Power Systems

PCI adapters for the 8233-E8B or 8236-E8C

IBM

Power Systems

*PCI adapters for the
8233-E8B or 8236-E8C*

IBM

> **Note**
>
> Before using this information and the product it supports, read the information in "Safety notices" on page vii, "Notices" on page 227, the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125–5823.

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Safety notices

Safety notices may be printed throughout this guide:

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

World Trade safety information

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

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

German safety information

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

Laser safety information

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

Laser compliance

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

DANGER

> **When working on or around the system, observe the following precautions:**
>
> **Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:**
> - Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
> - Do not open or service any power supply assembly.
> - Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
> - The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
> - Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
> - Connect any equipment that will be attached to this product to properly wired outlets.
> - When possible, use one hand only to connect or disconnect signal cables.
> - Never turn on any equipment when there is evidence of fire, water, or structural damage.
> - Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
> - Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.
>
>   **To Disconnect:**
>   1. Turn off everything (unless instructed otherwise).
>   2. Remove the power cords from the outlets.
>   3. Remove the signal cables from the connectors.
>   4. Remove all cables from the devices.
>
>   **To Connect:**
>   1. Turn off everything (unless instructed otherwise).
>   2. Attach all cables to the devices.
>   3. Attach the signal cables to the connectors.
>   4. Attach the power cords to the outlets.
>   5. Turn on the devices.
>
>   **(D005)**

DANGER

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

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

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

CAUTION

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

(R001)

CAUTION:

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

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

(R002)

(L001)

(L002)

(L003)
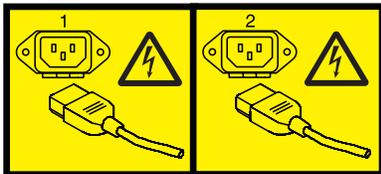
or

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

CAUTION:
This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:
- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

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

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

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

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

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

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

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

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

The equipment is suitable for installation in the following:
- Network telecommunications facilities
- Locations where the NEC (National Electrical Code) applies

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

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

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

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

Installing, removing, and replacing PCI adapters

Learn about installing, removing, and replacing Peripheral Component Interconnect (PCI), PCI-X, and PCI Express (PCIe) adapters.

Model 8233-E8B and 8236-E8C PCI adapters

You can remove, replace, or install PCI adapters in the 8233-E8B and 8236-E8C servers.

If you are installing a new adapter, you will also need to refer to PCI adapter placement for slot placement information.

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:

- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).
- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmcl/home.html).

Installing PCI adapters in the 8233-E8B and 8236-E8C servers

Learn about installing PCI, PCI-X, or PCIe adapters in the 8233-E8B and 8236-E8C servers.

Installing a PCI adapter in an 8233-E8B or 8236-E8C system with the power off

You can install a PCI adapter with the system power off.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you are installing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID Controller (FC 5739 or 5778, CCIN 571F and 575B), remove the lower, right standoff from between the two sides of the adapter before installing it in the system unit. See Figure 125 on page 169.

If you do not have an HMC, complete this procedure to install a PCI adapter with the system power off:

1. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
2. Determine in which slot to place the PCI adapter. For system-specific adapter placement information, see the PCI adapter placement.
3. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
4. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
5. Disconnect the power source from the system by unplugging the system.
6. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.

1

7. If necessary, remove the adapter from the antistatic package.

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

8. Place the adapter, component-side up, on a flat, antistatic surface.

9. Some PCI adapters 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.

10. Slide the adapter latch **(A)** into the open position, as shown in the following figure.

Figure 1. PCI adapter or filler plate removed from the rack-mounted system unit

11. If necessary, remove the adapter expansion slot filler.

12. Ensure that the slot is empty. If you are installing a double-wide adapter, remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.

13. Carefully grasp the adapter **(A)** by its top edge, and align the adapter with the expansion slot and its connector on the system backplane. See the following figure.

14. Press the adapter firmly into its connector.

15. Slide the adapter latch **(B)** back into place as shown in the following figure.
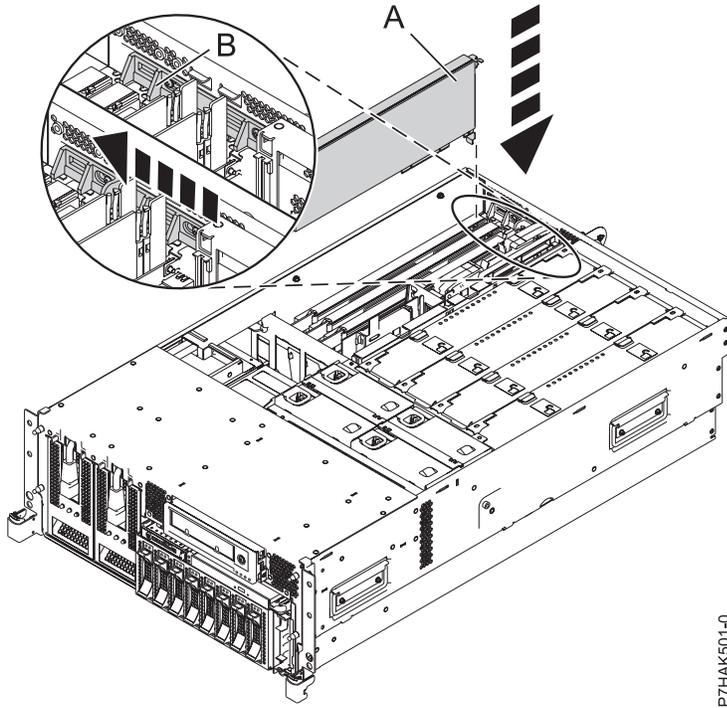
Figure 2. PCI adapter replaced in the rack-mounted system unit

16. Connect any adapter cables.
17. If you are servicing a rack-mounted system, route the cables through the cable-management arm.
18. Replace or close the service access cover and, if applicable, return the system to the operating position.
19. Reconnect the power source to the system.
20. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.
21. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter in the 8233-E8B and 8236-E8C server, with the power on in an AIX environment

You can install a PCI adapter with the system power on in an AIX® environment.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you are installing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID Controller (FC 5739 or 5778, CCIN 571F and 575B), remove the lower, right standoff from between the two sides of the adapter before installing it in the system unit. See Figure 125 on page 169.

If you do not have an HMC, complete the following steps to install a PCI adapter with the system power on in the AIX environment:

1. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
2. Determine in which slot to place the PCI adapter. For system-specific adapter placement information, see the PCI adapter placement.
3. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
4. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
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 connectors on the adapter.
7. Place the adapter, component-side up, on a flat, antistatic surface.
8. Some PCI adapters 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. If you are installing a double-wide adapter, remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.
10. Refer to "PCI hot-plug manager access for AIX" on page 162, and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
11. 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.
12. Select the appropriate empty PCI slot from the ones listed on the screen, and press Enter.
13. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
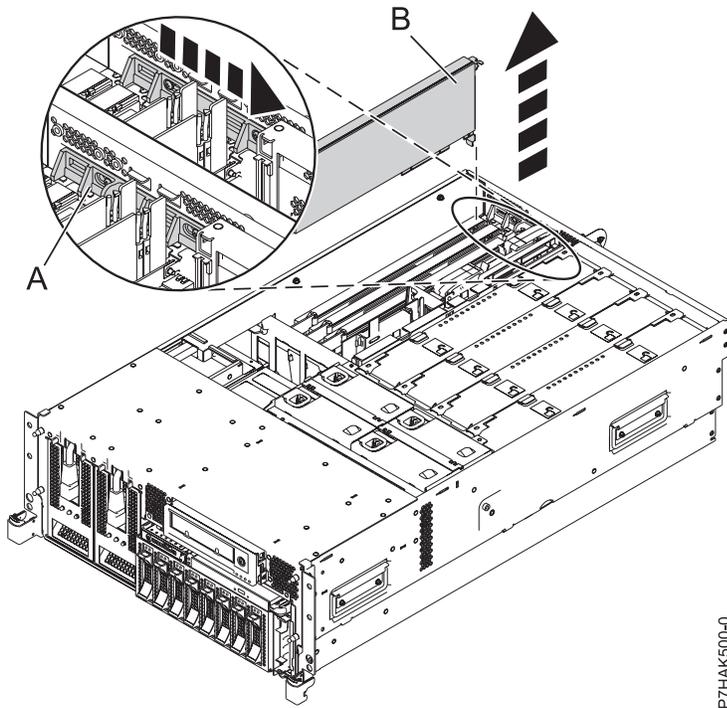
Figure 3. PCI adapter or filler plate removed from the rack-mounted system unit

14. Remove the adapter filler plate if one is present.
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 164.
16. When you are instructed to install the adapter in the adapter slot, carefully grasp the adapter by the edges and align the adapter **(A)** 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. Slide the adapter latch **(B)** back into place as shown in the following figure.
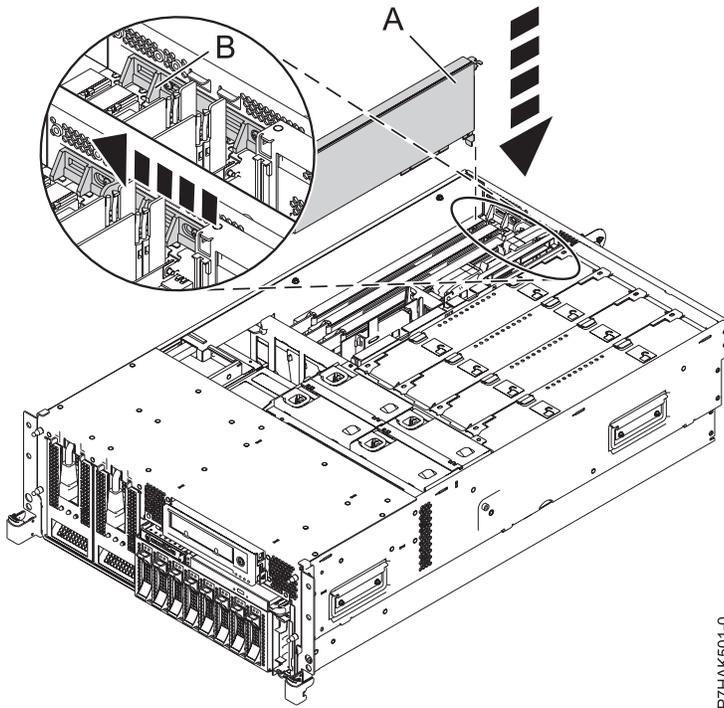
Figure 4. PCI adapter replaced in the rack-mounted system unit

19. Connect any adapter cables.
20. Replace or close the service access cover and, if applicable, return the system to the operating position.
21. Enter `cfgmgr` to configure the adapter.
22. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter in the 8233-E8B server, with the power on in an IBM i environment

You can install a PCI adapter in the IBM i environment.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you are installing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID Controller (FC 5739 or 5778, CCIN 571F and 575B), remove the lower, right standoff from between the two sides of the adapter before installing it in the system unit. See Figure 125 on page 169.

Important:
- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system.

In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

Note:
– Both PCI slots must be powered off when installing or removing this adapter with the system power on.
– If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.
- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

Note:
– Both PCI slots must be powered off when installing or removing this adapter with the system power on.
– If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.
- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166
- 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.

If you do not have an HMC, complete the following steps to install a PCI adapter with the system power on in the IBM i environment:
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Determine in which slot to place the PCI adapter. For system-specific adapter placement information, see the PCI adapter placement.
4. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
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 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. If you are installing a double-wide adapter, remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.

10. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:

    a. Type **strsst** on the command line of the Main Menu and press Enter.

    b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.

    c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.

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

    e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.

    f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.

    g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.

    h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.

    i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.

    j. Select **Toggle LED blink off/on** to stop the blinking LED.

    k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.

11. Slide the adapter latch **(A)** into the open position, as shown in the following figure.

Figure 5. PCI adapter or filler plate removed from the rack-mounted system unit

12. Ensure that the slot is empty. Remove the adapter filler plate if one is present.
13. Carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
14. Press the adapter firmly into its connector.
15. Slide the adapter latch **(B)** back into place as shown in the following figure.
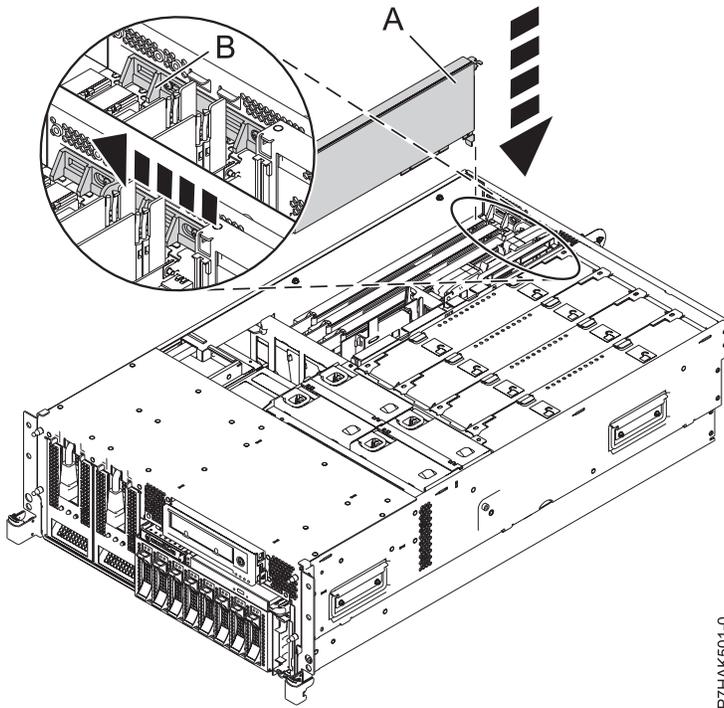
Figure 6. PCI adapter replaced in the rack-mounted system unit

16. Connect any adapter cables.
17. From the Hardware Resource Concurrent Maintenance display, complete the following steps:
    a. Select **Power on domain** and press Enter.
    b. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.
    c. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:

       `Power on complete`
18. Replace or close the service access cover and, if applicable, return the system to the operating position.
19. Verify the installed part.
    • If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    • If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter in the 8233-E8B and 8236-E8C system, with the power on in a Linux environment

You can install a PCI adapter with the system power on in the Linux environment.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you are installing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID Controller (FC 5739 or 5778, CCIN 571F and 575B), remove the lower, right standoff from between the two sides of the adapter before installing it in the system unit. See Figure 125 on page 169.

If you do not have an HMC, complete the following steps to install a PCI adapter with the system power on in the Linux environment:

1. Ensure that the system meets the "Prerequisites for hot-plugging PCI adapters in Linux" on page 165.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. "Verifying that the hot-plug PCI tools are installed for Linux" on page 165.
4. Determine in which slot to place the PCI adapter. For system-specific adapter placement information, see the PCI adapter placement.
5. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
6. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
    a. Open the front rack door.
    b. Place the system unit in the service position.
    c. Remove or open the service access cover.
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 connectors on the adapter.
9. Place the adapter, component-side up, on a flat, antistatic surface.
10. If you are installing a double-wide adapter, remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.
11. Log in to the system console as the root user.
12. Run the lsslot tool to list the hot-plug PCI slots that are available in the system 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.
13. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
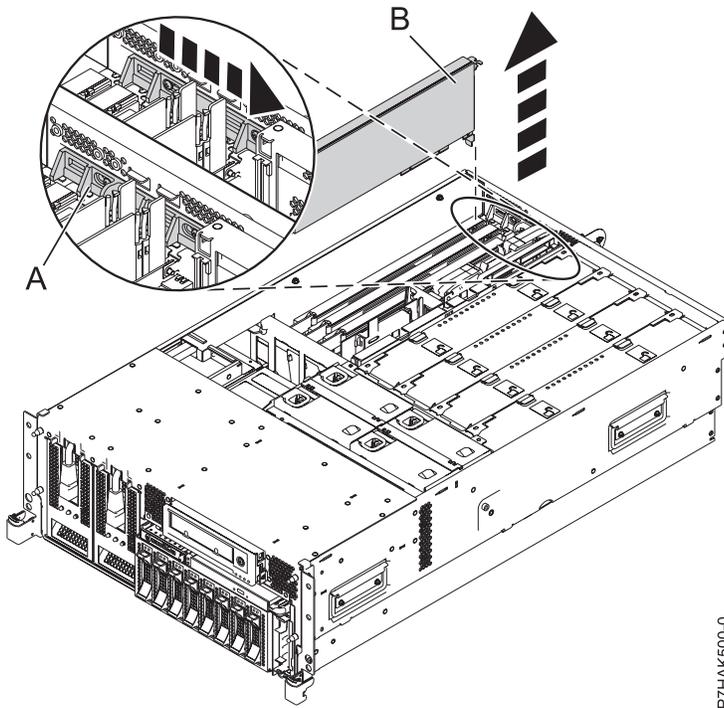
Figure 7. PCI adapter or filler plate removed from the rack-mounted system unit

14. Ensure that the slot is empty. Remove the adapter filler plate if one is present.

15. Run the **drmgr** 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:

    ```
    drmgr -c pci -r -s locationcode
    ```

    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 **(A)** 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.

