail pins **C** into the marked locations.
5. Extend the right rail and insert the rail pins **C** into the marked locations.
6. Using two M5 screws **D**, secure the left rail to the front of rack below each rail pin **C**.



IPHBF732-1

Figure 170. Attaching the system rails.

7. Using two M5 screws **D**, secure the right rail to the front of the rack.
8. Moving to the back of the rack and using two M5 screws **D**, secure the left rail to the back of the rack.
9. Using two M5 screws **D**, secure the right rail to the back of the rack.
10. Tighten the two screws in the middle of the left rail and the two screws in the middle of the right rail. Refer to Figure 170.
11. Insert two nut clips at the marked location on the front-left rail.
12. Insert two nut clips at the marked locations on the front-right rail.

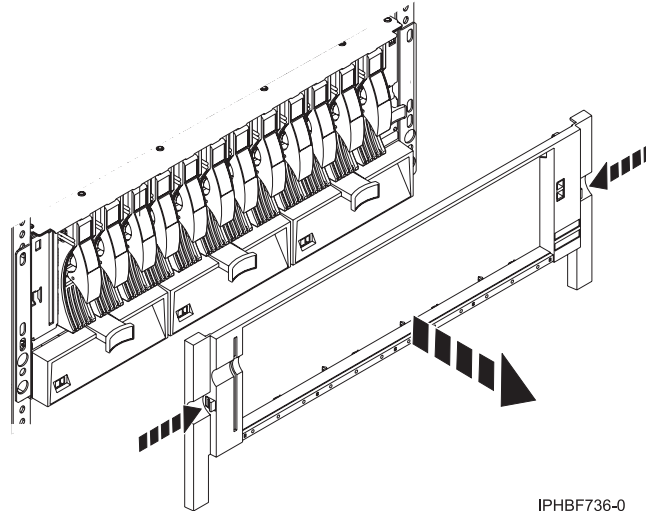
Installing the 31D/2457/86 on the rail assembly

You might need to install the system on the rail assembly. Use the procedure in this section to perform this task.

Before installing the system on the rail assembly, ensure that the stabilizers are extended and the tip plate is attached to the bottom front of the rack to prevent the rack from falling forward when the rails are pulled out of the rack. Refer to “Rack Safety Notices” on page 245.

To install the system unit on the rail assembly, follow these steps:

1. If the bezel is installed on the front of the system, remove it by pressing in on the two release buttons.

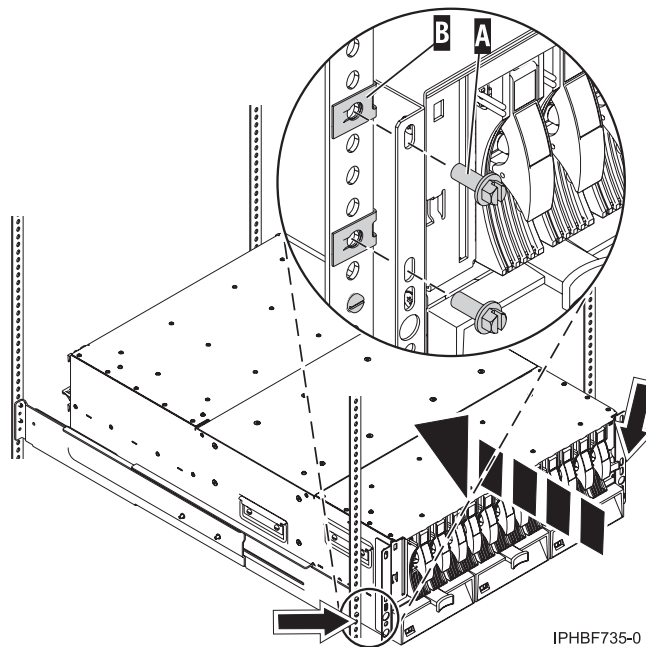


IPHBF736-0

Figure 171. Removing the bezel.

2. Using three people, lift the system unit and position it over front of the rails.

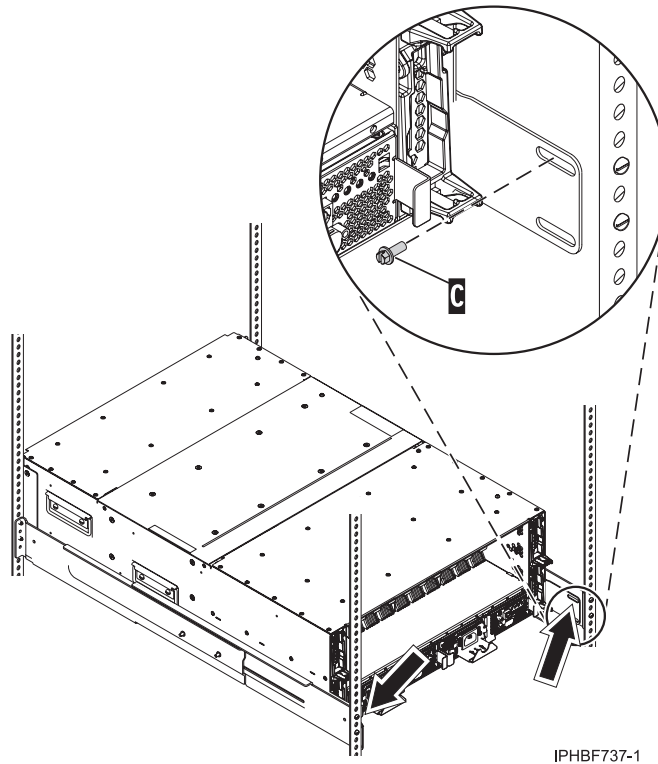
Attention: Three people are required to safely lift the system. Using fewer than three people to lift the system can result in injury.
3. Push the system into the rack until it is completely installed into the rack.
4. If the securing plates are not preinstalled on the back of the system, attach the plates to the back left and back right of the system. The securing plates are illustrated in Figure 173 on page 221.
5. Install the two M5 securing screws **A** through the chassis and into the nut clips **B** on the left and right rail.



IPHBF735-0

Figure 172. Installing the securing screws.

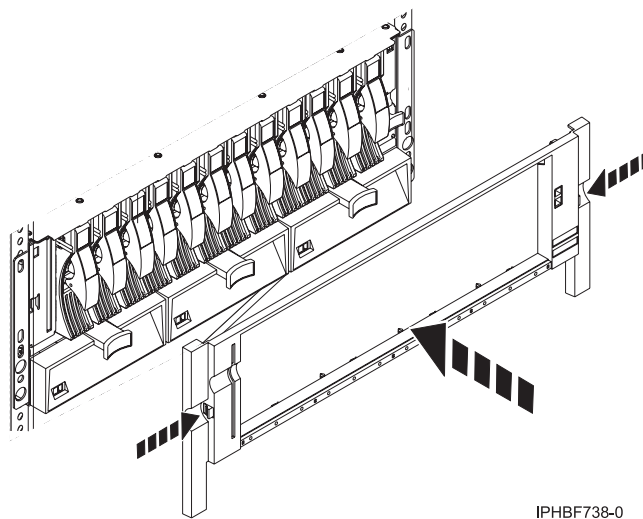
6. At the back of the rack, install two M5 securing screws **C** through the back of both the left and right securing plates and into the rack rail.



IPHBF737-1

Figure 173. Securing the system to the back of the rack.

7. Install the bezel onto the system.



IPHBF738-0

Figure 174. Installing the bezel.

For instructions on how to connect and configure the system when you have completed installing the 31D/2457/86 into the rack, see “Connect and configure the 57/86, 57/87, 31D/24 or 31T/24 SCSI disk-drive enclosure to a system or partition with the AIX operating system” on page 68 or “Connect and configure the disk drive enclosure in a system with the Linux operating system” on page 74.

Installing a system or expansion unit into a rack

You might need to install a system or expansion unit into a rack. This section includes procedures so that you can perform these tasks.

The following procedures describe how to install system units or expansion units into a rack. You can perform this task or contact a service provider to perform the task for you. You might be charged a fee by the service provider for this service.

Installing the 50/95 or 05/9511D/20 expansion unit into a rack

You might need to install an expansion unit into the rack. Use the procedure in this section to perform this task.

This procedure assumes that you are installing the model 50/95 or 05/9511D/20 expansion unit into an existing rack. If the rack is not installed, go to the instructions for “Installing the rack” on page 197 and then return to this procedure for instructions on installing the system unit into the rack.

Note: This procedure applies only to the models that are designed to be mounted in a rack. Do not attempt to install a stand-alone model in a rack.

To install the 50/95 or 05/9511D/20 into a rack, complete the following steps:

1. Read the “Rack Safety Notices” on page 245.
2. Unpack the template and rack hardware.

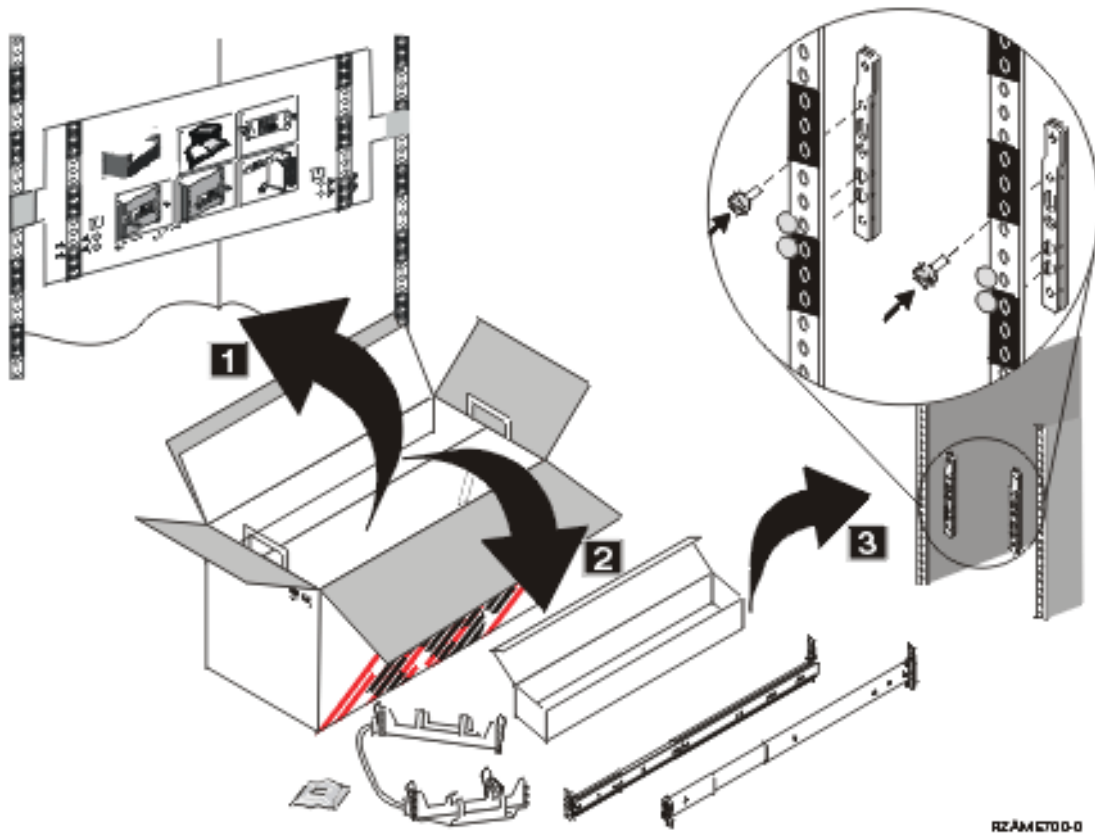


Figure 175. Unpacking the rack template and hardware.

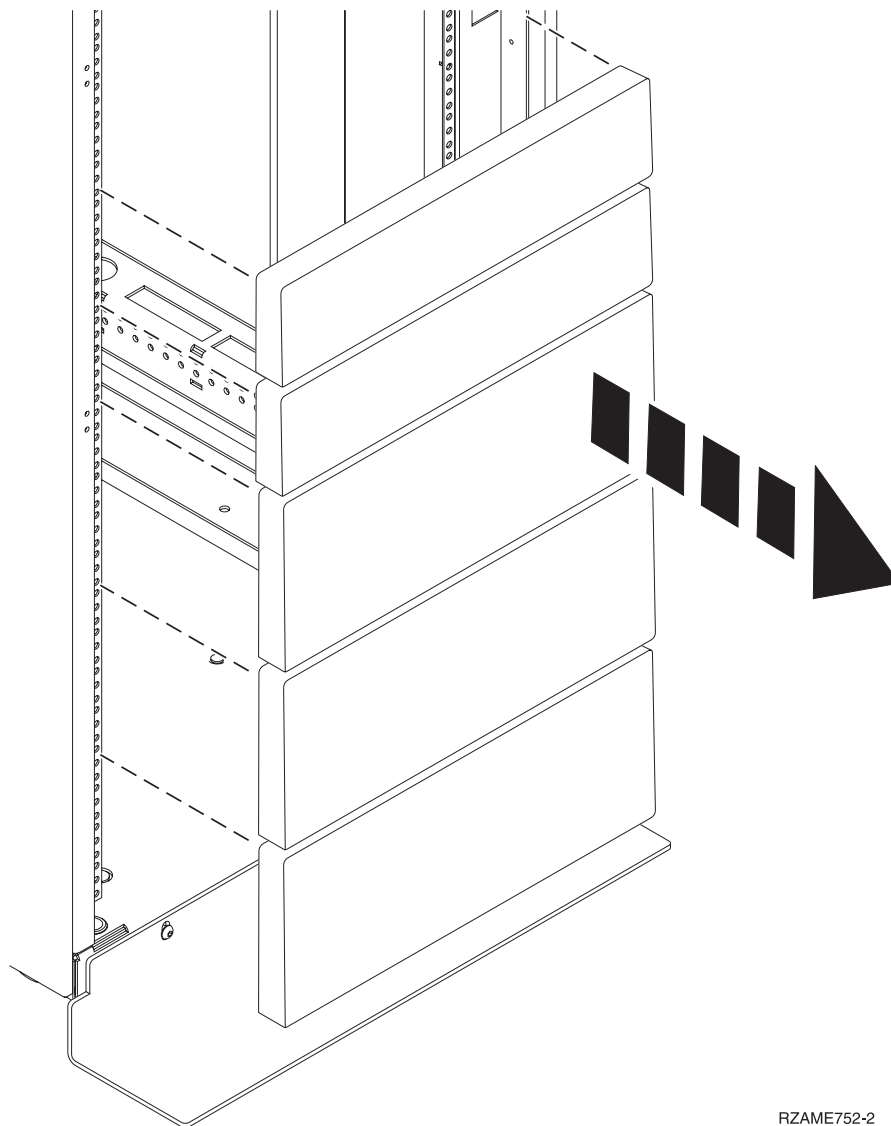
3. Complete a parts inventory (See “Completing a parts inventory” on page 214).
4. Determine where you will locate the expansion unit in the rack. See Locate in rack.
5. Mark the location. See “Marking the location using a rack-mounting template” on page 224. If you do not have the rack-mounting template, see “Marking the location without a rack-mounting template” on page 225.

Determining the location:

You might need to determine where to install the expansion unit in the rack. This section includes procedures so that you can perform these tasks.

Before installing the system unit or expansion unit into a rack, complete the following steps:

1. Plan where you will place the units. Place the larger and heavier units in the lower part of the rack.
2. If necessary, remove the filler panels to allow access to the inside of the rack enclosure where you plan to place the unit.



RZAME752-2

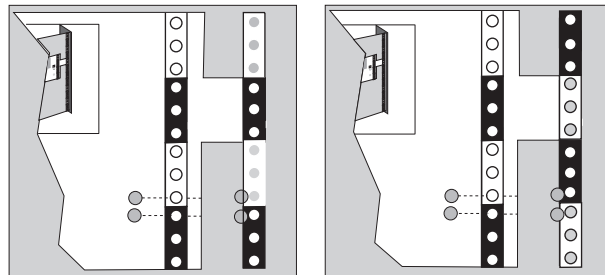
3. If necessary, remove the front and back rack doors.

4. Use the rack-mounting template to mark the location. See “Marking the location using a rack-mounting template.” If you do not have a rack-mounting template, follow the instructions for marking the location without a template, see “Marking the location without a rack-mounting template” on page 225.

Marking the location using a rack-mounting template:

You might need to mark the installation location using a rack-mounting template. Use the procedure in this section to perform this task.

1. Using the rack-mounting template, determine where in the rack to place the system unit. Install units in the lower part of the rack first. Place larger and heavier units in the lower part of the rack.



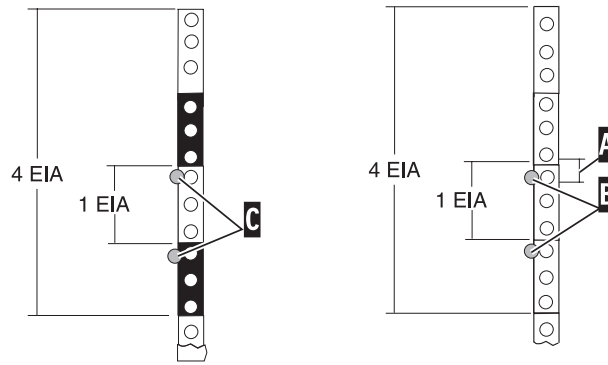
IPHBF502-0

Figure 176. Rack-mounting template

Note: The front of the rack-mounting template has printed illustrations designed to help you identify the EIA location holes to be used when you add units to the rack. *Do not* use the rack-mounting template without completing the following steps.

2. Note the following when using the rack-mounting template:
 - Each black or white unit on the template is equal to one EIA unit.
 - Each EIA unit consists of three holes.
 - The EIA units illustrated on the template must be aligned with the EIA units located on the rack.
 - It is not necessary to align like-colored EIA units. For example, a black EIA unit on the rack-mounting template can be aligned with a white EIA unit located on the rack.
 - The template is two-sided. When using the template, ensure that the appropriate side of the template is facing out.

Figure 177 on page 225 shows one EIA unit and four EIA units. Depending on the rack manufacturer, the EIA units might be separated either by color or by a line. Notice that the holes along the rail are not evenly spaced. If your rack has no color or line separation between EIA units, assume that each EIA unit begins where the hole spacing **A** is closest together.



IPHBF503-0

Figure 177. EIA units

To use the rack-mounting template, complete the following steps:

- a. Remove the protective coating from each adhesive strip located on the back of the rack-mounting template. Lightly press the template into position on the rack. Ensure that both the left and right sides are at the corresponding EIA locations.

Note: The tabs on each side of the template show a notch to indicate the proper spacing between the front flanges.

- b. Locate the dots, printed on the left and right side of the template. Place a self-adhesive dot directly across from the template's printed dots on or near the rack's EIA numbering strip. You will be using these dots to aid in correctly positioning the rail-alignment pins located on the front of each rail.
 - c. Remove the rack-mounting template from the front of the rack. The front of your rack should now contain dots.
 - d. Mount the rack-mounting template to the rack's back EIA frame. Place the rack-mounting template at the same EIA-numbered location that was used on the front of the rack.
 - e. Wrap a self-adhesive dot directly across from the template's printed dots. Ensure that a portion of the self-adhesive dot wraps around the rack frame so that it can be seen from the front of the rack.
 - f. Remove the rack-mounting template from the back of the rack. The back of your rack should now contain dots that have been partially wrapped around the frame.
3. Attach the rail assembly to the rack. See "Installing the 50/95 or 05/9511D/20 rails into the rack" on page 226.

Marking the location without a rack-mounting template:

You might need to mark the location without a template. Use the procedure in this section to perform this task.

If you do not have a rack-mounting template, do the following:

1. Determine where in the rack to place the system. Record the EIA location.
2. Note the following:
 - Each black or white unit is equal to 1 EIA unit.
 - Each EIA unit consists of three holes.
 - These systems are five EIA units high.
3. Facing the front of the rack and working from the right side, place a supplied self-adhesive dot next to the top hole of the bottom EIA unit.

Note: The self-adhesive dots are used to aid in identifying locations on the rack. If you no longer have any of the dots, use some other form of marking tool to aid you in identifying hole locations (for example, tape, a marker, or pencil).

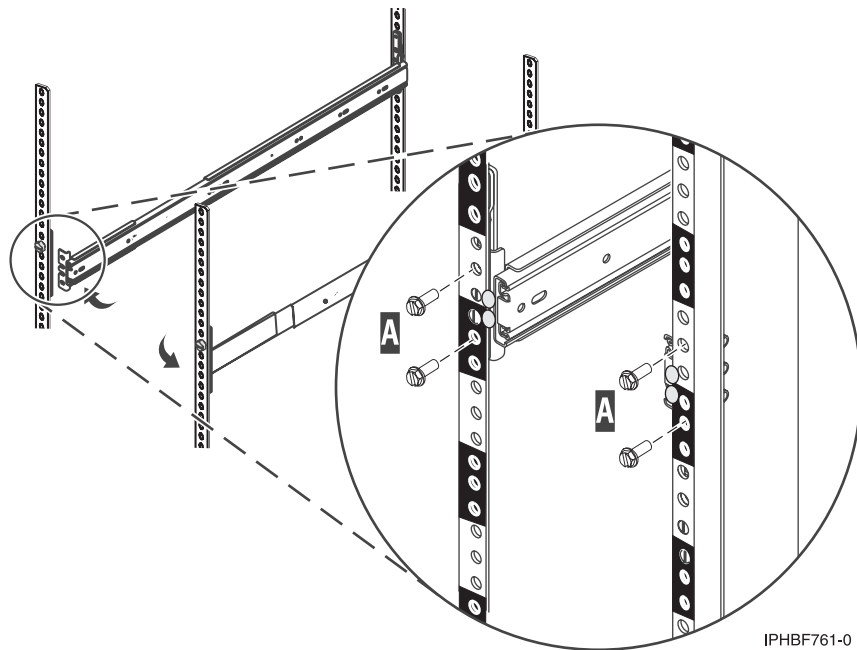
4. Place another self-adhesive dot next to the bottom hole of the next (above) EIA unit.
5. Repeat steps 3 on page 225 through 4 for the corresponding holes located on the left side of the rack.
6. Go to the back of the rack. On the right side, find the EIA unit that corresponds to the bottom EIA unit marked on the front of the rack.
7. Place a self-adhesive dot at the middle hole of the bottom EIA unit.
8. Place a self-adhesive dot at the middle hole of the next (above) EIA unit. There will be two holes between the two dots.
9. Mark the corresponding holes on the left side of the rack.
10. Attach two nut clips to the left side of the rack.
 - a. Put the first nut clip in the top hole of the third EIA unit. There will be three holes between this nut clip and the highest dot on the left side.
 - b. Put the second nut clip in the middle hole of the fourth nut clip. There will be one hole between the two nut clips.

Installing the 50/95 or 05/9511D/20 rails into the rack:

You might need to install rails into the rack. Use the procedure in this section to perform this task.

To install the rails into the rack, complete the following steps:

1. Using two screws **A**, attach the left rail assembly to the front of the rack.



IPHBF761-0

Figure 178. Attaching the rails to the front of the rack.

2. Using two screws **A**, attach the right rail assembly to the front of the rack.
3. Move to the back of the rack.
4. Extend the left and right rails.
5. Using two screws **B**, attach the left rail assembly to the back of the rack.

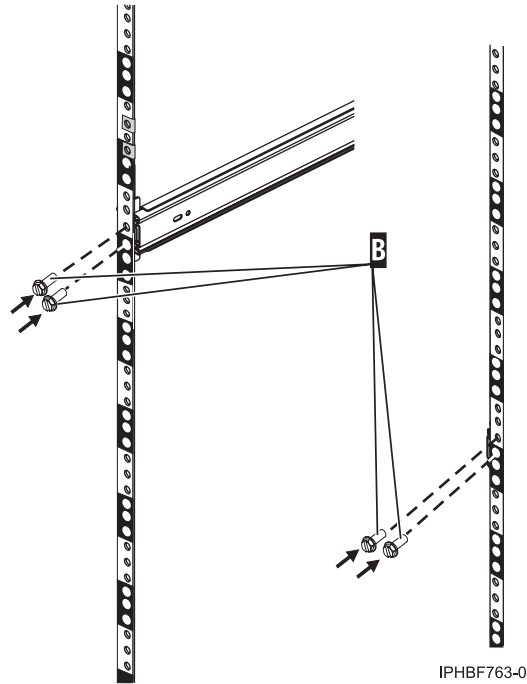


Figure 179. Attaching the rails to the back of the rack.

6. Using two screws **B**, attach the right rail assembly to the back of the rack.

Installing the 50/95 or 05/9511D/20 expansion unit into a rack:

You might need to install an expansion unit into a rack. Use the procedure in this section to perform this task.

To install the expansion unit into a rack, complete the following steps:

Attention: This expansion unit weighs in excess of 100 pounds (45 kg). A minimum of three people are required to lift the unit and install it on the rails.

1. Using four screws **A**, install the rail-mounting guides **B** to the left and right side of the expansion unit chassis.

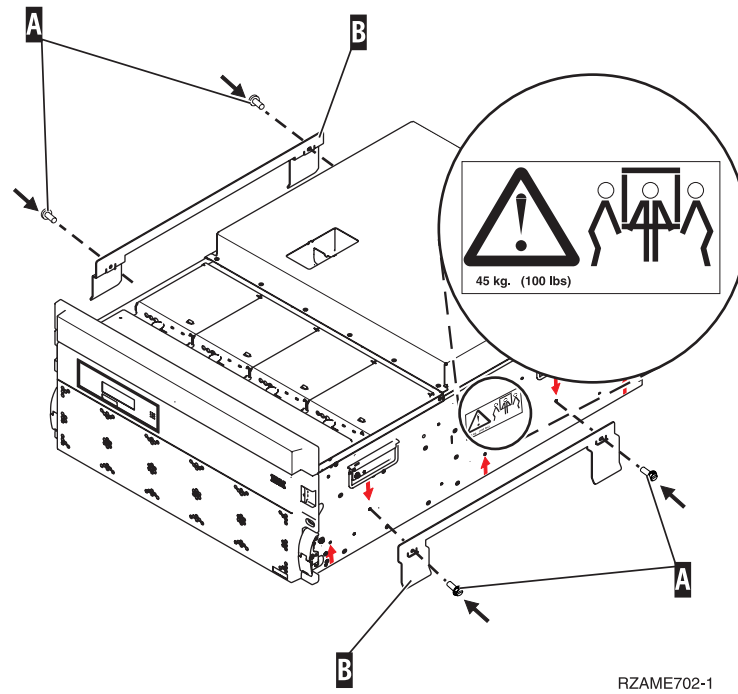


Figure 180. Attaching the rail-mounting guides.

2. Extend the rails from the rack until they lock into place.
3. Using at least three people, lift the expansion unit onto the rails. The rail guides **B** go over the rails.
4. Align the mounting holes on the chassis with their corresponding holes on the rail.
5. Install the six screws **C** through the rails and secure the screws to the expansion unit chassis.

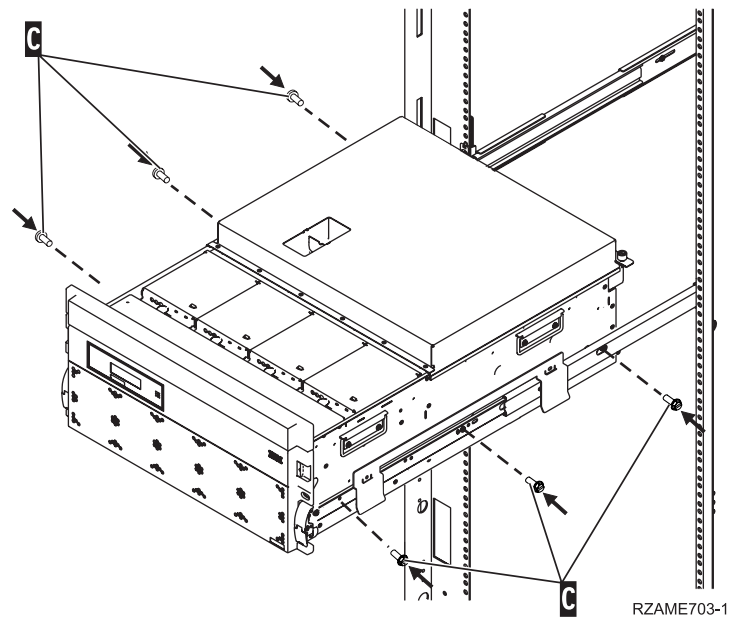


Figure 181. Installing the expansion unit onto the rails.

- Remove the four screws **A** securing the rail-mounting guides **B** to the expansion unit and remove the rail mounting guides.

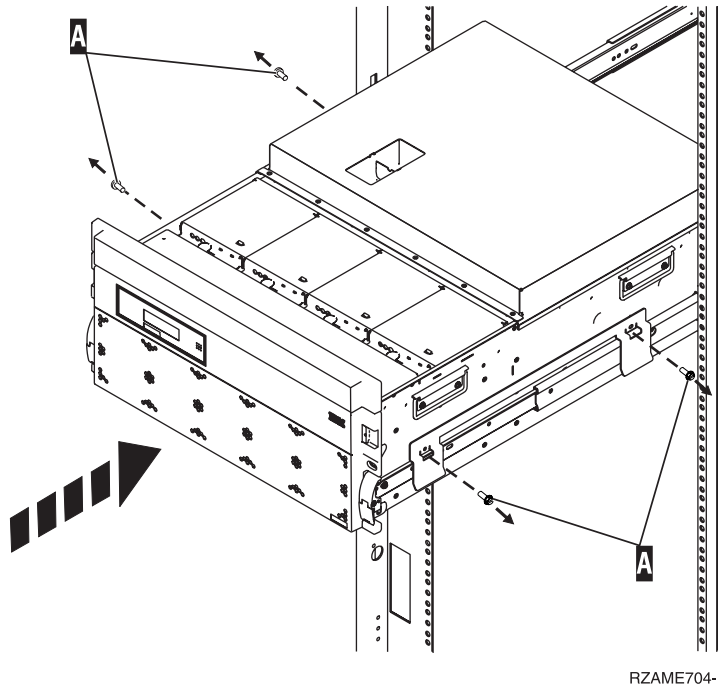


Figure 182. Removing the rail-mounting guides.

- Slide the system approximately three-quarters of the way into the rack.
- Move to the back of the rack.
- Attach one end of the cable-management arm to the back of the rack with two screws **D**. Attach the other end of the arm to the back of the expansion unit with two screws **E**.

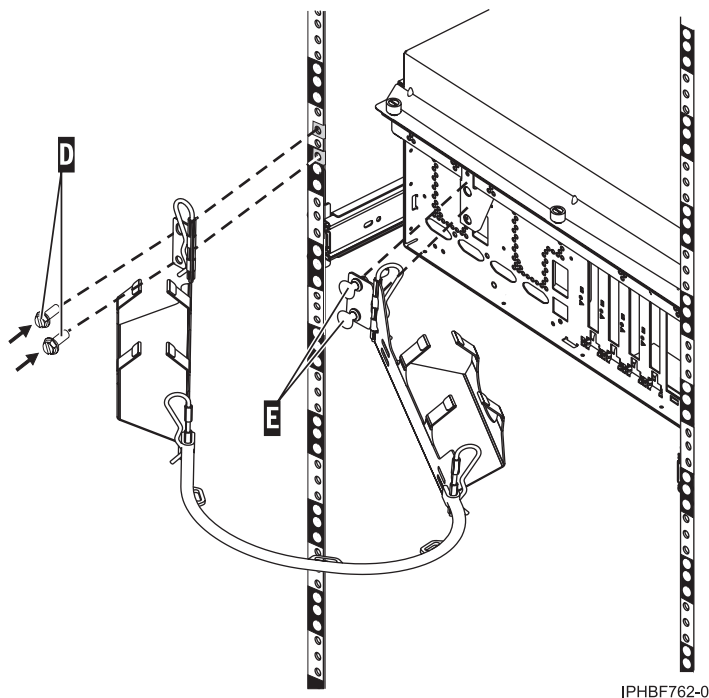


Figure 183. Attaching the cable-management arm.

10. Attach the securing screw mounts G with two screws F to the left and right rack rails.

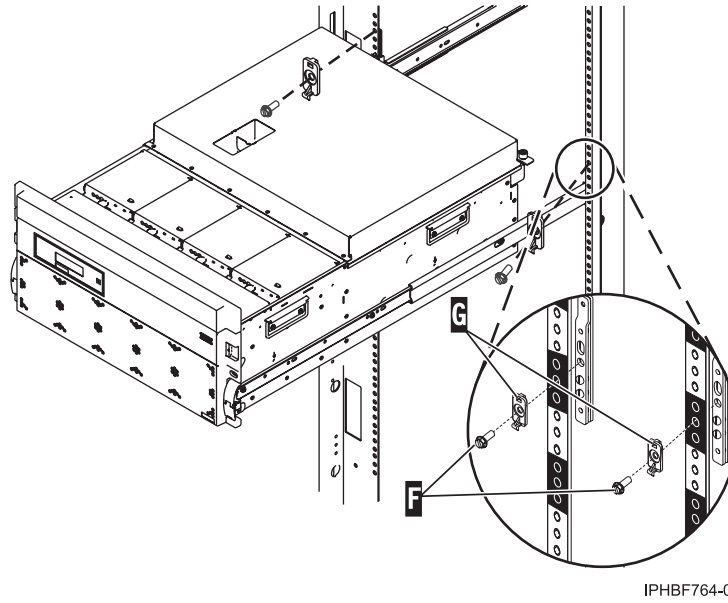


Figure 184. Attaching the securing screw mounts.

11. Slide the expansion unit into the rack.

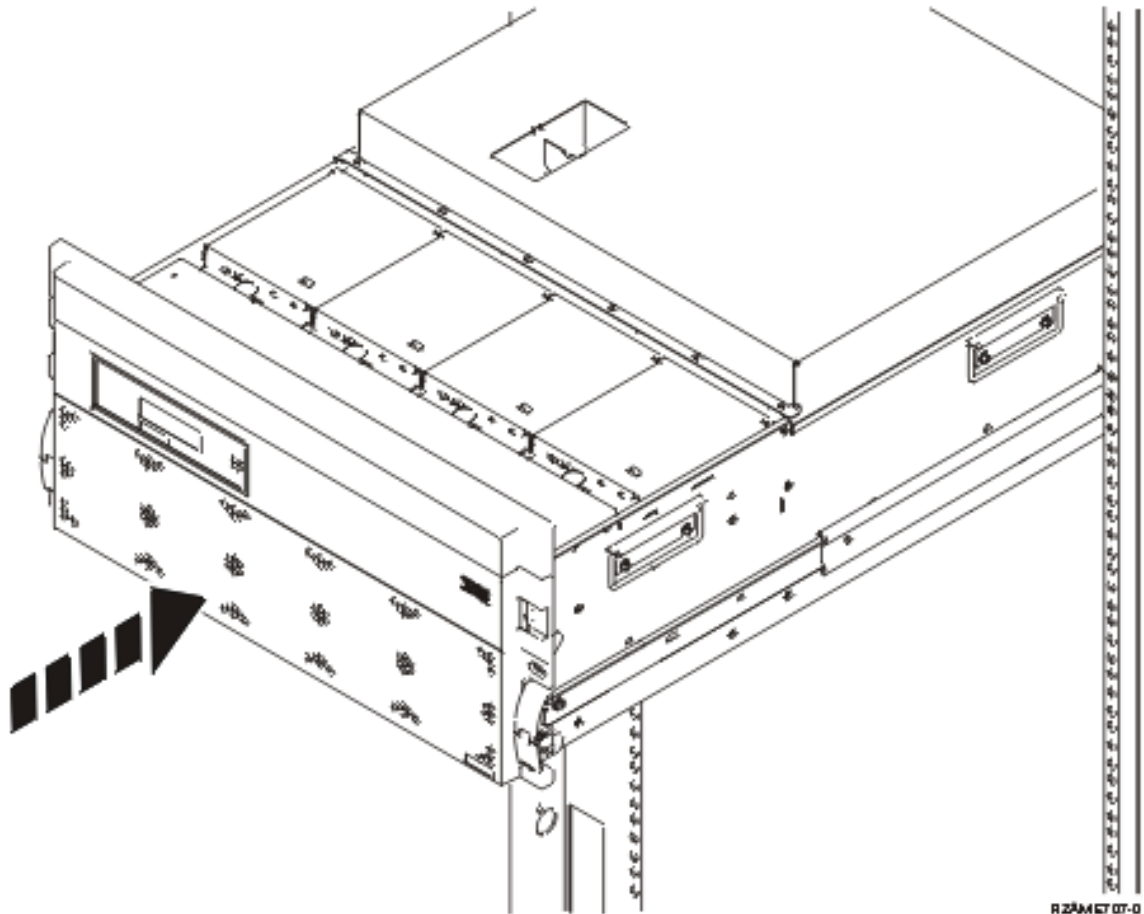


Figure 185. Sliding the expansion unit into the rack.