19. Slide the adapter latch **(B)** back into place as shown in the following figure.
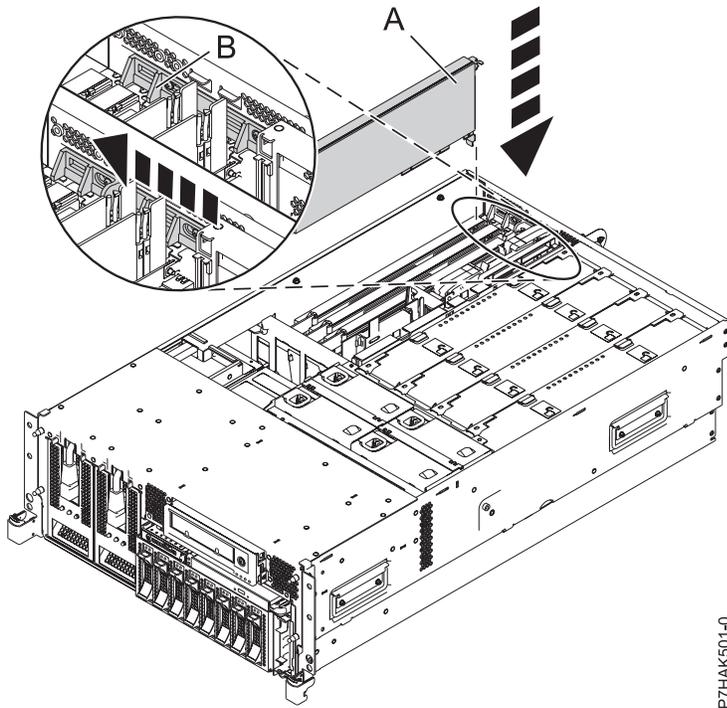
Figure 8. PCI adapter replaced in the rack-mounted system unit

20. Connect any adapter cables.
21. 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
    ```
22. If you are servicing a rack-mounted system, route the cables through the cable-management arm.
23. Replace or close the service access cover and, if applicable, return the system to the operating position.

Removing a PCI adapter from an 8233-E8B or 8236-E8C server

You can remove a PCI adapter.

Important:
* Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166
* 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.

Removing a PCI adapter from the 8233-E8B and 8236-E8C server with the power off

You can remove a PCI adapter with the system power off.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power off:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are removing a failing PCI adapter, see "Identifying a part" on page 180. If you are removing the PCI adapter for other reasons, continue to the next step.
4. Stop the system or logical partition.
5. Disconnect the power source from the system by unplugging the system.
6. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
7. Determine which adapter you plan to remove, then label and disconnect all cables attached to that adapter.
8. Record the slot number and location of each adapter being removed.

   Note: Adapter slots are numbered on the rear of the system.
9. Slide the adapter latch **(A)** into the open position, as shown in the following figure.

Figure 9. PCI adapter or filler plate removed from the rack-mounted system unit

10. Carefully grasp the PCI adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.

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. If you plan to install another adapter into the vacated slot, go to "Replacing a PCI adapter in the 8233-E8B and 8236-E8C server with the power off" on page 22; otherwise, continue with the next step.

13. Seal the expansion slot using an expansion-slot cover.

14. Replace or close the service access cover and, if applicable, return the system to the operating position.

15. Reconnect the power source to the system.

16. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.

17. To replace the PCI adapter, see "Replacing a PCI adapter in the 8233-E8B or 8236-E8C server" on page 22.

Removing a PCI adapter from the 8233-E8B and 8236-E8C server, with the power on in the AIX environment

You can remove a PCI adapter with the system power on in the AIX environment.

To remove a failing adapter and replace it with the same adapter, see "Removing and replacing a PCI adapter in the 8233-E8B and 8236-E8C server, with the power on in the AIX environment" on page 23. If the adapter that is removed will be placed into a different slot or system, complete this removal procedure, and then install the adapter as described in "Installing a PCI adapter in the 8233-E8B and 8236-E8C server, with the power on in an AIX environment" on page 3.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

Note: Procedures performed on a PCI adapter with the system power on in the AIX environment, also known as hot-plug procedures, require the system administrator to take the PCI adapter offline before 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.

If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power on in the AIX environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are removing a failing PCIe adapter, identify the failing part. For instructions, see "Identifying a part" on page 180. If you are removing the PCI adapter for other reasons, continue to the next step.
4. If you are removing a failing PCI adapter, see Identifying a failing part. If you are removing the PCI adapter for other reasons, continue to the next step.
5. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
6. Determine which adapters you plan to remove.
7. Record the slot number and location of each adapter being removed. Adapter slots are numbered on the rear of the system unit.
8. Ensure that any processes or applications that might use the adapter are stopped.
9. Follow these steps to remove a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:
   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.
10. Label, and then disconnect all cables attached to the adapter you plan to remove.

11. Slide the adapter latch **(A)** into the open position, as shown in the following figure.

Figure 10. PCI adapter or filler plate removed from the rack-mounted system unit

12. Carefully grasp the PCI adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.
13. If you plan to install another adapter into the vacated slot, go to "Installing a PCI adapter in the 8233-E8B and 8236-E8C server, with the power on in an AIX environment" on page 3; otherwise, continue with the next step.
14. Seal the expansion slot using an expansion-slot cover.
15. Lower the plastic retainer seat over the PCI adapter faceplate.
16. Rotate the locking latch clockwise until it clicks into the locked position.
17. 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.
18. 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 10 on page 16.

    If you do not have other adapters to remove, continue with the next step.
19. Press F10 to exit the Hot-Plug Manager.
20. Run the `diag -a` command. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.
21. Replace or close the service access cover and, if applicable, return the system to the operating position.
22. To replace the PCI adapter, see "Replacing a PCI adapter in the 8233-E8B or 8236-E8C server" on page 22.

Removing a PCI adapter in the 8233-E8B system, with the power on in the IBM i environment

You can remove a PCI adapter with the system power on in the IBM i environment.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

Important:

- If the adapter is the load source I/O adapter (IOA) or the load source I/O processor (IOP), or any other storage IOA or IOP with critical disk storage attached for the system or partition, follow the on-screen instructions when you use HSM to power down the IOP or IOA. Instructions to use functions 68 and 69 on the control panel will be included.
- If the adapter is the console IOA or the console IOP for the system or partition, you must perform the maintenance from an IBM i operating system session connected through a different IOA or IOP, or you must power down the partition to perform maintenance.
- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:

  – Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  – If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:

  – Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  – If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166
- 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.

If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Select from the following options:
   - If you are removing a failing PCI adapter, continue with step 4
   - If you are removing the PCI adapter for other reasons, continue with step 5.
4. Use the service indicator light-emitting diodes (LEDs) to help identify the part. For instructions, see "Identifying a part" on page 180.
5. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
6. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:
   a. Type **strsst** on the command line of the Main Menu and press Enter.
   b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
   c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
   d. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
   e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.
   f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.
   g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.
   h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.
   i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.
   j. Select **Toggle LED blink off/on** to stop the blinking LED.
   k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.
7. Label and then disconnect all cables attached to the adapter you plan to remove.
8. Record the slot number and location of each adapter being removed.

   Note: Adapter slots are numbered on the rear of the system.
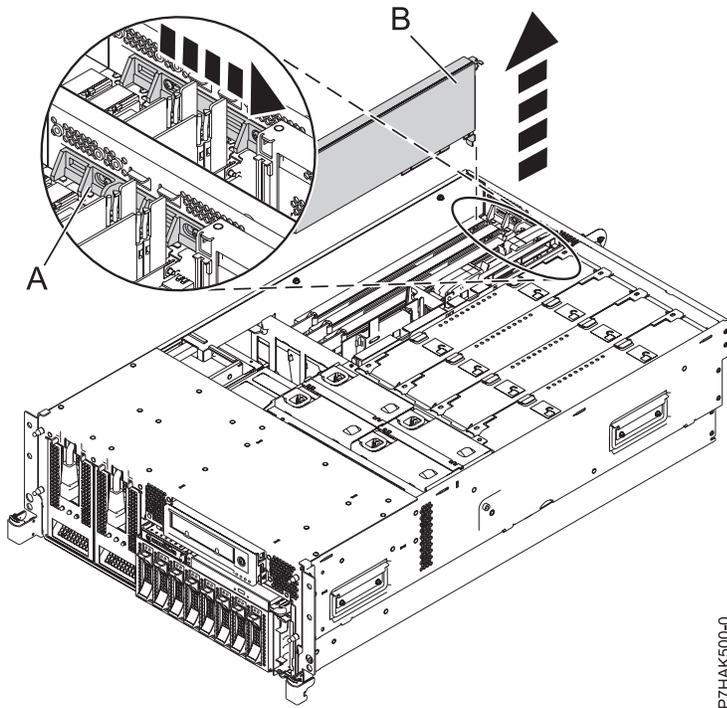9. Slide the adapter latch **(A)** into the open position, as shown in the following figure.

Figure 11. PCI adapter or filler plate removed from the rack-mounted system unit

10. Carefully grasp the PCI adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.

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. If you plan to install another adapter into the vacated slot, go to "Installing a PCI adapter in the 8233-E8B server, with the power on in an IBM i environment" on page 6; otherwise, continue with the next step.

13. Seal the expansion slot using an expansion-slot cover.

14. Replace or close the service access cover and, if applicable, return the system to the operating position.

15. To replace the PCI adapter, see "Replacing a PCI adapter in the 8233-E8B or 8236-E8C server" on page 22.

Removing a PCI adapter from the 8233-E8B and 8236-E8C system, with the power on in the Linux environment

You can remove a PCI adapter with the system power on in theLinux environment.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power on in the Linux environment:

1. Ensure that the system meets the "Prerequisites for hot-plugging PCI adapters in Linux" on page 165.

2. "Verifying that the hot-plug PCI tools are installed for Linux" on page 165.

3. Complete the prerequisite tasks that are described in "Before you begin" on page 175.

4. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.

5. If you are removing a failing PCIe adapter, identify the failing part. For instructions, see "Identifying a part" on page 180. If you are removing the PCI adapter for other reasons, continue to the next step.

6. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.

   a. Open the front rack door.

   b. Place the system unit in the service position.

   c. Remove or open the service access cover.

7. Determine which adapter you plan to remove, then label and disconnect all cables attached to that adapter.

8. Record the slot number and location of each adapter being removed.

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

9. 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 that the file systems on those devices are unmounted.

10. Run the **drmgr** 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:

    `drmgr -c pci -r -s locationcode`

    Follow the instructions on the display to complete the task.

11. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
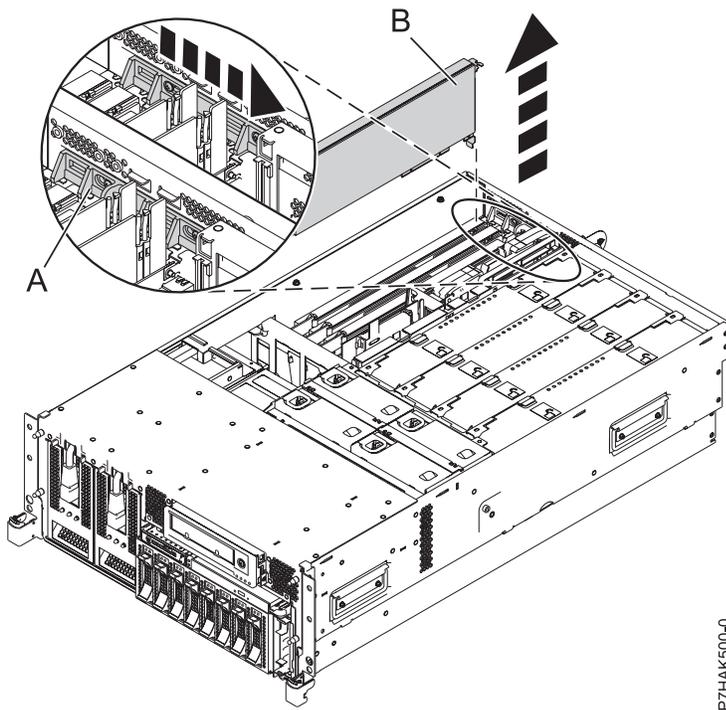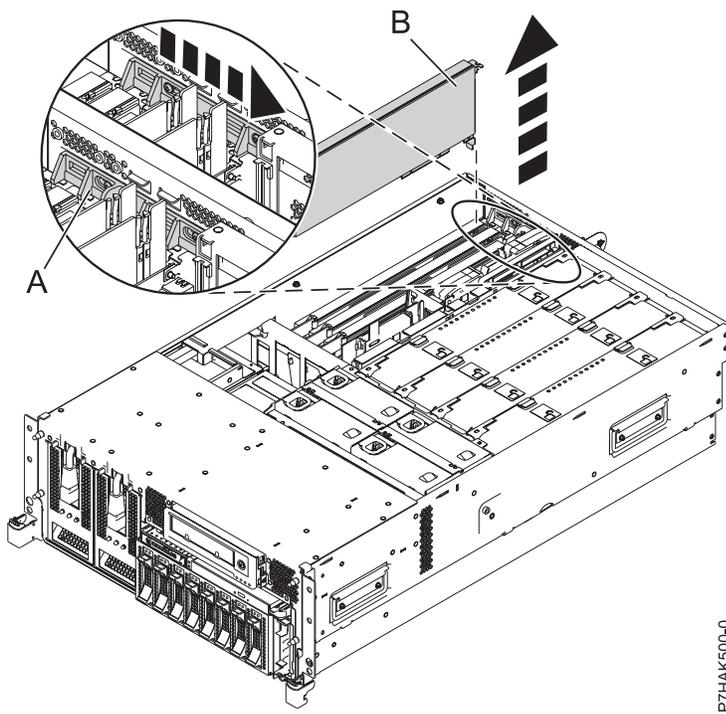

Figure 12. PCI adapter or filler plate removed from the rack-mounted system unit

12. Carefully grasp the PCI adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.
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. If you plan to install another adapter into the vacated slot, go to "Replacing a PCI adapter in the 8233-E8B and 8236-E8C system with the power on in the Linux environment" on page 29; otherwise, continue with the next step.
15. Seal the expansion slot using an expansion-slot cover.
16. Replace or close the service access cover and, if applicable, return the system to the operating position.

Replacing a PCI adapter in the 8233-E8B or 8236-E8C server

You can replace a PCI adapter.

Replacing a PCI adapter in the 8233-E8B and 8236-E8C server with the power off

You can replace a PCI adapter with the system power off.

You must have already completed the procedure "Removing a PCI adapter from the 8233-E8B and 8236-E8C server with the power off" on page 14 in order to have the slot powered off.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power off:
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If necessary, remove the adapter from the antistatic package.

   Attention: Avoid touching the components and gold connectors on the adapter.
4. Place the adapter, component-side up, on a flat, static-protective surface.
5. Carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
6. Press the adapter **(A)** 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.
7. Slide the adapter latch **(B)** back into place as shown in the following figure.
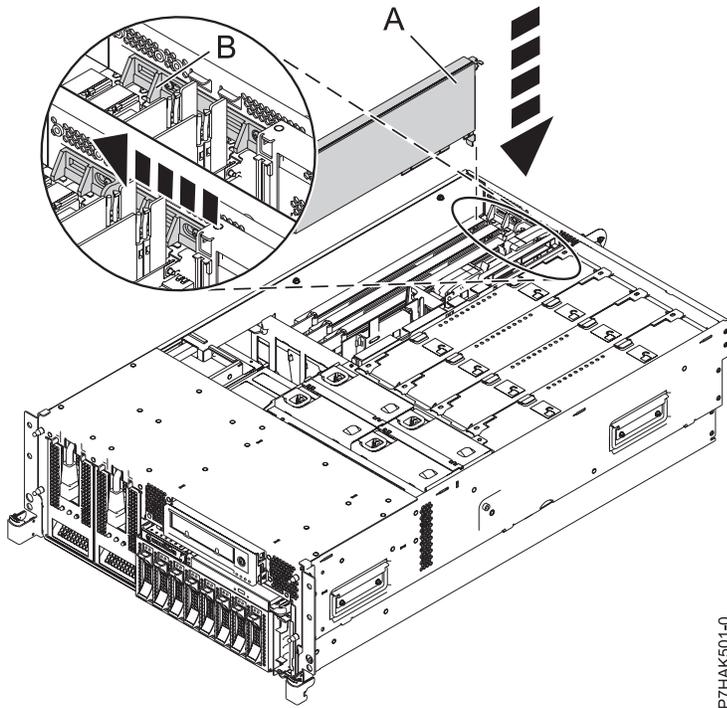
Figure 13. PCI adapter replaced in the rack-mounted system unit

8. Connect the adapter cables.

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

10. Replace or close the service access cover and, if applicable, return the system to the operating position.

11. Reconnect the power source to the system.

12. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.

13. Verify the installed part.

   - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.

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

Removing and replacing a PCI adapter in the 8233-E8B and 8236-E8C server, with the power on in the AIX environment

You can replace a PCI adapter with the system power on in the AIX environment.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

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

Notes:

- Use this procedure if you intend to remove a failing PCI adapter and replace it with the same type of adapter.

- If you plan to remove a failing adapter and leave the slot empty, see "Removing a PCI adapter from the 8233-E8B and 8236-E8C server, with the power on in the AIX environment" on page 15.

- This procedure should not be used to remove an existing adapter and install a different type of adapter. To install a different adapter, remove the existing adapter as described in "Removing a PCI adapter from the 8233-E8B and 8236-E8C server, with the power on in the AIX environment" on page 15, then install the new adapter as described in "Installing a PCI adapter in the 8233-E8B and 8236-E8C server, with the power on in an AIX environment" on page 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 before 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.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power on in the AIX environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are removing a failing PCIe adapter, identify the failing part. For instructions, see "Identifying a part" on page 180. If you are removing the PCI adapter for other reasons, continue to the next step.
4. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
5. Follow these steps to replace a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:
   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 YES 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 F3 (or Esc +3) 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 **Replace**. 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.
6. Label, and then disconnect all cables attached to the adapter you plan to remove.
7. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
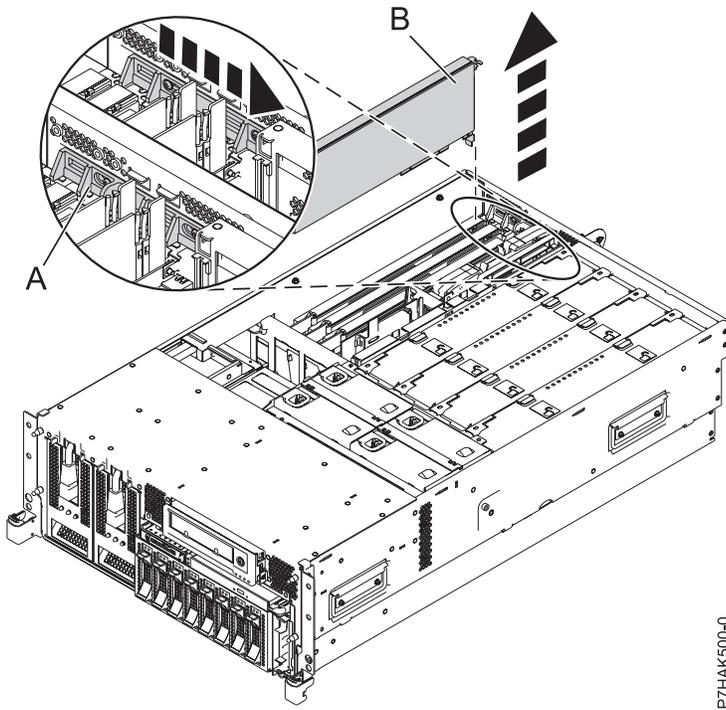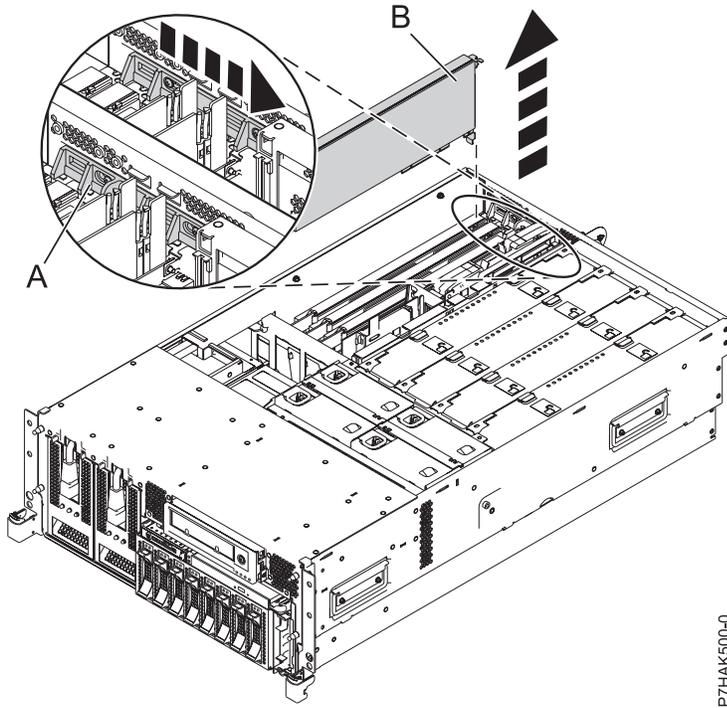
Figure 14. PCI adapter or filler plate removed from the rack-mounted system unit

8. Carefully grasp the PCI adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.

9. If necessary, remove the replacement adapter from the antistatic package.

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

10. Carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.

11. Press the adapter **(A)** firmly into its connector. See the following figure.

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

12. Slide the adapter latch **(B)** back into place as shown in the following figure.
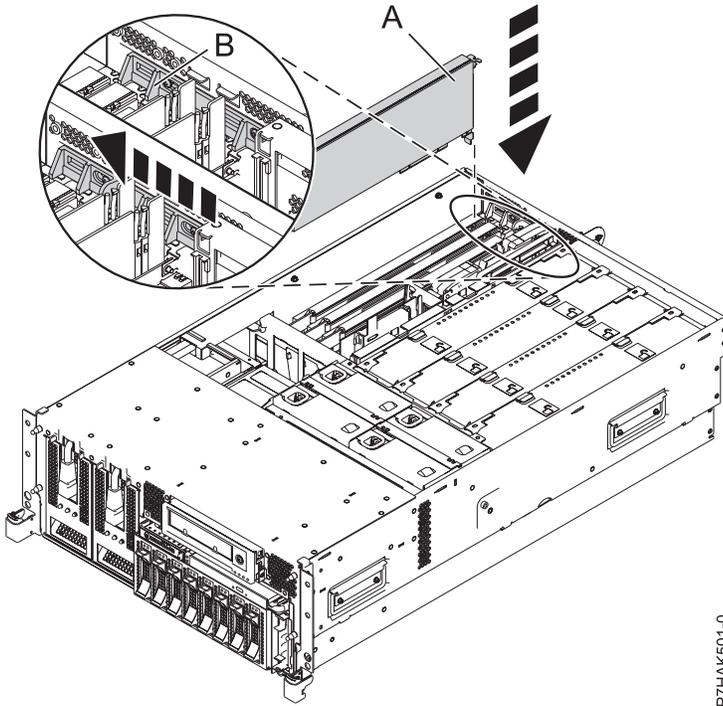
Figure 15. PCI adapter replaced in the rack-mounted system unit

13. Connect the adapter cables.

14. Press enter and continue to follow the instructions in the system diagnostics until you receive a message that the replacement is successful. Successful replacement is indicated by the OK message displayed next to the **Command** field at the top of the menu.

15. Press the F3 (or Esc+3) key to return to the **PCI Hot-Plug Manager** menu.

16. Press the F3 (or Esc+3) key to return to the **TASK** selection list.

17. Select **Log Repair Action**.

18. Select the resource just replaced, press Enter, press Commit (F7 or ESC 7), then press Enter.

19. Press F3 (or Esc+3) to return to **TASK Selection List**.

20. Select **Hot Plug Task**, press enter.

21. Select **PCI Hot Plug Manager**, then select **Configure a defined device**, then press Enter.

22. Select the device just replaced from the list, then press Enter. The device is now configured.

23. Press the F10 key to exit the diagnostic program.

    Note: If you are running the stand-alone diagnostics, do not exit the program completely.

24. Verify the PCI adapter by using the following instructions:

    a. Did you replace the adapter with the system power on?
       - Yes - Go to the next step.
       - No - Load the diagnostic program by doing the following:
         – If AIX is available, boot AIX, log in as root or CELOGIN, then enter the **diag** command.
         – If AIX is not available, boot the stand-alone diagnostics

    b. Type the **diag** command if you are not already displaying the diagnostic menus

    c. Select **Advance Diagnostic Routines**, then select **Problem Determination**.

    d. Select the name of the resource just replaced from the menu. If the resource just replaced is not shown, choose the resource associated with it. Press Enter, then press **Commit** ((F7 or Esc+7)).

e. Did the Problem Determination identify any problems?
- No: Continue to the next step.
- Yes: A problem is identified
  - If you are a customer, record the error information, then contact your service provider.
  - If you are an authorized service provider, return to map 210-5.

25. Press the F10 key to exit the diagnostic program.
26. Replace or close the service access cover and, if applicable, return the system to the operating position.
27. Verify the installed part.
- If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
- If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Replacing a PCI adapter in the 8233-E8B server, with the power on in the IBM i environment

You can replace a PCI adapter with the system power on in the IBM i environment.

Attention: You must have already completed the procedure "Removing a PCI adapter in the 8233-E8B system, with the power on in the IBM i environment" on page 17 in order to have the slot powered off.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

Important:
- If the adapter is the load source I/O adapter (IOA) or the load source I/O processor (IOP), or any other storage IOA or IOP with critical disk storage attached for the system or partition, follow the on-screen instructions when you use HSM to power down the IOP or IOA. Instructions to use functions 68 and 69 on the control panel will be included.
- If the adapter is the console IOA or the console IOP for the system or partition, you must perform the maintenance from an IBM i operating system session connected through a different IOA or IOP, or you must power down the partition to perform maintenance.
- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.
- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

Note:

- – Both PCI slots must be powered off when installing or removing this adapter with the system power on.
- – If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166
- 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.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If necessary, remove the adapter from the antistatic package.

   Attention: Avoid touching the components and gold connectors on the adapter.
4. Carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
5. Press the adapter **(A)** 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.
6. Slide the adapter latch **(B)** back into place as shown in the following figure.

Figure 16. PCI adapter replaced in the rack-mounted system unit

7. Connect the adapter cables.
8. From the Hardware Resource Concurrent Maintenance display, complete the following steps:
   a. Select **Power on domain** and press Enter.
   b. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.
   c. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:

   `Power on complete`
9. Replace or close the service access cover and, if applicable, return the system to the operating position.
10. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Replacing a PCI adapter in the 8233-E8B and 8236-E8C system with the power on in the Linux environment

You can replace a PCI adapter with the system power on in the Linux environment.

You must have already completed the procedure "Removing a PCI adapter from the 8233-E8B and 8236-E8C system, with the power on in the Linux environment" on page 20.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power on in the Linux environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If necessary, remove the adapter from the antistatic package.

   Attention: Avoid touching the components and gold connectors on the adapter.
4. Place the adapter, component-side up, on a flat, static-protective surface.
5. Run the **drmgr** command to enable an adapter to be replaced:

   For example, to replace the PCI adapter in slot U7879.001.DQD014E-P1-C3 run this command:

   ```
   drmgr -c pci -r -s locationcode
   ```

   Follow the instructions on the display to complete the task.
6. 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.
7. Carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
8. Press the adapter **(A)** 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.
9. Slide the adapter latch **(B)** back into place as shown in the following figure.
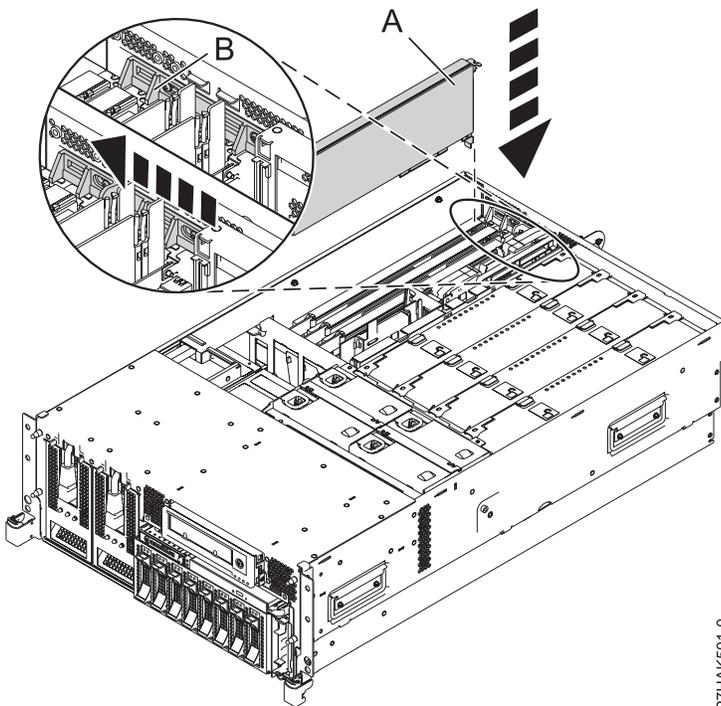
Figure 17. PCI adapter replaced in the rack-mounted system unit