12. If the system will be transported, install the two securing screws through the front of the expansion unit and into the securing screw mounts.

Installing the 57/90 or 57/9611D/11 or 14G/30 expansion unit in a rack

You might need to install an expansion unit into the rack. Use the procedure in this section to perform this task.

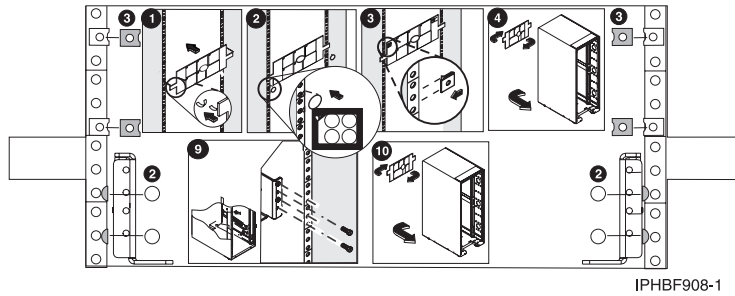
This procedure provides instructions for installing the model 57/90 or 57/9611D/11 or 14G/30 expansion unit into an existing rack. If the rack is not installed, go to the instructions for “Installing the rack” on page 197, and then return to this procedure for instructions on installing the system unit into the rack.

Note: The shells for the 11D/11 and 14G/30 are different.

CAUTION:

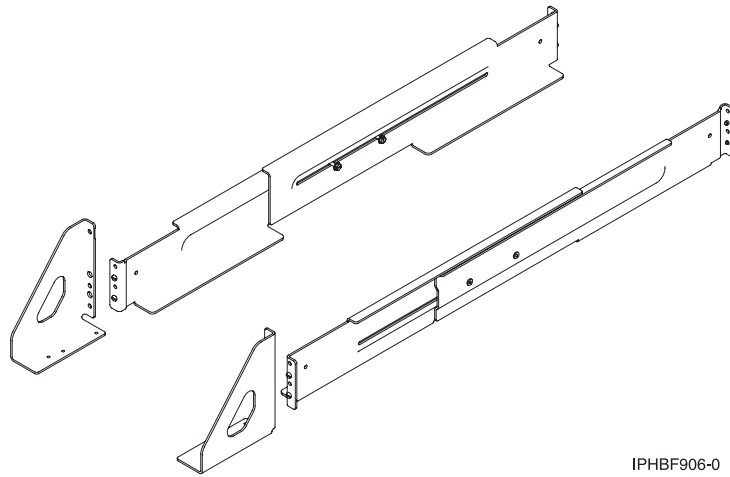
Installing the rails in the rack is a complex procedure. To install the rails correctly, you must perform each task in the following order. Failure to do so might cause rail failure and potential danger to yourself and the system unit.

1. Read the “Rack Safety Notices” on page 245.
2. Complete a parts inventory.
 - Locate the kitting report in an accessory box.
 - Ensure that you received all the parts that you ordered. There are two types of rail kits and templates for this system.
 - Two expandable rails with extension brackets



IPHBF908-1

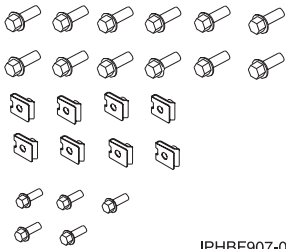
Figure 186. Rack-mounting template for the expandable rails.



IPHBF906-0

Figure 187. Expandable rails with extension brackets.

Note: There are two versions of the rail kits for the 57/90 or 57/9611D/11 or 14G/30.



IPHBF907-0

Figure 188. Rack-mounting kit.

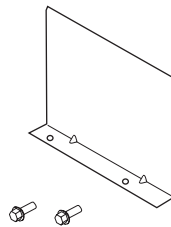


Figure 189. Filler plate and screws.

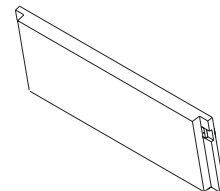


Figure 190. Front bezel.

If there are incorrect, missing, or damaged parts, contact:

- Your reseller

3. Ensure that there is an empty slot in an existing shell or that there is enough room in the rack to install a new shell.

Marking the location using the rack-mounting template:

You might need to mark the installation location using a rack-mounting template. Use the procedure in this section to perform this task.

If you do not have a rack-mounting template, go to “Marking the location without a rack-mounting template” on page 234.

Note:

1. Read the “Rack Safety Notices” on page 245.
2. The rack-mounting template has printed illustrations located on the front and back of the template. Each illustration is designed to aid you in identifying the EIA (Electronics Industries Association) location holes used when planning to populate your rack. *Do not* use the rack-mounting template without reading and understanding the following steps.
3. Each step must be completed in its entirety. Skipping steps or not following steps in sequence may cause rail failure, resulting in system-drawer damage or bodily injury.
4. Use the front side of the rack-mounting template when installing the hardware on the front of the rack, and the back side of the rack mounting template when installing the hardware on the back of the rack. You can distinguish the front of the template from the back by the step numbers. The steps on the front of the rack-mounting template begin with the number 1.

To install the nut clips into the rack, using the rack-mounting template, complete the following steps:

1. Locate the rack-mounting template, nut clips **B**, self adhesive dots **A**, and rails.
2. Using the rack-mounting template: Each black or white unit on the template is equal to one EIA unit. Each EIA unit consists of three holes. The EIA units illustrated on the template must be aligned with an EIA unit located on the rack. It is not necessary to align like-colored EIA units. For example, a black EIA unit illustrated on the rack-mounting template does not have to be aligned with a black EIA unit located on the rack. A black EIA unit on the rack-mounting template can be aligned with a white EIA unit located on the rack.

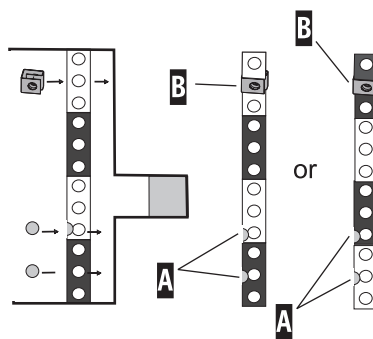
To use the rack-mounting template, do the following:

- a. Determine where in the rack to place the drawer. Make note of the EIA location number. Align the black and white strip located on each side of the rack-mounting template with an EIA location on each side of the rack.
- b. Remove the protective coating from each adhesive strip located on the back tabs of the rack-mounting template. Lightly press the template into position onto the rack. Ensure that the rack-mounting template is level.

Note: Make note of the rack EIA location where you mounted the template. You will use the same EIA locations on the back of the rack.

- c. Note the four dots printed on the front side of the template. Attach a self-adhesive dot **A** directly across from the template’s printed dots onto the rack’s EIA strip. These dots determine the placement of the rail-alignment pins.

Note: When attaching the self-adhesive dots, fold the dots around the EIA rail as shown on the template and in the following illustration.



A Folded self-adhesive dot

B Nut clip

Figure 191. Attaching the dots and nut clips for the standard rails.

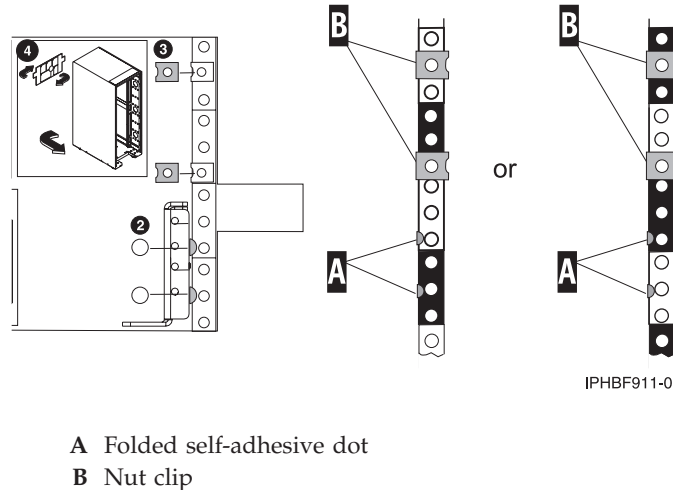


Figure 192. Attaching the dots and nut clips for the expandable rails.

- d. Attach the nut clips **B** directly across from the template's printed nut clips onto the rack's EIA strip.
- e. Remove the rack-mounting template from the front of the rack. The four self-adhesive dots and two nut clips have been placed on the front of the rack.
- f. Go to the back of the rack.
- g. Facing the back of the rack, remove the protective coating from each adhesive strip, and attach the backside of the rack-mounting template to the back of the rack. Place the template on the corresponding EIA locations that were noted from the front of the rack.

Note: The steps on the back of the rack-mounting template begin with number 7.

- h. Note the four dots **A** printed on the backside of the template. Attach a self-adhesive dot directly across from the template's printed dots onto the rack's EIA strip.

Note: These dots indicate where the rail retaining screws will be attached.

- i. Attach the nut clips **B** directly across from the templates printed nut clips onto the rack's EIA strip.

Marking the location without a rack-mounting template:

You might need to mark the location without a template. Use the procedure in this section to perform this task.

To mark the installation location and install the nut clips into a rack without using the rack-mounting template, complete the following steps:

1. This drawer requires four EIA units. Determine where in the rack to place the drawer and make note of the EIA location numbers.

Note: An EIA section on the rack consists of a grouping of three holes.

The following illustration shows a 1-EIA unit and a 4-EIA unit. Depending on the rack manufacturer, the EIA units may be separated either by color or by a line. The holes along the EIA strip are not

evenly spaced. If your rack has no color or line separation between EIAs, assume that each EIA section begins where the hole spacing is closest together.

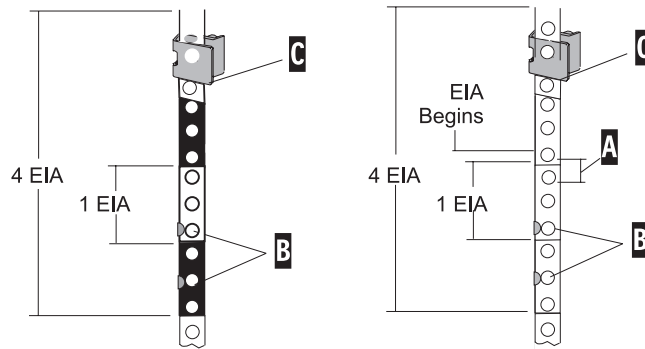


Figure 193. EIA units with the standard rails.

- A EIA hole spacing
- B Self-adhesive dot placement
- C Nut clip

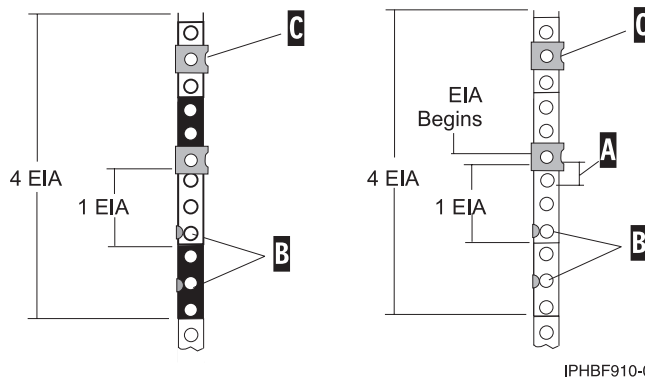


Figure 194. EIA units with the expandable rails.

2. Facing the front of the rack and working from the right side, locate the bottom EIA unit that your drawer will be using and make a note of the EIA location. Place a self-adhesive dot **B** next to the middle hole of this EIA unit and wrap the dot around the rail, or mark the rack where it can be seen from the rear of the rack.

Note: The self-adhesive dots **B** are used to identify the EIA unit holes located on the rack. Alignment pins located on the rail alignment brackets are placed through the identified holes when mounting the rails. If you no longer have any of the dots, use some other form of marking tool to aid you in identifying the hole locations. (for example, marker or pencil).

3. Begin with the hole identified by the dot, or mark, placed in substep 2; count up two holes and place the second dot, or mark the rack where it can be seen from the rear, next to the hole.
4. Begin with the hole identified in substep 3, count up seven holes and place a nut clip. The nut clip **C** aids in securing your drawer to the rack.
5. Repeat steps 2 through 4 on the left side of the rack.
6. Facing the back of the rack and working from the right side, locate the bottom EIA unit that your drawer will be using. Place a supplied self-adhesive dot **B**, or make a mark next to the middle hole of this EIA unit.

7. Begin with the hole identified by the dot, or mark, placed in substep 6, count up two holes and place the second dot, or mark, next to the hole.
8. Begin with the top dot, count up three holes and place a nut clip in that location.
9. Count up two more holes and place a second nut clip in that location.

Installing the expandable rails and extension bracket into the rack:

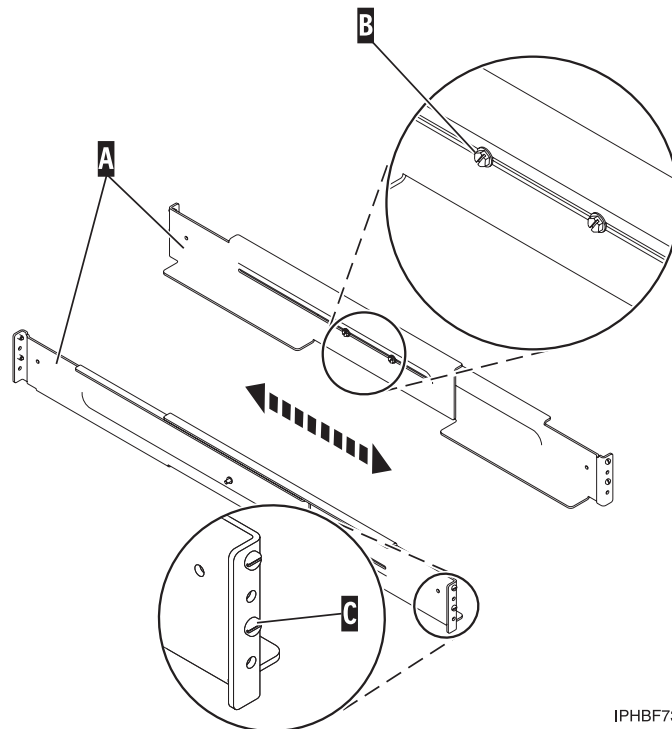
You might need to install rails into the rack. Use the procedure in this section to perform this task.

CAUTION:

Installing the rails in the rack is a complex procedure. To install the rails correctly, you must perform each task in the following order. Failure to do so might cause rail failure and potential danger to yourself and the system unit.

To install the expandable rails and extension bracket into the rack, complete the following steps:

1. Loosen the two screws **B** in the middle of both rails **A** to allow each rail to extend.



IPHBF731-0

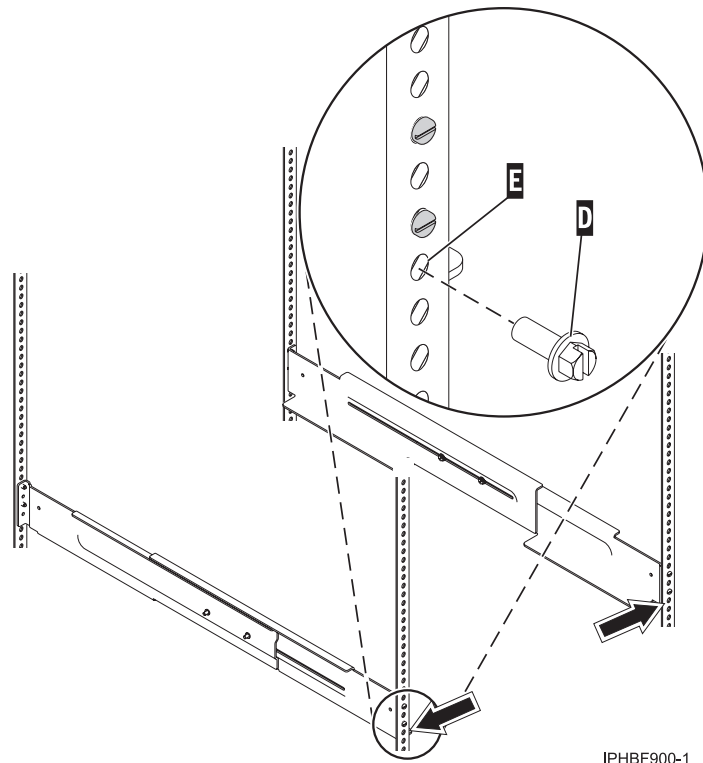
Figure 195. Extending the system rails.

2. Starting at the back of the rack, extend the left rail and insert the rail pins **C** into the marked locations the rack so that it is facing upward (L shape).

Tip: Although the rail installation can be completed by one person, for ease of installation, one person can be positioned at the front of the rack and one person at the back of the rack.

3. From the back of the rack, extend the right rail and insert the rail pins **C** into the marked locations.
4. Move to the front of the rack, extend the left rail and insert the rail pins **C** into the marked locations.
5. Extend the right rail and insert the rail pins **C** into the marked locations.
6. Using one M5 screw **D**, secure the left rail to the front of rack into the lower location **E**.

Important: Do not install a screw in the top location at this time. It will secure the shell to the assembly.

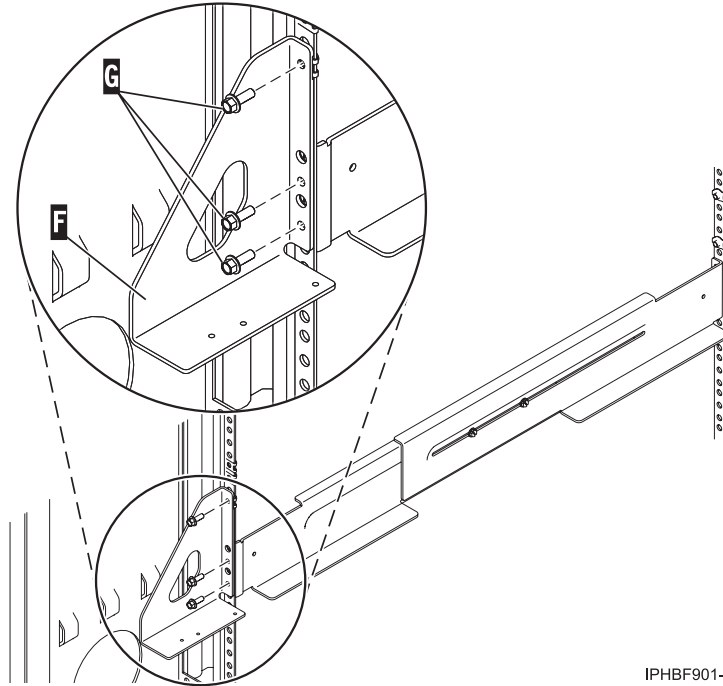


IPHBF900-1

Figure 196. Attaching the system rails to the front of the rack.

7. Using one M5 screw **D**, secure the right rail to the front of the rack into the lower location **E**.
8. Insert two nut clips at the marked location on the front-left rail of the rack.
9. Insert two nut clips at the marked locations on the front-right rail of the rack.
10. Move to the back of the rack and insert two nut clips at the marked locations on the back-left rail of the rack.
11. Insert two nut clips at the marked location on the back-right rail of the rack.
12. Using three M5 screws **G**, secure the extension bracket **F** through the rack and into the left rail.

Note: Each bracket will face inward.



IPHBF901-2

Figure 197. Attaching the extension brackets and rails to the back of the rack.

13. Using three M5 screws **G**, secure the extension bracket **F** through the rack and into the right rail.
14. Tighten the two screws in the middle of the left rail and the two screws in the middle of the right rail. Refer to Figure 196 on page 237.

Installing the shell:

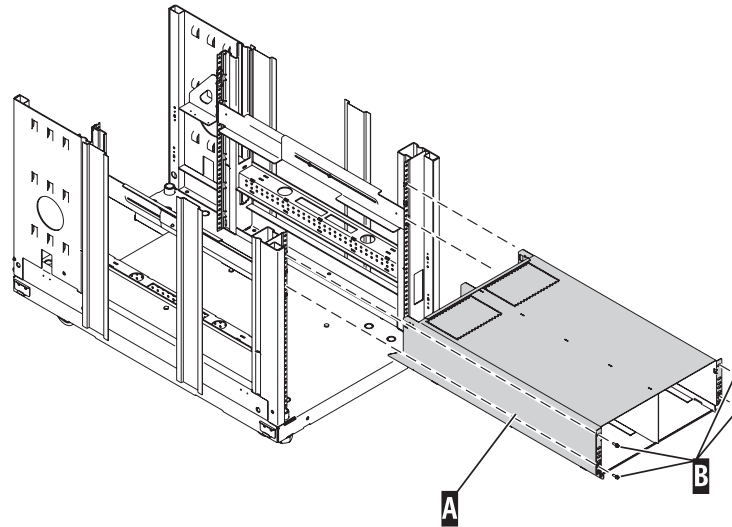
You might need to install the shell. Use the procedure in this section to perform this task.

Note: The shells for the 11D/11 and 14G/30 are different.

Note: Before installing the shell, ensure that the rails are level from side to side and from front to back.

To install the shell, complete the following steps:

1. From the front of the rack, place the shell **A** on the rails and slide it into the rack.



IPHBF903-2

Figure 198. Installing the shell into the rack on the expandable rails.

- A Shell
- B Retaining screws (four)

2. Install and tighten the four retaining screws **B** into the front of the shell, securing the shell **A** to the rack.
3. If you are only installing one drawer, move to the back of the rack and secure the shell **A** with the retaining screw **C**. Ensure screw **C** is attached to the slot of the shell opposite of the slot in which you intend to place the system drawer.

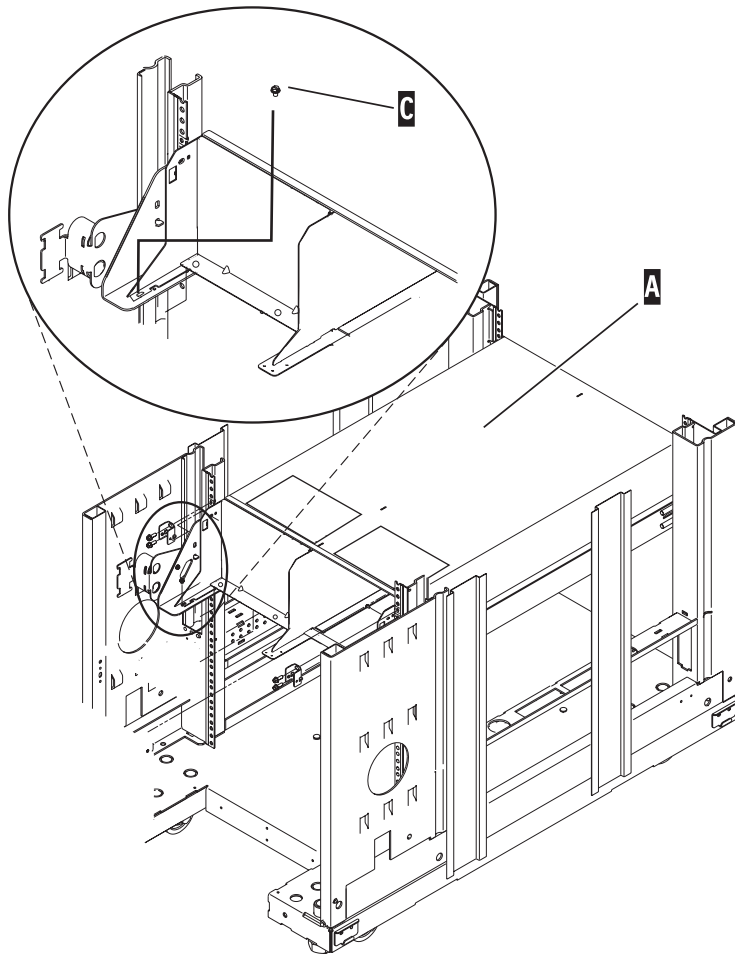
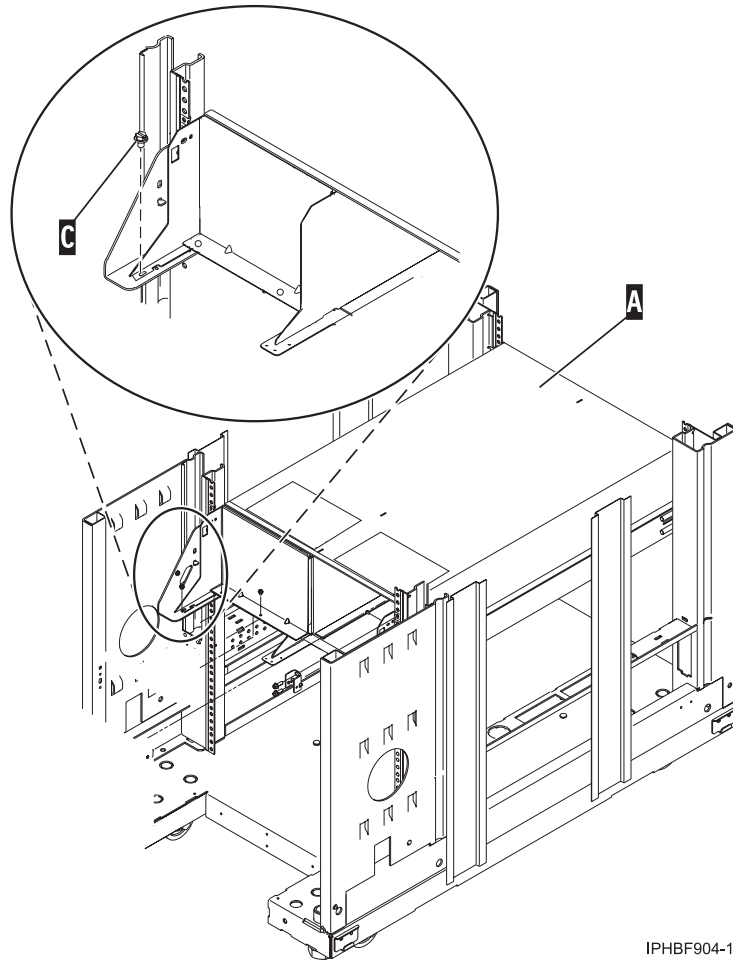


Figure 199. Securing the shell to the rack with the standard rails.

- A Shell
- C Retaining screw



IPHBF904-1

Figure 200. Securing the shell to the rack with the expandable rails.

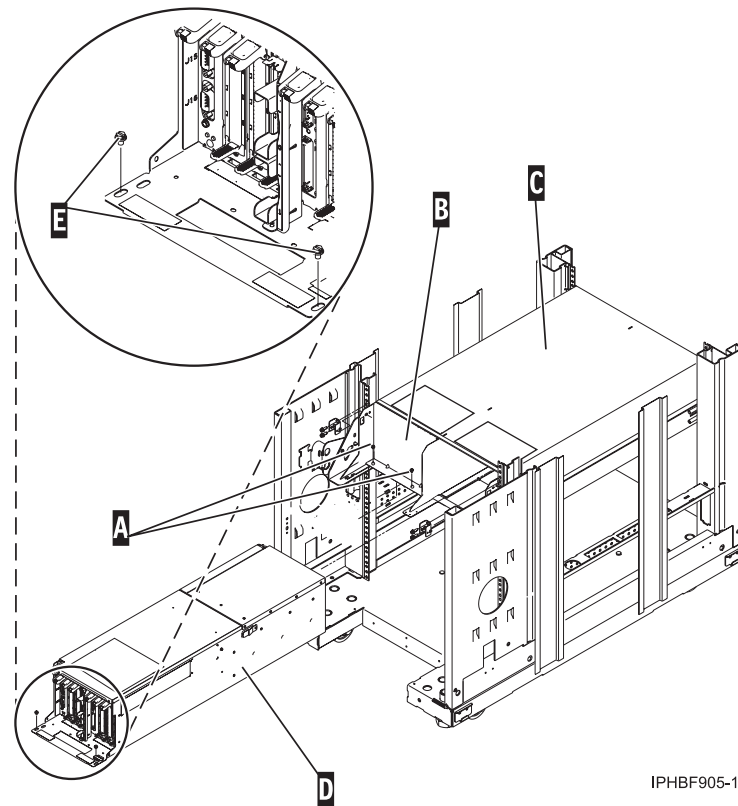
- A Shell
- C Retaining screw

Installing the system:

You might need to install the system into the rack. Use the procedure in this section to perform this task.

To install the system into a rack, complete the following steps:

1. Move to the back of the rack.
2. If you are installing a drawer **D** into an existing shell **C**, remove the two filler plate screws **A** and the filler plate **B**.



- A Filler plate screws
- B Filler plate
- C Shell
- D Drawer
- E Drawer screws

Figure 201. Removing the filler plate.

3. Carefully move any existing cables that are blocking the drawer location.
4. Slide the drawer **D** into the shell.
5. Install and tighten the two drawer screws **E**, securing the drawer to the shell.
6. If you are installing two drawers, repeat substeps 1 through 5. If there is only one drawer installed in the shell, ensure that the filler plate **B** is installed in the blank slot.

Attaching the RIO, power controller (SPCN), and power cables:

You might need to attach cables to the system. Use the procedure in this section to perform this task.

For instructions on cabling and connecting your expansion units, see “Connect your expansion units” on page 95.

Removing and replacing 14T/00, 14T/42, 0551, and 0553 side panels

You might need to remove and replace a side panel on a rack. Use the procedure in this section to perform this task.

The rack might have optional side panels. To remove and replace a side panel, complete the following procedure:

1. Unlock the side panels by pressing down on both locking latches to release the latches.

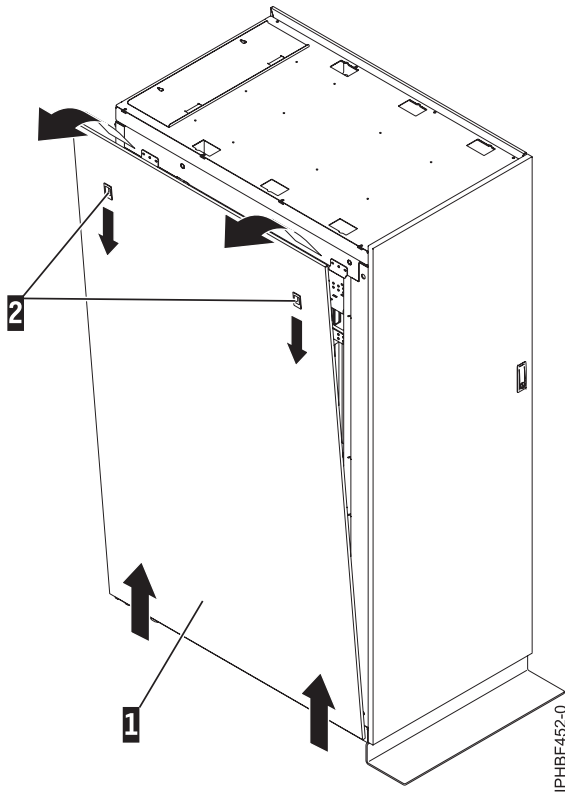


Figure 202. Removing the side panel.

Note: If your rack uses a ruggedized kit, you must remove the securing screw to allow each side panel to be removed. Refer to “Releasing the side panel with a ruggedized kit” on page 252.

2. Tilt the top of the side panel slightly toward you.
3. Lift the side panel away from the ridge on the bottom of the rack.
4. Repeat this procedure for the other side panel.

Replacing a 14T/00, 14T/42, 0551, and 0553 side panel

You might need to replace a side panel on a rack. Use the procedure in this section to perform this task.

1. Tilt the top of the side panel slightly toward you.

2. Place the bottom of the side panel onto the ridge on the bottom of the rack.

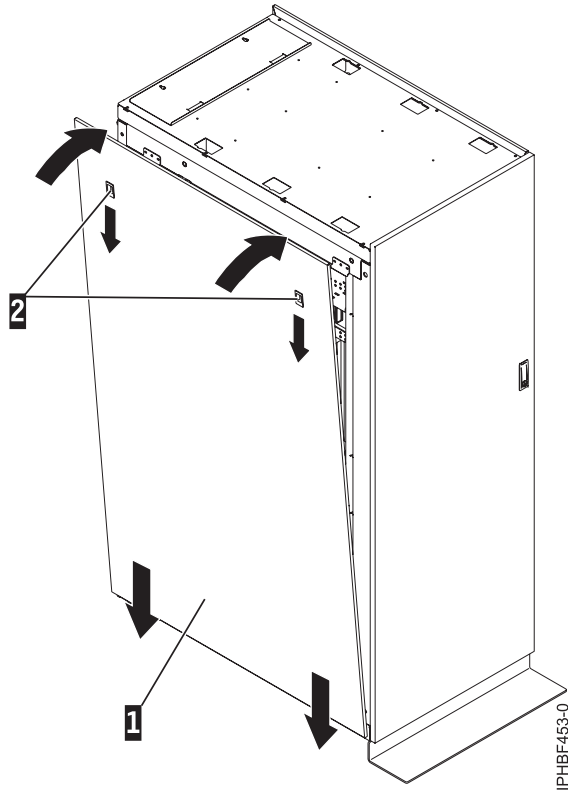


Figure 203. Replacing the side panel.

3. Slide the top of the side panel into place and close the locking latches.

Note: If your rack uses ruggedized kit, you must install a securing screw into each side panel that was installed. Refer to “Ruggedized kit” on page 250.

Attaching the rack doors

You might need to attach the rack doors. Use the procedure in this section to perform this task.

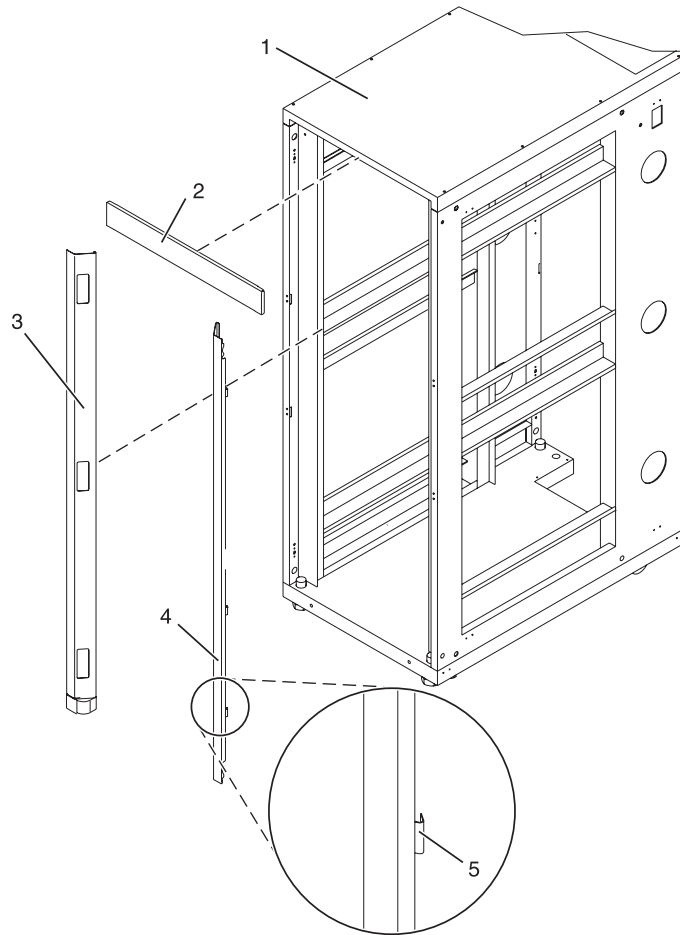
Depending on the model of the rack, the front door of a rack might be an optional feature. If your system already has the front door installed, or does not have a front door to install, skip this step.

Attaching a high-perforation front door

You might need to attach a front door to the rack. Use the procedure in this section to perform this task.

To install the high-perforation front door, do the following:

1. Read the “Rack Safety Notices” on page 245.
2. Remove the top, left, and right trim panels.



- 1 Rack chassis
- 2 Top trim panel
- 3 Left side trim panel
- 4 Right side trim panel
- 5 Spring clip

Figure 204. Removing the trim panels.