10. Connect the adapter cables.
11. 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
```

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

13. Replace or close the service access cover and, if applicable, return the system to the operating position.

14. Verify the installed part.

   - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.

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

Model 8233-E8B or 8236-E8C PCIe RAID and SSD SAS adapters

You can remove, replace, or install PCIe RAID and SSD SAS adapters in the 8233-E8B or 8236-E8C.

The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation (slot 3 for plugging, slot 2 for expansion).

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:

- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).
- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmc1/home.html).

Related information:

➡ SAS RAID enablement and cache battery pack

Installing a PCIe RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server

You can install a PCIe RAID and SSD SAS adapter in a server.

Installing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power off

You can install a PCIe RAID and SSD SAS adapter with the system power off.

Attention: If you are servicing a failing part, see the service procedures for "Removing a PCI RAID and SSD SAS adapter from the 8233-E8B and 8236-E8C server with the power off" on page 44 and "Replacing a PCIe RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power off" on page 51. This procedure is intended for installing a new or upgraded PCIe RAID and SSD SAS adapter.

The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation (slot 3 for plugging, slot 2 for expansion).

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:

- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).
- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmcl/home.html).

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to install a PCIe RAID and SSD SAS with the system power off:

1. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
2. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
3. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
4. Disconnect the power source from the system by unplugging the system.
5. If you are installing, removing, or replacing a PCIe adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
6. Determine that slots 2 and 3 are open for the PCIe adapter.
7. If necessary, remove the adapter from the antistatic package.

   Attention: Avoid touching the components and gold connectors on the adapter.
8. Place the adapter, component-side up, on a flat, antistatic surface.
9. Some PCI adapters 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.
10. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
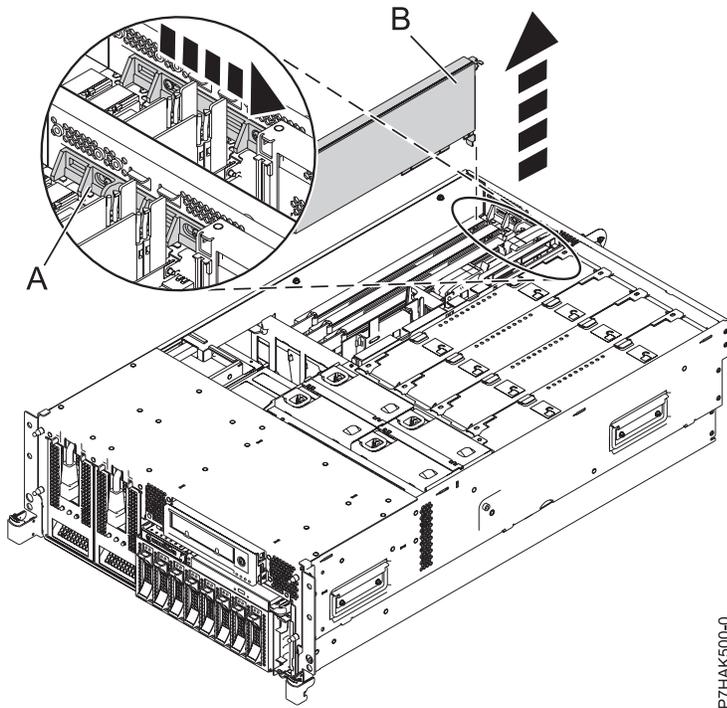
Figure 18. PCI adapter or filler plate removed from the rack-mounted system unit

11. If necessary, remove the adapter expansion slot filler.
12. Remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.
13. Remove the solid expansion slot cover and install the perforated expansion slot cover that shipped with your PCIe adapter. Press the expansion slot cover firmly into position in the adjacent slot to the left of the adapter slot.
14. Carefully grasp the adapter **(A)** by its top edge, and align the adapter with the expansion slot and its connector on the system backplane. See the following figure.
15. Press the adapter firmly into its connector.
16. Slide the adapter latch **(B)** back into place as shown in the following figure.
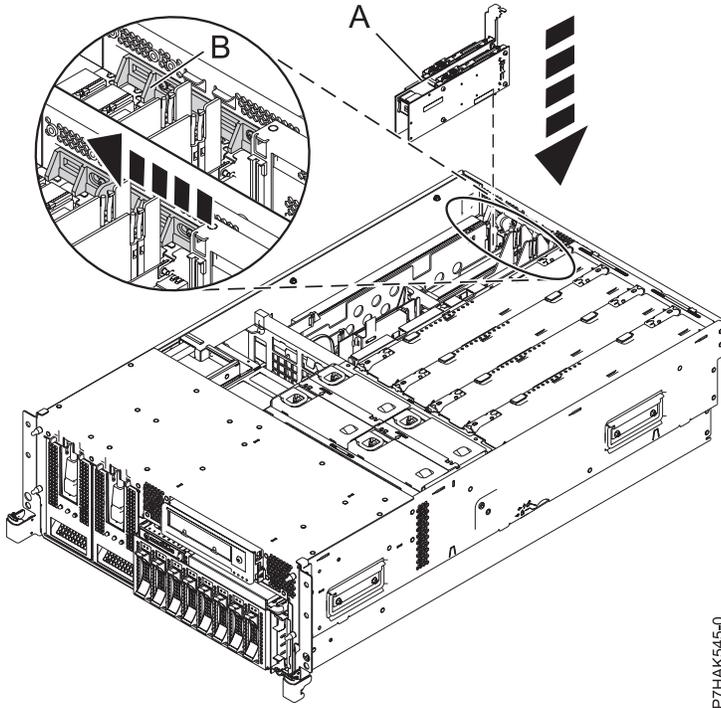
Figure 19. PCIe RAID and SSD SAS adapter replaced in the rack-mounted system unit

17. If you are servicing a rack-mounted system, route the cables through the cable-management arm.
18. Replace or close the service access cover and, if applicable, return the system to the operating position.
19. Reconnect the power source to the system.
20. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.
21. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

↪ SAS RAID enablement and cache battery pack

Installing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C system, with the power on in the AIX environment

You can install a PCI RAID and SSD SAS adapter with the system power on in the AIX environment.

The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation (slot 3 for plugging, slot 2 for expansion).

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:

- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).

- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmcl/home.html).

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to install a PCIe RAID and SSD SAS with the system power on in the AIX environment:

1. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
2. Determine in which slot to place the PCI adapter. For system-specific adapter placement information, see the PCI adapter placement.
3. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
4. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
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 connectors on the adapter.
7. Place the PCIe adapter, component-side up, on a flat, antistatic surface.
8. Some PCIe adapters 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. Remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.
10. Refer to "PCI hot-plug manager access for AIX" on page 162, and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
11. 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.
12. Select slot 3 from the appropriate empty PCI slots listed on the screen, and press Enter.
13. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
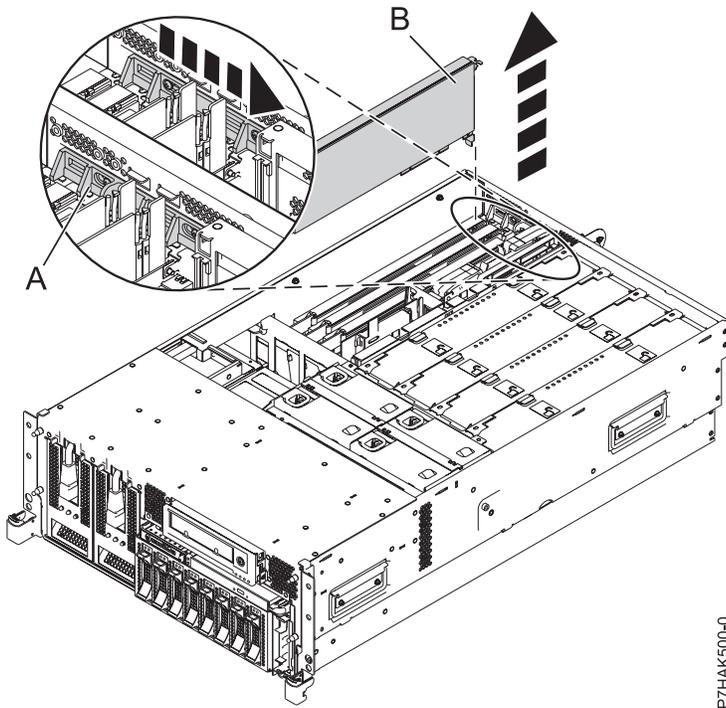
Figure 20. PCI adapter or filler plate removed from the rack-mounted system unit

14. Remove the adapter filler plate if one is present.
15. Remove the solid expansion slot cover and install the perforated expansion slot cover that shipped with your PCIe adapter. Press the expansion slot cover firmly into position in the adjacent slot to the left of the adapter slot.
16. Follow the instructions on the screen to install the adapter until the LED for the specified PCIe slot is set to the Action state. See "Component LEDs" on page 164.
17. When you are instructed to install the adapter in the adapter slot, carefully grasp the adapter by the edges and align the adapter **(A)** 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.
18. Press the adapter firmly into its connector.
19. Slide the adapter latch **(B)** back into place as shown in the following figure.
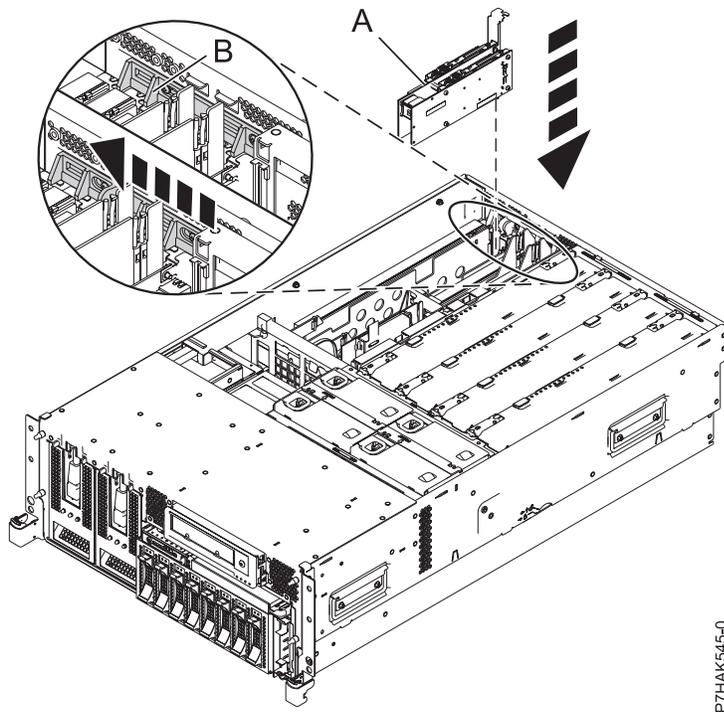
Figure 21. PCI RAID and SSD SAS adapter replaced in the rack-mounted system unit

20. Replace or close the service access cover and, if applicable, return the system to the operating position.
21. Enter `cfgmgr` to configure the adapter.
22. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

↪ SAS RAID enablement and cache battery pack

Installing a PCI RAID and SSD SAS adapter in the 8233-E8B server, with the power on in the IBM i environment

You can install a PCI RAID and SSD SAS adapter with the system power on in the IBM i environment.

The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation (slot 3 for plugging, slot 2 for expansion).

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:
- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).
- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmcl/home.html).

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to install a PCIe RAID and SSD SAS with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
4. If necessary, remove the adapter expansion slot shield.
5. If necessary, remove the adapter from the antistatic package.

   Attention: Avoid touching the components and gold connectors on the adapter.
6. Place the PCIe adapter, component-side up, on a flat, antistatic surface.
7. Some PCIe adapters 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.
8. Remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.
9. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:
   a. Type **strsst** on the command line of the Main Menu and press Enter.
   b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
   c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
   d. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
   e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.
   f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.
   g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.
   h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.
   i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.
   j. Select **Toggle LED blink off/on** to stop the blinking LED.
   k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.
10. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
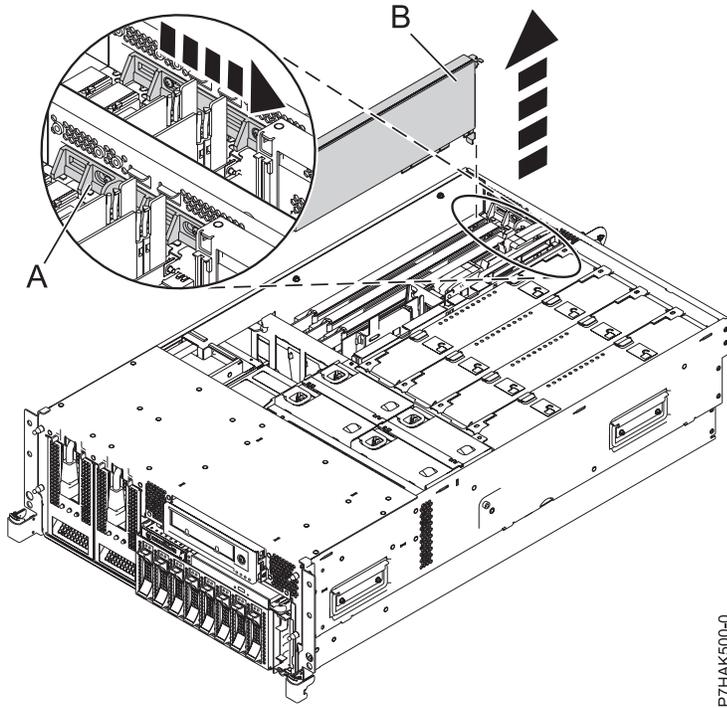
Figure 22. PCI adapter or filler plate removed from the rack-mounted system unit

11. Ensure that the slot is empty. Remove the adapter filler plate if one is present.

12. Remove the solid expansion slot cover and install the perforated expansion slot cover that shipped with your PCIe adapter. Press the expansion slot cover firmly into position in the adjacent slot to the left of the adapter slot.

13. Carefully grasp the PCIe adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.

14. Press the adapter firmly into its connector.

15. Slide the adapter latch **(B)** back into place as shown in the following figure.
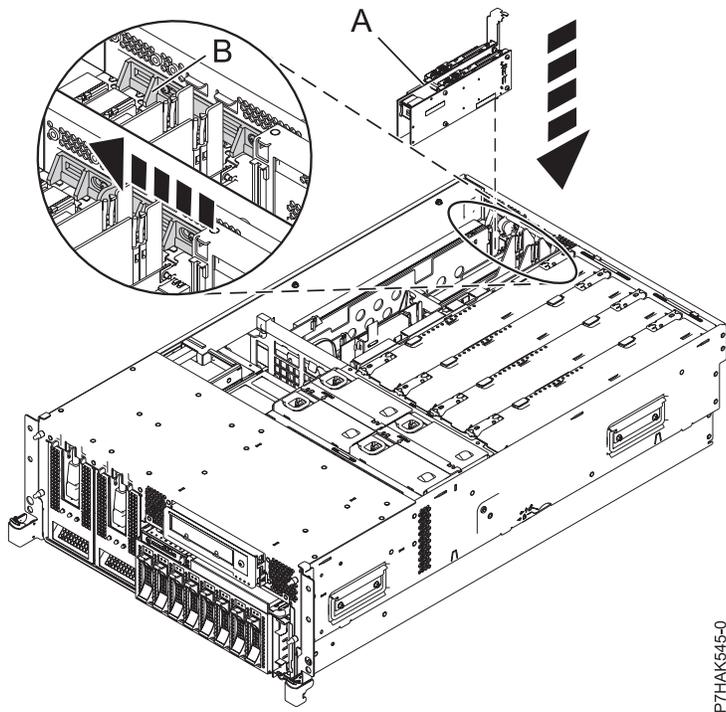
Figure 23. PCI RAID and SSD SAS adapter replaced in the rack-mounted system unit

16. From the Hardware Resource Concurrent Maintenance display, complete the following steps:
    a. Select **Power on domain** and press Enter.
    b. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.
    c. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:
       ```
       Power on complete
       ```
17. Replace or close the service access cover and, if applicable, return the system to the operating position.
18. Verify the installed part.
    • If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    • If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

SAS RAID enablement and cache battery pack

Installing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server, with the power on in the Linux environment

You can install a PCI RAID and SSD SAS adapter with the system power on in the Linux environment.

The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation (slot 3 for plugging, slot 2 for expansion).

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:

- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).
- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmcl/home.html).

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to install a PCIe RAID and SSD SAS with the system power on in the Linux environment:

1. Ensure that the system meets the "Prerequisites for hot-plugging PCI adapters in Linux" on page 165.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. "Verifying that the hot-plug PCI tools are installed for Linux" on page 165.
4. Determine in which slot to place the PCI adapter. For system-specific adapter placement information, see the PCI adapter placement.
5. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
6. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
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 connectors on the adapter.
9. Place the PCIe adapter, component-side up, on a flat, antistatic surface.
10. Remove the PCI adapter divider if one is present. See "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.
11. Log in to the system console as the root user.
12. 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.
13. Slide the adapter latch **(A)** into the open position, as shown in the following figure.

Figure 24. PCI adapter or filler plate removed from the rack-mounted system unit

14. Ensure that the slot is empty. Remove the adapter filler plate if one is present.
15. Run the **drmgr** 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:

    ```
    drmgr -c pci -r -s locationcode
    ```

    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. Remove the solid expansion slot cover and install the perforated expansion slot cover that shipped with your PCIe adapter. Press the expansion slot cover firmly into position in the adjacent slot to the left of the adapter slot.
18. When you are instructed to install the adapter **(A)** 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.
19. 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.

20. Slide the adapter latch **(B)** back into place as shown in the following figure.
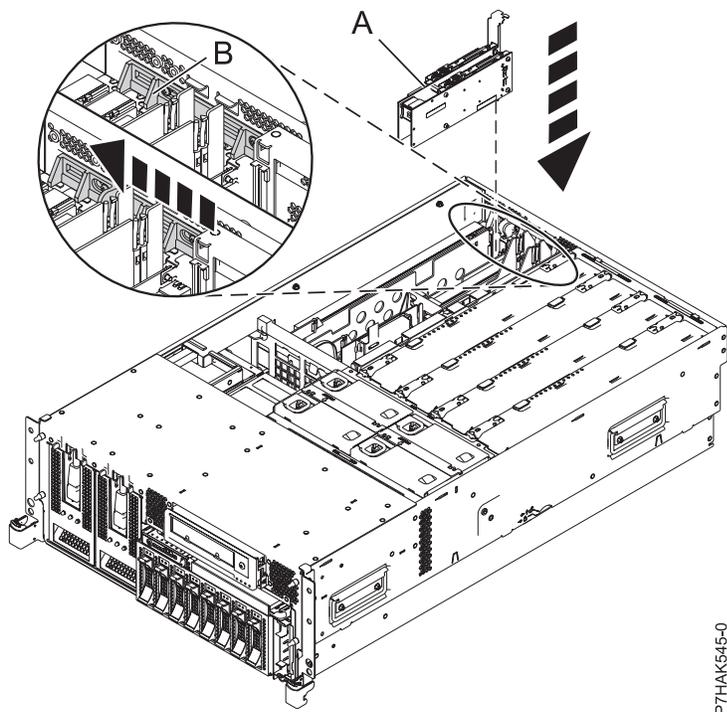
Figure 25. PCI RAID and SSD SAS adapter replaced in the rack-mounted system unit

21. 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
    ```

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

23. Replace or close the service access cover and, if applicable, return the system to the operating position.

24. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

 SAS RAID enablement and cache battery pack

Removing a PCIe RAID and SSD SAS adapter from an 8233-E8B and 8236-E8C server

You can remove a PCI adapter.

Removing a PCI RAID and SSD SAS adapter from the 8233-E8B and 8236-E8C server with the power off

You can remove a PCI RAID and SSD SAS adapter with the system power off.

Attention: If you are removing a PCIe adapter in order to install a new or upgraded PCIe adapter, see Installing a PCIe RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power off to obtain slot locations and required prerequisites. If you are removing a PCIe adapter as part of a service procedure, continue to use the following procedure.