3. Install the door latch on the right and the door hinges on the left.
4. For a high-perforation front door, align the door over the rack hinge, then move up the hinge pin on the door, and lower the hinge pin into the hinge.
5. Adjust the latch so the door latches securely.

Rack Safety Notices

You will need to read the rack safety notices before installing equipment. Use the procedure in this section to perform this task.

Before installing a rack, rack features, or a system or expansion unit into a rack, read the following safety information:

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.

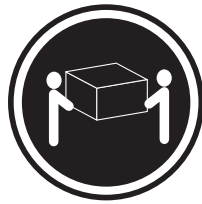
CAUTION

- 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)

If you are installing equipment into a rack, the rack must comply with the Electronics Industries Association (EIA) 310D specifications. If you do not have a rail kit designed for the equipment in the rack, do not install the equipment into the rack as damage to the equipment or personal injury could occur.

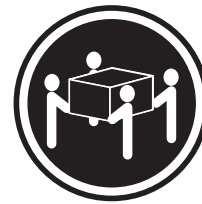
Lift precautions:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

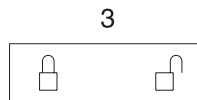
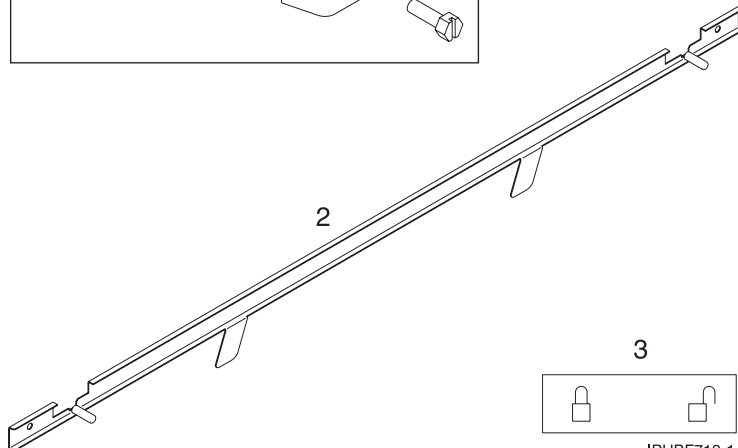
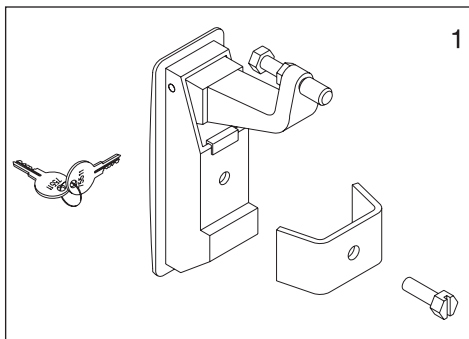
IPHBF442-0

Installing the rack security kit

You might need to install the rack security kit. Use the procedure in this section to perform this task.

To install a rack security kit that consists of the security lock and security slide bars, complete the following procedure:

1. “Rack Safety Notices” on page 245.
2. Verify the inventory in the rack security kit.



IPHBF713-1

-
- 1 Two lock hardware kits. Each kit contains:
 - Rack lock
 - Bracket
 - Screw
 - Two keys
- 2 Two security slide bars
- 3 Two locked/unlocked stickers

Figure 205. Rack security kit inventory.

- 3. Remove the existing door latch.

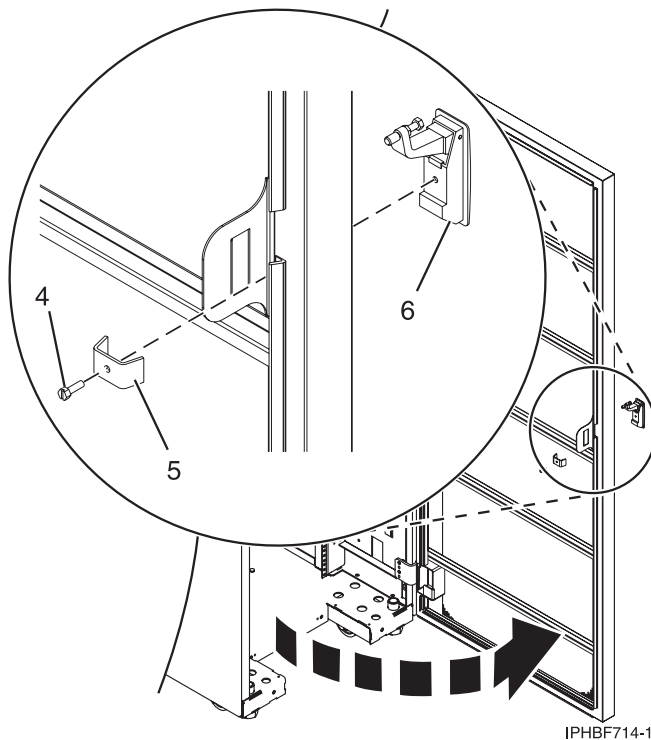


Figure 206. Removing the existing door latch.

- a. Open the front rack door.
- b. On the inside of the door, remove the screw 4 in Figure 206, that secures the lock to the rack door.
- c. Remove the bracket 5.
- d. From the outside of the door, remove the door latch 6.

Note: If the rack is equipped with the ruggedized kit, remove the jam nut and hex nut from the existing door latch and reinstall both nuts on the new door lock latch.

- 4. Install the locking latch.
 - a. Insert the keyed rack lock into the latch slot on the front of the door 6 in Figure 206.
 - b. Secure the lock by attaching the lock bracket 5 with the screw 4, on the inside of the door.

5. Repeat steps 3 on page 248 and 4 on page 248 to install the second lock on the back rack door.
6. Install a security slide bar on the right side of the rack.

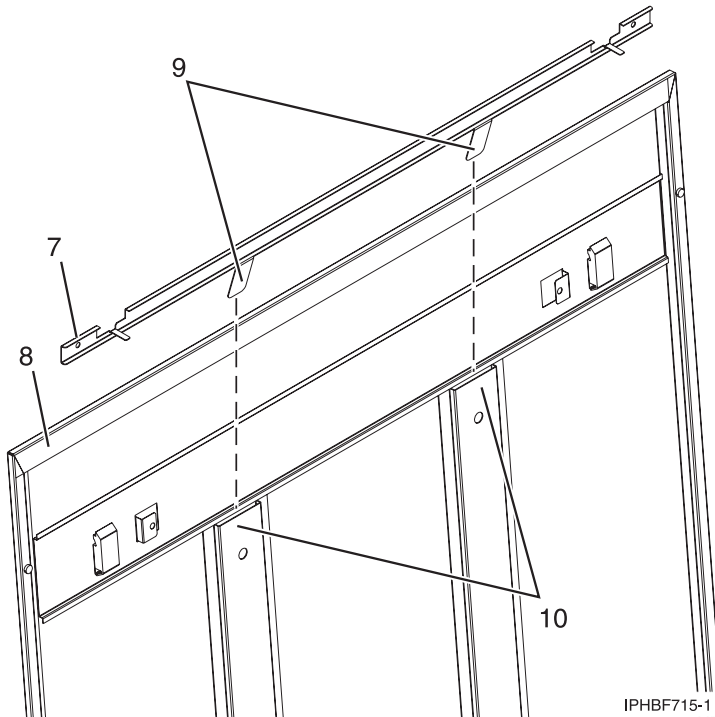


Figure 207. Installing a security slide bar.

Note: Each slide bar rail has two long tabs on the bottom of the rail. The slide bar rails are identical and can be installed on either the right or left side cover panel.

- a. Unlatch right-side cover panel and lean the panel back so that you can access the top of the panel.
- b. With the flat side of the slide bar rail 7 in Figure 207, facing the inside of the cover panel 8, insert the two tabs 9, on the slide bar rail into the two vertical support channels 10 on the side cover panel.

Note: When installed correctly, the slide rail should move front to back.

- c. Reinstall the side panel cover on to the rack.
- d. Lock the side panel covers by sliding the bars to the front of the rack.
- e. Place a locked/unlocked sticker on the inside of the cover panel so that when the slide bar is in the locked position, the tab is over the locked symbol, 11, as shown in Figure 208 on page 250 and over the unlocked symbol, 12, when the slide bar is unlocked.

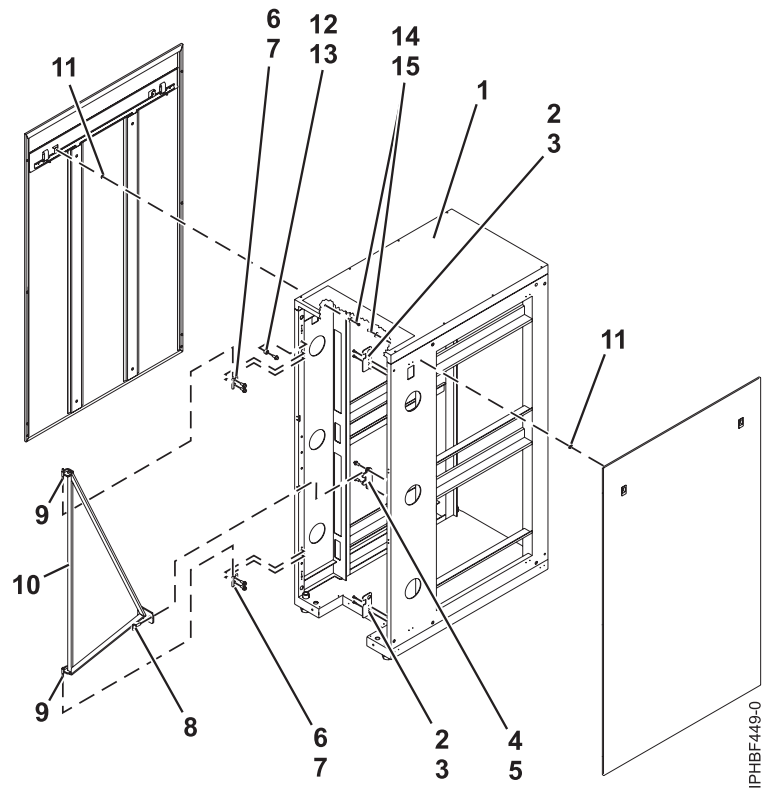


Figure 209. Ruggedized kit parts.

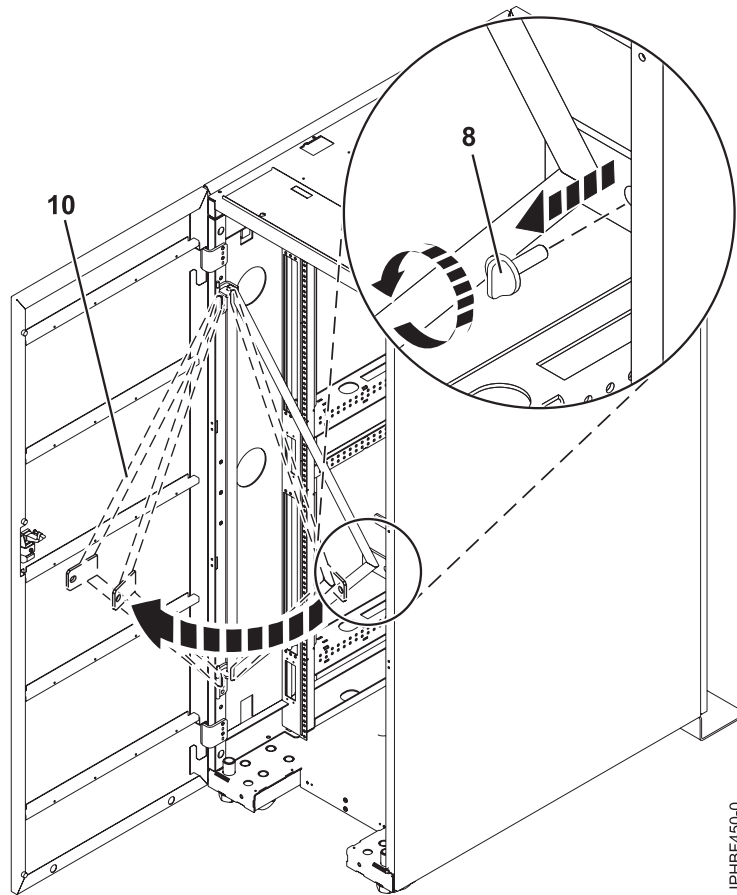
- | | |
|-----------------------|-----------------------------------|
| 1 Rack | 9 Brace hinges |
| 2 Spacer | 10 Brace |
| 3 Brace hinge | 11 Side-door securing screw mount |
| 4 Hinge pivot studs | 12 Spacer |
| 5 Brace latch bracket | 13 Screw |
| 6 Spacer | 14 Washer |
| 7 Screw | 15 Side door securing screw |
| 8 Brace thumbscrew | |

Releasing the ruggedized brace

You might need to release the ruggedized brace. Use the procedure in this section to perform this task.

To access the back of a system that is installed in a rack with a ruggedized kit, complete the following steps to release the ruggedized brace:

1. Remove the brace thumbscrew 8.



IPHBF450-0

Figure 210. Releasing the brace to access systems.

2. Swing the brace **10** out of the rack.
3. Access the system and reinstall the brace.

Releasing the side panel with a ruggedized kit

You might need to release the side panel on the rack. Use the procedure in this section to perform this task.

The ruggedized kit contains securing screws that secure the side panels to the rack. To remove a securing screw, complete the following steps:

1. If necessary, open or remove the back rack door.
2. Locate the securing screw mount **11** for the side door that will be removed.

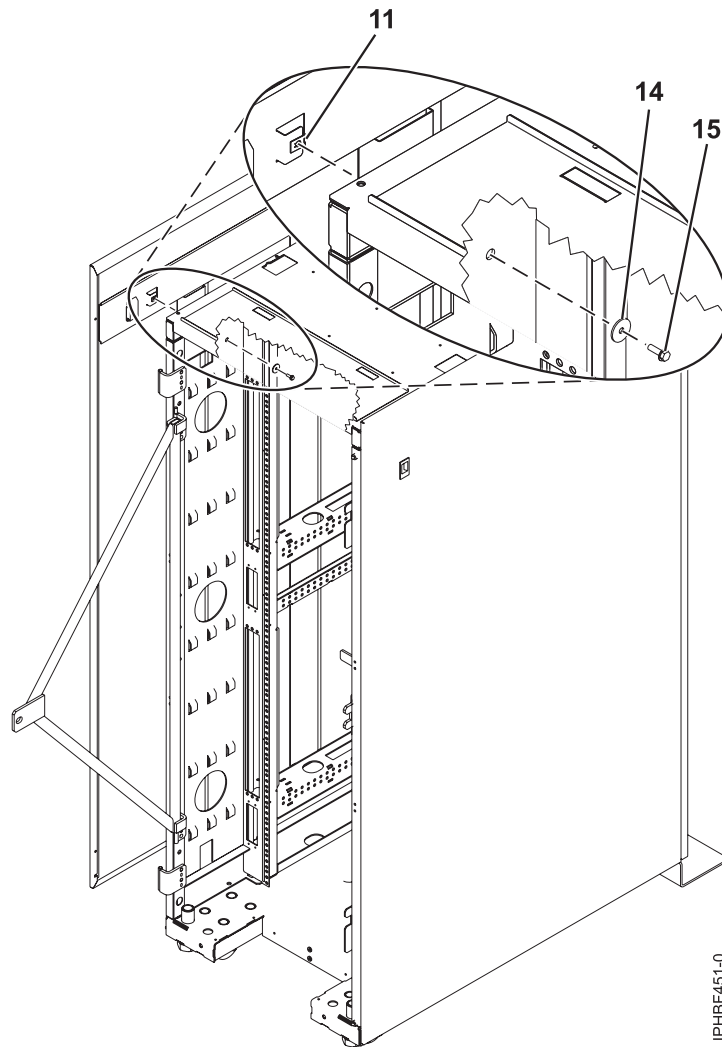


Figure 211. Removing the securing screws on the side panel.

3. Using a screwdriver, remove the securing screw **15** and washer **14** from the side panel. To remove the side panel, see “Removing and replacing 14T/00, 14T/42, 0551, and 0553 side panels” on page 242.

Connecting multiple racks with rack-to-rack attachment kit

You might need to connect multiple racks together. Use the procedure in this section to perform this task.

This topic describes how to connect multiple racks to each other using a rack-to-rack attachment kit. To do this, you will need the rack-to-rack attachment kit:

1. Read the “Rack Safety Notices” on page 245.
2. Remove the side panels from each rack, if they are installed. Remove side panels only from the sides that will be attached to each other. To do this:
 - a. Lift the two panel-release tabs up.
 - b. Pull the panel up and away from the rack chassis. This motion will release the panel from the two lower J brackets.
 - c. Store the side panels.
3. Remove the two Z brackets and the two J brackets. These brackets are used to hang the side panels.

4. Install the first two standoffs in the upper-left and lower-right corners of the first rack as shown in Figure 212.
5. Install the second two standoffs in the upper-left and lower-right corners of the second rack as shown in Figure 212.
6. Attach the long foam as shown in Figure 212. For a model T42 rack, join the short foam to the end of the long foam, and adhere it to the frame length of the rack.
7. Position the racks together.
8. Align the standoff holes. You might need to adjust the leveling feet to do this.
9. Install a screw and washer into all four positions, but do not tighten.

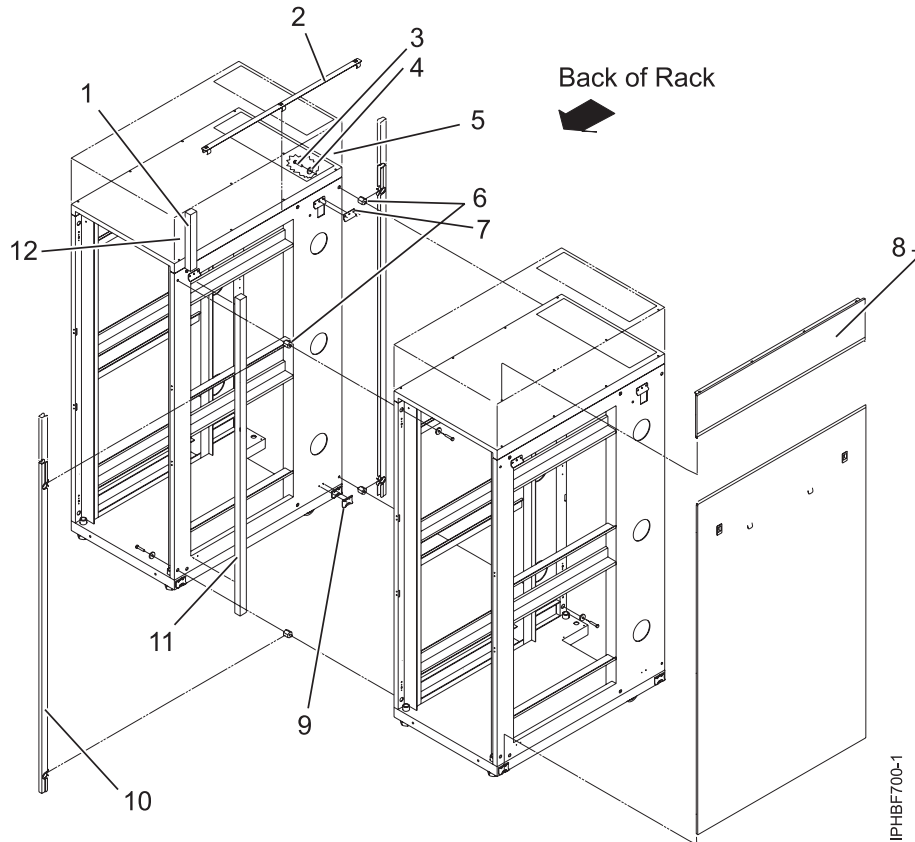


Figure 212. Removing the side panels, Z and J brackets, and installing standoffs and long foam to connect multiple racks.

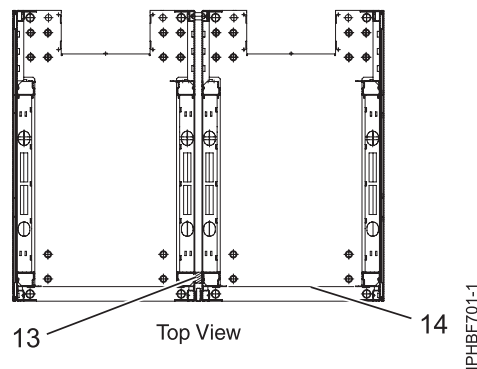


Figure 213. Location of foam strips (top view).

10. After all racks are bolted together, level the racks.
11. Tighten all four screws.
12. Snap on the trim pieces that go between the front and back racks.
13. Snap on the trim piece that goes on top and between the racks.
14. Install rack filler panels to cover the open areas at the front of the racks. All the gaps in the front of the rack must also be sealed, including the gaps between equipment. This step ensures that proper airflow within the rack is maintained.
15. Connect the cables that go between the racks.
16. If you are installing tip plates, go to step 5 in “Installing the rack” on page 197.

Rack status beacon

You might need to install a rack status beacon. This section includes procedures so that you can perform these tasks.

This is a customer task. You can perform this task yourself, or contact a service provider to perform the task for you. The service provider might charge you for this service.

These procedures assume that the system units have been installed into the rack and have been connected to the power supply. If the system units have not been installed, refer to the installation instructions for your system unit.

The rack status beacon is designed to be placed on top of a rack and cabled to multiple system units inside the rack. The server firmware will illuminate the rack status beacon in response to any detected problems in the status. This helps you locate the problem more quickly.

Installing the rack status beacon

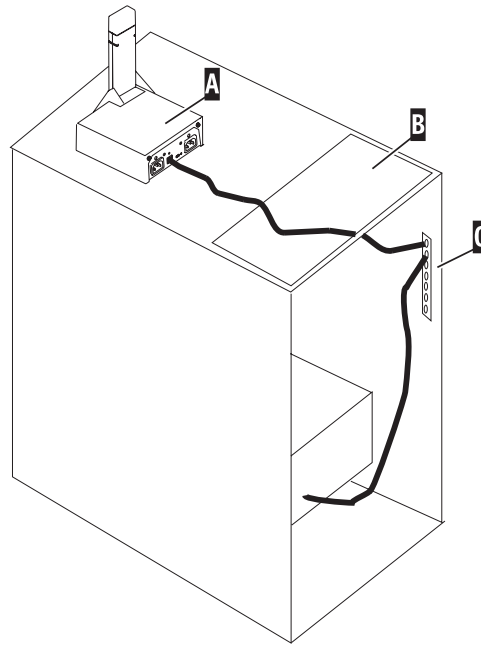
You might need to install the rack status beacon. Use the procedure in this section to perform this task.

To install the rack status beacon, you need the following:

- Rack status beacon assembly.
- Two or more rack status beacon cables. You need one cable to connect the beacon to the junction box and one for each system unit that you want to connect to the beacon.
- One or two power cords.
- One or more junction boxes for the rack status beacon.
- One or more junction box cables.

To install the rack status beacon, follow these steps:

1. Place the rack status beacon, **A**, on top of the rack so that the light is pointing to the front of the rack.

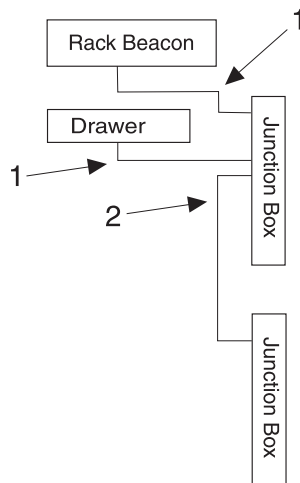


- A** Rack Beacon
- B** Cable Access Cover
- C** Junction Box

IPHBF702-0

Figure 214. Connecting the rack status beacon to the system unit through the junction box.

2. Plug one end of the rack status beacon cable 1 into the port on the back of the rack status beacon assembly.



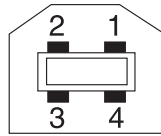
IPHBF703-0

Figure 215. Connecting the rack status beacon and system unit to the junction box.

3. Thread the rack status beacon cable through the rack's cable access cover, **B**.
4. Plug the other end of the rack status beacon cable into the output port on the junction box, **C**.
5. To connect the junction box to the system unit, plug one end of a rack status beacon cable, **1**, into an input port on the junction box.

6. Plug the other end of the second rack status beacon cable into the beacon port on the system unit. This port is labeled with a beacon symbol.

Note: On some system units, the orientation of the port is rotated.



IPHBF704-0

Figure 216. Rack status beacon port.

7. To add additional system units to this rack status beacon, repeat steps 4 and 5 for each additional system unit. You can connect multiple junction boxes to add additional system units. Refer to Connect multiple junction boxes.
8. Plug the power cords into the rack status beacon assembly. Only one power cord is required, but you can use two power cords for backup.
9. Plug the other end of the power cords into the rack power supply.

If you install the rack status beacon during initial server setup, the initial program load (IPL) will read the rack identification information. If you install the rack status beacon on system units that are running, you will need to start the system again.

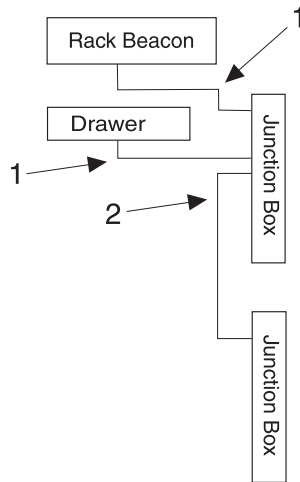
Connecting multiple junction boxes

You might need to connect multiple junction boxes. This section includes procedures so that you can perform these tasks.

You can connect multiple junction boxes so that additional system units can be added to the rack status beacon.

To connect multiple junction boxes, you need the following additional equipment:

- One or more rack status beacon junction boxes.
 - One or more junction box cables. You need a junction box cable for each junction box that you want to add.
1. Plug the one end of the junction box cable, **2**, into an input port on the first junction box.



IPHBF703-0

Figure 217. Connect the rack status beacon and system unit to the junction box.

2. Plug a junction box cable into the output port of the additional junction box.
3. Connect additional system units to the additional junction box as described in “Installing the rack status beacon” on page 255.
4. Repeat steps 1–3 for each additional junction box.

Installing or removing a rack-mounted system-unit latch bracket

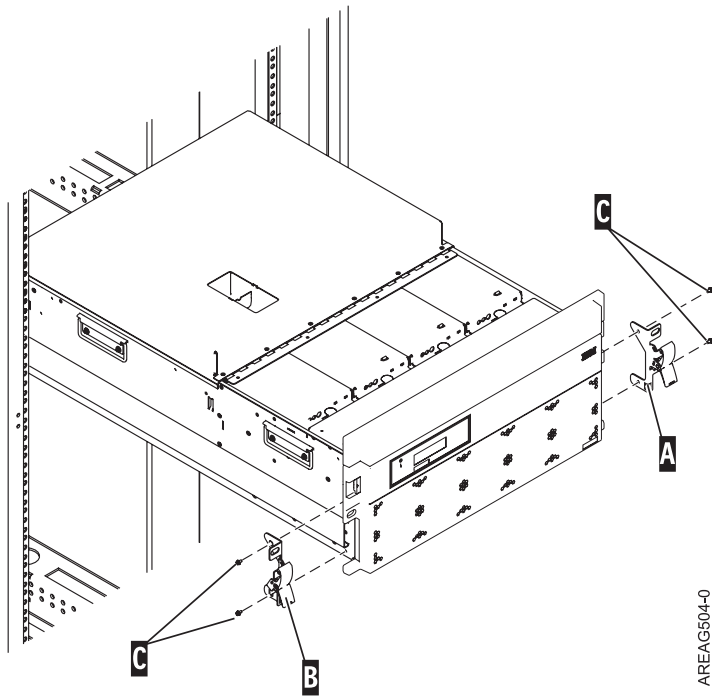
You might need to install or remove a latch bracket. Use the procedure in this section to perform this task.

These procedures describe how to install or remove the rack-mounted system-unit latch bracket. You can perform this task yourself, or contact a service provider to perform the task for you. The service provider might charge you for this service.

To install or remove a latch bracket, complete the following steps:

Note: The illustrations in these procedures may differ from your machine type and model.

1. Read the “Rack Safety Notices” on page 245.
2. Open the front rack door.
3. Push the latch bracket **A** or **B** into place on the side of the system unit.



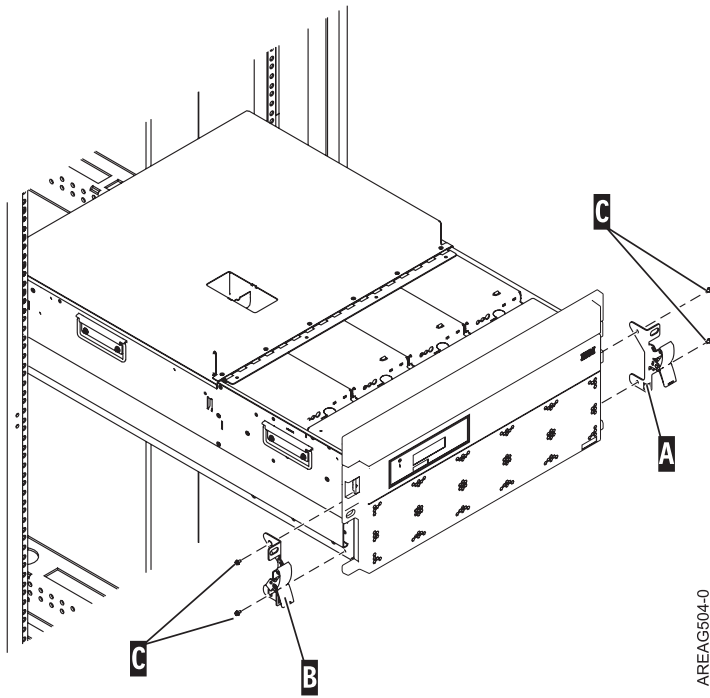
AREAG504-0

Figure 218. Reinstalling the latch brackets.

4. Secure the latch bracket with two retaining screws **C**, on the side of the latch bracket.
5. Replace the front cover. See "Install the front cover on the 11D/20 expansion unit" on page 310 See hwip2rackbezelon.dita.
6. Close the front rack door.

To remove a latch bracket, complete the following steps:

1. Remove the cover from the front of the system. See "Remove the front cover from the 11D/20 expansion unit" on page 309 See hwip2rackbezeloff.dita
2. Place the system in the service position. See the appropriate model's instructions.
3. Remove the retaining screws **C** located on the side of the latch bracket **A** or **B**.



AREAG504-0

Figure 219. Removing the retaining screws.

4. Remove the latch bracket from the system unit.

Chapter 7. Backplanes and cards

You might need to remove, replace, or install a Redundant Array of Independent Disks (RAID) enablement card or system backplane in the server. This section includes procedures so that you can perform these tasks.

Replacing this feature is a customer task. You can perform this task yourself, or contact a service provider to perform the task for you. You might be charged a fee by the service provider for this service.

Remove the model system backplane

You might need to remove the system backplane from the server. Use the procedure in this section to perform this task.

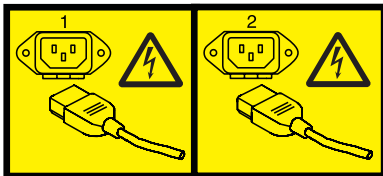
Prepare the system

If you have a SCSI disk enclosure attached to the system you might want to disconnect the SCSI cable at the enclosure to prevent a potential SCSI address conflict on the attached enclosure when you power down the system.

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Identify the system backplane assembly that you need to remove. For instructions, see “Identify a failing part” on page 299.
3. Stop the system. For instructions, see “Stop the system or logical partition” on page 303.
4. Disconnect the power source from the system by unplugging the system.

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

(L003)



or



5. Remove the front cover. For instructions, see “Remove the front cover from the model ” on page 311.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
6. Remove the SMP cable, if present, from the front of the processor. For instructions, see “Remove the model SMP processor cable” on page 264.
 7. Remove the control panel. For instructions, see “Remove the control panel with power off” on page 7.
 8. Remove the voltage regulator modules. Record the location of each voltage regulator module being removed. For instructions, see “Remove the model voltage regulator assembly with power off” on page 288.

Remove the system backplane

1. Locate the blue handle, which is below the processor assembly.

Attention: The system backplane assembly is of substantial weight and should not be pulled out using the blue lever. Grasp the system backplane assembly firmly with both hands when it is free of the system.

2. As shown in the following figure, push the blue lever **A** to the left and out from the system to unlock the system backplane assembly, and then pull the system backplane assembly **B** out of the system using both hands.

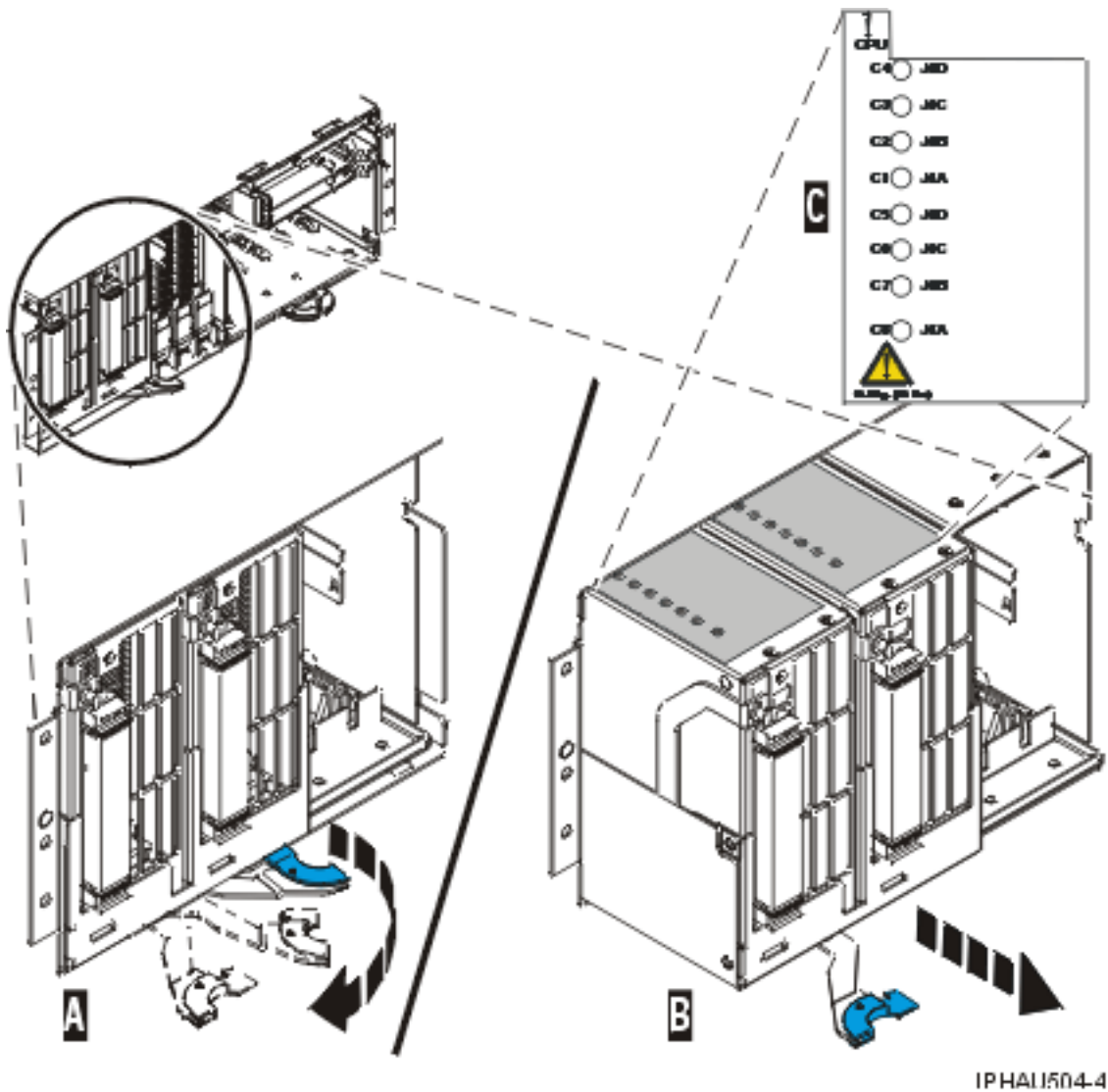


Figure 220. Slide the model system backplane assembly out of the system unit

3. If you are removing the system backplane as a part of another procedure, return to that procedure. If you are removing the system backplane because it is damaged or failing to operate correctly, continue to the next step.
4. Pull out the bracket by removing the 2 screws at the top of the bracket, and tipping the bracket back.
5. As shown in the following figure, pull out on the locking knobs **A** until you feel them unlock. Push the locking arms **B** down and out to unlock the processor assembly, and then lift it out of the system backplane assembly **C**. Remove all processor assemblies (or fillers) from the system backplane assembly.