When an SSD on the PCIe adapter fails, the entire adapter must be removed from the system before replacing the individual SSD. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter.

To remove a PCIe adapter with the system power off, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are removing a failing PCIe adapter, identify the failing part. For instructions, see "Identifying a part" on page 180. If you are removing the PCI adapter for other reasons, continue to the next step.
4. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
5. Disconnect the power source from the system by unplugging the system.
6. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
7. Attach the wrist strap.

   Attention:
   - Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
   - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
   - If you do not have a wrist strap, just before 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. Locate the PCIe adapter you plan to remove.
9. Record the slot number and location of each adapter being removed.

   Note: Adapter slots are numbered on the rear of the system.
10. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
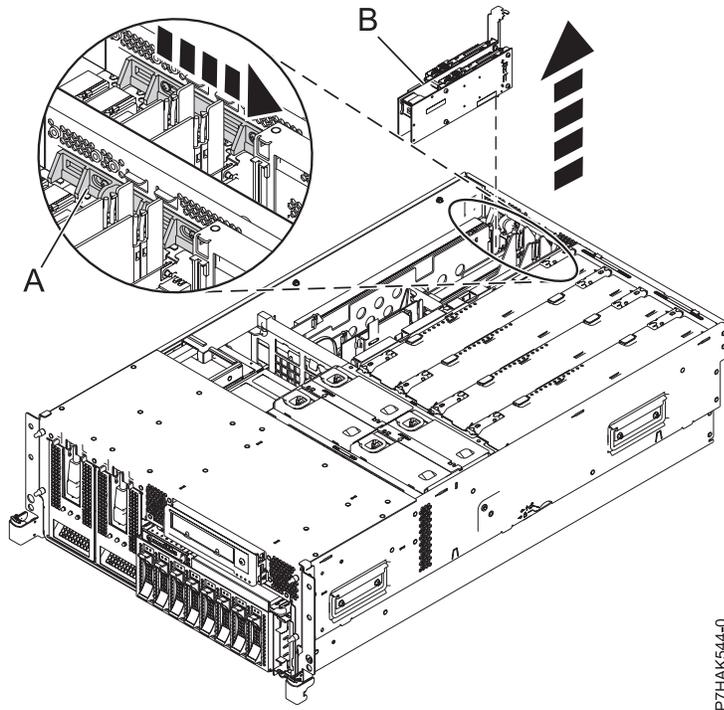
Figure 26. PCI RAID and SSD SAS adapter removed from the rack-mounted system unit

11. Carefully grasp the PCIe adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.
12. If you are removing a PCIe adapter as part of another procedure, return to that procedure. If not, continue to the next step.
13. If you plan to install another PCIe adapter into the vacated slot, go to "Replacing a PCIe RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power off" on page 51; otherwise, continue with the next step.
14. Seal the expansion slot using an expansion-slot cover.
15. Replace or close the service access cover and, if applicable, return the system to the operating position.
16. Reconnect the power source to the system.
17. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.

Related information:

↪ SAS RAID enablement and cache battery pack

Removing a PCIe RAID and SSD SAS adapter from the 8233-E8B and 8236-E8C server, with the power on in the AIX environment

You can remove a PCIe RAID and SSD SAS adapter with the system power on in the AIX environment.

When an SSD on the PCIe adapter fails, the entire adapter must be removed from the system before replacing the individual SSD. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter.

To remove a failing PCIe adapter and replace it with another PCIe adapter, see "Removing and replacing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server, with the power on in the AIX environment" on page 53. 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 "Installing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C system, with the power on in the AIX environment" on page 34.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

Note: Procedures performed on a PCIe adapter with the system power on in AIX, also known as hot-plug procedures, require the system administrator to take the PCIe adapter offline before 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.

If you do not have an HMC, complete the following steps to remove a PCIe RAID and SSD SAS adapter with the system power on in the AIX environment:
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are removing a failing PCIe adapter, identify the failing part. For instructions, see "Identifying a part" on page 180. If you are removing the PCI adapter for other reasons, continue to the next step.
4. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
    a. Open the front rack door.
    b. Place the system unit in the service position.
    c. Remove or open the service access cover.
5. Determine which adapter you plan to remove.
6. Record the slot number and location of each adapter being removed. Adapter slots are numbered on the rear of the system unit.
7. Ensure that any processes or applications that might use the adapter are stopped.
8. Follow these steps to remove a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:
    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.

9. Slide the adapter latch **(A)** into the open position, as shown in the following figure.

Figure 27. PCI RAID and SSD SAS adapter removed from the rack-mounted system unit

10. Carefully grasp the PCIe adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.

11. If you plan to install another adapter into the vacated slot, go to "Installing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C system, with the power on in the AIX environment" on page 34; otherwise, continue with the next step.

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. Press F10 to exit the Hot-Plug Manager.

17. Run the diag -a command. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.

18. Replace or close the service access cover and, if applicable, return the system to the operating position.

19. To replace the PCIe adapter, see "Removing and replacing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server, with the power on in the AIX environment" on page 53.

Related information:

SAS RAID enablement and cache battery pack

Removing a PCIe RAID and SSD SAS adapter in the 8233-E8B server, with the power on in the IBM i environment

You can remove a PCIe RAID and SSD SAS adapter with the system power on in the IBM i environment.

When an SSD on the PCIe adapter fails, the entire adapter must be removed from the system before replacing the individual SSD. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter.

Important: If the adapter is the load source I/O adapter (IOA) or the load source I/O processor (IOP), or any other storage IOA or IOP with critical disk storage attached for the system or partition, follow the on-screen instructions when you use HSM to power down the IOP or IOA. Instructions to use functions 68 and 69 on the control panel will be included.

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:

- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).
- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmcl/home.html).

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

Note: Procedures performed on a PCIe adapter with the system power on in AIX, also known as hot-plug procedures, require the system administrator to take the PCIe adapter offline before 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.

If you do not have an HMC, complete the following steps to remove a PCIe RAID and SSD SAS adapter with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are removing a failing PCIe adapter, see . If you are removing the PCIe adapter for other reasons, continue to the next step.
4. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
5. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:
   a. Type **strsst** on the command line of the Main Menu and press Enter.
   b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
   c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
   d. Select **Hardware service manager** from the Start a Service Tool display and press Enter.

e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.

f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.

g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.

h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.

i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.

j. Select **Toggle LED blink off/on** to stop the blinking LED.

k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.

6. Record the slot number and location of each adapter being removed.

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

7. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
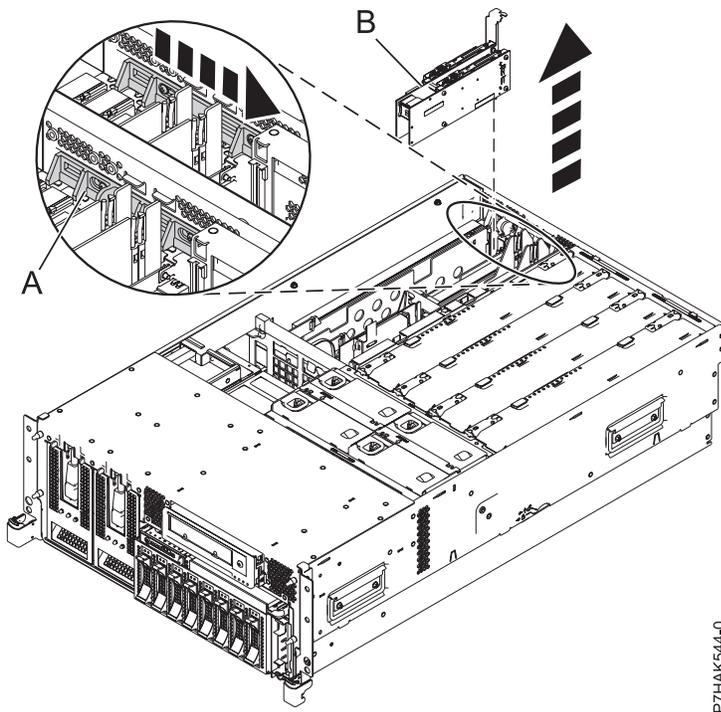
Figure 28. PCI RAID and SSD SAS adapter removed from the rack-mounted system unit

8. Carefully grasp the PCIe adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.

9. If you are removing a PCIe adapter as part of another procedure, return to that procedure. If not, continue to the next step.

10. If you plan to install another adapter into the vacated slot, go to "Installing a PCI RAID and SSD SAS adapter in the 8233-E8B server, with the power on in the IBM i environment" on page 37; otherwise, continue with the next step.

11. Seal the expansion slot using an expansion-slot cover.

12. Replace or close the service access cover and, if applicable, return the system to the operating position.
13. To replace the PCI adapter, see "Replacing a PCI RAID and SSD SAS adapter in the 8233-E8B server, with the power on in the IBM i environment" on page 57.

Related information:

➦ SAS RAID enablement and cache battery pack

Removing a PCIe RAID and SSD SAS adapter from the 8233-E8B and 8236-E8C server, with the power on in the Linux environment

You can remove a PCIe RAID and SSD SAS adapter with the system power on in the Linux environment.

When an SSD on the PCIe adapter fails, the entire adapter must be removed from the system before replacing the individual SSD. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

Note: Procedures performed on a PCIe adapter with the system power on in AIX, also known as hot-plug procedures, require the system administrator to take the PCIe adapter offline before 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.

If you do not have an HMC, complete the following steps to remove a PCIe RAID and SSD SAS adapter with the system power on in the Linux environment:

1. Ensure that the system meets the "Prerequisites for hot-plugging PCI adapters in Linux" on page 165.
2. "Verifying that the hot-plug PCI tools are installed for Linux" on page 165.
3. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
4. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
5. If you are removing a failing PCIe adapter, see . If you are removing the PCIe adapter for other reasons, continue to the next step.
6. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
7. Determine which adapter you plan to remove.

   Note: Before performing a PCI hot-plug removal of storage devices, ensure that the file systems on those devices are unmounted.
8. Record the slot number and location of each adapter being removed.

   Note: Adapter slots are numbered on the rear of the system.
9. Run the **drmgr** 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:
   ```
   drmgr -c pci -r -s locationcode
   ```
   Follow the instructions on the display to complete the task.

10. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
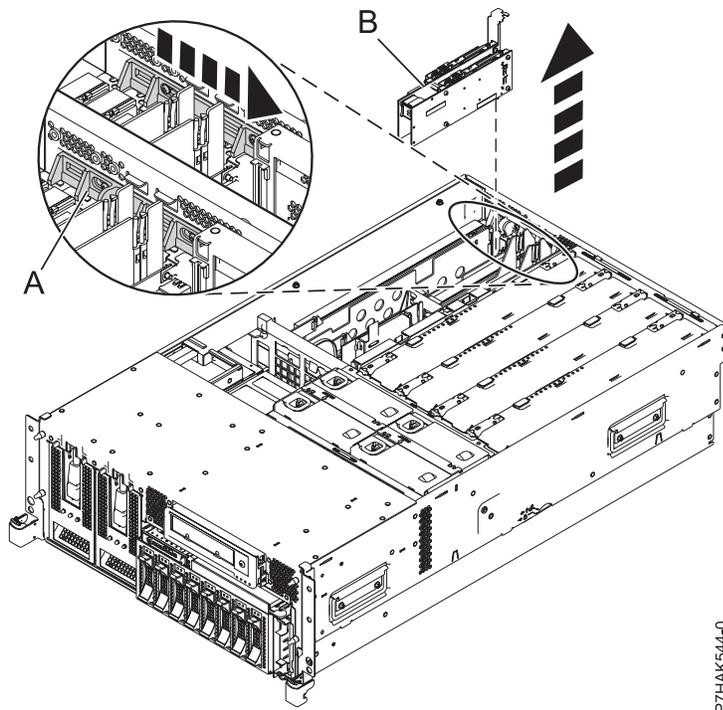

Figure 29. PCI RAID and SSD SAS adapter removed from the rack-mounted system unit

11. Carefully grasp the PCIe adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.
12. If you are removing a PCIe adapter as part of another procedure, return to that procedure. If not, continue to the next step.
13. If you plan to replace an adapter into the vacated slot, go to "Replacing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power on in the Linux environment" on page 58; otherwise, continue with the next step.
14. Seal the expansion slot using an expansion-slot cover.
15. Replace or close the service access cover and, if applicable, return the system to the operating position.

Related information:

➡ SAS RAID enablement and cache battery pack

Replacing a PCIe RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server

You can replace a PCIe RAID and SSD SAS adapter.

Replacing a PCIe RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power off

You can replace a PCIe RAID and SSD SAS adapter with the system power off.

Attention: If you are installing a new or upgraded adapter, see "Installing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power off" on page 31 to obtain slot locations and required prerequisites. If you are replacing an adapter as part of a service procedure, continue to use the following procedure.

Use this procedure if you intend to remove a failing PCI RAID and SSD SAS adapter and replace it with the same type of adapter. The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation.

You must have already completed the procedure "Removing a PCI RAID and SSD SAS adapter from the 8233-E8B and 8236-E8C server with the power off" on page 44 in order to have the slot powered off.

To replace a PCIe RAID and SSD SAS adapter with the system power off, do the following steps:
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
4. Disconnect the power source from the system by unplugging the system.
5. If you are installing, removing, or replacing a PCIe adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
6. Attach the wrist strap.

   Attention:
   - Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
   - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
   - If you do not have a wrist strap, just before 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. Determine that slots 2 and 3 are open for the PCIe adapter.
8. If necessary, remove the adapter from the antistatic package.

   Attention: Avoid touching the components and gold connectors on the adapter.
9. Place the PCIe adapter, component-side up, on a flat, static-protective surface.
10. Label the location of each SSD as you transfer the SSDs from the replaced adapter to the same location on the new adapter you are installing. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter. Repeat this step for each SSD.
11. After all SSDs have been transferred to the new adapter, carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
12. Press the PCIe adapter **(A)** 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.
13. Slide the adapter latch **(B)** back into place as shown in the following figure.
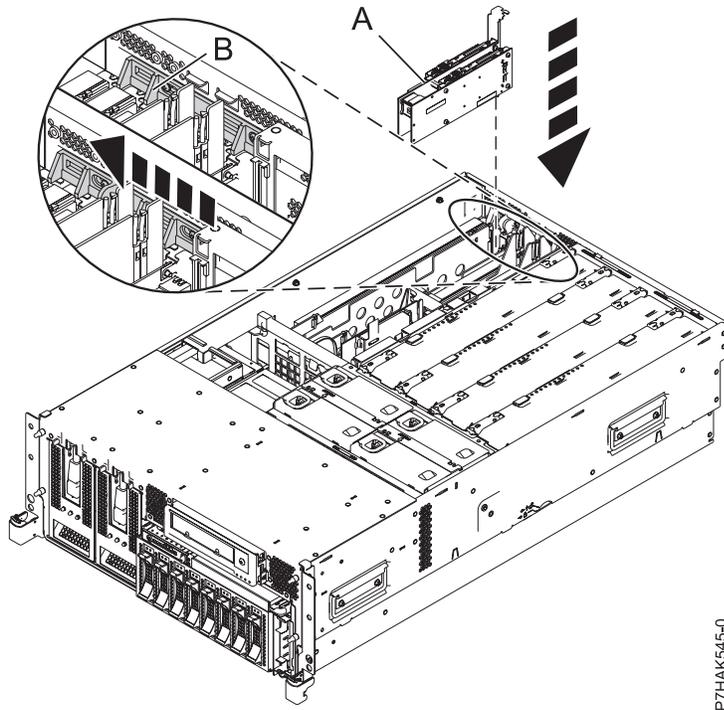
Figure 30. PCI RAID and SSD SAS adapter replaced in the rack-mounted system unit

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

15. Replace or close the service access cover and, if applicable, return the system to the operating position.

16. Reconnect the power source to the system.

17. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.

18. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

⇨ SAS RAID enablement and cache battery pack

Removing and replacing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server, with the power on in the AIX environment

You can replace a PCIe RAID and SSD SAS adapter with the system power on in the AIX environment.

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

Notes:
- Use this procedure if you intend to remove a failing PCIe RAID and SSD SAS adapter and replace it with the same type of adapter.
- If you plan to remove a failing adapter and leave the slot empty, see "Removing a PCI adapter from the 8233-E8B and 8236-E8C server, with the power on in the AIX environment" on page 15.

- Do not use this procedure to remove an existing adapter and install a different type of adapter. To install a different adapter, remove the existing adapter as described in "Removing a PCIe RAID and SSD SAS adapter from the 8233-E8B and 8236-E8C server, with the power on in the AIX environment" on page 45, then install the new adapter as described in "Installing a PCI adapter in the 8233-E8B and 8236-E8C server, with the power on in an AIX environment" on page 3.
- Procedures performed on a PCIe adapter with the system power on in AIX, also known as hot-plug procedures, require the system administrator to take the PCIe adapter offline before 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.

The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

If you do not have an HMC, complete the following steps to replace a PCIe RAID and SSD SAS adapter with the system power on in the AIX environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are removing a failing PCIe adapter, see . If you are removing the PCIe adapter for other reasons, continue to the next step.
4. If you are installing, removing, or replacing a PCI adapter in a rack-mounted system, follow these steps to remove the service access cover.
   a. Open the front rack door.
   b. Place the system unit in the service position.
   c. Remove or open the service access cover.
5. Locate the PCIe adapters you plan to remove.
6. Record the slot numbers and location of the adapter being removed.

   Note: PCI RAID and SSD SAS adapter slots are 3 and 2.
7. Ensure that any processes or applications that might use the adapter are stopped.
8. Follow these steps to replace a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:
   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 YES 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 F3 (or Esc +3) 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 **Replace**. 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.

9. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
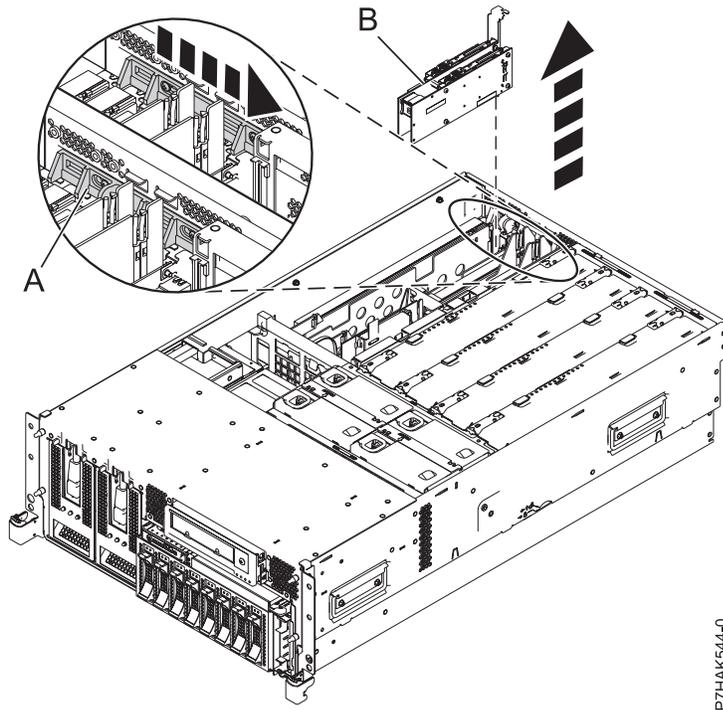

Figure 31. PCI adapter or filler plate removed from the rack-mounted system unit

10. Carefully grasp the PCIe adapter **(B)** by its top edge or upper corners, and remove it from the system. Store the adapter in a safe place.

11. If necessary, remove the replacement adapter from the antistatic package.

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

12. Label the location of each SSD as you transfer the SSDs from the replaced adapter to the same location on the new adapter you are installing. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter. Repeat this step for each SSD.

13. After all SSDs have been transferred to the new adapter, carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.

14. Press the adapter **(A)** firmly into its connector. See the following figure.

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

15. Slide the adapter latch **(B)** back into place as shown in the following figure.
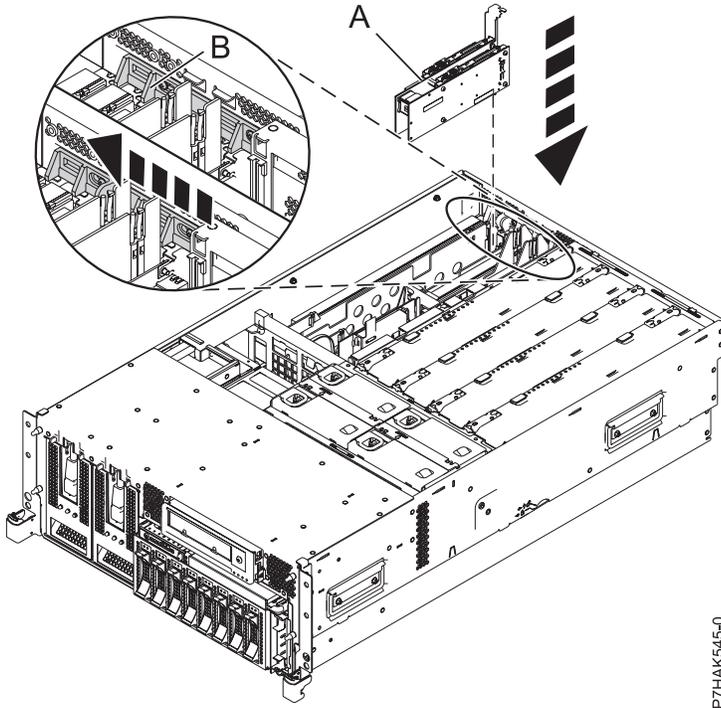
Figure 32. PCI RAID and SSD SAS adapter replaced in the rack-mounted system unit

16. Follow these steps to complete the PCI Hot Plug menus in the AIX Diagnostic tools and configure the device:

    a. Press enter and continue to follow the instructions in the system diagnostics until you receive a message that the replacement is successful. Successful replacement is indicated by the OK message displayed next to the **Command** field at the top of the menu.

    b. Press the F3 (or Esc+3) key to return to the **PCI Hot-Plug Manager** menu.

    c. Press the F3 (or Esc+3) key to return to the **TASK** selection list.

    d. Select **Log Repair Action**.

    e. Select the resource just replaced, press Enter, press Commit (F7 or ESC 7), then press Enter.

    f. Press F3 (or Esc+3) to return to **TASK Selection List**.

    g. Select **Hot Plug Task**, press enter.

    h. Select **PCI Hot Plug Manager**, then select **Configure a defined device**, then press Enter.

    i. Select the device just replaced from the list, then press Enter. The device is now configured.

    j. Press the F10 key to exit the diagnostic program.

    Note: If you are running the stand-alone diagnostics, do not exit the program completely.

17. Verify the PCIe adapter by using the following instructions:

    a. Did you replace the adapter with the system power on?

       • Yes - Go to the next step.

       • No - Load the diagnostic program by doing the following:

          – If AIX is available, boot AIX, log in as root or CELOGIN, then enter the **diag** command.

          – If AIX is not available, boot the stand-alone diagnostics

    b. Type the **diag** command if you are not already displaying the diagnostic menus

    c. Select **Advance Diagnostic Routines**, then select **Problem Determination**.

d. Select the name of the resource just replaced from the menu. If the resource just replaced is not shown, choose the resource associated with it. Press Enter, then press **Commit** (F7 or Esc+7).

e. Did the Problem Determination identify any problems?

- No: Continue to the next step.
- Yes: A problem is identified
  - If you are a customer, record the error information, then contact your service provider.
  - If you are an authorized service provider, return to map 210-5.

18. Press the F10 key to exit the diagnostic program.

19. Replace or close the service access cover and, if applicable, return the system to the operating position.

20. Verify the installed part.

- If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
- If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

⇥ SAS RAID enablement and cache battery pack

Replacing a PCI RAID and SSD SAS adapter in the 8233-E8B server, with the power on in the IBM i environment

You can replace a PCI RAID and SSD SAS adapter with the system power on in the IBM i environment.

Use this procedure if you intend to remove a failing PCI RAID and SSD SAS adapter and replace it with the same type of adapter. The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation.

Attention: You must have already completed the procedure "Removing a PCIe RAID and SSD SAS adapter in the 8233-E8B server, with the power on in the IBM i environment" on page 48 in order to have the slot powered off.

Important: If the adapter is the load source I/O adapter (IOA) or the load source I/O processor (IOP), or any other storage IOA or IOP with critical disk storage attached for the system or partition, follow the on-screen instructions when you use HSM to power down the IOP or IOA. Instructions to use functions 68 and 69 on the control panel will be included.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to replace a PCIe RAID and SSD SAS adapter with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.

2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.

3. If necessary, remove the adapter from the antistatic package.

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

4. Label the location of each SSD as you transfer the SSDs from the replaced adapter to the same location on the new adapter you are installing. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter. Repeat this step for each SSD.

5. After all SSDs have been transferred to the new adapter, carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.

6. Press the adapter **(A)** 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.

7. Slide the adapter latch **(B)** back into place as shown in the following figure.
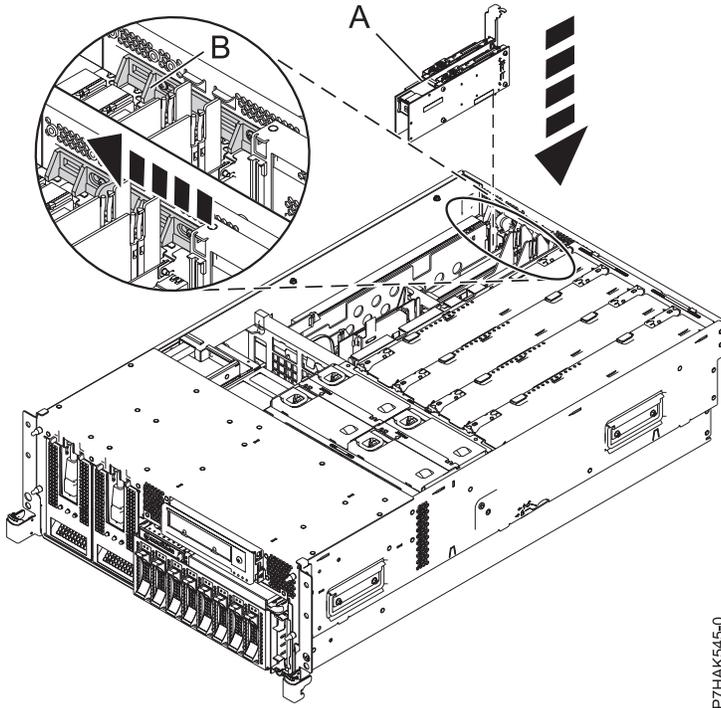
Figure 33. PCI RAID and SSD SAS adapter replaced in the rack-mounted system unit

8. From the Hardware Resource Concurrent Maintenance display, complete the following steps:
   a. Select **Power on domain** and press Enter.
   b. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.
   c. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:
      ```
      Power on complete
      ```

9. Replace or close the service access cover and, if applicable, return the system to the operating position.

10. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

➥ SAS RAID enablement and cache battery pack

Replacing a PCI RAID and SSD SAS adapter in the 8233-E8B and 8236-E8C server with the power on in the Linux environment

You can replace a PCI RAID and SSD SAS adapter with the system power on in the Linux environment.

Use this procedure if you intend to remove a failing PCI RAID and SSD SAS adapter and replace it with the same type of adapter. The PCIe RAID and SSD SAS adapter is a double-wide adapter. Although it plugs into a single PCIe slot, two adjacent PCIe slots are required for installation.

You must have already completed the procedure "Removing a PCIe RAID and SSD SAS adapter from the 8233-E8B and 8236-E8C server, with the power on in the Linux environment" on page 50.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

If you do not have an HMC, complete the following steps to replace a PCIe RAID and SSD SAS adapter with the system power on in the Linux environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If necessary, remove the PCIe adapter from the antistatic package.

   Attention: Avoid touching the components and gold connectors on the adapter.
4. Place the adapter, component-side up, on a flat, static-protective surface.
5. Label the location of each SSD as you transfer the SSDs from the replaced adapter to the same location on the new adapter you are installing. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter. Repeat this step for each SSD.
6. Run the **drmgr** command to enable an adapter to be replaced:

   For example, to replace the PCI adapter in slot U7879.001.DQD014E-P1-C3 run this command:

   ```
   drmgr -c pci -r -s locationcode
   ```

   Follow the instructions on the display to complete the task.
7. 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.
8. Carefully grasp the adapter by its top edge, and align the adapter with the expansion slot and its connector on the system backplane.
9. Press the adapter **(A)** 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.
10. Slide the adapter latch **(B)** back into place as shown in the following figure.
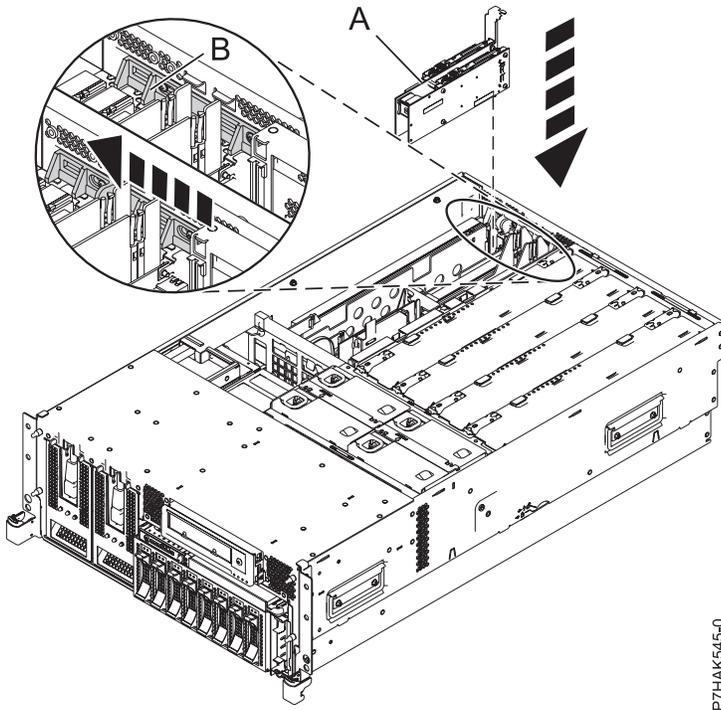
Figure 34. PCI RAID and SSD SAS adapter replaced in the rack-mounted system unit

11. 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
    ```

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

13. Replace or close the service access cover and, if applicable, return the system to the operating position.

14. Verify the installed part.

    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Related information:

SAS RAID enablement and cache battery pack

Model 8233-E8B and 8236-E8C PCI adapter dividers

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

Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server

You can remove a PCI adapter divider.

The following procedure describes the removal of PCI adapter dividers with the system power off. This procedure can be done with the system power on by omitting the steps related to powering off the system.

To remove a divider, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
4. Disconnect the power source from the system by unplugging the system.
5. Remove the unit's cover if you are installing or removing a PCI adapter divider.
6. Slide the adapter latch (A) into the open position, as shown in the following figure.
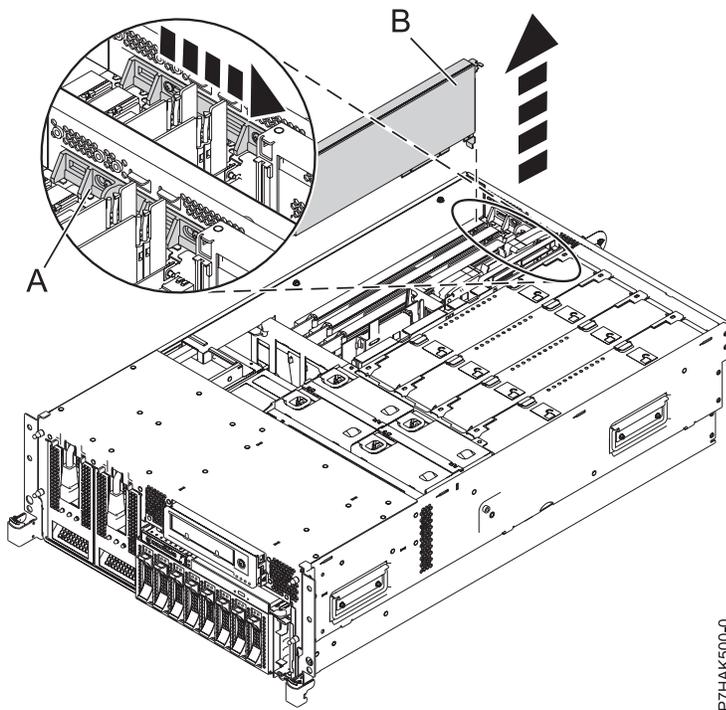
Figure 35. PCI adapter or filler plate removed from the rack-mounted system unit

7. Flex the front edge (A) of the PCI adapter divider out of the bracket and toward the rest of the divider.
8. Pull the back edge of the divider away from the retention notches (B).
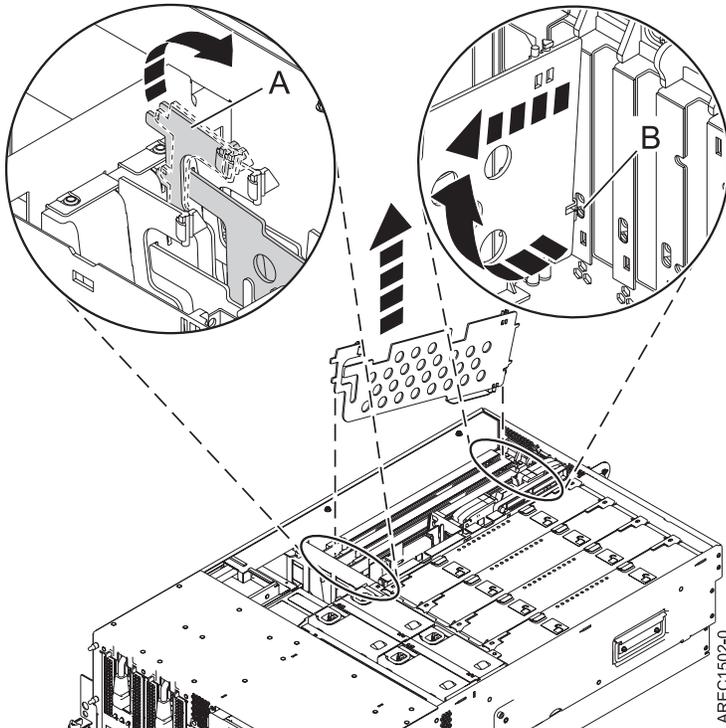
Figure 36. PCI-adapter divider removed from the system unit

9. If you are removing the PCI adapter divider as part of another procedure, return to that procedure now. To replace the divider, see "Installing a PCI adapter divider in the 8233-E8B and 8236-E8C server" on page 63. To close up the system, continue to the next step.

10. Slide the adapter latch **(B)** back into place as shown in the following figure.
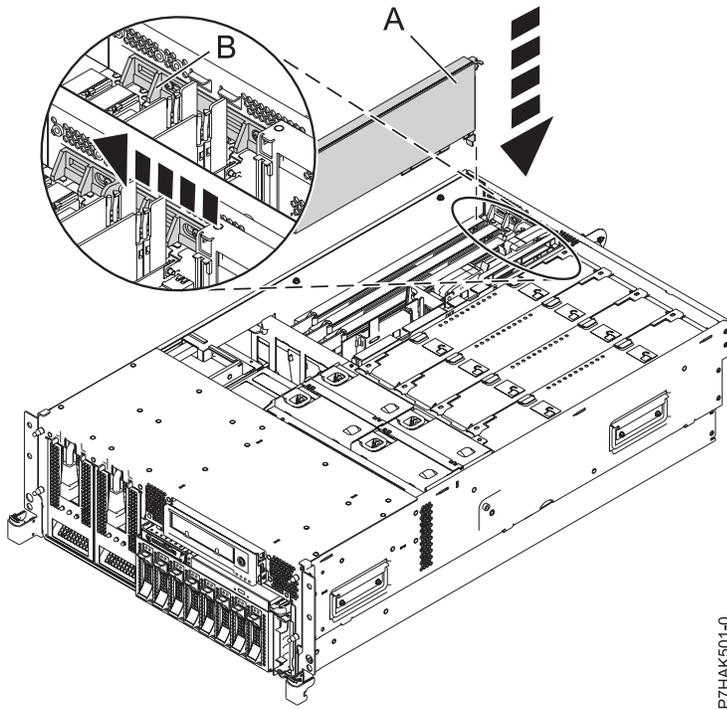
Figure 37. PCI adapter replaced in the rack-mounted system unit