Tip: Record the location of each processor assembly being removed for use during reinstallation.

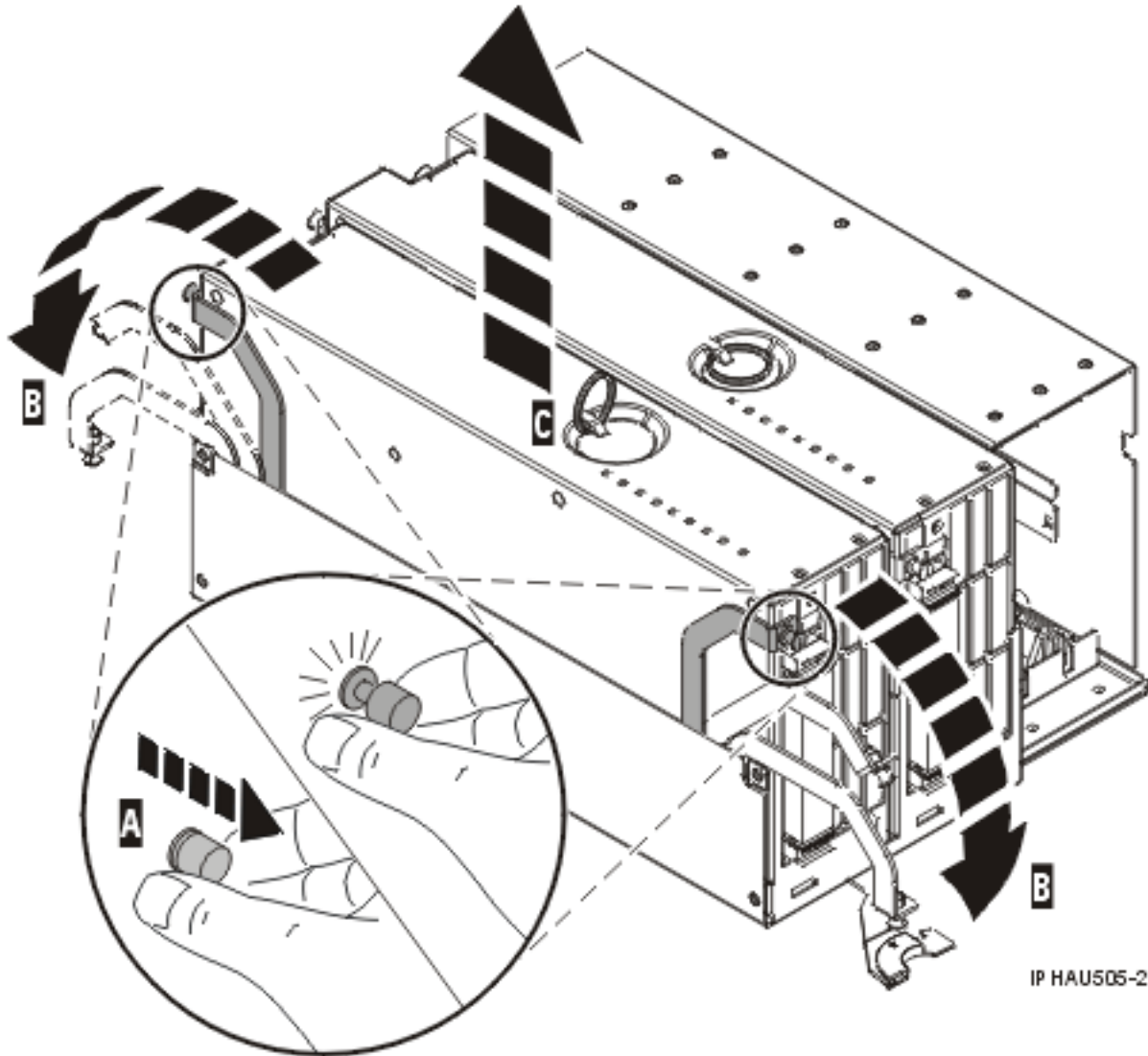


Figure 221. Remove the processor assembly from model backplane assembly

6. Place the processor assembly on a surface that is safe from electrostatic discharge.
7. Replace the system backplane. For instructions, see “Replace the model system backplane” on page 268.

Remove the model SMP processor cable

You might need to remove the SMP processor cable. Use the procedure in this section to perform this task.

DANGER

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

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

- Connect power to this unit only with the 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)

To remove the SMP processor cable, complete the following steps:

1. Perform prerequisite tasks as described in “Before you begin” on page 291.
2. Stop all system units. Refer to “Stop the system or logical partition” on page 303.
3. Disconnect the power source from the system units by unplugging the system units.

Once the system is powered off, remove all power cords from all of the processor enclosures starting with the primary processor enclosure (topmost) and then each secondary enclosure working from top to bottom. See Figure 222 on page 266 for details.

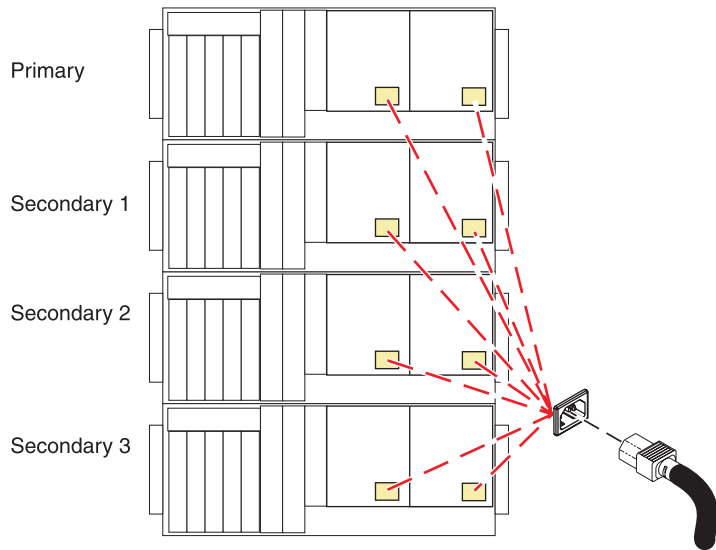
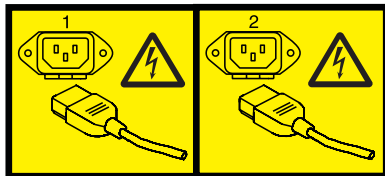


Figure 222. Remove power cords

Note: The system units might be equipped with secondary power supplies. Before continuing with this procedure, ensure that all power sources to the system units have been disconnected completely.

(L003)



OR



Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge 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.
4. Remove the front cover as shown in “Remove the front cover from the model ” on page 311.
 5. Remove the SMP processor cable.

Beginning with the SMP processor cable connection to the lowest system unit in the rack, and moving up to the SMP processor cable connection to the highest system unit in the rack, perform the following for each rack:

 - a. Carefully pull the handle **A** from the system until the connector is unseated.
 - b. When the guide pins **B** are free, carefully pull the SMP processor cable away from the system unit.
 - c. Carefully pull the cable away from the rack and set it aside.

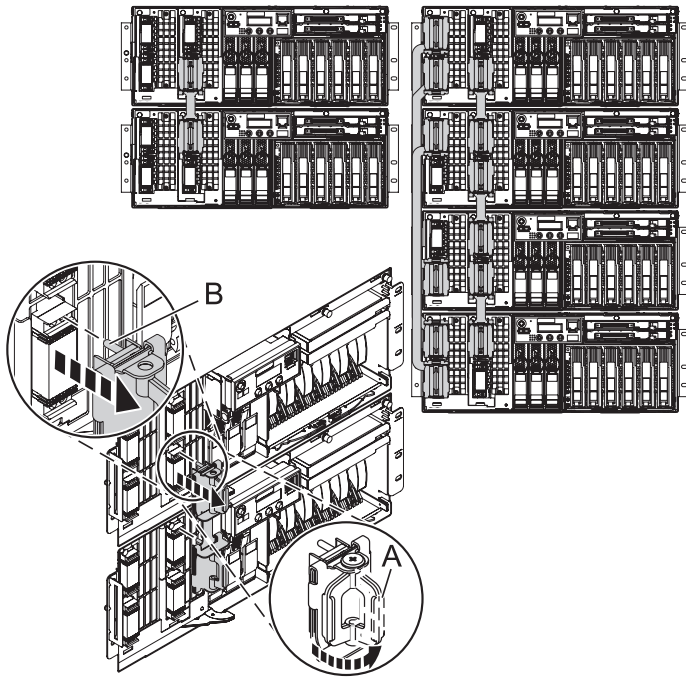


Figure 223. Remove the SMP Cable

Replace the model system backplane

If you removed the system backplane as a part of another procedure, you might need to replace the system backplane. Use the procedure in this section to perform this task.

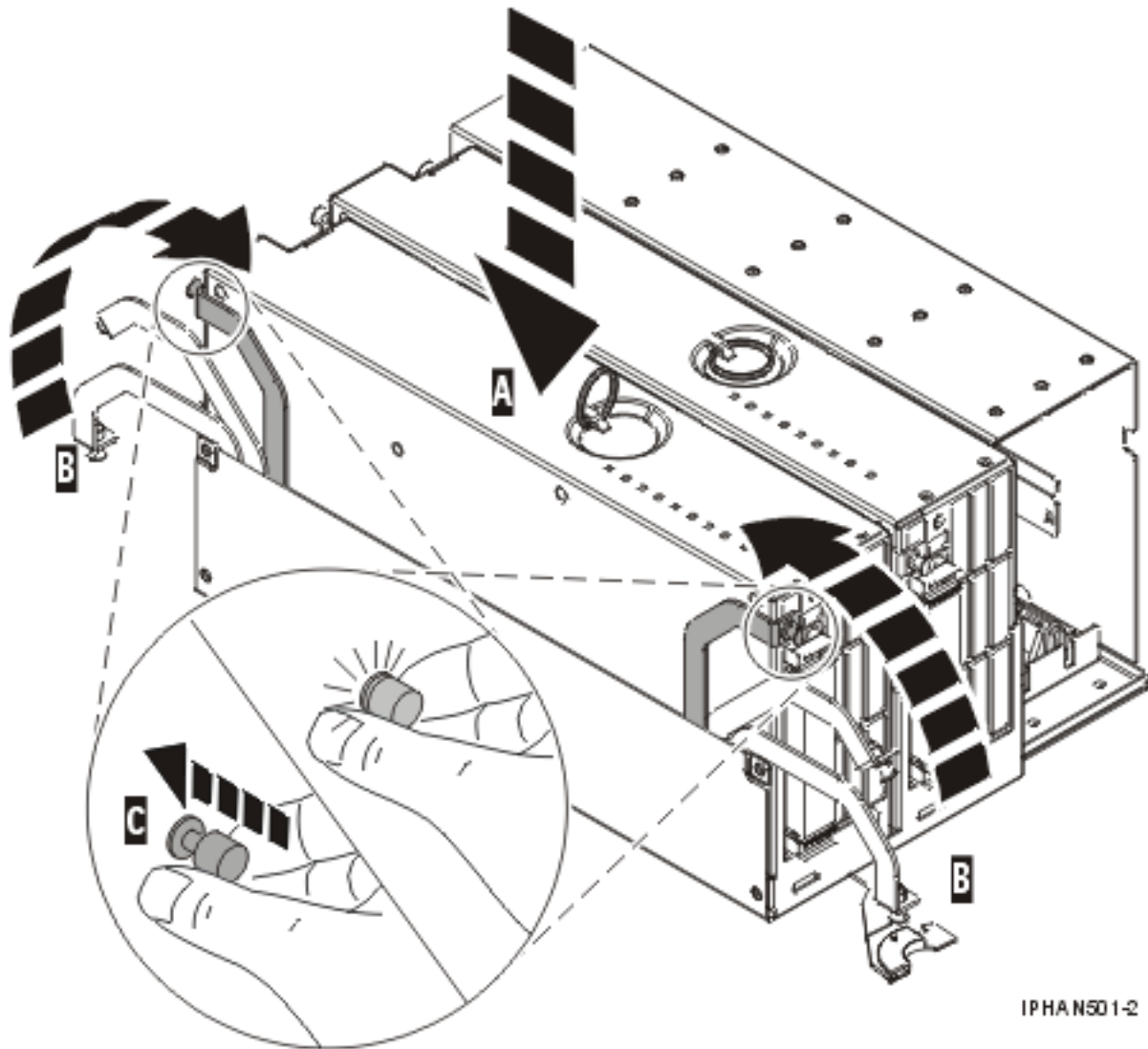
You must have already completed the procedure “Remove the model system backplane” on page 261.

Replace the system backplane

1. As shown in Figure 224 on page 269, place the system processor assembly into the system backplane assembly **A** using the location information that you recorded during the removal procedure. Lock the system processor assembly into place with the locking arms **B**. Press in on the locking knobs **C** until you feel them lock into place. Replace all processor assemblies that were removed earlier.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge 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.



IPHAN501-2

Figure 224. Replace the model backplane assembly

2. Align the system backplane assembly with the slot in the system.
3. Slide the system backplane assembly into the system **A**, as shown in Figure 225 on page 270.
4. Push the blue lever **B** to the right and in toward the system to lock the system backplane assembly.

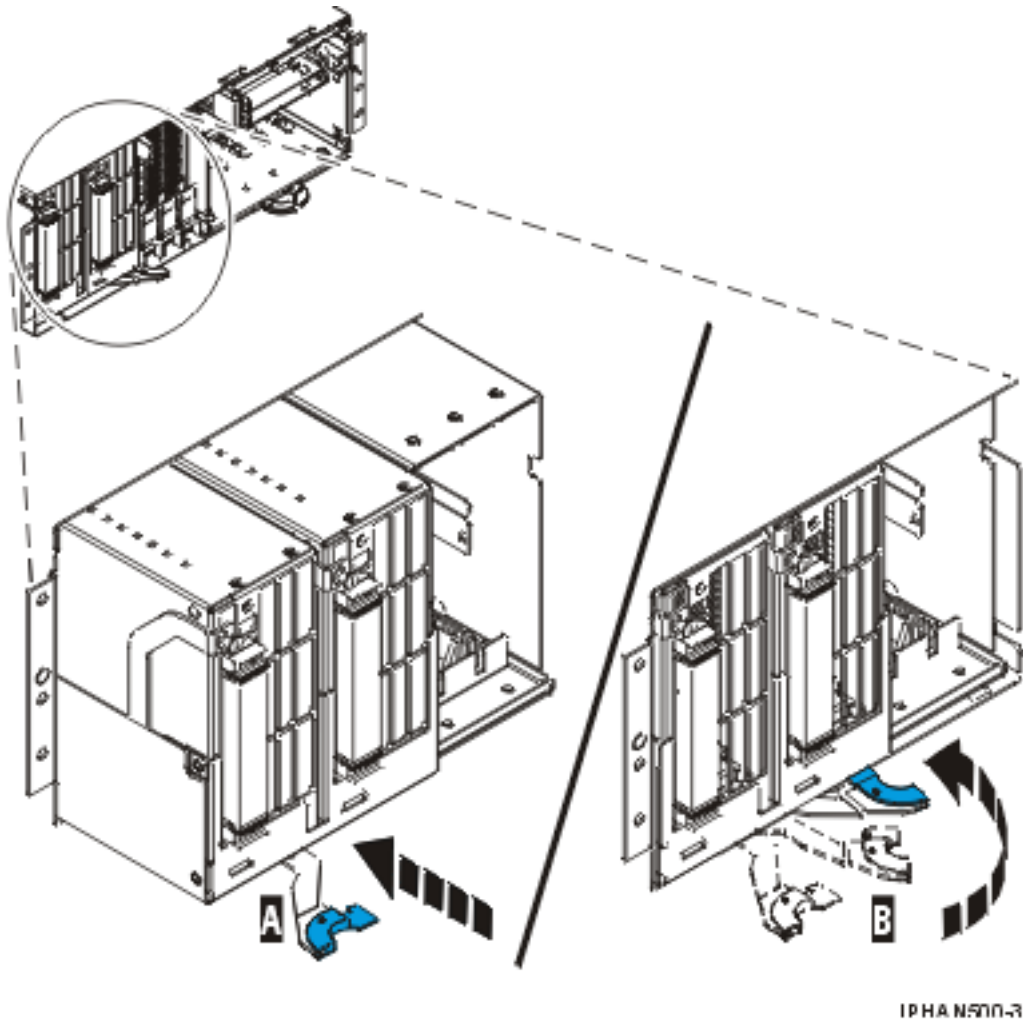


Figure 225. Slide the model system backplane assembly into the system unit

Complete the procedure

1. Reinstall the voltage regulator modules. For instructions, see “Install the model voltage regulator assembly with power off” on page 286.
2. Reinstall the control panel. For instructions, see “Install or replace the control panel with power off” on page 6.
3. Reinstall the SMP processor cable, if it was removed. For instructions, see “Replace the model SMP processor cable.”
4. Reinstall the front cover. For instructions, see “Install the front cover on the model ” on page 311.
5. “Start the system or logical partition” on page 300.
6. If you replaced the system backplane as part of another procedure, return to that procedure now. If you replaced it because it was not operational, verify that the new resource is functional. For instructions, see “Verify the installed part” on page 319.

Replace the model SMP processor cable

You might need to replace the SMP processor cable. Use the procedure in this section to perform this task.

DANGER

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

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

- Connect power to this unit only with the 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.

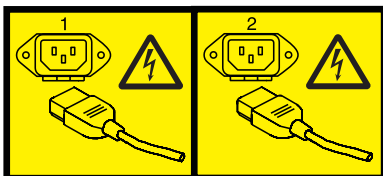
(D005a)

To replace the SMP processor cable, complete the following steps:

1. Disconnect the power source from the system units by unplugging the system units.

Note: The system units might be equipped with secondary power supplies. Before continuing with this procedure, ensure that all power sources to the system units have been disconnected completely.

(L003)



or



Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge 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. Place the SMP processor cable into position over the system units so that the connectors align with the processor cards in each unit.
 3. Beginning with the topmost SMP cable connection and continuing downward, perform the following for each rack:
 - a. Align the guide pins **A** with the connectors **B** on the system unit.
 - b. Using the handle **C**, carefully push the SMP processor cable into the system unit connector.

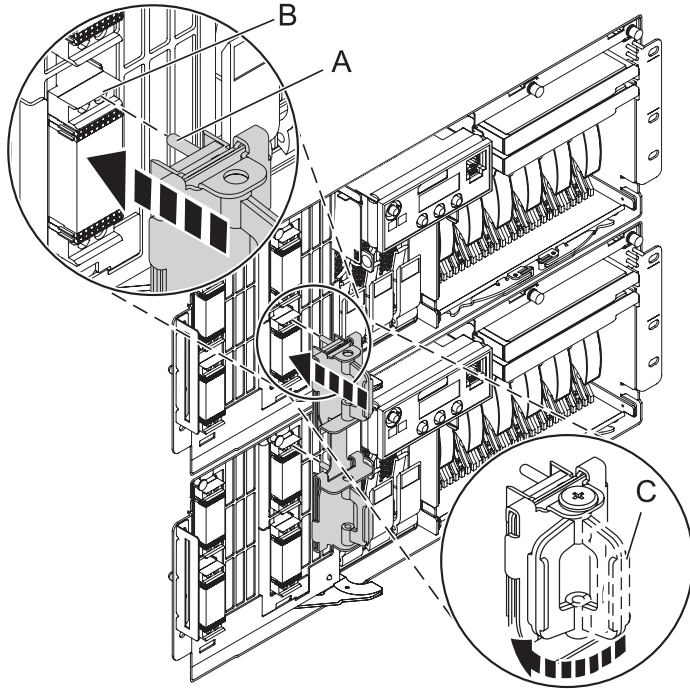


Figure 226. Installing the SMP Cable

4. Install the front cover. For more information, see “Install the front cover on the model ” on page 311.
5. Reconnect all system power cables.
Install the cords in the following order. See Figure 227 on page 274 for a description.
 - a. Secondary 2
 - b. Secondary 3
 - c. Primary
 - d. Secondary 1

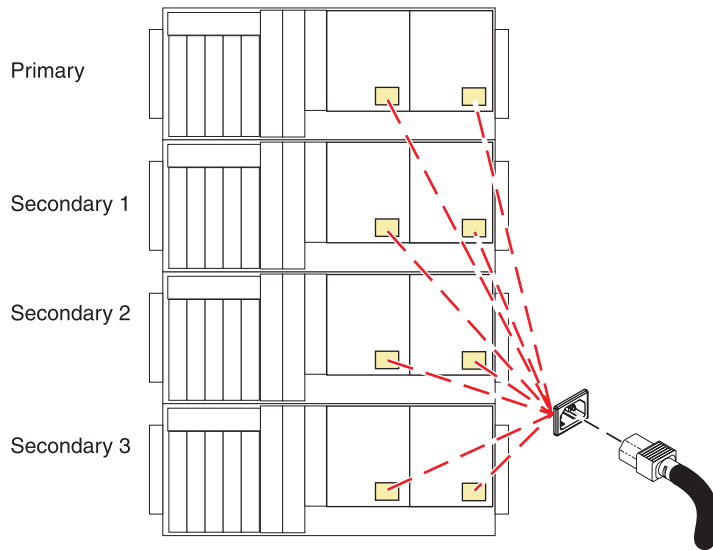


Figure 227. Install power cords

6. "Start the system or logical partition" on page 300.
7. If you replaced the SMP processor cable as part of another procedure, return to that procedure now. If you replaced it because it was not functioning correctly, verify that the new cable is functional. See "Verify the installed part" on page 319.

Chapter 8. RIO or GX Dual-Port 12X Channel Attach adapteradapters and cables

The information and procedures in this topic are for remote input/output (RIO), or GX Dual-Port 12X Channel Attach adapter adapters and cables, including connector locations and installing, removing, or replacing the RIO or GX Dual-Port 12X Channel Attach adapter adapters.

Model RIO or GX Dual-Port 12X Channel Attach adapter adapter

Learn more about the model RIO or GX Dual-Port 12X Channel Attach adapter adapter.

The following procedures describe the removal, replacement, and installation of the model RIO or GX Dual-Port 12X Channel Attach adapter adapter.

Replacing this feature is a customer task. You can perform this task yourself, or contact a service provider to perform the task for you. You might be charged a fee by the service provider for this service.

To set up your RIO or GX Dual-Port 12X Channel Attach adapter cabling, see Chapter 3, “Expansion units,” on page 89.

Install a model RIO or GX Dual-Port 12X Channel Attach adapter adapter

Learn more about installing a model RIO or GX Dual-Port 12X Channel Attach adapter adapter.

The following procedure describes the installation of the model RIO or GX Dual-Port 12X Channel Attach adapter adapter.

If your system is managed by the HMC, use the HMC to complete the steps for installing the model RIO or GX Dual-Port 12X Channel Attach adapter adapter. See “Install a feature using the Hardware Management Console” on page 318.

To install the adapter on a system that is not managed by the HMC, complete the following steps:

1. Perform the prerequisite tasks as described in “Before you begin” on page 291.
2. Stop the system. See “Stop the system or logical partition” on page 303.
3. Disconnect the power source from the system by unplugging the system.

Note: This system can be equipped with a second power supply. Before continuing with this procedure, ensure that the power source to the system has been disconnected completely.

4. Open the back rack door.
5. Attach the wrist strap.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
6. If there is not an adapter in slot 7, the new GX Dual-Port 12X Channel Attach adapter adapter should be installed there. If there is already a GX Dual-Port 12X Channel Attach adapter adapter in slot 7, you will need to install the new adapter in slot 6. If slot 6 contains a PCI adapter, relocate that to another slot. For instructions, see Chapter 4, "PCI adapter," on page 121.

Note: If you need to have a HSL/RIO card and a GX adapter in slots 6 and 7, the GX adapter should go in slot 7 to maximize the performance.

Note: If you have a 2-way system, slot 7 is not active and slot 6 must be used. In that case, only 1 loop is supported.

7. Align the RIO or GX Dual-port 12x HCA adapter with the slot in the system.
8. Slide the RIO or GX Dual-Port 12X Channel Attach adapter adapter into the system.
9. Push the handle **A** up and toward the system until the handle stops against the adapter.
10. Turn the thumbscrew **B** until tight.

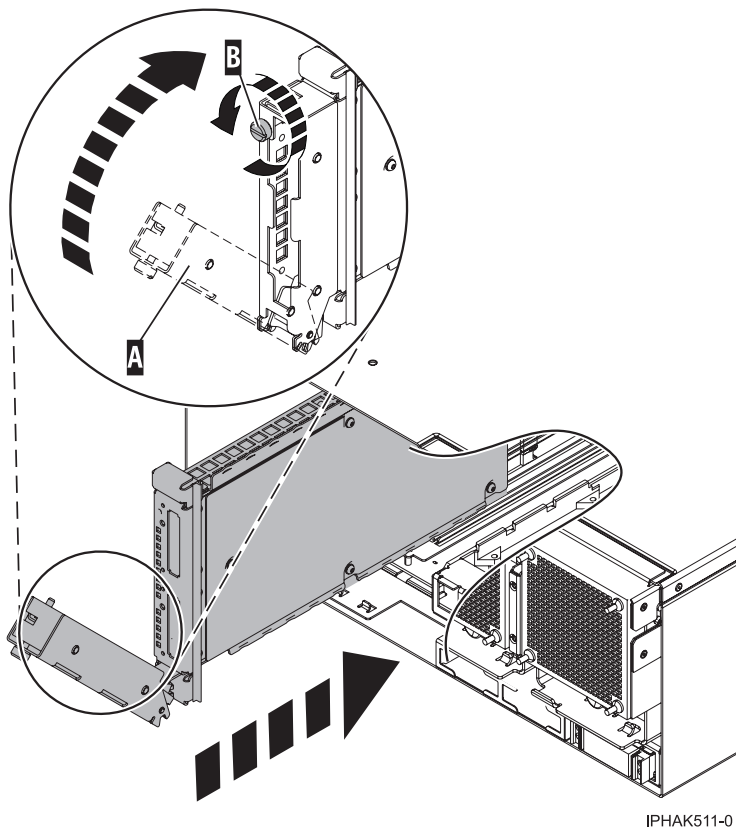


Figure 228. Model RIO or GX Dual-Port 12X Channel Attach adapter adapter installed in the system unit

11. Reconnect all power and signal cables to their respective connectors.

12. Close the back rack door.
13. Start the system. See “Start the system or logical partition” on page 300.
14. Verify that the new resource is working correctly. For instructions, see “Verify the installed part” on page 319.

Remove a model RIO or GX Dual-Port 12X Channel Attach adapter adapter

Learn more about removing a model RIO or GX Dual-Port 12X Channel Attach adapter adapter.

The following procedure describes the removal of the RIO or GX Dual-Port 12X Channel Attach adapter adapter.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing the RIO or GX Dual-Port 12X Channel Attach adapter adapter. See “Remove a part using the Hardware Management Console” on page 318.

To remove the adapter on a system that is not managed by the HMC, complete the following steps:

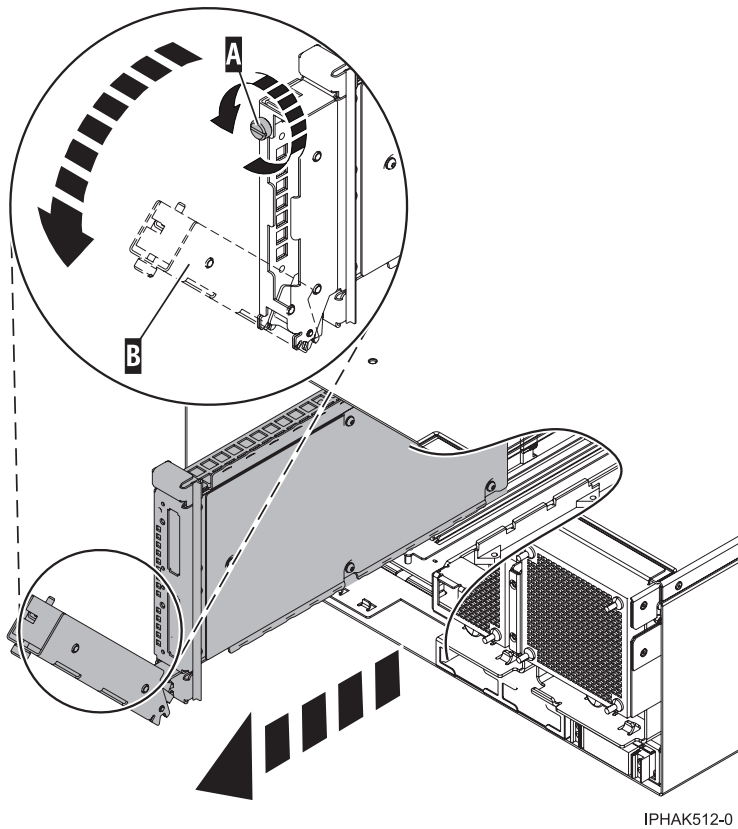
1. Perform the prerequisite tasks described in “Before you begin” on page 291.
2. Identify the failing part. For instructions, see “Identify a failing part” on page 299.
3. Stop the system. See “Stop the system or logical partition” on page 303.
4. Disconnect the power source from the system by unplugging the system.

Note: This system can be equipped with a second power supply. Before continuing with this procedure, ensure that the power source to the system has been disconnected completely.

5. If necessary, disconnect any cables connected to the adapter at the back of the system.
6. Attach the wrist strap.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
7. Turn the thumbscrew **A** until the adapter is loose.
 8. Pull the handle **B** down.
 9. Slide the adapter out of the system.



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Figure 229. Removal of RIO or GX Dual-Port 12X Channel Attach adapter adapter in a model

Replace a model RIO or GX Dual-Port 12X Channel Attach adapter adapter

Learn more about replacing a model RIO or GX Dual-Port 12X Channel Attach adapter adapter.

The following procedure describes the replacement of the model RIO or GX Dual-Port 12X Channel Attach adapter adapter.

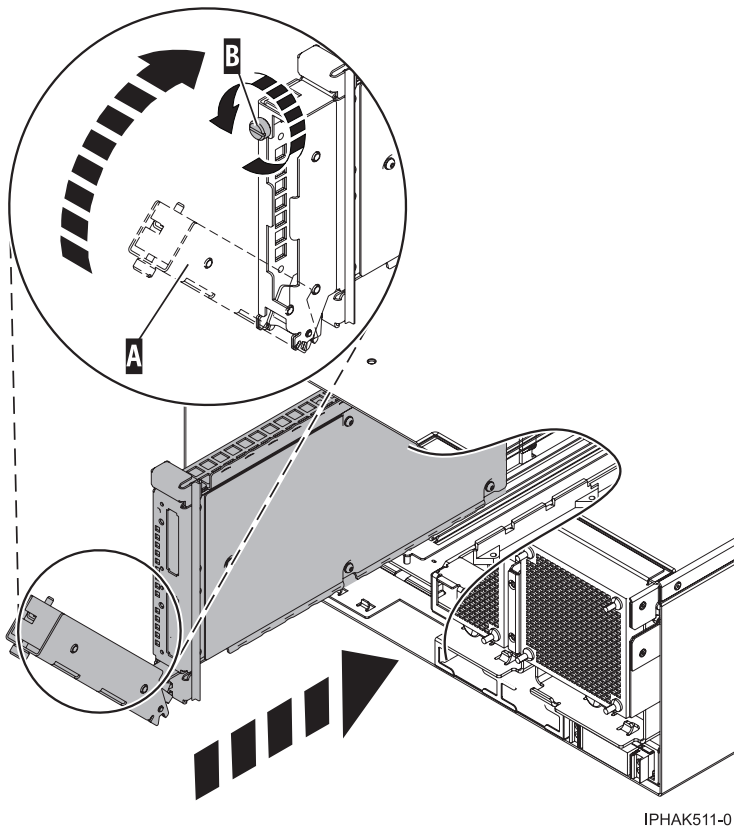
If your system is managed by the HMC, use the HMC to complete the steps for replacing the adapter. See “Exchange a part using the Hardware Management Console” on page 319.

To replace the adapter on a system that is not managed by the HMC, complete the following steps:

1. Remove the adapter from the system unit. See “Remove a model RIO or GX Dual-Port 12X Channel Attach adapter adapter” on page 277.
2. Attach the wrist strap.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
3. Align the adapter with the slot in the system.
 4. Slide the adapter into the system.
 5. Push the handle **A** up and toward the system until the handle stops against the adapter.
 6. Turn the thumbscrew **B** until tight.



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Figure 230. Model RIO or GX Dual-Port 12X Channel Attach adapter replacement

7. Reconnect all power and signal cables to their respective connectors.
8. Close the back rack door.
9. Start the system. See “Start the system or logical partition” on page 300.
10. Verify that the new resource is working correctly. For instructions, see “Verify the installed part” on page 319.

Chapter 9. Voltage regulator

You might need to remove or replace a voltage regulator. This section includes procedures so that you can perform these tasks.

Replacing this feature is a customer task. You can perform this task yourself or contact a service provider to perform the task for you. You might be charged a fee by the service provider for this service.

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)

Model voltage regulator assembly

You might need to install, remove, or replace the voltage regulator assembly. This section includes procedures so that you can perform these tasks.

The system unit might contain up to three voltage regulator assemblies. The following procedures describe the installation, removal, and replacement of the voltage regulator assemblies.

A voltage regulator assembly can be removed with the system power on if, when you start the removal procedure, at least one more voltage regulator assembly is installed than the number of system processor assemblies installed. That is, one system processor assembly requires two voltage regulator assemblies to be installed, and two system processor assemblies require three voltage regulator assemblies to be installed.

A voltage regulator assembly can be added into an empty slot with the system power on or the system power off.

To determine how many voltage regulator assemblies and system processor assemblies are installed, do the following:

1. If necessary, open the front rack door.
2. "Remove the front cover from the model " on page 311.
3. Count the number of system processor assemblies and voltage regulator assemblies installed. For example, Figure 231 shows two system processor assemblies **A** and three voltage regulator assemblies **B**.

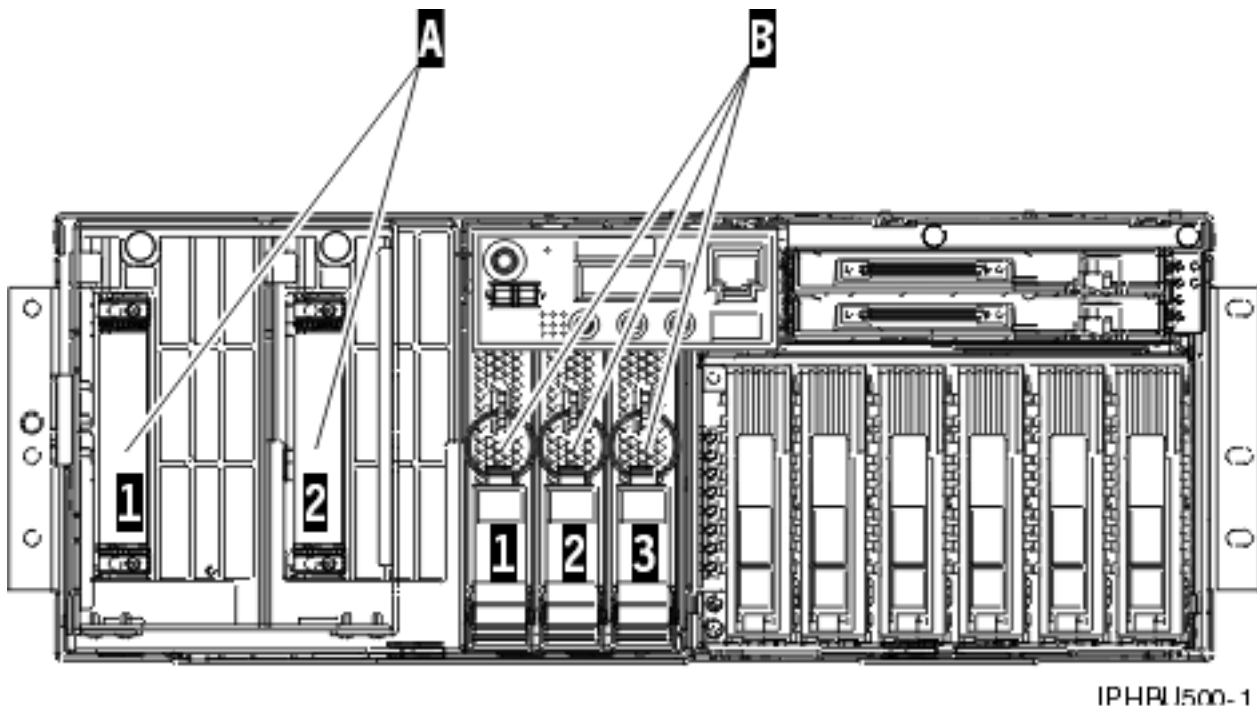


Figure 231. System processor assemblies and voltage regulator assemblies (front view)

Table 22 shows the possible valid combinations of system processor assemblies and voltage regulator assemblies for replacing a voltage regulator assembly with the system power on.