11. Replace or close the service access cover and, if applicable, return the system to the operating position.
12. Reconnect the power source to the system.
13. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.

Installing a PCI adapter divider in the 8233-E8B and 8236-E8C server

You can install a PCI adapter divider.

The following procedure describes the installation of a PCI adapter divider with the system power off. This procedure can be done with the system power on by omitting the steps related to powering on the system.

To install a divider, do the following steps:
1. Locate the PCI adapter divider slot that you want to use. To access the divider slots, see the first 6 steps in "Removing a PCI adapter divider from the 8233-E8B and 8236-E8C server" on page 60.
2. Slide the adapter latch **(A)** into the open position, as shown in the following figure.
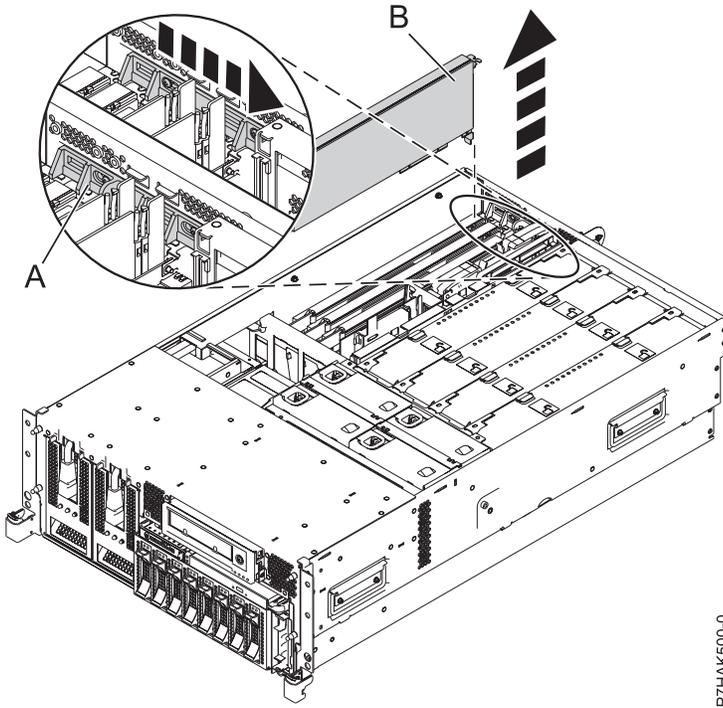
Figure 38. PCI adapter or filler plate removed from the rack-mounted system unit

3. Carefully grasp the PCI adapter divider by its top edge and align the back edge of the divider with the retention notches **(A)**.

4. Insert the front edge of the divider **(B)** into the slots and then press the divider into place.
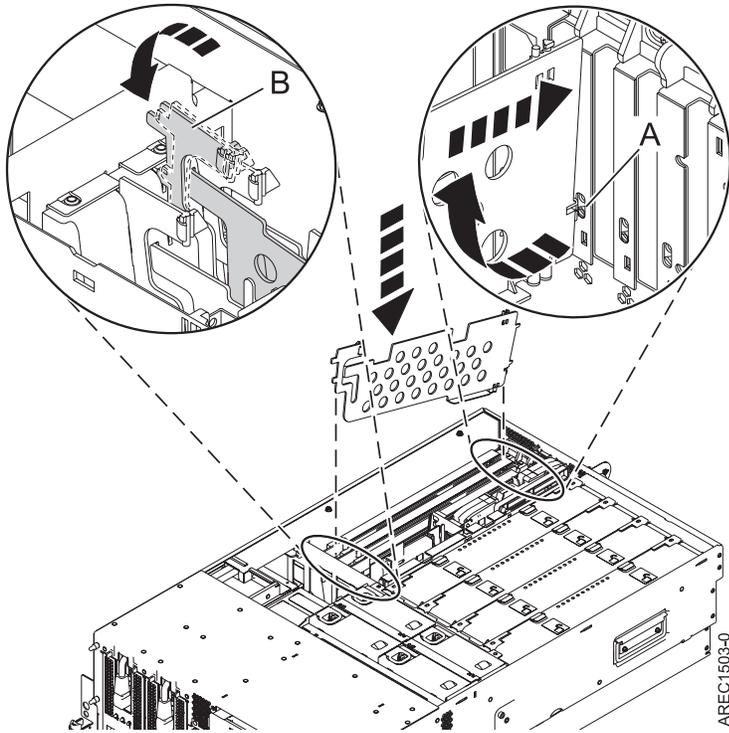
Figure 39. PCI-adapter divider replaced in the system unit

5. Slide the adapter latch **(B)** back into place as shown in the following figure.
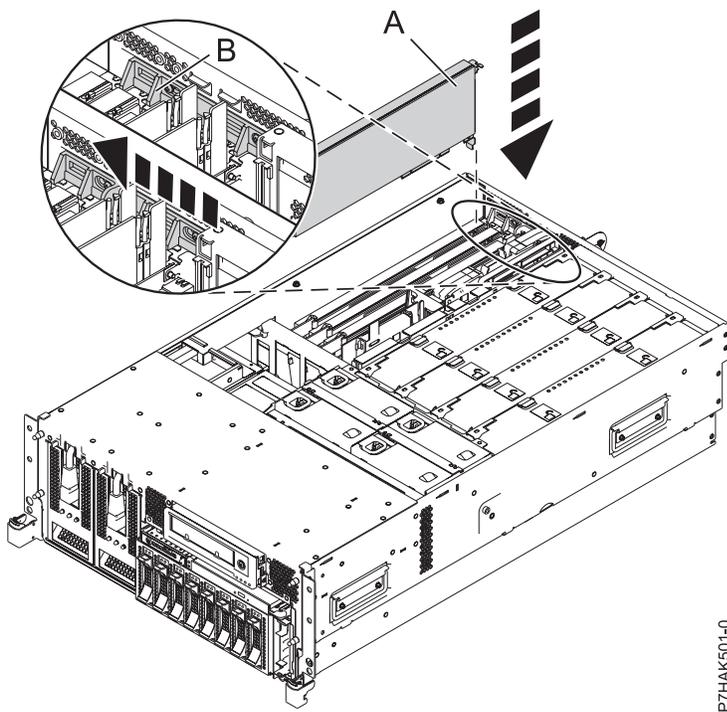
Figure 40. PCI adapter replaced in the rack-mounted system unit

6. Replace or close the service access cover and, if applicable, return the system to the operating position.

7. Reconnect the power source to the system.

8. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.

Model 5796 expansion units, PCI adapters and cassettes

You can remove, replace, or install PCI adapter cassettes.

Important:

- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

   Note:
   - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
   - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

   Note:
   - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
   - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166

- 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.

Installing a PCI adapter contained in a cassette

You can install a PCI adapter.

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

You can install a PCI adapter.

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf). If the required software is not installed, see the following websites to download it, and then install it before continuing:

- To download firmware and software updates and fixes, see the Fix Central (www.ibm.com/support/fixcentral).
- To download Hardware Management Console (HMC) updates and fixes, see Hardware Management Console Support and downloads (http://www14.software.ibm.com/webapp/set2/sas/f/hmcl/home.html).

Notes:

- If the system is partitioned, you must determine the partition owning the I/O slot. Once the adapter is installed, the I/O slot must be powered on in the operating system.
- If an I/O slot on a partitioned system is not owned by a partition, then the I/O slot cannot be powered on.
- Adding an I/O slot to a partition using dynamic logical partitioning (DLPAR) will power on the I/O slot as part of the DLPAR add. For information about DLPAR, see Dynamic Logical Partitioning.
- To learn more about working in a partitioned environment, see Logical partitioning.

If you do not have an HMC, complete this procedure to install a PCI adapter, complete the following steps to install a PCI adapter with the system power off:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. To determine in which slot to place the PCI adapter, refer to the placement guide for information regarding slot restrictions for the adapters that can be used in this system.
4. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
5. Disconnect the power source from the system by unplugging the system.
6. Determine the location of PCI adapter in the system.
7. Remove the PCI adapter cassette by completing the following steps.
   a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 41 on page 68.
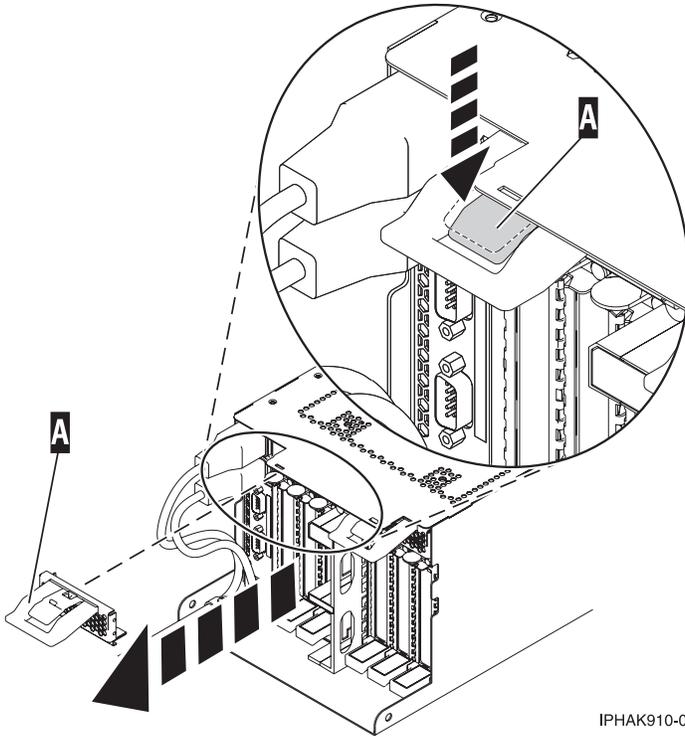
IPHAK910-0

Figure 41. Remove the EMC shield

    b. Lift up the lower cassette handle **(B)** as shown in Figure 42 on page 69. Pull the PCI cassette **(C)** out of the system.
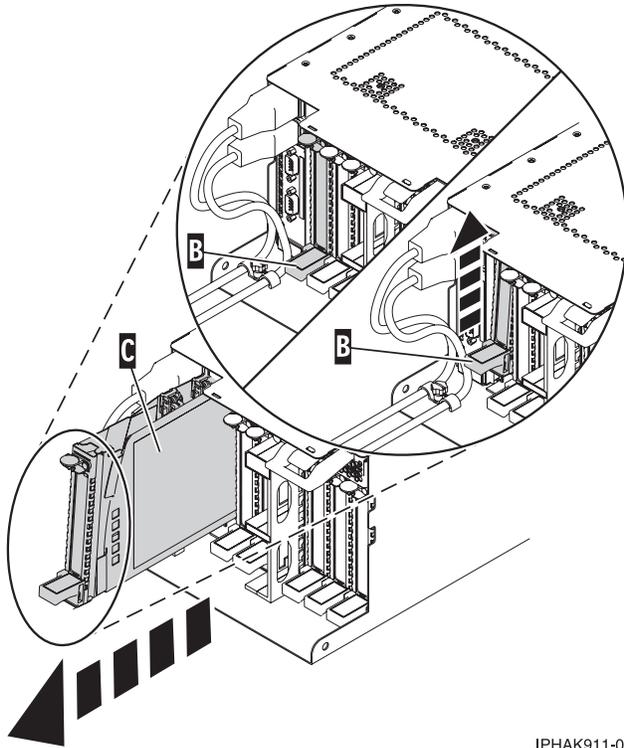
IPHAK911-0

Figure 42. PCI adapter cassette removed from the system unit

8. Install the adapter into the PCI adapter cassette. See the following topics:
   - "PCI adapter single-width, third generation cassette" on page 107
   - "PCI adapter double-wide cassette" on page 120
9. 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.
10. Install the PCI adapter cassette by completing the following steps:
    a. Slide the cassette **(B)** into the cassette slot as shown in Figure 43 on page 70. 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.

IPHAK912-0

Figure 43. PCI adapter cassette installed in the system unit

    b. Replace the EMC shield **(C)** as shown in Figure 44.
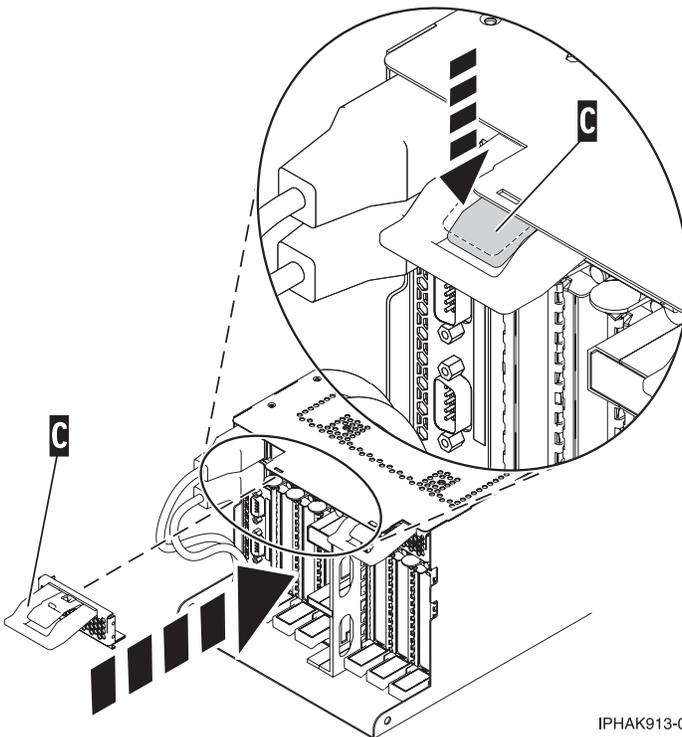
IPHAK913-0

Figure 44. PCI adapter EMC shield in the closed position

11. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.
12. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter contained in a cassette with the power on in the AIX environment

You can install a PCI adapter with the power on in the AIX environment.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

Notes:
- If the system is partitioned, you must determine the partition owning the I/O slot. Once the adapter is installed, the I/O slot must be powered on in the operating system.
- If an I/O slot on a partitioned system is not owned by a partition, then the I/O slot cannot be powered on.
- Adding an I/O slot to a partition using dynamic logical partitioning (DLPAR) will power on the I/O slot as part of the DLPAR add. For information about DLPAR, see Dynamic Logical Partitioning.
- To learn more about working in a partitioned environment, see Logical partitioning.

If you do not have an HMC, complete the following steps to install a PCI adapter with the system power on in the AIX environment:
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. To determine in which slot to place the PCI adapter, refer to the placement guide for information regarding slot restrictions for the adapters that can be used in this system.
4. Refer to "PCI hot-plug manager access for AIX" on page 162, and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
5. 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.
6. Select the appropriate PCI slot from the ones listed on the screen, and press Enter.
7. Locate the PCI adapter slot and cassette you want to use.
8. 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 "Removing a PCI adapter contained in a cassette from the system with the power on in the AIX environment" on page 86.
9. Remove the PCI adapter cassette by completing the following steps.
   a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 45 on page 72.

Figure 45. Remove the EMC shield

  b. Lift up the lower cassette handle **(B)** as shown in Figure 46 on page 73. Pull the PCI cassette **(C)** out of the system.

IPHAK911-0

Figure 46. PCI adapter cassette removed from the system unit

10. Install the adapter into the PCI adapter cassette. See the following topics:
    - "PCI adapter single-width, third generation cassette" on page 107
    - "PCI adapter double-wide cassette" on page 120

11. 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.

12. Install the PCI adapter cassette by completing the following steps:

    a. Slide the cassette **(B)** into the cassette slot as shown in Figure 47 on page 74. 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 47. PCI adapter cassette installed in the system unit

     b. Replace the EMC shield **(C)** as shown in Figure 48.

Figure 48. PCI adapter EMC shield in the closed position

13. Enter `cfgmgr` to configure the adapter.
14. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter contained in a cassette with the power on in the IBM i environment

You can install a PCI adapter with the power on in the IBM i environment.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

Notes:
- If the system is partitioned, you must determine the partition owning the I/O slot. Once the adapter is installed, the I/O slot must be powered on in the operating system.
- If an I/O slot on a partitioned system is not owned by a partition, then the I/O slot cannot be powered on.
- Adding an I/O slot to a partition using dynamic logical partitioning (DLPAR) will power on the I/O slot as part of the DLPAR add. For information about DLPAR, see Dynamic Logical Partitioning.
- To learn more about working in a partitioned environment, see Logical partitioning.

Important:
- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.
- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.
- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make

sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166

- 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.

If you do not have an HMC, complete the following steps to install a PCI adapter with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. To determine in which slot to place the PCI adapter, refer to the placement guide.
4. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:
   a. Type **strsst** on the command line of the Main Menu and press Enter.
   b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
   c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
   d. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
   e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.
   f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.
   g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.
   h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.
   i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.
   j. Select **Toggle LED blink off/on** to stop the blinking LED.
   k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.
5. Locate the PCI adapter slot and cassette you want to use.
6. 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 "Removing a PCI adapter contained in a cassette from the system with the power on in the IBM i environment" on page 89.
7. Remove the PCI adapter cassette by completing the following steps. If not, go to step 8 on page 78.
   a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 49 on page 77.
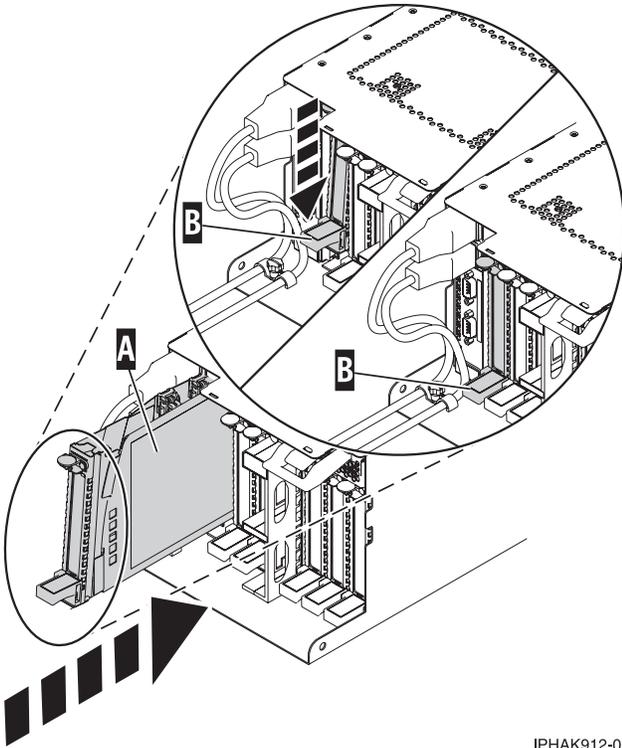
IPHAK910-0

Figure 49. Remove the EMC shield

b. Lift up the lower cassette handle **(B)** as shown in Figure 50 on page 78. Pull the PCI cassette **(C)** out of the system.

*Figure 50. PCI adapter cassette removed from the system unit*

8. Install the adapter into the PCI adapter cassette. See the following topics:
    - "PCI adapter single-width, third generation cassette" on page 107
    - "PCI adapter double-wide cassette" on page 120

9. 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.

10. Install the PCI adapter cassette by completing the following steps: If not, skip to step 11 on page 80
    a. Slide the cassette **(B)** into the cassette slot as shown in Figure 51 on page 79. 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.

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Figure 51. PCI adapter cassette installed in the system unit

    b. Replace the EMC shield **(C)** as shown in Figure 52.
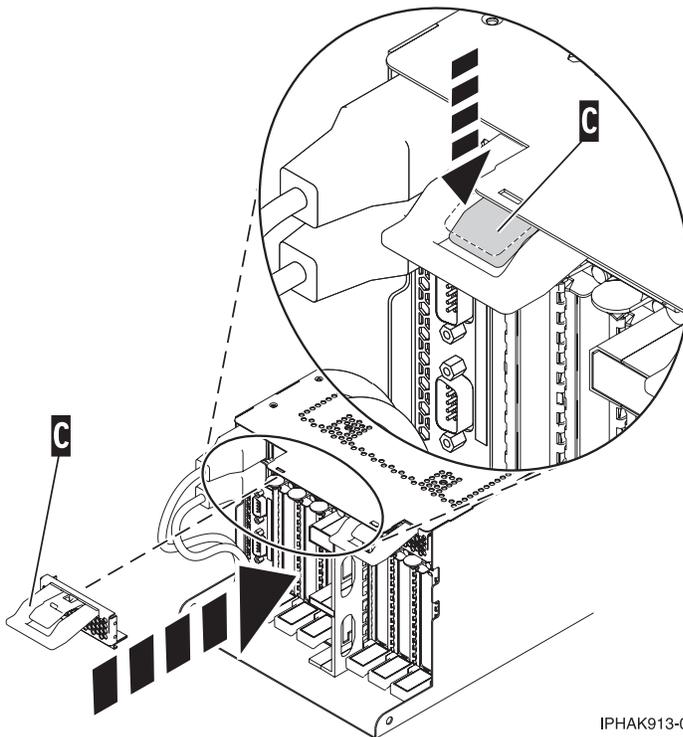
IPHAK913-0

Figure 52. PCI adapter EMC shield in the closed position

11. Attach any cables that should be attached the adapter.
12. From the Hardware Resource Concurrent Maintenance display, complete the following steps:
    a. Select **Power on domain** and press Enter.
    b. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.
    c. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:
       ```
       Power on complete
       ```
13. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter contained in a cassette with the power on in the Linux environment

You can install a PCI adapter with the power on in the Linux environment.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

Notes:
- If the system is partitioned, you must determine the partition owning the I/O slot. Once the adapter is installed, the I/O slot must be powered on in the operating system.
- If an I/O slot on a partitioned system is not owned by a partition, then the I/O slot cannot be powered on.
- Adding an I/O slot to a partition using dynamic logical partitioning (DLPAR) will power on the I/O slot as part of the DLPAR add. For information about DLPAR, see Dynamic Logical Partitioning.
- To learn more about working in a partitioned environment, see Logical partitioning.

If you do not have an HMC, complete the following steps to install a PCI adapter with the system power on in the Linux environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. To determine in which slot to place the PCI adapter, refer to the placement guide for information regarding slot restrictions for the adapters that can be used in this system.
4. Log in to the system console as the root user.
5. 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
   ```
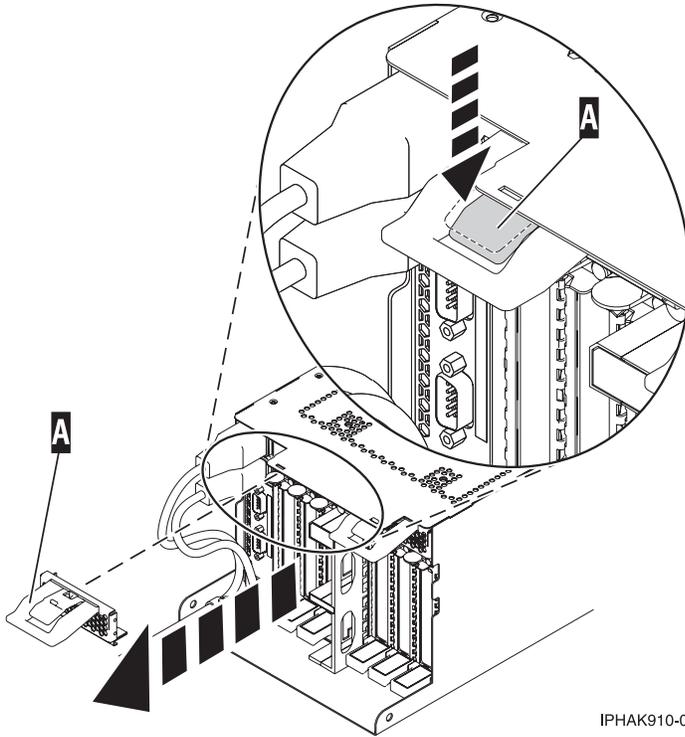
   Select the appropriate empty PCI slot from the ones listed by the command.
6. Remove the PCI adapter cassette by completing the following steps.
    a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 53 on page 81.
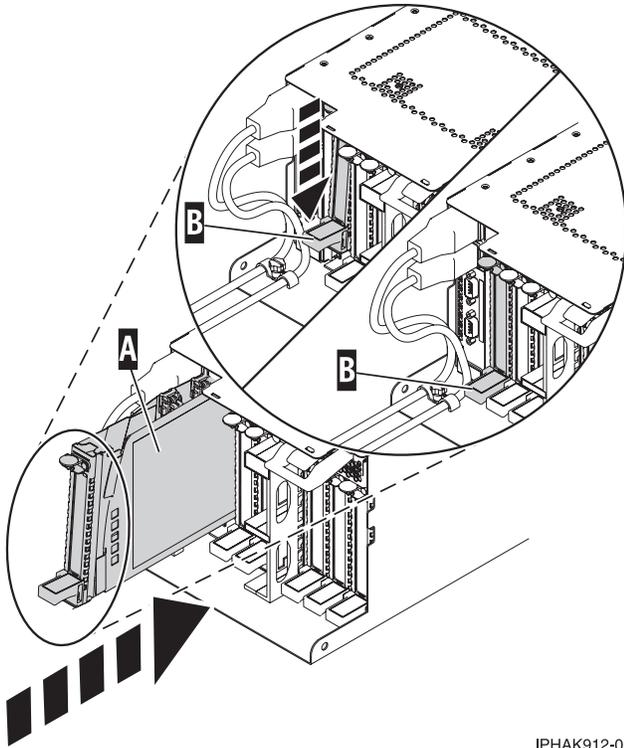
IPHAK910-0