Table 22. Determining when a voltage regulator assembly can be removed with the system power on

System processor assemblies A		Voltage regulator assemblies B			Replace with system power on?
1	2	1	2	3	
x		x			No
x		x	x		Yes
x	x	x	x		No
x	x	x	x	x	Yes

Select the appropriate instructions from this list:

- “Install the model voltage regulator assembly with power on.”
- “Remove and replace the model voltage regulator assembly with power on” on page 284. To remove and replace the voltage regulator assembly with the power on, you need to have at least one more voltage regulator assembly installed than the number of system processor assemblies installed.
- “Install the model voltage regulator assembly with power off” on page 286.
- “Remove and replace the model voltage regulator assembly with power off” on page 287.

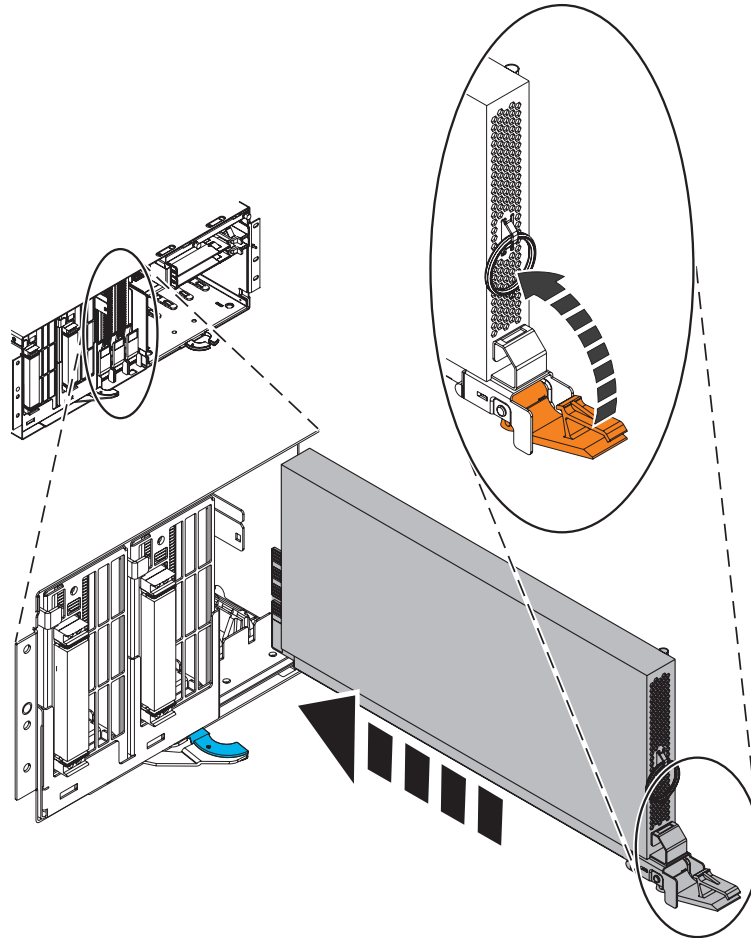
Install the model voltage regulator assembly with power on

You might need to install the voltage regulator assembly with power on. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), you can use the HMC to complete the steps for installing a voltage regulator module. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

To install a voltage regulator assembly, do the following:

1. Perform the prerequisite tasks as described in “Before you begin” on page 291.
2. If necessary, open the front rack door.
3. “Remove the front cover from the model ” on page 311.
4. “Remove the control panel with power on” on page 4.
5. Remove the voltage regulator assembly from its antistatic package.
6. Remove the space filler from the card slot. Press the thumb tab on the space filler and pull the space filler from the card slot.
7. Install the voltage regulator assembly into the next available slot by doing the following.
 - a. Ensure that the voltage regulator assembly latch is rotated out to the unlocked position.
 - b. Carefully grasp the voltage regulator assembly and slide it into the enclosure.
 - c. When the voltage regulator assembly is almost all the way into the enclosure, rotate the latch up into the locked position.



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8. "Install or replace the control panel with power on" on page 3.
9. "Install the front cover on the model " on page 311.
10. Verify that the system processor assembly is functional. Refer to "Verify the installed part" on page 319.

Remove and replace the model voltage regulator assembly with power on

You might need to remove and replace the voltage regulator assembly with the power on.. Use the procedure in this section to perform this task.

To remove and replace the model voltage regulator assembly with the system power on, follow these steps.

Remove the model voltage regulator assembly with power on

You might need to remove the voltage regulator assembly with the power on. Use the procedure in this section to perform this task.

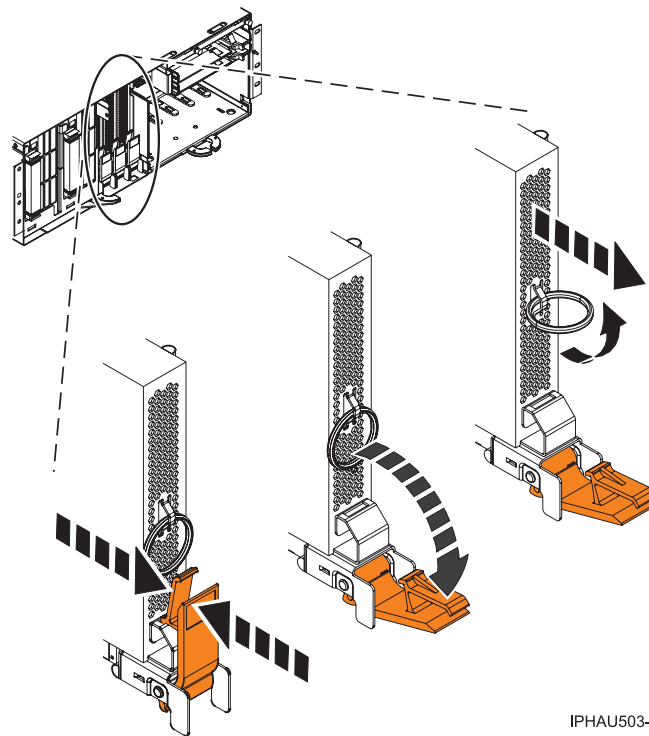
If your system is managed by the Hardware Management Console (HMC), you can use the HMC to complete the steps for removing a voltage regulator module. For instructions, see "Remove a part using the Hardware Management Console" on page 318.

To remove a voltage regulator assembly, do the following:

1. Perform the prerequisite tasks as described in "Before you begin" on page 291.

2. If necessary, open the front rack door.
3. "Remove the front cover from the model " on page 311.
4. Identify the voltage regulator assembly that you need to replace. For instructions, see "Identify a failing part" on page 299.
5. "Remove the control panel with power on" on page 4.
6. Remove the voltage regulator assembly by doing the following.
 - a. Squeeze the top of the latch to release it.
 - b. Rotate the latch out and then down.
 - c. Grasp the pull ring and slowly pull the voltage regulator assembly out of the card enclosure.

Attention: Pulling the voltage regulator assembly out of the card enclosure requires a large amount of force. The voltage regulator assembly is of substantial weight, so grasp it firmly when it is free of the card enclosure.



7. Place the voltage regulator assembly on an electrostatic discharge (ESD) surface.

Replace the model voltage regulator assembly with power on

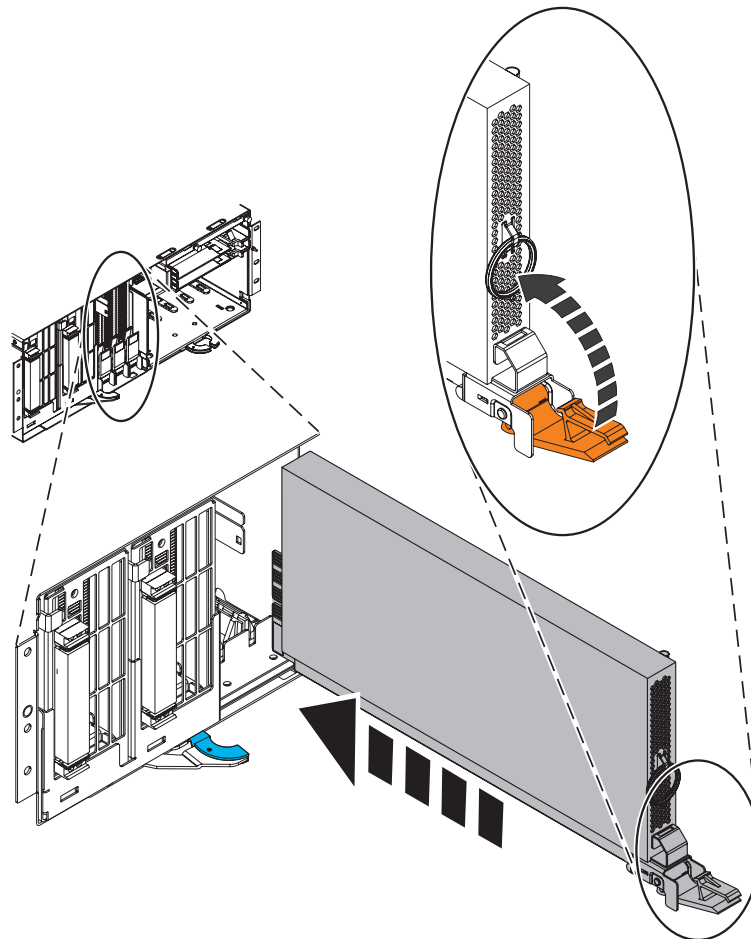
You might need to replace the voltage regulator assembly with the power on. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), you can use the HMC to complete the steps for replacing a voltage regulator module. For instructions, see "Exchange a part using the Hardware Management Console" on page 319.

To replace a voltage regulator assembly, do the following:

1. Remove the voltage regulator assembly from its antistatic package.
2. Replace the voltage regulator assembly by doing the following.
 - a. Ensure that the voltage regulator assembly latch is rotated out to the unlocked position.
 - b. Carefully grasp the voltage regulator assembly and slide it into the enclosure.

- c. When the voltage regulator assembly is almost all the way into the enclosure, rotate the latch up into the locked position.



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3. “Install or replace the control panel with power on” on page 3.
4. “Install the front cover on the model ” on page 311.
5. Verify that the system processor assembly is functional. Refer to “Verify the installed part” on page 319.

Install the model voltage regulator assembly with power off

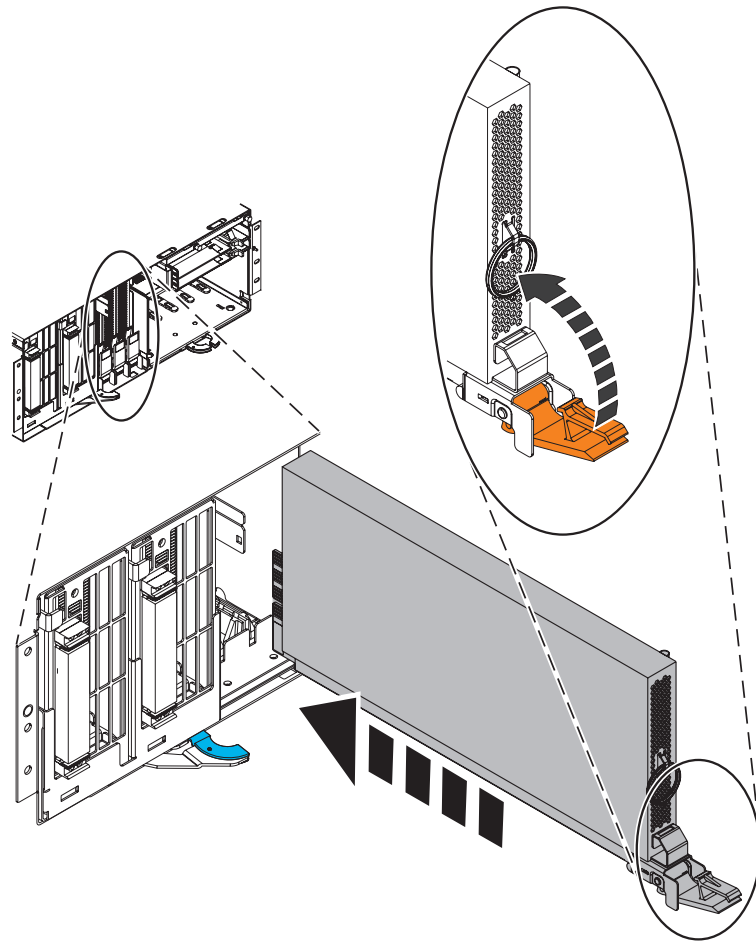
You might need to install a voltage regulator assembly with the system power off. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), you can use the HMC to complete the steps for installing a voltage regulator module. For instructions, see “Install a feature using the Hardware Management Console” on page 318.

To install a voltage regulator assembly with power off, do the following:

1. Perform the prerequisite tasks as described in “Before you begin” on page 291.
2. “Stop the system or logical partition” on page 303.
3. If necessary, open the front rack door.
4. “Remove the front cover from the model ” on page 311.
5. “Remove the control panel with power off” on page 7.

6. Remove the voltage regulator assembly from its antistatic package.
7. Install the voltage regulator assembly by doing the following.
 - a. Remove the space filler from the card slot. Press the thumb tab on the space filler, and pull the space filler from the card slot.
 - b. Ensure that the voltage regulator assembly latch is rotated out in the unlocked position.
 - c. Carefully grasp the voltage regulator assembly and slide it into the enclosure.
 - d. When the voltage regulator assembly is almost all the way into the card enclosure, rotate the latch up into the locked position, as shown in the following figure:



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8. "Install or replace the control panel with power off" on page 6.
9. "Install the front cover on the model " on page 311.
10. Restore power to the system by reconnecting the system power cables.
11. "Start the system or logical partition" on page 300.
12. Verify that the system processor assembly is functional. Refer to "Verify the installed part" on page 319.

Remove and replace the model voltage regulator assembly with power off

You might need to remove or replace the voltage regulator module with the power off. This section includes procedures so that you can perform these tasks.

If there is not one more voltage regulator assembly installed than the number of system processor assemblies installed, follow these steps:

Remove the model voltage regulator assembly with power off

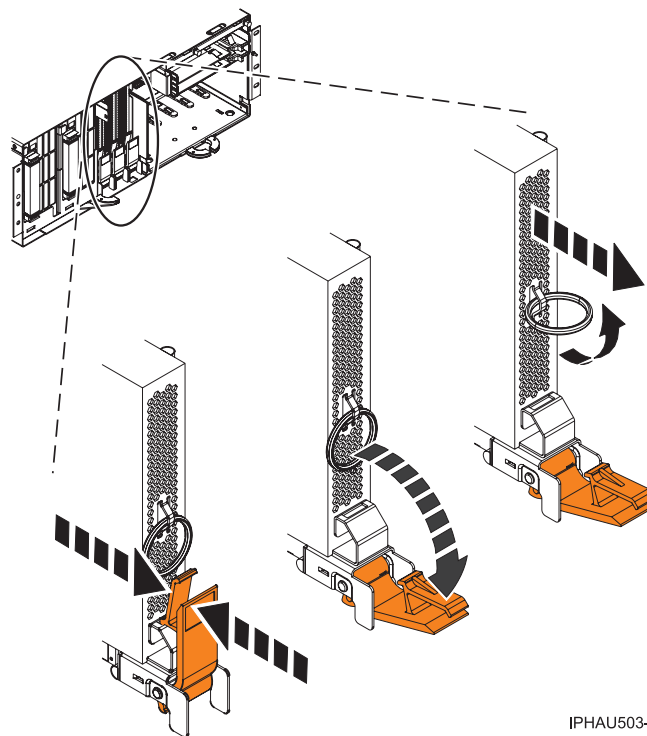
You might need to remove a voltage regulator assembly with the system power off. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), you can use the HMC to complete the steps for removing a voltage regulator module. For instructions, see “Remove a part using the Hardware Management Console” on page 318.

To remove a voltage regulator assembly, do the following:

1. Perform the prerequisite tasks as described in “Before you begin” on page 291.
2. If necessary, identify the voltage regulator assembly that you need to replace. Refer to “Identify a failing part” on page 299.
3. “Stop the system or logical partition” on page 303.
4. If necessary, open the front rack door.
5. “Remove the front cover from the model ” on page 311.
6. “Remove the control panel with power off” on page 7.
7. Remove the voltage regulator assembly by doing the following.
 - a. Squeeze the top of the latch to release it.
 - b. Rotate the latch out and then down.
 - c. Grasp the pull ring and slowly pull the voltage regulator assembly out of the enclosure.

Attention: Pulling the voltage regulator assembly out of the card enclosure requires a large amount of force. The voltage regulator assembly is of substantial weight, so grasp it firmly when it is free of the card enclosure.



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8. Place the voltage regulator assembly on an electrostatic discharge (ESD) surface.

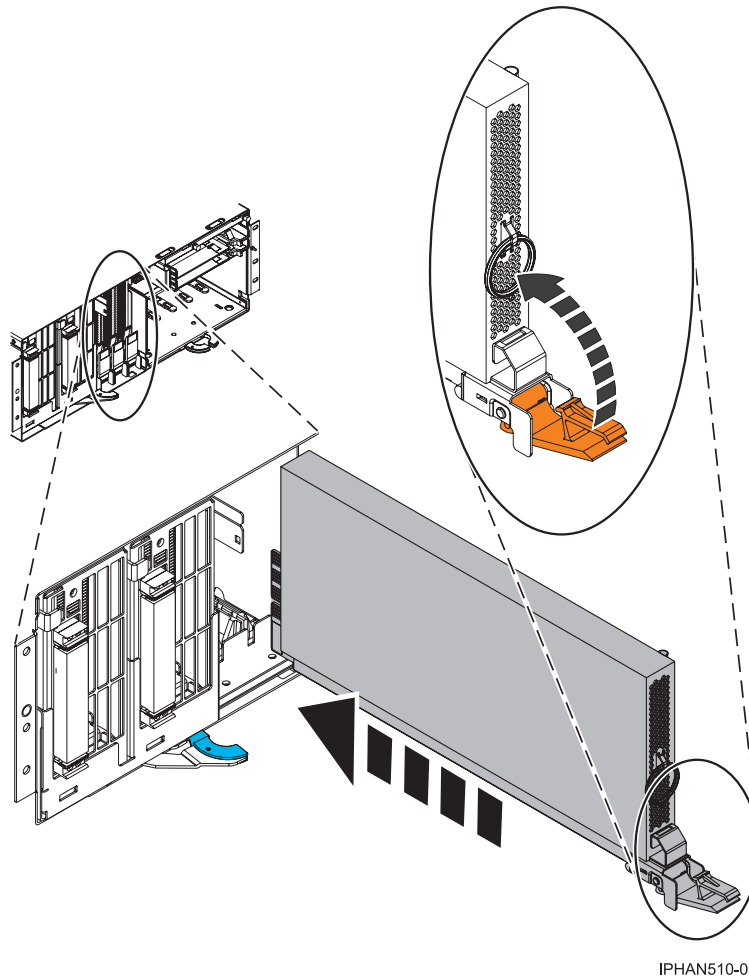
Replace the model voltage regulator assembly with power off

You might need to replace a voltage regulator assembly with the system power off. Use the procedure in this section to perform this task.

If your system is managed by the Hardware Management Console (HMC), you can use the HMC to complete the steps for replacing a voltage regulator module. For instructions, see “Exchange a part using the Hardware Management Console” on page 319.

To replace a voltage regulator assembly, do the following:

1. Remove the voltage regulator assembly from its antistatic package.
2. Replace the voltage regulator assembly by doing the following.
 - a. Ensure that the voltage regulator assembly latch is rotated out to the unlocked position.
 - b. Carefully grasp the voltage regulator assembly and slide it into the enclosure.
 - c. When the voltage regulator assembly is almost all the way into the card enclosure, rotate the latch up into the locked position, as shown in the following figure:



3. “Install or replace the control panel with power off” on page 6.
4. “Install the front cover on the model ” on page 311.
5. Restore power to the system by reconnecting the system power cables.
6. “Start the system or logical partition” on page 300.
7. Verify that the system processor assembly is functional. Refer to “Verify the installed part” on page 319.

Chapter 10. Common Procedures

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

Before you begin

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

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:

1. If you are installing a new feature, ensure that you have the software required to support the new feature.
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.
6. If parts are incorrect, missing, or visibly damaged, do the following:
 - If you are replacing a part, contact your service provider or next level of support.
 - If you are installing a feature, contact one of the following:
 - Your service provider 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 Guide* ([http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf](http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf)), and then return to these instructions.

Managing the Advanced System Management Interface (ASMI)

Understand how to manage the Advanced System Management Interface (ASMI).

The Advanced System Management Interface (ASMI) is the interface to the service processor that is required to perform general and administrator-level service tasks, such as reading service processor error logs, reading vital product data, setting up the service processor, and controlling the system power. The ASMI might also be referred to as the service processor menus.

Accessing the ASMI

You can access the ASMI through a Web browser, an ASCII terminal, or the Hardware Management Console (HMC).

Accessing the ASMI using a Web browser

Connect a PC or mobile computer to the server to access the ASMI. The Web interface to the ASMI is available during all phases of system operation including the initial program load (IPL) and run time.

The Web interface to the Advanced System Management Interface (ASMI) is accessible through Microsoft® Internet Explorer 6.0, Netscape 7.1, or Opera 7.23 running on a PC or mobile computer connected to the service processor. The Web interface is available during all phases of system operation including the initial program load (IPL) and run time. However, some of the menu options in the Web interface are unavailable during IPL or run time to prevent usage or ownership conflicts if the system resources are in use during that phase.

Note: Users that have systems that do not use the Hardware Management Console must set up the ASMI. To perform general and administrator-level service tasks, such as reading service processor error logs, reading vital product data, setting up the service processor, and controlling the system power, you must set up the ASMI.

The following instructions apply to systems that are not connected to an HMC. If you are managing the server using an HMC, see the *Operations Guide for the Hardware Management Console and Managed Systems*, ([https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/OperationsGuideForHardwareManagementConsole/\\$file/sa76-0085.pdf](https://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/OperationsGuideForHardwareManagementConsole/$file/sa76-0085.pdf)).

To set up the Web browser for direct or remote access to the ASMI, complete the following tasks:

1. Connect the power cord from the server to a power source, and wait for the control panel to display 01.

2. Select a PC or mobile computer that has Microsoft Internet Explorer 6.0, Netscape 7.1, or Opera 7.23 to connect to your server.
If you do not plan to connect your server to your network, this PC or mobile computer will be your ASMI console.
If you plan to connect your server to your network, this PC or mobile computer will be temporarily connected directly to the server for setup purposes only. After setup, you can use any PC or mobile computer on your network that is running Microsoft Internet Explorer 6.0, Netscape 7.1, or Opera 7.23 as your ASMI console.
3. Connect an Ethernet cable from the PC or mobile computer to the Ethernet port labeled HMC1 on the back of the managed system. If HMC1 is occupied, connect an Ethernet cable from the PC or mobile computer to the Ethernet port labeled HMC2 on the back of the managed system.
4. Configure the Ethernet interface on the PC or mobile computer to an IP address and subnet mask within the same subnet as the server so that your PC or mobile computer can communicate with the server. For instructions, see “Setting the IP address on your PC or mobile computer” on page 295. Use the following table to help you determine these values:

Table 23. PC or mobile computer network configuration information

Server connector	Subnet mask	IP address
HMC1	255.255.255.0	169.254.2.147
HMC2	255.255.255.0	169.254.3.147

For example, if you connected your PC or mobile computer to HMC1, the IP address for your PC or mobile computer could be 169.254.2.146 and the subnet mask would be 255.255.255.0. Set the gateway IP address to the same IP address as the PC or mobile computer.

5. Use Table 23 to determine the IP address of the Ethernet port that your PC or mobile computer is connected to, and type the IP address in the Address field of your PC’s or mobile computer’s Web browser. For example, if you connected your PC or mobile computer to HMC1, type `https://169.254.2.147` in your PC’s or mobile computer’s Web browser.
6. When the login display appears, enter one of the following default user IDs and passwords:

Table 24. Default user IDs and passwords for the Web interface

User ID	Password
general	general
admin	admin

7. Change the default password when prompted. For information, see “ASMI Authority Levels” on page 296.
8. If you plan to connect your PC or mobile computer to your network, complete the following steps:
 - a. From the navigation area, expand **Network Services**.
 - b. Click **Network Configuration**.
 - c. If your PC or mobile computer is connected to HMC1, fill in the section labeled Network interface eth0.
If your PC or mobile computer is connected to HMC2, fill in the section labeled Network interface eth1.
Ensure that the following fields are filled in correctly.

Table 25. Fields and values for network configuration

Field	Value
Configure this interface?	Selected
Type of IP address	Static

Table 25. Fields and values for network configuration (continued)

Field	Value
IP address	This is a set IP address obtained from the network administrator
Subnet mask	This is a set subnet mask obtained from the network administrator

Note: For information about the other fields and values, refer to “Configuring network interfaces” on page 297.

- d. Click **Continue**.
 - e. Click **Save Settings**.
 - f. Disconnect your PC or mobile computer from the server.
 - g. Connect the server to your company network.
 - h. Go to any PC or mobile computer on your company network that is running Microsoft Internet Explorer 6.0, Netscape 7.1, or Opera 7.23, and type the following in the Address field of your browser:
`https://host name.domain name`
 where *host name* and *domain name* are the host name and domain name you entered when completing step 8c on page 294.
 - i. Log in to the ASMI.
9. “Changing the time of day” on page 298 on the server.

Setting the IP address on your PC or mobile computer:

To access the ASMI through a Web browser you first need to set the IP address on your PC or mobile computer. The following procedures describe setting the IP address on PC and mobile computers running Microsoft Windows® and Linux.

Setting the IP address in Windows XP and Windows 2000

To set the IP address within Windows XP and Windows 2000, complete these steps.

1. Click **Start >Settings >Control Panel**.
2. On the control panel, double-click **Network Connections**.
3. Right-click **Local Area Connection**.
4. Click **Properties**.

Attention: Record the current settings before making any changes. This will allow you to restore these settings if you disconnect the PC or mobile computer after setting up the ASMI Web interface.

Note: If Internet Protocol (TCP/IP) does not appear in the list, do the following:

- a. Click **Install**.
 - b. Select **Protocol**, and then click **Add**.
 - c. Select **Internet Protocol (TCP/IP)**.
 - d. Click **OK** to return to the Local Area Connection Properties window.
5. Select **Internet Protocol (TCP/IP)**, and then click **Properties**.
 6. Select **Use the Following IP Address**.
 7. Complete the **IP address**, **Subnet mask**, and **Default gateway** fields by using the values in step 4 on page 294 from Accessing the ASMI using a Web Browser.
 8. Click **OK** on the Local Area Connection Properties window. It is not necessary to restart your PC.

Setting the IP address in Linux

To set the IP address in Linux, complete these steps. You will need the information from step 4 on page 294 in Accessing the ASMI using a Web Browser to complete step 4 in the following procedure.

1. Make sure you are logged on as a root user.
2. Start a terminal session.
3. Type `ifconfig` at the command prompt.
Attention: Record or print the current settings before making any changes. This allows you to restore these settings if you disconnect the PC or mobile computer after setting up the ASMI Web interface.
4. Type `ifconfig eth0 xxx.xxx.xxx.xxx netmask xxx.xxx.xxx.xxx`, where the `xxx.xxx.xxx.xxx` values are the values from step 4 on page 294 for IP address and Subnet mask.
5. Press Enter.

ASMI Authority Levels:

There are several authority levels for accessing the service processor menus using the ASMI. The following levels of access are supported:

General user

The menu options presented to the general user are a subset of the options available to the administrator and authorized service provider. Users with general authority can view settings in the ASMI menus. The login ID is **general** and the default password is *general*.

Administrator

The menu options presented to the administrator are a subset of the options available to the authorized service provider. Users with administrator authority can write to persistent storage, and view and change settings that affect the server's behavior. The first time a user logs into the ASMI after the server is installed, a new password must be selected. The login ID is **admin** and the default password is *admin*.

Authorized service provider

This login gives the authorized service provider access to all functions that could be used to gather additional debug information from a failing system, such as viewing persistent storage, and clearing all deconfiguration errors.

There are three authorized service provider login IDs: **celogin0**, **celogin1**, and **celogin2**.

- **celogin0** is the primary service provider account. It is enabled by default, and it can enable or disable the other two service provider IDs, **celogin1** and **celogin2**. The login ID is **celogin0**; the password is generated dynamically and must be obtained by calling IBM technical support. **celogin0** can be disabled by the **admin** user.
- **celogin1** and **celogin2** are disabled by default. If the IDs are enabled, a static password must be set for them. The default password for both IDs is *celogin*. The default password must be changed the first time the ID is enabled. The **admin** user can also disable and enable these login IDs.
- To reset the password for **celogin1** or **celogin2**, the **admin** user can disable, then re-enable the ID. As soon as the ID is re-enabled, the password will have to be changed.
- If enabled, **celogin0**, **celogin1**, or **celogin2** can be used to reset the **admin** password, if necessary.

Development

This login is used by support personnel to analyze a system that is failing at a detailed level. It is enabled by default, and can be disabled by the admin user. The userid is **dev**, and the password is generated dynamically and must be obtained by calling IBM technical support. This ID has the highest authority. Once a password for the ID is obtained, the ID can be used to reset the admin password, if necessary.

During the initial administrator and general user logins, the only menu option available is **Change Password**. In order to gain access to additional ASMI menus, you must change the administrator and general user default passwords. If you are an authorized service provider, you cannot change your password. For information about how to change your password, see “Changing ASMI passwords.”

Changing ASMI passwords:

Change the general user, administrator, and HMC access passwords.

You can change the general user, administrator, and HMC access passwords. If you are a general user, you can change only your own password. If you are an administrator, you can change your password and the passwords for general user accounts. If you are an authorized service provider, you can change your password, the passwords for general and administrator user accounts, and the HMC access password.

Passwords can be any combination of up to 64 alphanumeric characters. The default password for the general user ID is `general`, and the default password for the administrator ID is `admin`. After your initial login to the ASMI and after the reset toggle jumpers are moved, the general user and administrator passwords must be changed.

The HMC access password is usually set from the HMC during initial login. If you change this password using the ASMI, the change takes effect immediately.

To change a password, follow these steps:

Note: As a security measure, you are required to enter the current user’s password into the **Current password for current user** field. This password is not the password for the user ID you want to change.

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **Login Profile**.
3. Select **Change Password**.
4. Specify the required information, and click **Continue**.

Configuring network interfaces:

Configure the number and type of network interfaces according to the needs of your system.

You can configure network interfaces on the system. The number and type of interfaces vary according to the specific needs of your system.

Attention: This operation can be performed when the system is powered on as well as powered off. Because network configuration changes occur immediately, existing network sessions, such as HMC connections, are stopped. If a firmware update is in progress, do not perform this operation. The new settings must be used to re-establish any network connections. Additional errors might also be logged if the system is powered on.

You can change the network configurations when the system is in any state.

To perform this operation, your authority level must be one of the following:

- Administrator
- Authorized service provider

To configure network interfaces, do the following:

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.

2. In the navigation area, expand **Network Services**.
3. Select **Network Configuration**.

Important: If you are attempting to configure a network connection on a multi-drawer system, you must select the primary or secondary service processor, and then click **Continue**.

4. In the right pane, locate the interface that you want to change. Select the box corresponding to the **Configure this interface?** field of the identified interface. If this box is not selected, the corresponding field changes are ignored.
5. Select the **Type of IP address** from the following options:

Static The IP address, subnet mask, broadcast address, default gateway and first DNS server address must be entered. The second and third DNS server addresses are optional.

Dynamic

No additional input is required.

6. Click **Continue**. The next screen allows you to verify the IP settings that have been entered.
Attention: If incorrect network configuration information is entered, you may not be able to use the ASMI after the changes are made. To remedy this situation, you must reset the service processor to the default settings by removing the service processor assembly from the server and moving the reset jumpers. Resetting the service processor also resets all user IDs and passwords to their default values.

Note: Click **Reset Network Configuration** to reset Network Configuration settings to their default factory settings.

7. Click **Save settings** to make the changes.

Changing the time of day:

Display and change the time and date stored by the system.

You can display and change the system's current date and time. The date and time can only be changed when the system is powered off. The time is stored as UTC (Coordinated Universal Time), formerly expressed as Greenwich mean time (GMT).

To perform this operation, your authority level must be one of the following:

- Administrator
- Authorized service provider

Note: You can change the time of day only when the system is powered off.

To change the time of day, do the following:

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **System Configuration**.
3. Select **Time of Day**. If the system is powered off, the right pane displays a form that shows the current date (month, day, and year) and time (hours, minutes, seconds).
4. Change either the date value or the time value or both, and click **Save settings**.

Accessing the ASMI using the HMC

Access the ASMI through the HMC interface.

To access the Advanced System Management Interface (ASMI) using the Version 7 or higher HMC, complete the following steps:

1. Ensure that the HMC is set up and configured.
2. In the navigation area, click **Systems Management**.

3. Click **Servers**. A list of the servers managed by this HMC displays.
4. Select the server whose ASMI you want to access using the checkbox next to the managed server's name.
5. Select **Tasks > Operations > Advanced System Management (ASM)**.
6. Confirm that the Selected System and the Service Processor IP Address are correct. Click **Yes** to launch the ASMI.

Identify a failing part

Use the instructions in this section to learn how to locate and identify a failing part on your system or expansion unit using the appropriate method for your system.

Identify a failing part on an AIX system or logical partition

Use the instructions in this section to learn how to locate a failing part, and then activate the indicator light for that part on a system or logical partition running AIX.

Locate 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. Use the procedure in this section to accomplish this task.

1. Log in as root user or celogin-.
2. At the command line, type `diag` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. Select **Display Previous Diagnostic Results** and press Enter.
5. From the **Display Previous Diagnostic Results** display, select **Display Diagnostic Log Summary**. A **Display Diagnostic Log** display appears. This display contains a chronological list of events.
6. Look in the T column for the most recent S entry. Select this row in the table and press Enter.
7. Choose **Commit**. The details of this log entry are shown.
8. Record the location information and the SRN value shown near the end of the entry.
9. Exit to the command line.

Use the location information for the failing part to activate the indicator light that identifies the failing part. For instructions, see "Activate the indicator light for the failing part."

Activate the indicator light for the failing part

You might need to use the indicator light to help you physically locate a part. Use the procedure in this section to accomplish this task.

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**. Press Enter.
4. From the **Task Selection** menu, select **Identify and Attention Indicators**. Press Enter.
5. From the list of lights, select the location code for the failing part and press Enter.
6. Select **Commit**. This turns on the system attention and indicator light for the failing part.
7. Exit to the command line.

Identify a failing part on a Linux system or logical partition

Use the instructions in this section to learn how to identify a failing part using one of a number of methods on a system or logical partition running Linux.

Locate a failing part and activate the indicator light

If the service aids have been installed on a system or logical partition running Linux, you can use the instructions in this section to locate the failing part, and then activate the indicator light for that part.

Locate a failing part in a Linux system or logical partition:

If you do not know the location code of the failing part, use the instructions in this section to locate the failing part.

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

1. Log in as root user.
2. At the command line, type `grep diagela /var/log/platform` and press Enter.
3. Look for the most recent entry that contains a system reference code (SRC).
4. Record the location information.

Activate 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. Use the procedure in this section to accomplish this task.

To activate the indicator light, follow these steps:

1. Log in as root user.
2. At the command line, type `/usr/sbin/usysident -s identify -l<location code>` and press Enter. Substituting the location code of the failing unit for `<location code>`.
3. Look for the system attention light to identify the enclosure that contains the failing part.

Deactivate the failing-part indicator light

After you complete a removal and replacement procedure, use this task to deactivate the failing-part indicator light.

1. Log in as root user.
2. At the command line, type `/usr/sbin/usysident -s normal -l<location code>` and press Enter. Substitute the location code of the failing unit for `<location code>`.
3. Look for the system attention light to identify the enclosure that contains the failing part.

Start or stop the system or logical partition

Learn how to start or stop a system or logical partition.

Start the system or logical partition

You might need to start a system or logical partition. You can use this procedure to start the system or logical partition.

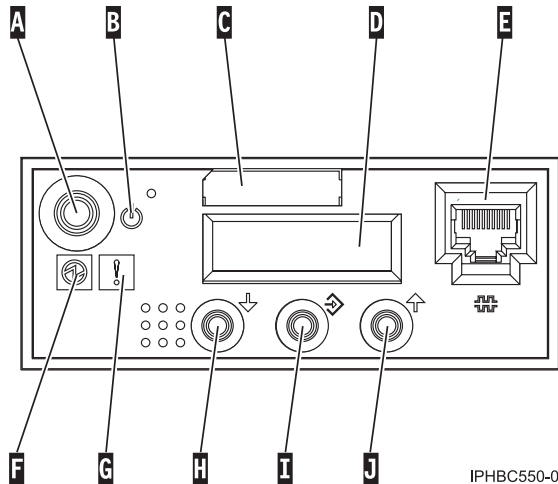
Start a system that is not managed by a Hardware Management Console

You can use the power button or the Advanced System Management Interface to start a system that is not managed by a Hardware Management Console.

To start a system that is not managed by a Hardware Management Console (HMC), follow these steps:

1. On a rack-mounted system unit, open the front rack door, if necessary. On a stand-alone system unit, open the front door.

2. Before you press the power button on the control panel, ensure that power is connected to the system unit as follows:
 - All system power cables are connected to a power source.
 - The power-on light **F**, as shown in the following figure, is slowly blinking.
 - The top of the display **D**, as shown in the following figure, shows 01 V=F.



IPHBC550-0

Tip: The system attention light **G**, as shown in the previous figure, does not appear on the control panel on the model 17M/MA.

3. Press the power button **A**, as shown in the previous figure, on the control panel.
4. Observe the following after pressing the power button:
 - The power-on light begins to blink faster.
 - The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
 - Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops blinking and remains on, indicating that system power is on.

Tip: If pressing the power button does not start the system, use the following to start the system using the Advanced System Management Interface (ASMI).

- Set up access to the ASMI. For instructions, see “Managing the Advanced System Management Interface (ASMI)” on page 293.
- Start the system using the ASMI. For instructions, see “Powering the system on and off.”

Powering the system on and off

View and customize various initial program load (IPL) parameters.

You can start and shut down the system in addition to setting IPL options.

To perform these operations, your authority level must be one of the following:

- Administrator
- Authorized service provider

Several IPL options that you can set pertain to the server firmware. Firmware is an integral part of the server that is stored in *flash memory*, whose contents are preserved when the system is powered off. The firmware is code that automatically starts when the server is turned on. Its main purpose is to bring the

server to a state where it is ready to operate, which means the server is ready to install or boot an operating system. Firmware also enables the handling of exception conditions in the hardware and provides extensions to the functions of the server hardware platform. You can view the server's current firmware level on the Advanced System Management Interface (ASMI) Welcome pane.

This server has a permanent firmware boot side, or P side, and a temporary firmware boot side, or T side. When updating the firmware, install new levels of firmware on the temporary side first to test the compatibility with your applications. When the new level of firmware has been approved, copy it to the permanent side.

To view and change IPL settings, perform the following steps:

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **Power/Restart Control** and select **Power On/Off System**.
3. Set the following desired boot settings.

System boot speed

Select the speed for the next boot: **Fast** or **Slow**. Fast boot results in some diagnostic tests being skipped, and shorter memory tests being run during the boot.

Firmware boot side for next boot

Select the side from which the firmware boots the next time: **Permanent** or **Temporary**. Test firmware updates by booting from the temporary side before being copied into the permanent side.

System operating mode

Select the operating mode: **Manual** or **Normal**. Manual mode overrides various automatic power-on functions, such as auto-power restart, and enables the power button.

Boot to server firmware

Select the state for the server firmware: **Standby** or **Running**. When the server is in the server firmware standby state, partitions can be set up and activated.

System power off policy

Select the system power off policy. The system power off policy is a system parameter that controls the system's behavior when the last partition (or the only partition in the case of a system that is not managed by an HMC) is powered off.

Current hyperboot mode state:

This setting is displayed if the hyperboot feature is activated for the system. The hyperboot mode states are: **capable** and **enabled**. When the hyperboot feature is activated by entering the activation code, the mode state initializes in the ASMI and displays **capable** until the system is restarted. After the system has restarted the state changes to **enabled**. Any time you restart the system in the enabled state, it starts in hyperboot mode.

4. Perform one of the following steps:
 - Click **Save settings** to save the selected options. The power state does not change.
 - Click **Save settings and power on/off**. All selected options are saved and the system turns on or off. The power-on option is available only if the system is powered off. The power-off option is available only if the system is powered on.
 - Click **Save settings and continue server firmware boot** to save the selected options, and turn the server firmware on or off. This option is available only if the server firmware is in *standby* mode.

Start the system or logical partition using the Hardware Management Console

You can use the Hardware Management Console (HMC) user interface to start the system or logical partition after the required cables are installed and the power cables are connected to a power source.

For instructions on working with the HMC, see *Powering on a Managed System*, or you can also find instructions at *Activating a partition using the HMC in the Logical Partitioning Guide* ([http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf#IPHBLACTIVATEP6](http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf#IPHBLACTIVATEP6)).

Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops blinking and remains on, indicating that system power is on.

Powering on a managed system

Understand how to power on a managed system using the HMC.

You can use the HMC to power on a managed system and to monitor the power-on state.

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

- super administrator
- service representative
- operator
- product engineer

To power on a managed system, complete the following steps:

1. In the Navigation area, expand the **Systems Management** folder.
2. Click the **Servers** icon.
3. In the Contents area, select the managed system.
4. Select **Tasks**, then **Operations**, and then **Power On**.
5. Select the desired power-on mode and click **OK**.

Stop the system or logical partition

Learn how to stop a system or logical partition.

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:

Stop the system that is not managed by a Hardware Management Console

You might need to stop the system to perform another task. Use these instructions to stop the system using the power button or Advanced System Management Interface.

The following procedure describes how to stop a system that is not managed by a Hardware Management Console (HMC).

Prepare to stop the system

Before you stop the system, do the following:

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

Stop the system

To stop a system, follow these steps:

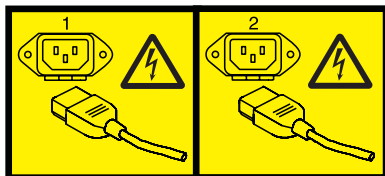
1. Log in to the system as a user with the authority to run the shutdown or pwrdownsys (Power Down System) command.
2. At the command line, enter one of the following commands:
 - If your system is running AIX, type **shutdown**.
 - If your system is running Linux, type **shutdown -h now**.
 - If your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

3. Set the power switches of any devices connected to the system to off.
4. 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 might be equipped with a second power supply. Before continuing with this procedure, ensure that all power sources to the system have been completely disconnected.

(L003)



or



Stop the system or logical partition using the Hardware Management Console

You can use the Hardware Management Console (HMC) user interface to stop the system or a logical partition. For instructions on stopping the system, see *Powering off a managed system*, or you can also find instructions at *Using a partition* ([http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf#IPHBLUSINGI5OSP6](http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf#IPHBLUSINGI5OSP6)).

Powering off a managed system

Understand how to use the HMC to power off a managed system.

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.

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

- super administrator
- service representative
- operator
- product engineer

To power off the managed system, complete the following steps:

1. In the Navigation area, expand the **Systems Management** folder.
2. Click the **Servers** icon.
3. In the Contents area, select the managed system.
4. Select **Tasks**, then **Operations**, and then **Power Off**
5. Select the desired power-off mode and click **OK**.

Expansion unit cover or door

You might need to remove, replace, or install covers or doors on an expansion unit as a part of accessing components or servicing your unit. This section includes instructions to accomplish these tasks.

Install the front cover on a model 14G/3057/96

You might need to install the front cover. Use the instructions in this section to complete this task.

If you only have one side of the chassis populated ensure the airflow block is present on the unpopulated side.

1. Insert the posts on the bottom of the cover **A** into the hooks on the chassis of the enclosure.
2. Press in on the two latches **C** on the right and left of the front cover.

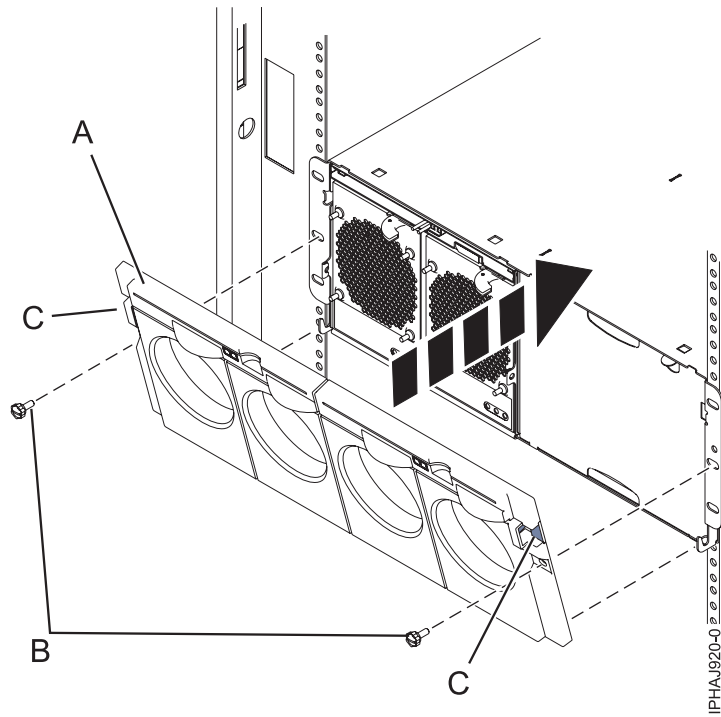


Figure 232. Front cover on a model 14G/3057/96

3. Push the cover onto the chassis and release the latches. The cover should securely snap into place.
4. Replace the two thumbscrews **B** into the slots on the left and right of the front cover.

Remove the front cover on a model 14G/3057/96

You might need to remove the front cover to perform service to the system. Use the instructions in this section to accomplish these tasks.

1. Remove the two thumbscrews **B** located on the left and right of the cover.

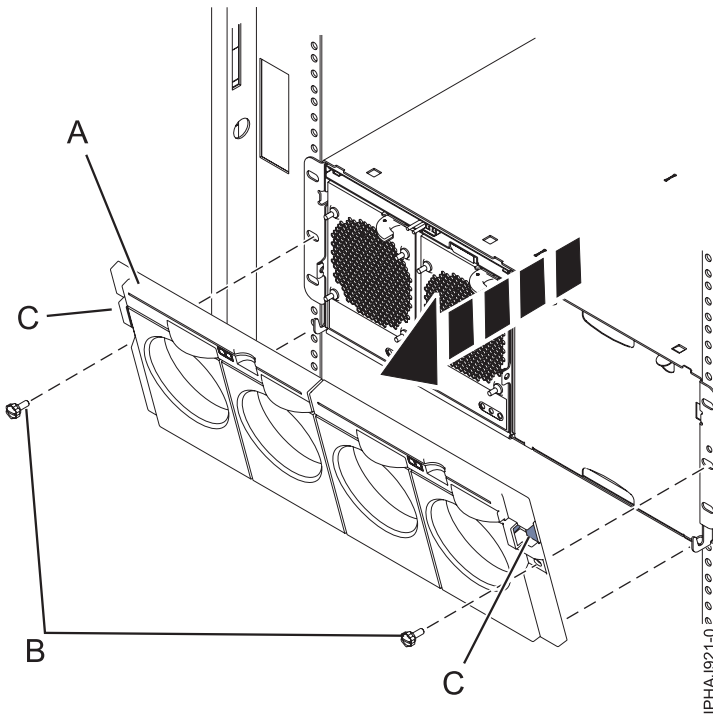


Figure 233. Front cover for model 14G/3057/96

2. Press in on the two latches **C** located left and right of the cover to release the cover.
3. Lift the cover **A** out and away from the chassis.

Tip: If an air flow block is present on an unpopulated side of the chassis do not remove it unless you are populating that side of the chassis.

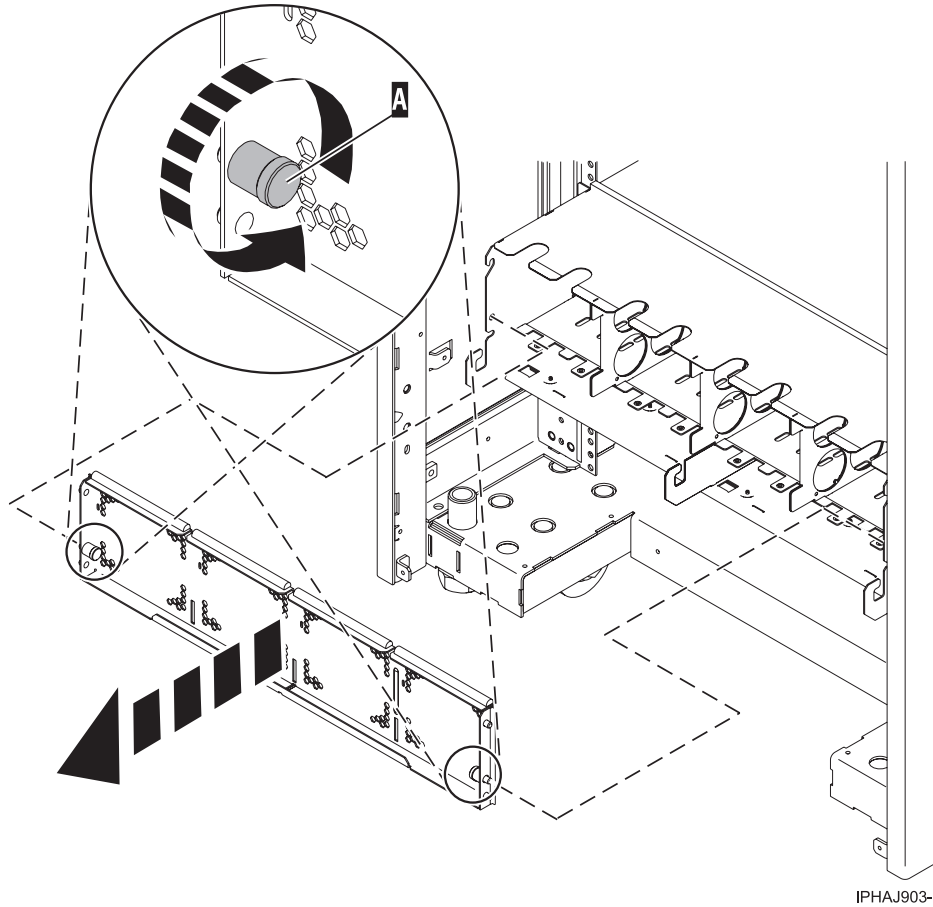
Remove the front cover from the 11D/1157/91 or 57/94 expansion unit

You might need to remove the cover to access components or perform service. Use the procedure in this section to accomplish this task.

To remove the front cover, follow these steps:

1. Open the rack front door, if necessary.

2. Pull in the knobs on the left and right of the front cover as shown in the following figure:



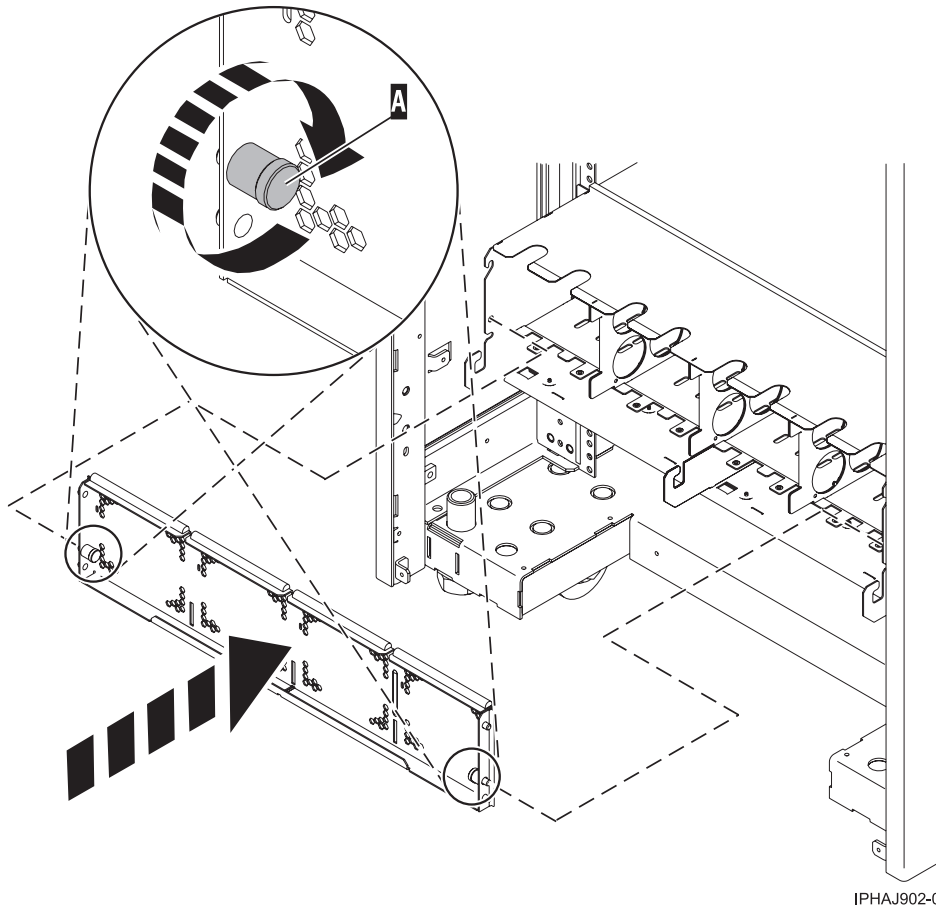
3. Pull the cover out and away from the expansion unit.

Install the front cover on the 11D/1157/91 or 57/94 expansion unit

You might need to install the cover after accessing components or performing service. Use the instructions in this section to accomplish this task.

To install the front cover, follow these steps:

1. Position the cover on the front of the expansion unit so that the pins on the cover line up with the slots on the front of the expansion unit as shown in the following figure:



2. Pull in the knobs on the left and right of the front cover.
3. Push the cover on to the front of the expansion unit.
4. Release the knobs on the left and right of the front cover.

Front cover

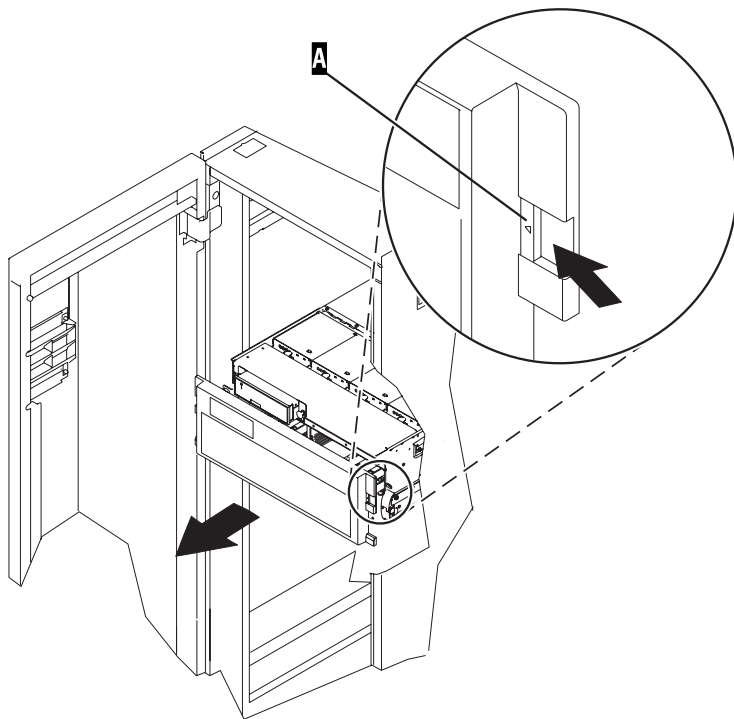
You might need to remove, replace, or install covers to access components or perform service. Use the instructions in this section to accomplish these tasks.

Remove the front cover from the 11D/20 expansion unit

You might need to remove the cover to access components or perform service. Use the procedure in this section to accomplish this task.

To remove the expansion unit front cover, follow these steps:

1. If necessary, open the front rack door.
2. Remove the thumbs screws that are securing the covers to the rack.
3. Push both cover-release latches in the direction of the arrows to release the cover as shown in the following figure.



4. Pivot the cover from the bottom and swing the top of the cover out.
5. Pull the bottom of the cover up and then away from the expansion unit. This releases the two tabs located on the bottom of the cover.
6. Put the cover in a safe place.

Install the front cover on the 11D/20 expansion unit

You might need to install the cover after accessing components or performing service. Use the procedure in this section to accomplish this task.

To install the expansion unit front cover, follow these steps:

1. If necessary, open the front rack door.
2. Insert the two tabs located on the bottom edge of the cover into their locking slots, located on the expansion unit frame.
3. Pivot the front cover up toward the top of the expansion unit frame.
4. Align the tabs to the matching slots located on the front of the expansion unit frame.
5. Gently push the tabs into the slots until the cover seats against the front of the expansion unit.
6. Install the thumbs screws to secure the covers to the rack.
7. Close the front rack door.

Front cover for the model 17M/MA

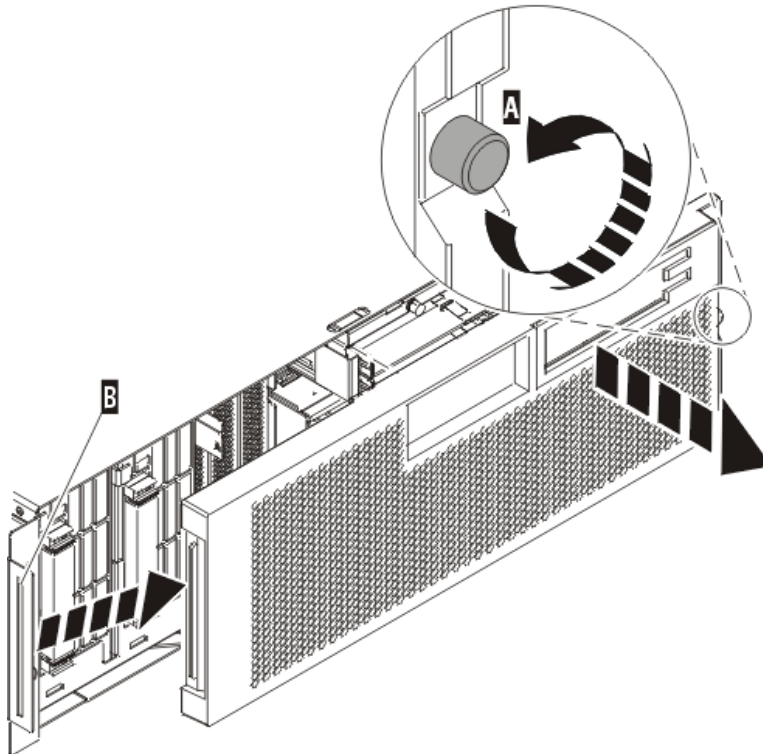
You might need to remove and replace the cover to access components or perform service. Use the procedures in this section to accomplish these tasks.

Remove the front cover from the model

You might need to remove the cover to access components or perform service. Use the procedure in this section to accomplish this task.

To remove the front cover follow these steps:

1. If necessary, open the front rack door.
2. Loosen the thumbscrew on the right side of the cover as shown in the following figure.



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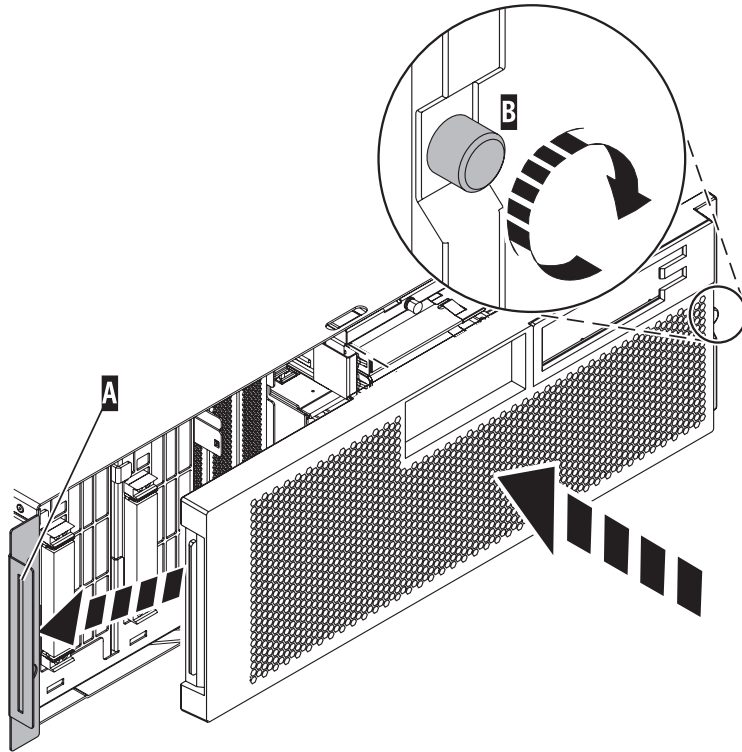
3. Slide the cover to the right and remove it from the system unit.

Install the front cover on the model

You might need to install the cover after accessing components or performing service. Use the procedure in this section to accomplish this task.

To install the front cover follow these steps:

1. Position the cover on the front of the system unit so that the tab on the left side of the cover is in the matching slot on the left side of the system unit as shown in the following figure.



IPHAJ500-1

2. Tighten the thumbscrew on the right side of the cover.
3. Close the front rack door.

Place the rack-mounted system or expansion unit in the service position or operating position

You might need to place a system or expansion unit into the service position or operating position to perform service or gain access to internal components. Use the instructions in this section to perform these tasks.

Place the rack-mounted system or expansion unit in the service position

You might need to perform service or gain access to internal components by placing the rack-mounted system or expansion unit in the service position. Use the procedure in this section to accomplish 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.

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.

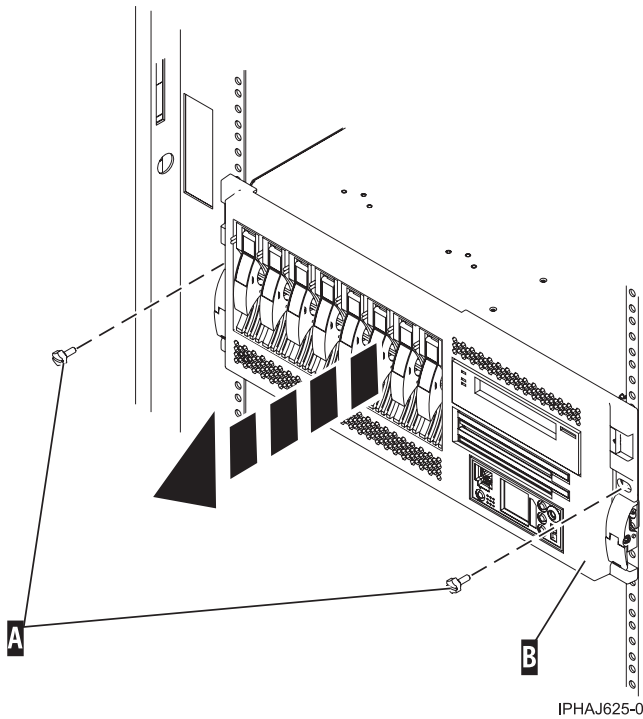
CAUTION

- 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.

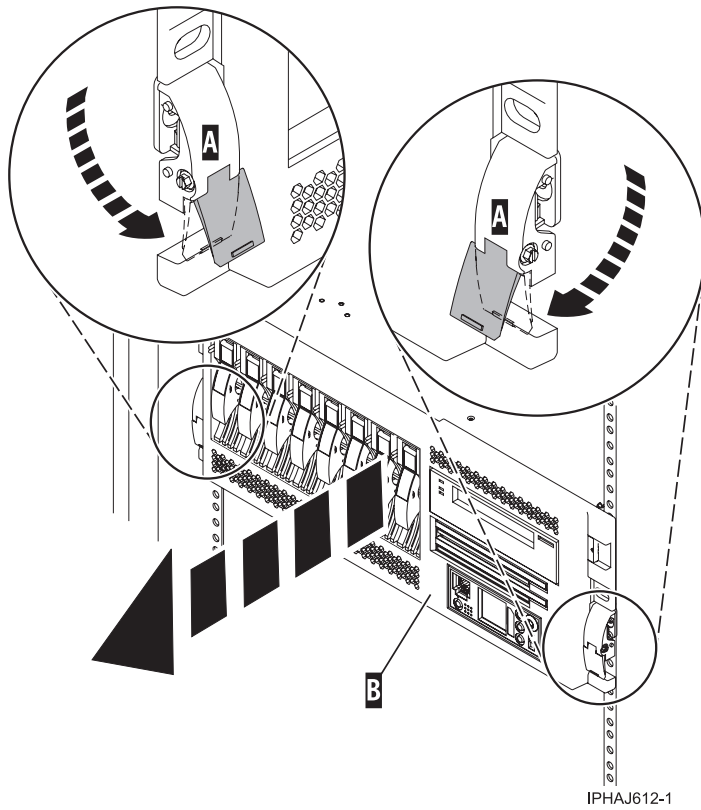
(R001)

To place the rack-mounted system or expansion unit into the service position, follow these steps:

1. If necessary, open the front rack door.
2. Remove the two thumbscrews **A** that secure the system or expansion unit **B** to the rack as shown in the following figure.



3. Release the rack latches A on both the left and right sides as shown in the following figure.



4. Review the following note, and then slowly pull the system or expansion unit out from the rack until the rails are fully extended and locked.

Note:

- If the procedure you are performing requires you to unplug cables from the back of the system or expansion unit, do so before you pull the unit out from the rack.
- Ensure that the cables at the rear of the system or expansion unit do not catch or bind as you pull the unit out from the rack.
- Ensure the rails are fully extended. When the rails are fully extended, the rail safety latches lock into place. This action prevents the system or expansion unit from being pulled out too far.

Place the rack-mounted system or expansion unit in the operating position

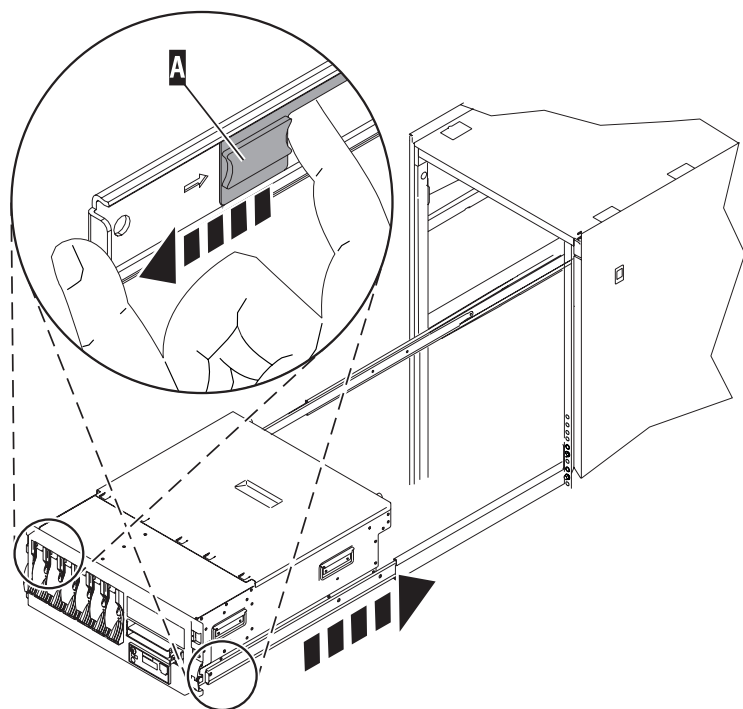
You might need to place the rack-mounted system or expansion unit in the operating position to make the unit available for use. Use the instructions in this section to accomplish this task.

Tip: 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.

To place the rack-mounted system or expansion unit into the operating position, follow these steps:

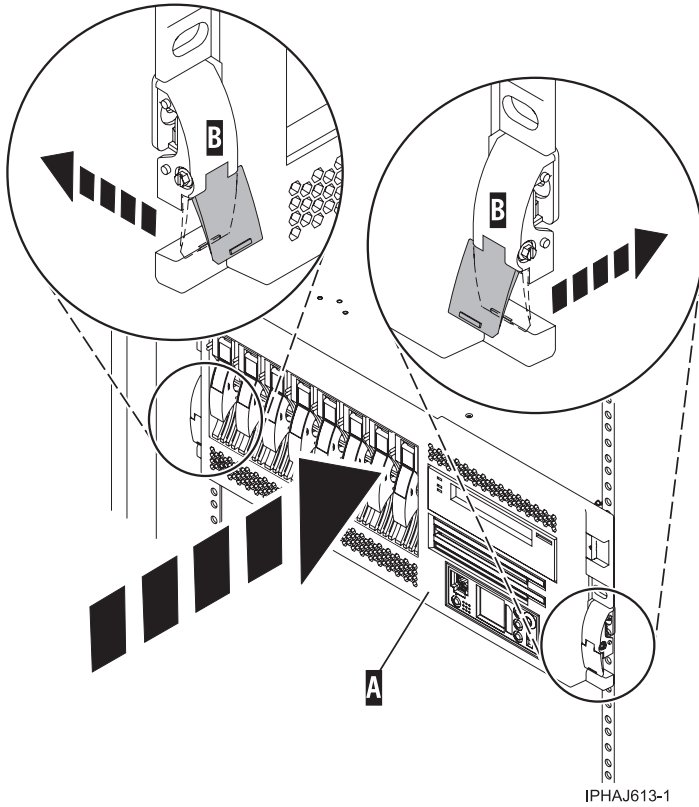
1. Simultaneously release the blue rail safety latches **A**, located near the front of each rail, and push the system or expansion unit into the rack as shown in the following figure.

Note: Ensure that the cables at the rear of the system or expansion unit do not catch or bind as you push the unit back into the rack.

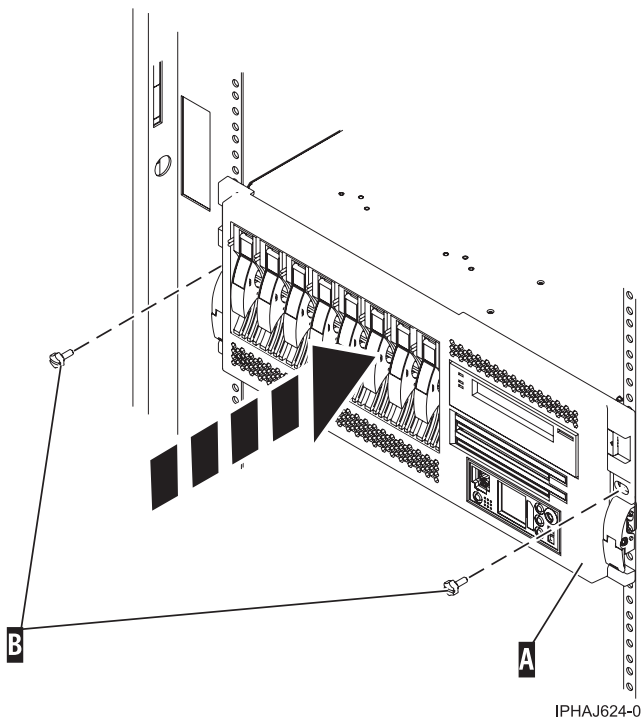


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- a. Both rack latches **B** should lock into position as shown in the following figure.



2. Replace and tighten the two thumbscrews **B** that secure the system or expansion unit **A** to the rack as shown in the following figure.



3. Close the front rack door.

Viewing existing firmware levels

Find out how to view the level of firmware that currently runs on your server.

You can view the current and backup levels of server firmware on the managed system.

Using the HMC to view the existing firmware levels

Learn how to view the level of firmware that currently runs on your server using the HMC.

1. In the Navigation area, click **Updates**.
2. Ensure that the managed system Status is Power Off, Standby, or Operating.
3. Record the level that appears in the EC Number field. For example, 01EM310.

Using the ASMI to view the existing level of server firmware

Find out how to use the ASMI to view the level of firmware that currently runs on your server.

On the ASMI Welcome pane, view the existing level of server firmware in the upper-right corner below the copyright statement, for example, 01EM310.

Install a feature using the Hardware Management Console

You might need to use the Hardware Management Console to install a feature. Use the procedure in this section to perform this task.

Install a feature using the HMC Version 7 or later

1. In the navigation area, expand **Systems Management**.
2. Expand **Servers**.
3. Select the managed system you will install the part in.
4. In the Tasks area expand **Serviceability**.
5. Expand **Hardware**.
6. Select **Add FRU**.
7. In the **Add/Install/Remove Hardware** window select the system or enclosure into which you are installing the feature.
8. Select the type of feature you are installing from the menu and click **Next**.
9. Select the location code for where you will install the feature and click **Add**.
10. Once the FRU is in pending actions click **Launch Procedure** and follow the instructions to install the feature.

Note: The HMC might open external instructions for installing the feature. If so, follow these instructions to install the feature.

Remove a part using the Hardware Management Console

You might need to use the Hardware Management Console to facilitate removing a part from your managed system. Use the procedure in this section to accomplish this task.

To use the Hardware Management Console user interface to remove a part in a system or expansion unit that is managed by a Hardware Management Console (HMC), follow these steps:

Remove a part using the HMC Version 7 or later

1. In the navigation area, expand **Systems Management**.
2. Expand **Servers**.
3. Select the managed system from which you are removing a part.
4. In the Tasks area expand **Serviceability**.
5. Expand **Hardware**.
6. Select **Remove FRU**.
7. In the **Add/Install/Remove Hardware - Remove FRU, Select FRU Type** window select the system or enclosure from which you are removing the part from the list.
8. Select the type of part you are removing from the menu and click **Next**.
9. Select the location of the part you are removing and click **Add**.
10. Once the part is listed in **Pending Actions** click **Launch Procedure** and follow the instructions to remove the part.

Note: The HMC might open external instructions for removing the part. If so, follow these instructions to remove the part.

Exchange a part using the Hardware Management Console

If you are exchanging a part to repair a serviceable event follow those instructions. If you are exchanging a part as a part of any other procedure using HMC Version 7 or later use these steps, "Exchange a part using the HMC Version 7"

Exchange a part using the HMC Version 7

1. In the navigation area, expand **Systems Management**.
2. Expand **Servers**.
3. Select the managed system in which you are exchanging a part.
4. In the Tasks area expand **Serviceability**.
5. Expand **Hardware**.
6. Select **Exchange FRU**.
7. In the **Replace Hardware - Replace FRU, Select FRU Type** window select the system or enclosure in which you will exchange a part from the list.
8. Select the type of part you will exchange from the menu and click **Next**.
9. Select the location code of the part you will exchange from the menu and click **Add**.
10. Once the part is listed in **Pending Actions** click **Launch Procedure** and follow the instructions to exchange the part.

Note: The HMC might open external instructions for replacing the part. If so, follow these instructions to replace the part.

Verify the installed part

Use the instructions in this section to learn how to verify a newly installed or replaced part on your system, logical partition, or expansion unit by selecting the appropriate procedure for the operating system or console.

Verify an installed feature or replaced part on an AIX system or logical partition

If you installed feature or replaced a part you might want to use the tools in AIX to verify that the feature or part is recognized by the system or logical partition. Use the procedure in this section to accomplish 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 using AIX:

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. Select **Advanced Diagnostics Routines**. Press Enter.
4. From the **Diagnostic Mode Selection** menu, select **System Verification**. Press Enter.
5. When the **Advanced Diagnostic Selection** menu appears, do one of the following:
 - To test a single resource, select the resource that you just installed from the list of resources and press Enter.
 - To test all the resources available to the operating system, select **All Resources** and press Enter.
6. Select **Commit**, and wait until the diagnostic programs run to completion, responding to any prompts that appear.
7. Did the diagnostics run to completion and display the message No trouble was found?
 - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the installation procedures to ensure that the new feature is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system is running in LPAR mode, note the logical partition in which you installed the feature. Contact your service provider for assistance.
 - **Yes:** The new device is installed correctly. Exit the diagnostic programs and return the system to normal operations.

Verify the replacement part using AIX

To verify the operation of a newly installed feature or replacement part, follow these steps:

1. Did you replace the part using either AIX or the online diagnostics service aid's concurrent (hot-swap) service operation?
 - No:** Go to step 2.
 - Yes:** Go to step 5 on page 321.
2. Is the system powered off?
 - Yes:** If the system supports slow boot, set the system to perform a slow boot. For information, see "Using the HMC to perform a slow boot" on page 322.
 - No:** Go to step 4 on page 321.
3. Start the system and wait until the AIX operating system login prompt displays or until apparent system activity on the operator panel or display has stopped.

Did the AIX login prompt display?

 - **Yes:** Go to step 4 on page 321
 - **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: .

If the system is partitioned, note the logical partition in which you replaced the part. Contact your service provider for assistance.

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 `diag` and press Enter.
 - b. From the **Function Selection** menu, select **Advanced Diagnostics Routines**. Press Enter.
 - c. From the **Diagnostic Mode Selection** menu, select **System Verification**. 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. 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`. 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 322

7. 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. After replacing a part, you must select the resource for that part from the *Resource Repair Action* menu. This updates the AIX error log to indicate that a system-detectable part has been replaced.

Note: On systems with a indicator light for the failing part, this changes the indicator light to the normal state.

Follow these steps:

- 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 on page 322
Yes: Go to step 8.
8. The parent or child of the resource you just replaced may also require that you run the Resource Repair Action option on it. 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. After replacing that part, you must select the resource for that part from the *Resource Repair Action* menu. This updates the AIX error log to indicate that a system-detectable part has been replaced.

Note: This changes the indicator light for the part from the fault state to the normal state.

Follow these steps:

- 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 reseal a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**. Press Enter.
- b. Select **Commit** after you make your selections.
- c. If the *No Trouble Found* display appears, go to step 9.
9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the value they had prior to servicing the system.
10. Did you do any hot-plug procedures before doing this procedure?
No: Go to step 11.
Yes: Go to step 12.
11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?
No: Contact your service provider. **This ends the procedure.**
Yes: Go to step 12.
12. Are the indicator lights still on?
 - **No. This ends the procedure.**
 - **Yes.** Turn off the lights. See one of the following for instructions:
 - “Changing service indicators” on page 324

Using the HMC to perform a slow boot

Learn how to perform a slow boot using the HMC.

In some cases, you need to perform a slow-mode boot in order to perform extended diagnostic testing.

Note: A slow-mode boot might yield a new reference code on the control panel, or new errors in the service processor error log. When the server reports a new error code, record it for use in subsequent steps.

1. Record any reference codes appearing on the control panel or HMC. See “Using the control panel to collect reference codes and system information” on page 323 for details.
2. Shut down all logical partitions and the server. For instructions, see “Powering off a managed system” on page 305.
3. In the navigation area, select **Systems Management** → **Servers**.
4. Select the server you want to perform a slow boot on.
5. In the **Tasks** portion of the content area, select **Properties**.
6. Click the **Power-On Parameters** tab.
7. Record the current boot setting in the Power-on speed override box.
8. Select **slow** in the Power-on speed override list.

Note: These settings will apply to all future boots. After you complete the service action, change the settings back to what you recorded in step 7.

9. Click **OK**.

10. After you are done, return to the step in the procedure that caused you to perform a slow boot. **This ends the procedure.**

Using the control panel to collect reference codes and system information

Learn how to use the control panel to collect reference codes and other system information.

Follow these steps to collect reference codes and system information (functions 11 through 20) using the control panel:

1. On the control panel, press the increment button until 11 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code: 16 characters from the first line, and 16 characters from the second line of the Function/Data display.
2. Press the increment button until 12 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
3. Press the increment button until 13 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
4. Press the increment button until 14 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
5. Press the increment button until 15 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
6. Press the increment button until 16 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
7. Press the increment button until 17 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
8. Press the increment button until 18 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
9. Press the increment button until 19 is shown on the Function/Data display.
 - a. Press Enter.
 - b. Record the 32-character code.
10. Press the increment button again until 20 is shown on the first line of the Function/Data display.
 - a. Press Enter.
 - b. Record the machine type, model, and serial number that is shown.

Note:

1. If 11 is shown in the Function/Data display on the control panel display, the numbers that follow are the reference codes.
2. If a number other than 11 is shown in the Function/Data display, the number might not indicate a problem with the system. These reference codes might indicate functions you select from the control panel display.

3. If you have a console with Type and Reference Code columns on it, record the data under the Type column as the first 4 characters of function 11 on the problem reporting form. If an A, B, C, or D is displayed as the first character in the Type column, use the data in the Reference Code column as the last 4 characters of function 11.

Changing service indicators

Turn off system attention indicator, enable enclosure indicators, change indicators by location code, and perform an LED test on the control panel.

The service indicators alert you that the system requires attention or service. It also provides a method for identifying a field-replaceable unit (FRU) or a specific enclosure within the system.

A hierarchical relationship exists between FRU indicators and enclosure indicators. If any FRU indicator is in an *identify* state, then the corresponding enclosure indicator will change to an *identify* state automatically. You cannot turn off the enclosure indicator until all FRU indicators within that enclosure are in an *off* state.

Turning off system attention indicator

Learn how to turn off the system attention indicator.

The system attention indicator provides a visual signal that the system as a whole requires attention or service. Each system has a single system attention indicator. When an event occurs that either needs your intervention or that of service and support, the system attention indicator lights continuously. The system attention indicator is turned on when an entry is made in the service processor error log. The error entry is transmitted to the system level and operating system error logs.

To perform this operation, your authority level must be one of the following:

- Administrator
- Authorized service provider

To turn off the system attention indicator, do the following:

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **System Configuration** and **Service Indicators**.
3. Select **System Attention Indicator**.
4. In the right pane, click **Turn off system attention indicator**. If the attempt is unsuccessful, an error message is displayed.

Verify the installed part on a Linux system or logical partition (run AIX diagnostics)

If you have installed a new part, use the instructions in this section to learn how to verify that the system recognizes the part.

To verify the newly installed or replaced part, choose one of the following:

Verify an installed part using stand-alone diagnostics

If you have installed or replaced a part, verify that the system recognizes the new part. Use the procedure in this section to accomplish this task.

You can use stand-alone diagnostics to verify an installed part in a Linux system, expansion unit, or logical partition. You access these diagnostics from a CD-ROM or from the Network Installation Management (NIM) server. This procedure describes how to use the diagnostics from a CD-ROM. For

information on running diagnostics from the Network Installation Management (NIM) server, see “Running stand-alone diagnostics from a Network Installation Management server” on page 326.

Prerequisites

- If this server is directly attached to another server or attached to a network, be sure communication with the other servers is stopped.
- stand-alone diagnostics require use of all of the logical partition resources. No other activity can be running on the logical partition.
- stand-alone diagnostics require access to the system console.

To use stand-alone diagnostics, follow these steps:

1. Stop all jobs and applications and then stop the operating system on the system or logical partition.
2. Remove all tapes, diskettes, and CD-ROM.
3. Turn off the system unit power. The next step boots the server or logical partition from the stand-alone diagnostics CD-ROM. If the optical drive is not available as the boot device on the server or logical partition on which you are working, follow these steps:
 - a. Access the ASMI. See “Accessing the ASMI” on page 293 for information on using the ASMI.
 - b. On the ASMI main menu, click on **Power/Restart Control**.
 - c. Click on Power On/Off System.
 - d. Select the **Service mode boot from default boot list** option in the AIX/Linux logical partition mode boot drop-down menu.
 - e. Click on **Save settings and power on**. As soon as the optical drive has power, insert the standalone diagnostic CD-ROM.
 - f. Go to step 5.
4. Turn on the system unit power and immediately insert the diagnostics CD-ROM into the optical drive.
5. After the **keyboard** POST indicator displays on the system console and before the last POST indicator (**speaker**) displays, press the numeric 5 key on the system console to indicate that a service mode boot should be initiated using the default service mode boot list.
6. Enter any requested password.
7. At the *Diagnostic Operating Instructions* display, press Enter.

Note: If an 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, you must use the **Initialize Terminal** option on the *Function Selection* menu to initialize the operating system before you can continue.
9. From the Function Selection menu, select **Advanced Diagnostics Routines**. Press Enter.
10. From the Diagnostic Mode Selection menu, select **System Verification**. 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. 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. 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.

Running stand-alone diagnostics from a Network Installation Management server

If the system or logical partition where you would like to run diagnostics has AIX installed but it cannot be started, or you have Linux installed, use this procedure to perform diagnostic procedures from a Network Installation Management (NIM) server when directed from another procedure or by your next level of support.

Diagnostics, which are available for AIX and Linux systems and logical partitions, can help you perform hardware analysis. If a problem is found, you will receive a service request number (SRN) that can help pinpoint the problem and determine a corrective action.


A client system connected to a network with a NIM server can boot stand-alone diagnostics from the NIM server if the client-specific settings on both the NIM server and client are correctly configured.

Notes:

- For NIM clients that have adapters that would typically require that supplemental media be installed when stand-alone diagnostics are run from CD, the support code for these adapters must be installed into the directory pointed to by the NIM SPOT from which you want to boot that client. Before running stand-alone diagnostics on these clients from the NIM server, the NIM server system administrator must ensure that any needed support for these devices is installed on the server.
- All operations to configure the NIM server require root user authority.
- If you replace the network adapter in the client, the network adapter hardware address settings for the client must be updated on the NIM server.
- Ensure that the **Cstate** for each stand-alone diagnostics client on the NIM server is kept in the *diagnostic boot has been enabled* state.
- On the client system, the NIM server network adapter should be put in the bootlist after the boot disk drive. This allows the system to boot in stand-alone diagnostics from the NIM server if there is a problem booting from the disk drive. Refer to the Multiboot section under "SMS" in the client system's service guide for information about setting the bootlist.

Configuring the NIM server

Refer to the "Performing advanced NIM configuration tasks" chapter of the AIX Installation and

Migration guide  (<http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/insgdrf.pdf>) for information about performing the following tasks:

- Registering a client on the NIM server
- Enabling a client to run diagnostics from the NIM server

To verify that the client system is registered on the NIM server and the diagnostic boot is enabled, run the command from the command line on the NIM server: `lsnim -a Cstate -z ClientName`. Refer to the following table for system responses.

Note: The ClientName is the name of the system on which you want to run stand-alone diagnostics.

System response	Client status
#name:Cstate:ClientName:diagnostic boot has been enabled:	The client system is registered on the NIM server and enabled to run diagnostics from the NIM server.
#name:Cstate:ClientName:ready for a NIM operation:or #name:Cstate:ClientName:BOS installation has been enabled:	The client is registered on the NIM server but not enabled to run diagnostics from the NIM server. Note: If the client system is registered on the NIM server but Cstate has not been set, no data will be returned.
0042-053 lsrim: there is no NIM object named "ClientName"	The client is not registered on the NIM server.

Configuring the client and running the stand-alone diagnostics from a NIM server


Perform the following steps to run stand-alone diagnostics on a client from the NIM server:

1. Let the system administrator and system users know that the system unit might be shut down.
2. Stop all programs including the AIX or Linux operating system. For details, see "Start or stop the system or logical partition" on page 300. If you need help, contact the system administrator.
3. Remove all tapes, diskettes, and CDs.
4. Choose from the following options:
 - If you are running stand-alone diagnostics in a full system partition profile, verify with the system administrator and system users that the system unit can shut down using the shutdown command. Then power down the system.
 - If you are running on a logically partitioned system, make sure the CD drive is available to the partition used to run stand-alone diagnostics. Verify with the system administrator and system users using that partition that all applications on that partition must be stopped, and that the partition will be restarted. Stop all programs on that partition, including the operating system.
5. Choose from the following options:
 - If you are in a full system partition, power on the system unit to run stand-alone diagnostics.
 - If you are in a logically partitioned system, restart the partition to run stand-alone diagnostics.
6. When the keyboard indicator is displayed (the word *keyboard* on an HMC virtual terminal window or the keyboard icon on a graphical display) press the number 1 key on the keyboard to display the SMS menu.
7. Enter any requested passwords.
8. Select **Set Up Remote IPL** (Initial Program Load).
9. Enter the client address, server address, gateway address, if applicable, and subnet mask. If there is no gateway between the NIM server and the client, set the gateway address to 0.0.0.0.
To determine if there is a gateway, either ask the system network administrator or compare the first three octets of the NIM server address and the client address. If they are the same, (for example, if the NIM server address is 9.3.126.16 and the client address is 9.3.126.42, the first 3 octets (9.3.126) are the same), then set the gateway address in the RIPL field to 0.0.0.0.

Note: The RIPL is located under the Utility menu in System Management Services (SMS). Refer to it for information about setting these parameters.

10. If the NIM server is set up to allow pinging from the client system, use the ping utility in the RIPL utility to verify that the client system can ping the NIM server.
11. Under the ping utility, choose the network adapter that provides the attachment to the NIM server to do the ping operation. If the ping returns with an OK prompt, the client is prepared to boot from the NIM server. If ping returns with a FAILED prompt, the client cannot proceed with the NIM boot.

Note: If the ping fails, refer to the "Troubleshooting NIM" section of the AIX Installation and

Migration guide  (<http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/insgdrf.pdf>)

12. Exit the SMS Main screen.
13. Select **Select Boot Options** → **Install or Boot a Device** → **Network**.
14. Record the current bootlist settings. You will need to set the bootlist back to the original settings after running diagnostics from the NIM server.
15. Change the bootlist so the network adapter attached to the NIM is first in the bootlist.
16. Set the network parameters for the adapter from which you want to boot.
17. Exit completely from SMS. The system will start loading packets while doing a bootp from the network.
18. Follow the on-screen instructions.
 - If Diagnostic Operating Instructions Version x.x.x displays, stand-alone diagnostics have installed successfully.
 - If the AIX login prompt displays, stand-alone diagnostics did not load. Continue with step 19.
19. If the diagnostics did not load, check the following items:
 - The bootlist on the client might be incorrect.
 - Cstate on the NIM server might be incorrect.
 - Network problems might be preventing you from connecting to the NIM server.
 - Verify the settings and the status of the network. If you continue to have problems, refer to the Boot problems/concerns section for the system unit. Then follow the steps for network boot problems.
20. After running diagnostics, restart the system and use SMS to change the IP settings and bootlist sequence back to the original settings.

Verify the presence of an installed part using Hardware Management Console (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. Use the procedure in this section to accomplish this task. If you have reference codes, symptoms, or location codes that you used during the service action, locate the records to use during this procedure.

1. At the HMC, examine the service action event log for any open service action events. See "Viewing serviceable events" on page 329 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" on page 329. **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.
 - **Yes:** Continue with the next step.
 - **No:** Choose from the following options:
 - Review the other serviceable events and 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.

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 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.

Viewing serviceable events

Use this procedure to view a serviceable event, including details, comments, and service history.

To view serviceable events and other information about the events, you must be a member of one of the following roles:

- Super administrator
- Service representative
- Operator
- Product engineer
- Viewer

To view serviceable events, follow these steps:

1. In the navigation area, select **Service Management**.
2. Select **Manage Serviceable Events**.
3. Select the criteria for the serviceable events that you want to view, and click **OK**. The Serviceable Event Overview window opens. The list shows all serviceable events that match your selection criteria. You can use the menu options to perform actions on the serviceable events.
4. Select a line in the Serviceable Event Overview window, and select **Selected** → **View Details**. The Serviceable Event Details window opens, showing detailed information about the serviceable event. The upper table shows information, such as problem number and reference code. The lower table shows the field replaceable units (FRUs) associated with this event.
5. Select the error for which you want to view comments and history, and follow these steps:
 - a. Select **Actions** → **View Comments**.
 - b. When you are finished viewing the comments, click **Close**.
 - c. Select **Actions** → **View Service History**. The Service History window opens, showing service history associated with the selected error.
 - d. When you are finished viewing the service history, click **Close**.
6. When you are finished, click **Cancel** twice to close the Serviceable Event Details window and the Serviceable Event Overview window.

Activating and deactivating LEDs

Use this procedure to activate or deactivate LEDs using Service Focal Point for the HMC.

Choose from the following:

- “Deactivate a system attention LED or partition LED” on page 330

- “Activate or deactivate identify LED”

Deactivate a system attention LED or partition LED

You can deactivate a system attention LED or a logical partition LED. For example, you might determine that a problem is not a high priority and decide to repair the problem at a later time. However, you want to be alerted if another problem occurs, so you must deactivate the system attention LED so that it can be activated again if another problem occurs.

1. In the navigation area, open **Systems Management**.
2. Open **Servers** and select the appropriate system.
3. In the content area, check the box for the appropriate Partition.
4. Select **Tasks**, then **Operations**, and then **Manage Attention LED**.
5. Select the appropriate Partition.
6. Select **Deactivate System Attention LED** from the **Action** menu. A confirmation window is displayed that provides the following information:
 - A verification that the system attention LED was deactivated.
 - An indication that there still might be open problems within the system.
 - An indication that you cannot activate the system attention LED.
7. Select one of the logical partitions in the lower table, and select **Deactivate partition LED** from the **Partition Operations** menu. A confirmation window is displayed that provides the following information:
 - A verification that the logical partition LED was deactivated.
 - An indication that there still might be open problems within the logical partition.
 - An indication that you cannot activate the logical partition LED.

Activate or deactivate identify LED

The system provides several LEDs that help identify various components, such as enclosures or field replaceable units (FRUs), in the system. For this reason, they are called *Identify LEDs*.

You can activate or deactivate the following types of identify LEDs:

- **Identify LED for an enclosure** If you want to add an adapter to a specific drawer (enclosure), you need to know the machine type, model, and serial number (MTMS) of the drawer. To determine whether you have the correct MTMS for the drawer that needs the new adapter, you can activate the LED for a drawer and verify that the MTMS corresponds to the drawer that requires the new adapter.
- **Identify LED for a FRU associated with a specified enclosure** If you want to hook up a cable to a specific I/O adapter, you can activate the LED for the adapter which is a field replaceable unit (FRU), and then physically check to see where you should hook up the cable. This is especially useful when you have several adapters with open ports.

To activate or deactivate an identify LED for an enclosure or FRU, follow these steps:

1. In the navigation area, open **Systems Management**.
2. Select **Servers**.
3. In the content area, check the box for the appropriate System.
4. Select **Tasks**, then **Operations**, then **LED Status**, and then **Identify LED**.
5. To activate or deactivate an identify LED for an enclosure, select an enclosure from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
6. To activate or deactivate an identify LED for a FRU, select an enclosure from the table, select **Selected** → **List FRUs**.
7. Select one or more FRUs from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Squadrons Common content

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge 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.

CAUTION:

Energy hazard present. Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

Only trained service personnel may replace this battery. The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do Not:

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

Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C002a)

CAUTION:

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

Do Not:

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

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

CAUTION:

Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn.

Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C004a)

CAUTION:

The battery is a nickel-cadmium battery. To avoid possible explosion, do not burn. Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C005a)

CAUTION:

The battery is a nickel metal hydride battery. To avoid possible explosion, do not burn. Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C006a)

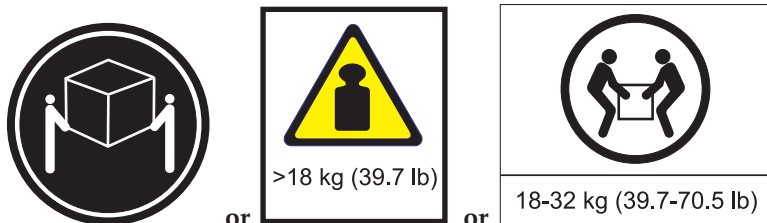
CAUTION:

The battery is a lithium ion battery. To avoid possible explosion, do not burn. Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C007a)

CAUTION:

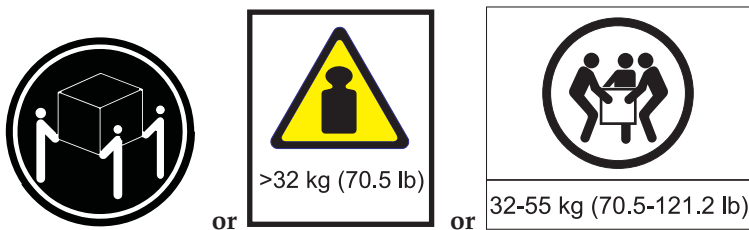
This part or unit is heavy but has a weight smaller than 18 kg (39.7 lb). Use care when lifting, removing, or installing this part or unit. (C008)

CAUTION:



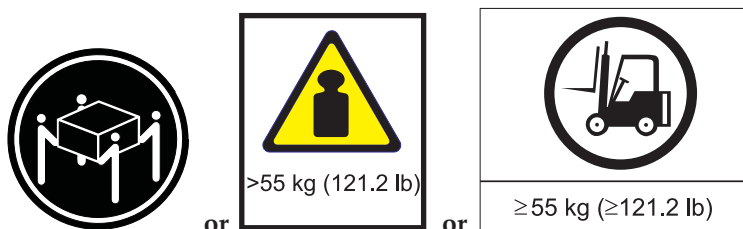
The weight of this part or unit is between 18 and 32 kg (39.7 and 70.5 lb). It takes two persons to safely lift this part or unit. (C009)

CAUTION:



The weight of this part or unit is between 32 and 55 kg (70.5 and 121.2 lb). It takes three persons to safely lift this part or unit. (C010)

CAUTION:



The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)

CAUTION:

To avoid personal injury, before lifting this unit, remove all appropriate subassemblies per instructions to reduce the system weight. (C012)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

The system contains circuit cards, assemblies, or both that contain lead solder. To avoid the release of lead (Pb) into the environment, do not burn. Discard the circuit card as instructed by local regulations. (C014)

CAUTION:

Refrigeration components are pressurized. Eye protection must be worn when servicing the Modular Cooling System (MCS). Refrigerant is very cold and can cause frostbite. Do not place your hands, even with gloves, directly into the path of flowing refrigerant. To avoid the possibility of frostbite from incidental contact, you must wear gloves whenever you handle refrigeration lines. (C015a)

CAUTION:

When removing the Modular Refrigeration Unit (MRU), immediately remove any oil residue from the MRU support shelf, floor, and any other area to prevent injuries because of slips or falls. Do not use refrigerant lines or connectors to lift, move, or remove the MRU. Use handholds as instructed by service procedures. (C016)

CAUTION:

Do not remove or install this unit without using the provided lift tool. (C017)

CAUTION:

This product is equipped with a 3-wire (two conductors and ground) power cable and plug. Use this power cable with a properly grounded electrical outlet to avoid electrical shock. (C018)

CAUTION:

This product is equipped with a 4-wire (three-phase and ground) power cable. Use this power cable with a properly grounded electrical outlet to avoid electrical shock. (C019)

CAUTION:

This product might be equipped with a 5-wire (three-phase, neutral ground) power cable. Use this power cable with a properly grounded electrical outlet to avoid electrical shock. (C020)

CAUTION:

The power distribution outlets provide 200 to 240 V ac. Use these outlets only for devices that operate within this voltage range. (C021)

CAUTION:

The product might be equipped with a hard-wired power cable. Ensure that a licensed electrician performs the installation per the national electrical code. (C022)

CAUTION:

Ensure the building power circuit breakers are turned off *BEFORE* you connect the power cord or cords to the building power. (C023)

CAUTION:

To avoid personal injury, disconnect the hot-swap, air-moving device cables before removing the fan from the device. (C024)

CAUTION:

This assembly contains mechanical moving parts. Use care when servicing this assembly.

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:

This product contains a Class 2 laser. Do not stare into the beam. (C029)

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 power-control button on the device does not turn off the electrical current supplied to the device. The device might also have more than one connection to dc power. To remove all electrical current from the device, ensure that all connections to dc power are disconnected at the dc power input terminals. (C031)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

CAUTION:

To reduce the risk of electric shock or energy hazards:

- This equipment must be installed by trained service personnel in a restricted-access location, as defined by the NEC and IEC 60950, The Standard for Safety of Information Technology Equipment.
- Connect the equipment to a reliably grounded, safety extra low voltage (SELV) source. An SELV source is a secondary circuit that is designed so that normal and single fault conditions do not cause the voltages to exceed a safe level (60 V direct current).
- The branch circuit overcurrent protection must be rated per the following table.
- Use copper wire conductor only, not exceeding 3 m (9.8 ft.) in length and sized according to the following table.
- Torque the wiring-terminal screws to the values in the following table.
- Incorporate a readily available approved and rated disconnect device in the field wiring.

(C033)

CAUTION:

This lubricant might cause irritation to the skin and eyes. Avoid direct contact with the lubricant. (C034)

CAUTION:

To reduce the risk of fire, use only No. 26 AWG or larger (for example, 24 AWG) UL-listed or CSA certified telecommunication line cord. (C035)

DANGER

To prevent a possible shock from touching two surfaces with different protective ground (earth), use one hand, when possible, to connect or disconnect signal cables. (D001)

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device or the power rating label for electrical specifications. (D002)

DANGER

If the receptacle has a metal shell, do not touch the shell until you have completed the voltage and grounding checks. Improper wiring or grounding could place dangerous voltage on the metal shell. If any of the conditions are not as described, *STOP*. Ensure the improper voltage or impedance conditions are corrected before proceeding. (D003)

DANGER

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. (D004)

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

Heavy equipment—personal injury or equipment damage might result if mishandled. (D006)

DANGER

Uninterruptible power supply (UPS) units contain specific hazardous materials. Observe the following precautions if your product contains a UPS:

- The UPS contains lethal voltages. All repairs and service must be performed only by an authorized service support representative. There are no user serviceable parts inside the UPS.
- The UPS contains its own energy source (batteries). The output receptacles might carry live voltage even when the UPS is not connected to an AC supply.
- Do not remove or unplug the input cord when the UPS is turned on. This removes the safety ground from the UPS and the equipment connected to the UPS.
- The UPS is heavy because of the electronics and batteries that are required. To avoid injury, observe the following precautions:
 - Do not attempt to lift the UPS by yourself. Ask another service representative for assistance.
 - Remove the battery, electronics assembly, or both from the UPS before removing the UPS from the shipping carton or installing or removing the UPS in the rack.

(D007)

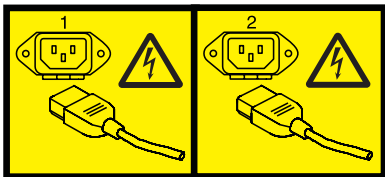
(L001)



(L002)



(L003)



or



(L004)



(L005)



(L006)



(L007)



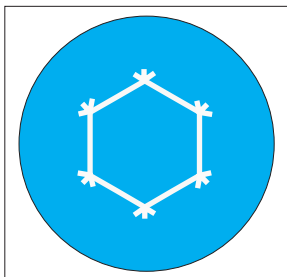
(L008)



(L009)



(L010)



(L011)



(L012)



(L013)



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)

Chapter 11. Upgrades

You can migrate or upgrade AIX to a new release, upgrade your server model to a new servers model, or upgrade to a new hardware feature.

Upgrade concepts

Learn about supported upgrade paths, upgrade considerations, and upgrade terminology.

An *upgrade* is the process of changing from one server model, hardware feature, or software version to a new servers model, hardware feature, or software version while retaining the serial number of the source server.

Upgrade terminology

Understand upgrade terminology for new servers models.

Review the following information to become familiar with the terminology used to describe upgrades:

apply A method of installing an update that provides a way to remove the fix and return to the previous level of the function

commit

A method of installing an update that does not allow you to remove the fix without also removing the base function.

fix A temporary or interim change to use until the official update can be obtained and applied, usually applied using the **fixmgr** command. Also known as *interim fix*.

maintenance package

A group of fixes that are tested and released together in one package. Also known as *recommended maintenance level*, *maintenance level*, *ML*, *fix pack*, and *recommended maintenance package*.

migrate

1. To install a new version or release of a program to replace an earlier version or release.
2. To move data from one storage location to another.

migration

The installation of a new version or release of a program to replace an earlier version or release.

update

To apply fixes to a system.

upgrade

1. To add or replace hardware or software with newer models or releases.
2. Any hardware or software change to a later release, or any hardware addition or software addition.

Upgrade path

Learn about supported upgrade paths.

You can upgrade the 175/70 to a servers 17M/MA.

Upgrade timeline

Determine how much time you need for an upgrade, and learn about the different stages of an upgrade.

The following timeline describes common stages that occur during an upgrade. The timeline incorporates the entire process from when you first start planning for an upgrade until the time when you have finished preparing your target server for production. Listed next to each stage are more detailed descriptions that describe what the stage entails and what must be accomplished when you have finished the stage. In the right column of the table, you see an estimated amount of time that it takes to complete that stage. This time estimate applies to situations where there are resources dedicated to the tasks. For complex upgrades or situations where there are not dedicated resources, your upgrade might take longer.

Nearly all of the responsibilities for planning, ordering, preparing, and preinstalling are customer responsibilities. If you need assistance with these stages of the upgrade, services are available to assist you. When you have completed these stages, the authorized service provider performs the hardware upgrade at this time. Following the hardware upgrade, you are presented with the new server and its physical configuration for review.

Your unique upgrade might include some or all of the following upgrade stages.

Table 26. Upgrade stages

Stage	Stage description	Time required
Plan	Develop a detailed project plan. Focus your plan on items such as a solution, a task list, a timeline, and a project schedule. Determine the hardware, software, and the services that are required for your new server as a result of the solution that you want. You must also determine the prerequisites that are required to support your new hardware and software. Consider backup and recovery, time you can afford to be down for the upgrade, and whether or not side-by-side services will be needed.	2 weeks
Order	Analyze the detailed plan that you developed in the planning stage with your reseller or marketing representative. Consider whether your upgrade is feasible, the risk involved with your upgrade, and whether your requirements will be met. If everything appears acceptable after analyzing your detailed plan, place your order.	1 day
Preparation	<p>Prepare your server for an upgrade. Tasks in this stage include the following:</p> <ul style="list-style-type: none"> • Preparing your environment and your server. This includes adding, replacing, or removing a hardware feature, activating inactive resources, and converting an expansion unit. Depending on your hardware compatibility, you might need to upgrade your software prior to changing a hardware feature or converting an expansion unit. • Cleaning up your server by doing tasks such as removing failed or nonreporting resources, removing unsupported disk units and deleting device configurations. • Backing up your data. • Installing any hardware or software prerequisites. • Ensuring that checklists are complete, including the hardware installation readiness checklist. 	2 weeks

Table 26. Upgrade stages (continued)

Stage	Stage description	Time required
Preinstallation	<p>Tasks in this stage include the following:</p> <ul style="list-style-type: none"> • Examine what you have done so far and determine whether you are now ready for the upgrade. • Gather all necessary server information for the authorized service provider. • Determine if you need to complete any remaining work items. • After you determine that you are ready, establish a meeting with your authorized service provider. In this meeting, you can then display all pertinent information to them such as your target server configuration. 	1 day
Installation	<p>Install the software on your source server several weeks before the hardware upgrade.</p>	1 day
Postinstallation	<p>Tasks in this stage include the following:</p> <ul style="list-style-type: none"> • After you have reviewed your new server and the physical configuration, configure your target server. This includes the following: <ul style="list-style-type: none"> – Configuring your Hardware Management Console (HMC). – Migrating existing logical partition configurations. – Rearranging hardware as needed for logical partitions. – Setting up and changing your logical partitions. • Migrate any applications and data at this time. • Finish your upgrade by testing your server as detailed in your test methodology plan. <p>Fixes and enhancements might have been released between the time that your new server was built and shipped, and when it was installed. Therefore, the first key step is to update the HMC, system firmware, and operating system code to the latest level.</p> <p>After you have completed the hardware resource-management tasks, label your cables and hardware resources, and then print out your configuration information for reference. You can use the configuration information for future server-management tasks, and server-maintenance tasks.</p>	1–2 days

Common deviations

There are many reasons or situations that might change the previous timeline. The following list includes a few of the more common deviations that might affect your timeline:

- Unassigned resource

If the resources are incorrectly assigned to the upgrade tasks, your upgrade can take longer. Ensure that you have the appropriate people and skills assigned to the correct upgrade tasks.

- Logical partitions

The preparation and installation time increases with each logical partition on the server. With proper planning and preparation, this should not be a problem; however, servers with multiple logical partitions will require a longer timeline than servers with fewer partitions or servers with only one partition.

- Unsupported I/O devices

If you do not plan for the removal or replacement of unsupported I/O devices but realize during your upgrade that you have unsupported I/O devices, you must remove those devices, and perhaps replace those devices with supported I/O devices, which increases your timeline.

- **Unsupported software**

If your software is not properly planned, it might add several unexpected hours by forcing you to reschedule your upgrade to another time, or require that your upgrade be removed and rescheduled, which might result in additional costs. It is imperative that you understand what software is compatible with your server and hardware features. For example, if you are changing a hardware feature before upgrading your server, you might need to upgrade your software prior to making the hardware feature change depending on the requirements and compatibility of that hardware feature. If you do not need to upgrade your software during the preparation stage, you might need to during the installation stage as a requirement prior to upgrading your server.

Upgrade considerations

Learn about what to consider before starting an upgrade for new models.

All upgrade situations are different. The following examples show possible upgrade scenarios:

- Replace an older server that will no longer be used with a new servers 17M/MA.
- Replace several older servers with one new, partitioned servers 17M/MA in a server consolidation.

Analyzing your environment to determine what you will upgrade, both hardware and software, is critical for any type of upgrade. Consider the following issues when you are deciding to upgrade your server:

- What media will you use for backups and installations? One option for backups and installations is using CDs. You can also use the network and file systems.
- What operating system are you currently running? That version might not run on your new hardware, or you might need to upgrade to the latest recommended maintenance level.
- What operating system is required on the new server?
 - AIX 5L™ Version 5.2 with the 5200-04 Technology Level or later is required to run a servers 17M/MA. If you are already running AIX 5.2, you must update to the latest recommended maintenance level.
 - AIX 5.3 is required to use shared processors or virtual I/O. If you are currently running AIX 5.1 or earlier, you must perform a migration installation to AIX 5.2 or AIX 5.3.
- What applications do you want to run on the new server? Ensure that the applications are certified on the level of operating system that you are running on the new server.
- Is all of your current hardware supported on the new server? Some or all of the hardware might not be supported. (http://www-912.ibm.com/e_dir/eServerPreReq.nsf).

Upgrade checklist

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

If you prefer not to use this checklist, you can read through all the tasks under “Upgrading the server” on page 347. The tasks under that section are in the same order as they appear in this checklist.

If the responsibility states *customer and reseller*, ensure that you work in cooperation with your reseller to complete that task.

Several of the tasks below are embedded in other tasks. A higher-level task might state customer and reseller; however, the majority of the tasks within that section might be your responsibility, meaning that for a few of the tasks within that section, ensure that you work in cooperation with your reseller.

Before you begin

- The following checklist is broken into stages. Ensure that you understand the stages involved when upgrading your server before completing this checklist. To understand the basics of each stage and where certain tasks will fall, see “Upgrade timeline” on page 343.

Server upgrade tasks

Responsibility

- | | |
|--|-----------------------|
| — “Upgrade planning tasks” on page 348 | Customer |
| — “Order tasks” on page 348 | |
| — “Configuring your order” on page 348 | Customer and reseller |
| — “Validating your order” on page 349 | Customer and reseller |
| — “Validating your upgrade project plan” on page 349 | Customer and reseller |
| — “Placing your order” on page 349 | Customer and reseller |
| — “Preparation tasks” on page 350 | Customer and reseller |
| — “Confirming your upgrade schedule” on page 350 | Customer |
| — “Cleaning up disk storage” on page 350 | Customer |
| — “Adjusting memory and processing resources” on page 350 | Customer |
| — “Developing your test plan” on page 351 | Customer |
| — “Scheduling your acceptance review” on page 352 | Customer |
| — “Preinstallation tasks” on page 352 | |
| — “Software considerations” on page 352 | Customer |
| — “System backup requirements” on page 353 | Customer |
| — “Preparing your location for the upgrade” on page 353 | Customer |
| — “Reviewing your project and contingency plans” on page 353 | Customer |
| — “Running the AIX pre_migration command” on page 354 | Customer |
| — “Performing the upgrade” on page 354 | |
| — “Saving your existing partition profiles from a Hardware Management Console” on page 355 | Customer |
| — “Updating AIX with a new maintenance level” on page 356 | Customer |
| — “Migrating AIX to a new version or release” on page 357 | Customer |
| — “Backing up AIX to a CD” on page 360 | Customer |
| — “Restoring an AIX system backup from a CD” on page 361 | Customer |
| — “Testing your server” on page 363 | Customer |

After you complete the tasks in the preceding checklist, and after the upgrade is complete, do the following:

After you finish

- Consider examining your server’s performance. For more information, see Performance Management (http://publib.boulder.ibm.com/infocenter/pseries/v5r3/index.jsp?topic=/com.ibm.aix.prftungd/doc/prftungd/performance_management-kickoff.htm) and AIX 5L Performance Tools Guide and Reference (<http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.prftools/doc/prftools/prftools.htm>).

Upgrading the server

View information about upgrading your server, such as planning and preparation tasks and tasks on how to perform your upgrade.

This topic explains in detail all the tasks that are listed in the upgrade checklist. They are listed in chronological order starting from the time you first start planning for your server upgrade until the time

you have finished preparing your target server for production. These tasks are also separated into various stages, which are described in the upgrades concepts topic. See “Upgrade timeline” on page 343 for information about what each upgrade stage entails. To see all of these tasks, including who is responsible for each task, in a checklist format, see the “Upgrade checklist” on page 346.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Upgrade planning tasks

Understand the items to consider before you upgrade your server, including hardware, software, and the physical site preparation.

Read the items that you need to consider before you upgrade your server. These planning topics are essential and can assist you when planning for hardware, software, and the physical site preparation. For more information, see “Upgrade considerations” on page 346.

You can help to minimize your downtime and make performing the upgrade easier by planning carefully. The many items that you need to consider before upgrading your server are included in a checklist for each server items model. To review the checklist for your server, see the *Planning checklist* ([http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/rlepSiteandHardwarePlanningGuide/\\$file/sa76-0091.pdf](http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/rlepSiteandHardwarePlanningGuide/$file/sa76-0091.pdf)) in the Planning topic.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Order tasks

Understand the order process, such as how to configure, validate, and place your order.

Use this information to learn the order process. Learn how to configure and validate your order as well as how your order is placed. In this stage, you and your reseller or authorized service provider must analyze your detailed plan that you developed in the previous step. Some items to be taken into consideration include whether your upgrade is feasible, the risk involved with your upgrade, and whether your requirements will be met. If everything appears acceptable after analyzing your detailed plan, place your order.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Configuring your order

Learn how to develop a solution that is correct for you.

After planning for your upgrade, determine if your solution is correct and available. The configurator tool performs the following tasks:

- Validating your hardware and software order
- Analyzing possible problems with disk space and console requirements
- Analyzing performance, I/O structure, and server availability
- Providing a price estimate for your new solution
- Validating combinations of hardware and software based on your configuration and order availability

Your reseller assists you when using the configurator tool.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Validating your order

Ensure that your order is complete.

Finalize your order based on your solution by completing a solutions assurance review. Validate the following items with your reseller or marketing representative when you examine your order:

- The target server meets your performance requirements.
- Thorough hardware and feature placement and cabling plans are available.
- Software requirements are identified for all logical partitions.
- Data, hardware configuration, and business continuity requirements can be maintained.
- Customer acceptance criteria is established.
- The backup plan is supported.
- The System Planning Tool (SPT) information, which is used to plan LPAR configurations, is appropriate.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Validating your upgrade project plan

Ensure that you have developed a thorough upgrade schedule and project plan.

Ensure that your upgrade project plan is extensive and detailed. Validate that your plan includes the following information:

- A list of responsibilities for the tasks involved in an upgrade
- The skills and people that have been assigned to complete the tasks
- Adequate backup or contingency plans
- A contact list for the people assigned to the upgrade tasks
- An upgrade schedule that includes your dependencies, expectations, and limitations

Items that are billable during or after the upgrade include the following:

- Rearranging existing hardware that is not required to physically install new items
- Developing a plan that lists unnecessary actions where the same result can be attained without those actions
- Moving items that are not affected by your new hardware, or moving items to provide for placement of your new hardware for items other than placing them in a supported location within the system. For example, supporting a specific environment, such as placement for logical partitioning or clustering considerations, is considered a billable item.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Placing your order

Understand who places your order and how your order will be placed.

Place your order with your reseller or authorized service provider after you have configured and validated it. Your reseller or authorized service provider ensures that your order has been properly placed and that everything is correct. They also ensure that you sign your contract. Your reseller or authorized service provider confirms with you what parts or features will be returned at the conclusion of the upgrade.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Preparation tasks

Learn how to prepare your server for an upgrade, and complete other preparation tasks.

During this stage, you prepare your server for an upgrade. The major tasks associated with this stage include adding, replacing, or removing a hardware feature, activating inactive resources, and converting expansion units. You must also clean up and back up your server, and ensure that your target console is prepared and running, and develop a test plan.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Confirming your upgrade schedule

Understand why and who you should confirm your upgrade schedule with.

Confirm your schedule with all parties involved. By confirming your schedule, you ensure that everyone understands when the upgrade tasks will be completed and that they must be available to support the portion of the upgrade for which they are responsible if questions or problems arise. Resolve any potential conflicts immediately.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Cleaning up disk storage

It is important that you clean up your disk storage before you back up your data and eventually perform your upgrade. Understand why you should clean up your disk storage.

Cleaning up your disk storage is important for several reasons:

- It shortens the amount of time it takes you to back up your data.
- It might improve performance.
- It frees up additional storage space.
- If it is necessary to perform an unplanned recovery from media, your recovery time is shorter.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Adjusting memory and processing resources

Understand why and how to adjust memory and processing resources. Adjusting those resources can help you adjust to changing workloads.

If your target server or partition has already been set up and you realize there is inadequate processor or memory, you can adjust these without having to re-create the partition. If the target server has fewer processors than the source server, you must adjust the configuration on the source server to reflect the target server's processing resources. If the target server has less memory than the source server, you can adjust the minimum memory values per logical partition.

For more information on adjusting processing power, see *Dynamically managing processing power* ([http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf#IPHBLDLPARPROCPOWERP6](http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf#IPHBLDLPARPROCPOWERP6)). For more information about adjusting memory, see *Dynamically managing memory* ([http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf#IPHBLDLPARMEMORYP6](http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf#IPHBLDLPARMEMORYP6)).

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Developing your test plan

Understand how to develop acceptance criteria, a test plan, and a test schedule. You can also learn why you should develop these items.

Before you develop your test plan, determine your acceptance criteria. These criteria must establish the requirements and steps it will take to return your new server to the appropriate level of function, performance, availability and risk following the upgrade. These criteria will help promote a quick and easy transition from the time when the authorized service provider presents the server to you until you formally accept your new server.

When developing your test plan, assess your business situation to determine the level of testing that you need. Examine the risk involved by not testing and whether that risk justifies the time, expense, and resources required to complete the test.

After you have determined the preliminary tasks, your next step is to develop your actual test plan, which should be partially based on your criteria and risk assessment. To continue developing your test plan, complete the following tasks:

1. Identify focus areas to be covered by testing
2. Identify resources that can support this testing
3. Assign appropriate personnel to develop a test strategy and test schedule

After you have covered those tasks, your next steps are to:

1. Develop a test strategy, plan, and timeline
2. Ensure that you have enough resources to complete your test. Consider the following resources:
 - Hardware
 - Software
 - Labor
 - Tools
 - Licenses
 - Location
3. Verify that you have taken into consideration physical planning and installation requirements
4. Develop a test schedule

Review your plan thoroughly before implementing it. Use this review to focus on your timeline, requirements, cost, and steps necessary to complete your plan.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Scheduling your acceptance review

Understand why you need an acceptance review and who should be involved.

The acceptance review is a meeting where you can evaluate whether the hardware configuration matches your plan. At the meeting, include the service provider and anyone else who needs to evaluate the new server. The service provider presents the new server and its physical configuration to you.

You use the information provided by the service representative to prepare the server for production. Therefore, it is important to determine whether the current server hardware configuration matches your plan.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Preinstallation tasks

The major tasks in this stage include reviewing system requirements, preparing your location, and reviewing your project and contingency plans. Find links to instructions for preparing for your upgrade.

Use this stage as a checkpoint to examine what you have done so far and to determine whether you are now ready for the upgrade. Also, gather all necessary information for the authorized service provider. Determine if any tasks still exist that need to be done. If you determine that you are ready, your next step is to establish a meeting with your authorized service provider. In this case, you can then show them all pertinent information.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Software considerations

Different options are available for upgrading an existing AIX environment. Learn about those options before you perform an upgrade.

You can use the following methods to upgrade an existing environment:

Using a mksysb backup image

If you can migrate your server to AIX 5L Version 5.2 with the 5200-04 Technology Level or later, you can create a mksysb backup image of the older server. You can then use the mksysb image to reinstall AIX on the new server.

Using alternate disk migration

If you want to decrease the amount of time that your production environment is down, you can use the **nimadm** command to perform an alternate disk migration. This method requires more resources than the other methods. You must have an existing AIX Network Installation Management (NIM) master that is running the same version of AIX to which you are migrating the new server.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

System backup requirements

Understand the options to back up your current server before you perform an upgrade. Before performing an upgrade, you can back up your server using a mksysb image or alternate disk installation.

Before you perform any upgrade tasks, verify that you have a current system backup in the AIX environment of your rootvg and all of your data. An AIX system backup is called a mksysb image. You can either create a mksysb backup image or use alternate disk installation.

If you create a mksysb backup image, you can record a backup on any of the following media:

- Tape
- Network file system
- CD-RW
- DVD-RW
- DVD-RAM

To make recovery flexible and reliable, back up to more than one media if possible. For additional information on creating a mksysb backup, see *Creating system backups* (http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/create_sys_backup.htm).

To back up your system using alternate disk installation, you can clone a copy of your running system to another drive. For additional information about using alternate disk installation, see *Alternate disk installation* (http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/HT_insgdrf_altdiskinstall_clone.htm).

Preparing your location for the upgrade

Learn how to prepare your location for the upgrade. Specifically, use this information to understand what you need to do to ensure that your location is ready for the authorized service provider.

To prepare your location for the upgrade, perform the following tasks:

- Validate that all of your existing cables are labeled appropriately with the port and location where they plug into the server and the destination information on both ends.
- Assemble and lay out all of the new cables. The service provider connects the cables to your new server.
- Install any network or telephone connections such as telephone twisted pair or Ethernet cables.
- Rearrange hardware, whenever possible, to ensure that it is located in its final location. This might involve billable services, and you might need to have a plan to determine when the hardware relocation activity should occur.
- Prepare a work space that provides enough room for the service provider to lay out their ESD-protective mat and display I/O and other items.
- Validate that when the service provider arrives, the server is available to the service provider with all users off the machine and no production jobs running. This allows the service provider to power off the machine and perform other jobs.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Reviewing your project and contingency plans

Learn how to validate that your project and contingency plans are thorough and correct.

Review your project plan to ensure that you have correctly planned for everything in the upgrade. This prepares you for the installation and post-installation stages. Also, understand all billable items and the responsibilities of all the parties involved.

Discuss your target hardware configuration with your reseller or marketing representative. Focus on any changes that you want to make because they need to be examined to determine if additional services are required and if they might cause any problems with the configuration.

In the event that you experience problems during an upgrade, ensure that you understand your recovery or installation backout plan when reviewing your contingency plans. A contingency plan should include the following items:

- Alternate site processing
- Alternate backup schedule
- Availability of a backup server to run critical applications

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Running the AIX `pre_migration` command

Learn when you should run and how to run the AIX `pre_migration` command.

Before you migrate AIX, ensure that your server does not have existing installation issues.

If you are migrating to AIX 5.2 or later, you can run the `pre_migration` command on the CD that runs a set of tests and verifications on your server before you start the migration process. All output from the `pre_migration` command is saved in the `/home/pre_migration.date` directory. To run the `pre_migration` command, complete the following steps:

1. Mount the AIX 5.2 or AIX 5.3 CD using the following command:

```
# mount -v cdrfs -o ro /dev/cd0 /mnt
```
2. Copy the script to your server. The script is located in the `/mnt/usr/lpp/bos/pre_migration` directory. Run the following command:

```
# cp /mnt/usr/lpp/bos/pre_migration /tmp/pre_migration
```
3. Run the script using the following command:

```
# /tmp/pre_migration
```

The script performs the following checks:

- Placement and size of boot logical volume
- Requirements for disk space
- Verification of current system installation

If any problems are found, they are logged and reported to you. The premigration script does not make any changes on the server. The script verifies the current environment and checks for specific circumstances that might cause problems during a migration.

Run the premigration script before starting any migration, including alternate disk migration. Although all of the checks are also done before migration, it is easier to correct problems on a running server.

Performing the upgrade

Performing your upgrade entails saving your partition profiles, and updating, migrating, backing up, and restoring AIX on your system. Use these instructions to perform those tasks.

This topic describes how to upgrade your server. Before you begin these tasks, complete the necessary steps in “Upgrade planning tasks” on page 348. Depending on which scenario you are using, performing an upgrade includes a subset of steps.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Saving your existing partition profiles from a Hardware Management Console

Saving your existing partition profiles allows for an easier restoration of your partitions following your upgrade. Learn how to save your existing partition profiles from a Hardware Management Console (HMC).

You can use this procedure to save the logical partition definition information from a HMC. In this procedure, the managed server is named 7038-6M2*10A59BC.

The following steps show you how to use the HMC to save the logical partition definition information:

1. Log in to the HMC that is connected to the managed server using an SSH client application.

2. Run the `lssyscfg` command to list all the partitions on the server, as follows:

```
lssyscfg -r lpar -m "7038-6M2*10A59BC" -F name
```

3. Save this information. For example:

a. On your local system, redirect the output to a file when you issue the `ssh` command. For example, type the following:

```
ssh username@hmchostname lssyscfg -r lpar -m "7038-6M2*10A59BC" -F name > outputfile
```

4. On the HMC, run the `lssyscfg` command to list the partition profiles for each partition on the server, as follows (where `name_from_step2` is one of the partition names returned in step 2):

```
lssyscfg -r prof -m "7038-6M2*10A59BC" -p name_from_step2 //  
-F name:boot_mode:desired_cpu:minimum_cpu:maximum_cpu:desired_mem:minimum_mem:maximum_mem://  
desired_io:required_io:service_authority:sfp_surveillance:sni_device_id
```

Note: You do not need to perform this step for the `FullSystemPartition` name that was returned in step 2.

5. Save this information. For example:

a. On your local system, redirect the output to a file when you issue the `ssh` command. For example, type the following:

```
ssh username@hmchostname lssyscfg -r lpar -m "7038-6M2*10A59BC" -F name > outputfile
```

6. On the HMC, run the `lshwres` command to list all the slot information for the server, as well as the partition that the slot is assigned, as follows:

```
lshwres -m "7038-6M2*10A59BC" -r slot -F phys_loc:drawer_id:slot_id:slot_type:assigned_to
```

7. Save this information. For example:

a. On your local system, redirect the output to a file when you issue the `ssh` command. For example, type the following:

```
ssh username@hmchostname lssyscfg -r lpar -m "7038-6M2*10A59BC" -F name > outputfile
```

After you have saved the partition profile information, do the following:

1. Use the HMC to create an AIX logical partition and partition profile on your new server. For more information, see *Configuring AIX logical partitions* ([http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/\\$file/sa76-0098.pdf#IPHBLCONFIGURELPARP6](http://www.ibm.com/servers/resourcelink/lib03030.nsf/pages/LogicalPartitioningGuide/$file/sa76-0098.pdf#IPHBLCONFIGURELPARP6)).

2. Update your partition profile on the new server using the information from the partition profile that you saved. For more information, see “Restoring an AIX system backup from a CD” on page 361.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Updating AIX with a new maintenance level

Your current version and release of AIX must match the level of AIX to which you are updating. Learn how to update your current maintenance level of AIX.

Attention: This procedure requires that you restart AIX. Whenever you restart AIX, schedule your downtime when it least impacts your workload to protect yourself from a possible loss of data or functionality. Before you update AIX with a new maintenance level, ensure that you have reliable backups of your data and any customized applications or volume groups. For instructions on how to create a system backup, see *Creating system backups*.

The following steps show you how to use a CD-ROM or DVD device to update AIX with a new maintenance level.

Step 1. Prepare for the update procedure

Before starting the update procedure, complete the following prerequisites:

- You must be logged in to the server as the root user.
- Either insert the media that contains the optional software or service updates into the appropriate drive or know the local or routed path to the software.
- If system files have been modified, back them up separately before updates are applied, because the update process might replace configuration files.
- Before you begin the update procedure, ensure that other users who have access to your server are logged off.
- Verify that your applications run on the new AIX maintenance level.
- Verify that all currently installed software is correctly entered in the Software Vital Product Database (SWVPD), by using the **lppchk** command. To verify that all filesets have all required requisites and are completely installed, type the following:

```
# lppchk -v
```
- Check that your hardware microcode is up-to-date.
- Ensure that all requisite hardware, including any external devices (such as tape drives or CD or DVD-ROM drives), are physically connected and powered on. If you need further information, refer to the hardware documentation that accompanied your server.
- Use the **errpt** command to generate an error report from entries in the system error log. To display a detailed report, type the following command:

```
# errpt -a
```
- Ensure that adequate disk space and memory are available. For additional release information, see the *AIX Release Notes* that correspond to the maintenance level that you are installing.
- Make a backup copy of your server software and data. For instructions on how to create a system backup, see *Creating system backups*.

You can perform the update procedure either using the SMIT interface or the command line. Use one of the following sets of instructions, depending on whether you are using the SMIT interface or the command line:

Step 2. Perform the update procedure using the SMIT interface

1. Insert the AIX maintenance level CD into the CD-ROM or DVD device.
2. Type `smitty update_all` at the command line.
3. Type or select the input device that contains the AIX maintenance level CD, and then press Enter.
4. Type or select values in all entry fields, and then press Enter.

When you press Enter to start the installation, the COMMAND STATUS panel is displayed. As the installation proceeds, a series of messages is displayed. The amount of time that the installation takes varies depending on your server and the software that you are installing and updating.

When the installation is complete, the panel returns to the top of the list of messages that are displayed during installation. The **Command: status** field on the COMMAND STATUS panel changes to **OK** or **failed**. **OK** indicates that the installation ran to completion, although some filesets might not have installed successfully. The **failed** status means that there was a problem with the installation. Although a preview installation always finishes with an **OK** status, always check the summaries.

5. Press F10 (or Esc+0) to exit SMIT.
6. Review the **smit.log** file (**/smit.log** or **/home/user_id/smit.log**).
7. Remove all installation media for the maintenance level from the drives.
8. When you are directed, restart your server by typing the following command:

```
# shutdown -Fr
```

Step 2. Perform the update procedure using the command line

1. Use the **install_all_updates** command to install all installp updates on the **/dev/cd0** device and to verify the current recommended maintenance level:

```
# install_all_updates -d /dev/cd0
```
2. Remove all installation media for the maintenance level from the drives.
3. When you are directed, restart your server by typing the following command:

```
# shutdown -Fr
```

For more information about the **install_all_updates** command, see the **install_all_updates** command in the *AIX 5L Commands Reference*.

Step 3. Verify server configuration after installation

After the update procedure is complete and AIX has been restarted, verify the server configuration, as follows:

1. Verify that all currently installed software is correctly entered in the Software Vital Product Database (SWVPD), by using the **lppchk** command. To verify that all filesets have all required requisites and are completely installed, type the following:

```
# lppchk -v
```
2. Use the **errpt** command to generate an error report from entries in the system error log. To display a detailed report, type the following:

```
# errpt -a
```

Migrating AIX to a new version or release

Using this procedure, you can migrate a server from an earlier version or release of AIX to AIX 5.3.

Before you migrate AIX, review the information in “Saving your existing partition profiles from a Hardware Management Console” on page 355. In this procedure, you perform a migration installation from an earlier version or release of AIX to AIX 5.3 using the following options:

- Use English as the primary language
- Use the default options in the **Advanced Options** menu

If you are overwriting an existing server, get the TCP/IP information before you begin this procedure.

Attention: This procedure requires shutting down and reinstalling the base operating system. Whenever you reinstall any operating system, schedule your downtime when it least impacts your workload to protect yourself from a possible loss of data or functionality. Before you perform a migration installation, ensure that you have reliable backups of your data and any customized applications or volume groups. For instructions on how to create a system backup, see *Creating system backups*.

Use the following steps to use the server's built-in CD-ROM device to perform a migration installation of the base operating system. For information about preparing for the migration, see "Preinstallation tasks" on page 352.

Step 1. Boot from the AIX product CD

Before you begin: Ensure that you run the `pre_migration` command and that you are logged in as the root user. For more information about running the `pre_migration` command, see "Running the AIX `pre_migration` command" on page 354.

1. If they are not already on, turn on your attached devices.
2. Insert the *AIX Volume 1* CD into the CD-ROM device.
3. Verify that the boot list is set to boot from the CD-ROM device, by typing the following command:

```
# bootlist -m normal -o
```
4. Add the CD-ROM device to the boot list, if the CD-ROM device is not in the boot list. For example, to add the `cd0` device to the boot list to include both the CD-ROM device and the hard disk in the boot list, type the following command:

```
# bootlist -m normal -o cd0 hdisk0
```
5. Restart the server by typing the following command:

```
# shutdown -r
```
6. When the server beeps twice, press F5 on the keyboard (or 5 on a nongraphical terminal). If you have a graphics display, the keyboard icon is displayed when the beeps occur. If you have a nongraphical terminal (also called a tty terminal), the word keyboard is displayed when the beeps occur.

Note: If your server does not boot using the F5 key (or the 5 key on a nongraphical terminal), see your hardware documentation for information about how to start your server from an AIX product CD.

7. Select the server console by pressing F1 (or 1 on a nongraphical terminal), and then press Enter.
8. Select the English language for the BOS Installation menus by typing a 1 at the **Choice** field, and then press Enter. The Welcome to Base Operating System Installation and Maintenance menu opens.
9. Type 2 to select **2 Change/Show Installation Settings and Install** in the **Choice** field, and then press Enter.

```
                Welcome to Base Operating System
                Installation and Maintenance

Type the number of your choice and press Enter. Choice is indicated by >>>.

    1 Start Install Now with Default Settings
    2 Change/Show Installation Settings and Install
    3 Start Maintenance Mode for System Recovery

    88 Help ?
    99 Previous Menu
>>> Choice [1]: 2
```

Step 2. Verify migration installation settings and begin installation

1. Verify that migration is the method of installation. If migration is not already selected as the method of installation, select it now. Select the disk or disks that you want to install.

```

1 System Settings:
  Method of Installation.....Migration
  Disk Where You Want to Install....hdisk0

```

2. Select **Primary Language Environment Settings (AFTER Install)**.
3. Type 3, and then press Enter to select **More Options**. To use the Help menu to learn more about the options available during a migration installation, type 88, and then press Enter in the Installation Options menu. For more information about the installation options available in AIX 5.3, see BOS installation options.
4. Verify the selections in the Migration Installation Summary panel, and then press Enter.
5. When the Migration Confirmation menu is displayed, follow the menu instructions to list the server information, or continue with the migration by typing 0 and then pressing Enter.

```

Migration Confirmation

Either type 0 and press Enter to continue the installation, or type the
number of your choice and press Enter.

1 List the saved Base System configuration files which will not be
merged into the system. These files are saved in /tmp/bos.
2 List the filesets which will be removed and not replaced.
3 List directories which will have all current contents removed.
4 Reboot without migrating.

Acceptance of license agreements is required before using system.
You will be prompted to accept after the system reboots.

>>> 0 Continue with the migration.
88 Help ?

-----
WARNING: Selected files, directories, and filesets (installable options)
from the Base System will be removed. Choose 2 or 3 for more information.

>>> Choice[0]:

```

Step 3. Verify server configuration after installation

After the migration is complete, the server restarts. Verify the server configuration, as follows:

1. On servers with a graphics display, after a migration installation, the Configuration Assistant opens. On servers with a nongraphical display, after a migration installation, the Installation Assistant opens. For more information about the Configuration Assistant or the Installation Assistant, see Configuring AIX.
2. Select the **Accept Licenses** option to accept the electronic licenses for the operating system.
3. Verify the administrator (root user) password and network communications (TCP/IP) information. Use any other options at this time. You can return to the Configuration Assistant by typing configassist or the Installation Assistant or by typing smitty assist at the command line.
4. Select **Exit the Configuration Assistant** and select **Next**. Or, press F10 (or ESC+0) to exit the Installation Assistant.
5. If you are in the Configuration Assistant, select **Finish now, and do not start Configuration Assistant when restarting AIX** and select **Finish**.
6. When the login prompt is displayed, log in as the root user to perform system administration tasks.
7. Run the **post_migration** command, which is located in the /user/lpp/bos directory on your server.
8. Verify the output files, which are saved in the /home/post_migration.date directory.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Related information



Creating system backups

(http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/create_sys_backup.htm)



Migrating AIX

(http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/bos_migration_installation.htm)



Configuring AIX

(http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/bos_configuration.htm)



BOS installation options

(http://publib.boulder.ibm.com/infocenter/pseries/v5r3/topic/com.ibm.aix.install/doc/insgdrf/bos_install_more_options.htm)

Backing up AIX to a CD

Ensuring you have a current backup of your operating system is essential to ensure a smooth upgrade. Learn how to back up your current environment and then restore it on your new server.

This procedure provides information about how to back up the AIX operating system to a CD. This procedure assumes that your server might not have a CD-R or CD-RW drive. If your server does not have a CD-R or CD-RW drive, you can back up AIX to a file, and then FTP the AIX backup file to a server that does have a CD-R or CD-RW drive.

This procedure involves performing the following tasks:

1. Backing up AIX to an ISO image file
2. Transferring the ISO image to another server
3. Burning the ISO image to a CD

The following steps show you how to back up the AIX operating system to a CD.

1. Log in to the server as the root user.
2. Verify your running server.
3. Check the firmware code level from AIX, and update the firmware, if necessary.
4. Use the **errpt** command to generate an error report from entries in the system error log. To display a complete detailed report, type the following command:

```
# errpt -a
```

Note: There must be adequate disk space and memory available. For additional release information, see the *AIX 5L Release Notes*.

5. Run the **smitty mkcd** command as follows

```
# smitty mkcd
```
6. Select **No** from the **Use an existing mksysb image** menu. Selecting **No** allows you to create a new system backup that reflects your current running environment.
7. Select the options that are appropriate to your environment from the **Back Up This System to CD** menu. You can also leave the default options as they are.
8. Select **Yes** for the **Do you want the CD to be bootable** option.

9. Select **No** for the **Remove final images after creating CD** option.
10. Select **No** for the **Create the CD now** option.
11. Press Enter to begin the system backup creation when you finish making selections. When the operation completes successfully, there is a file or files located in the /mkcd/cd_images directory.
12. Transfer the ISO backup image to a server that has a CD-R or CD-RW device.
13. Create a bootable CD from the ISO backup image using the CD-burning software available in your environment.

Restoring an AIX system backup from a CD

In this procedure, you restore an AIX system backup, also called a mksysb, on a logical partition using the logical partition's CD-ROM device.

This procedure assumes that there is a Hardware Management Console (HMC) attached to the managed server.

Note: Ensure that you follow the sequence of steps for the installation method that you choose. Within each procedure, some steps are completed in AIX and some steps are completed using the HMC interface.

Prerequisites

Before you begin this procedure, ensure that you have already used the HMC to create an AIX logical partition and partition profile with the information from "Saving your existing partition profiles from a Hardware Management Console" on page 355. Ensure that the AIX logical partition has the following resources assigned:

- A device adapter attached to the DVD or CD-ROM drive
- A network adapter
- A hard disk with the minimum amount of space needed for AIX

Set the boot mode for this partition to be **Normal** mode. After you have successfully created the logical partition and partition profile, leave the logical partition in the *Ready* state.

Step 1. Activate and install the partition (performed in the HMC interface)

1. Insert the AIX system backup CD into the CD device of the AIX logical partition.
2. Right-click the partition to open the menu.
3. Click **Activate**. The **Activate Partition** menu opens with a selection of partition profiles. Ensure that the correct profile is highlighted.
4. Click **Open a terminal window or console session** from the menu to open a virtual terminal (vterm) window.
5. Click **Advanced** to open the **Advanced options** menu.
6. Click **SMS** for the Boot mode.
7. Click **OK** to close the **Advanced options** menu.
8. Click **OK** again. A vterm window opens for the partition.

Step 2. Select the boot device

Note: The default password for the administrator is admin.

In the SMS menu on the vterm window, complete the following steps:

1. Press the 5 key, and then press Enter to select **5. Select Boot Options**.

```

Firmware
-----
Main Menu

1. Select Language
2. Setup Remote IPL (Initial Program Load)
3. Change SCSI Settings
4. Select Console
5. Select Boot Options

-----
Navigation Keys:

          X = eXit System Management Services

-----
Type the number of the menu item and press Enter or select Navigation Key: 5

```

2. Press the 2 key, and then press Enter to select **2. Select Boot Devices**.
3. Press the 1 key, and then press Enter to select **1. Select 1st Boot Device**.
4. Press the 3 key, and then press Enter to select **3. CD/DVD**.
5. Select the media type that corresponds to the CD-ROM device, and then press Enter.
6. Select the device number that corresponds to the CD-ROM device, and then press Enter.
7. Set the boot sequence to configure the first boot device. The CD-ROM device is now the first device in the Current Boot Sequence list.
8. Press the x key to exit the SMS menu and confirm that you want to exit SMS.

Step 3. Restore the AIX system backup

Install the AIX system backup, as follows:

Note: As you exit the SMS menus, the AIX base operating system (BOS) installation environment loads. It might take a few minutes for the boot image to load before the BOS Installation menus are displayed.

1. Define the System Console, and then press Enter.
2. Select the language for the Base Operating System (BOS) Installation menus, and then press Enter to open the **Welcome to Base Operating System Installation and Maintenance** menu.
3. Type 1 to select **Start Install Now with Default Settings** in the **Choice** field, and then press Enter.

```

Welcome to Base Operating System
      Installation and Maintenance

Type the number of your choice and press Enter. Choice is indicated by >>>.

  1 Start Install Now with Default Settings
  2 Change/Show Installation Settings and Install
  3 Start Maintenance Mode for System Recovery

 88 Help ?
 99 Previous Menu
>>> Choice [1]: 1

```

4. Verify that the selections are correct in the **Installation Summary** menu.

System Backup Installation Summary

```
Disks: hdisk0
Use Physical Location Maps: No
Shrink File System: No
Import User Volume Groups: Yes
Recover Devices: No

>>> 1 Continue with Install

88 Help ?
99 Previous Menu

>>> Choice [1]: 1
```

5. Type 1 in the **Choice** field, and then press Enter to confirm the installation options and begin the installation. If the AIX system backup spans multiple CDs, the BOS installation program prompts you to switch to the next volume, and then press Enter. Repeat as many times as necessary until all the system backup volumes have been processed.

The server automatically restarts after installation is complete.

Step 4. Log into AIX

When AIX has been successfully restored, the login prompt is displayed. Complete the following steps:

1. Log into AIX using your user name and password.
2. Run the `errpt` command to verify that there are no errors on the server, as follows:

```
# errpt -a | pg
```

You are now finished restoring the AIX system backup. AIX is now ready for further configuration.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Testing your server

Understand how to ensure that your new system is running correctly.

Test your server as you have previously specified in your planning phase. After you finish testing, track and report any problems that arose to the appropriate people. You also need to develop a readiness report. After you have completed a readiness report, finish returning your server to production.

Related concepts

“Upgrade checklist” on page 346

Use this checklist as a guide to complete your upgrade. The checklist contains a list of tasks for upgrading your server and also lists who is responsible for each task.

Appendix. Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

The following list includes the major accessibility features:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are tactilely discernible and do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

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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 respecte 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:
IBM Technical Regulations
Pascalstr. 100, Stuttgart, Germany 70569
Tele: 0049 (0)711 785 1176
Fax: 0049 (0)711 785 1283
E-mail: tjahn@de.ibm.com

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、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス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。

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

This product is a Class A Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

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

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

Germany Compliance Statement

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

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

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

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

"Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 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 Konformitätserklärung nach des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.

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.
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

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