Figure 53. Remove the EMC shield

b. Lift up the lower cassette handle **(B)** as shown in Figure 54 on page 82. Pull the PCI cassette **(C)** out of the system.
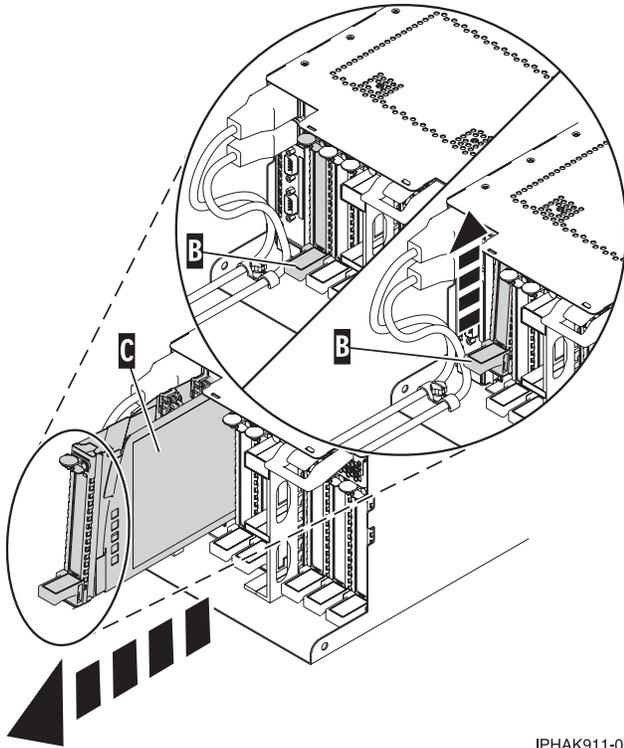
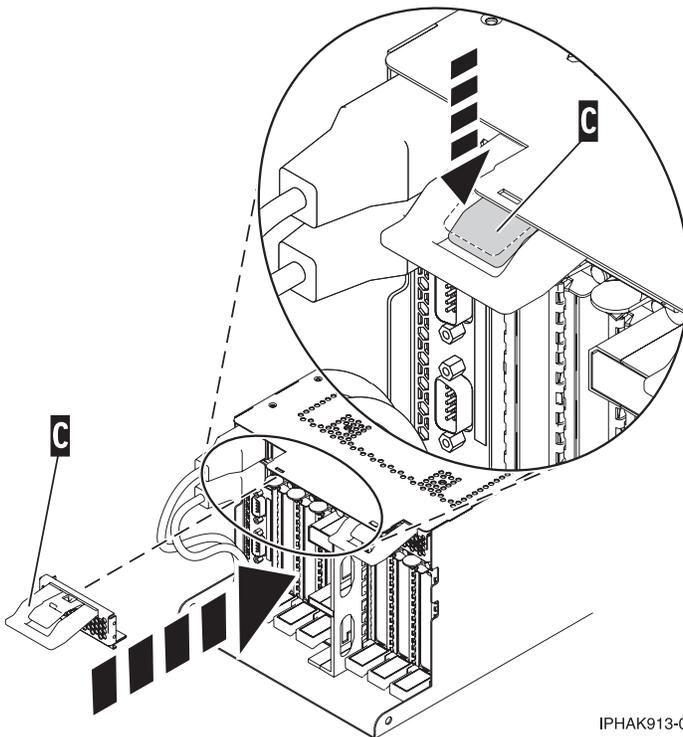*Figure 54. PCI adapter cassette removed from the system unit*

7. Install the adapter into the PCI adapter cassette. See the following topics:
   - "PCI adapter single-width, third generation cassette" on page 107
   - "PCI adapter double-wide cassette" on page 120

8. 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.

9. Run the **drmgr** command to enable an adapter to be installed.

   For example, to install an adapter in slot U7879.001.DQD014E-P1-C3, run:

   ```
   drmgr -c pci -r -s locationcode
   ```

   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.
   ```

10. 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.
    ```

11. Install the PCI adapter cassette by completing the following steps: If not, skip to step 12 on page 84.

    a. Slide the cassette **(B)** into the cassette slot as shown in Figure 55 on page 83. 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.
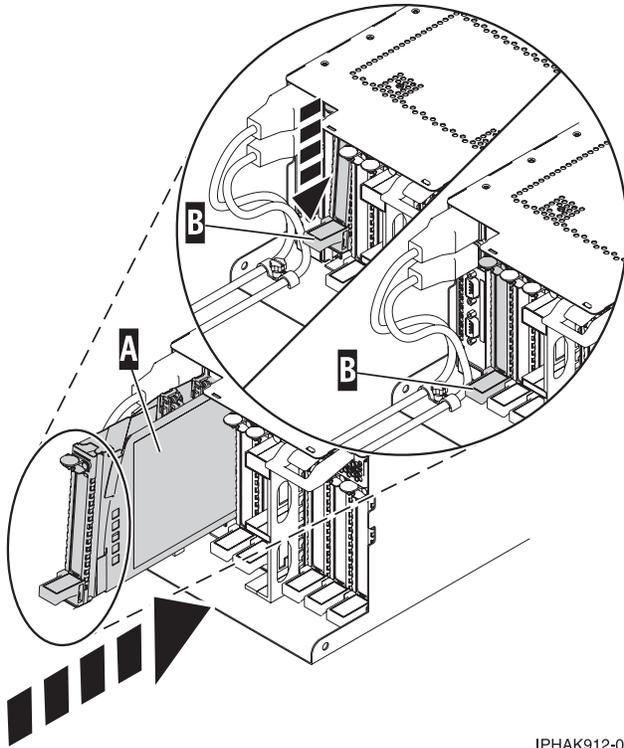
Figure 55. PCI adapter cassette installed in the system unit

IPHAK912-0

    b. Replace the EMC shield **(C)** as shown in Figure 56.
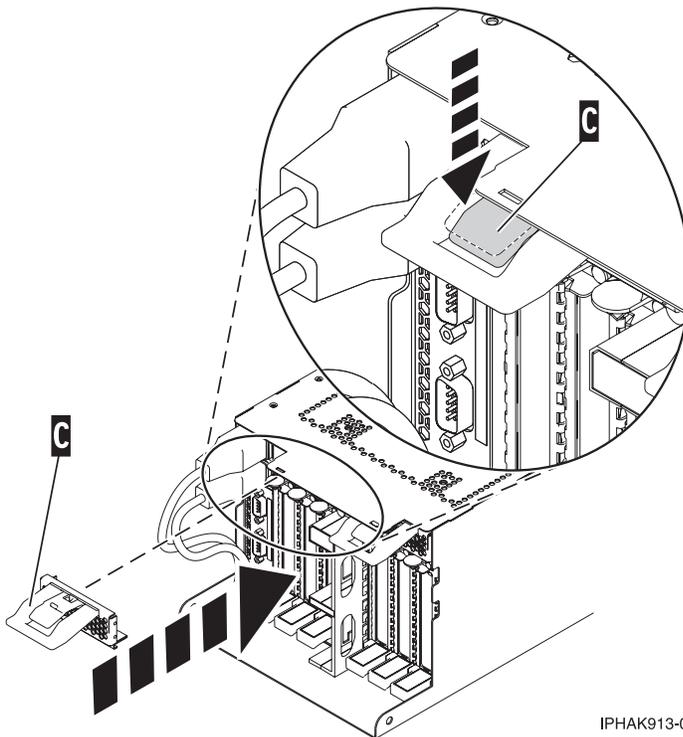
IPHAK913-0

Figure 56. PCI adapter EMC shield in the closed position

12. 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
    ```

Removing a PCI adapter contained in a cassette from the system

You can remove a PCI adapter.

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

You can remove a PCI adapter with the system power off.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power off:
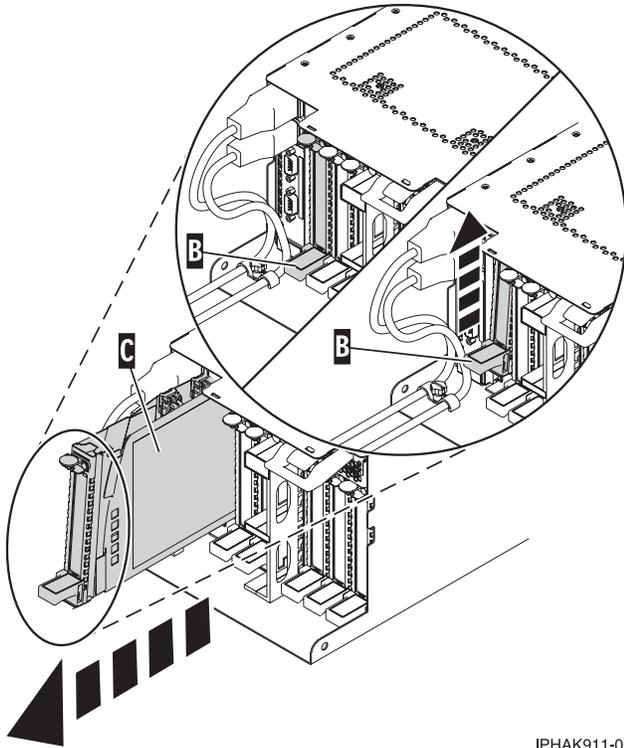
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
4. Disconnect the power source from the system by unplugging the system.
5. Determine the location of PCI adapter in the system.
6. Remove the PCI adapter cassette from the system by completing the following steps:
    a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 57 on page 85.

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Figure 57. Remove the EMC shield

   b. Lift up the lower cassette handle **(B)** as shown in Figure 58 on page 86. Pull the PCI cassette **(C)** out of the system.

Figure 58. PCI adapter cassette removed from the system unit

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

   Note: The cover will have a label on it.

8. To remove the adapter from the cassette, refer to "PCI adapter single-width and double-width cassettes" on page 140.

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

You can remove a PCI adapter with the system power on in the AIX environment.

Notes:

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 "Installing a PCI adapter contained in a cassette with the power on in the AIX environment" on page 71.

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.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.

If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power on in the AIX environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.

2. Determine the location of PCI adapter in the system.
3. Record the slot number and location of each adapter being removed.

    Note: Adapter slots are numbered on the rear of the system unit.
4. Ensure that any processes or applications that might use the adapter are stopped.
5. Follow these steps to remove a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:
    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.
6. Label, and then disconnect all cables attached to the adapter you plan to remove.
7. Before handling any PCI adapter, see "Handling static-sensitive devices" on page 159.
8. Remove the PCI adapter cassette from the system. Follow these substeps:
    a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 59 on page 88.
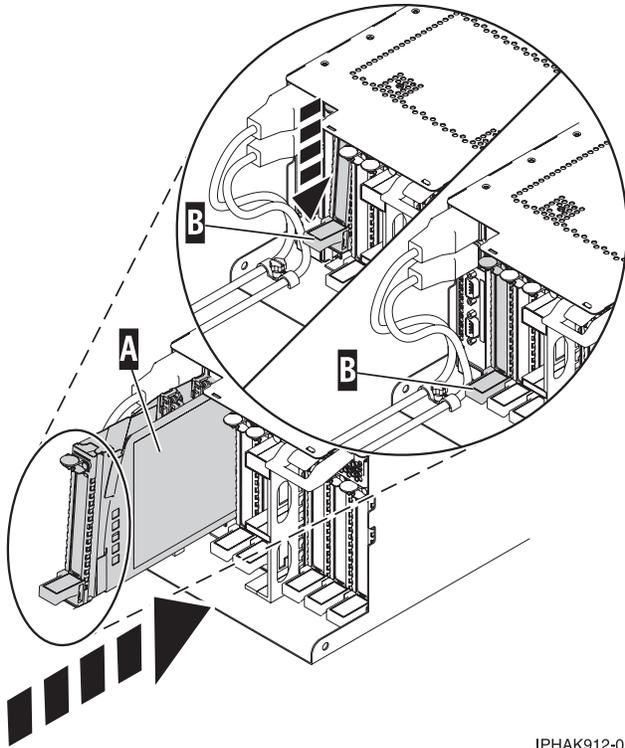
Figure 59. Remove the EMC shield

    b. Lift up the lower cassette handle **(B)** as shown in Figure 60 on page 89. Pull the PCI cassette **(C)** out of the system.

IPHAK911-0

*Figure 60. PCI adapter cassette removed from the system unit*

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

   Note: The cover will have a label on it.

10. Continue to follow the screen instructions until you receive a message that the adapter removal is successful. Successful removal is indicated by the 0K message displayed next to the Command field at the top of the screen.

11. 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 6 on page 87.

    or

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

12. Press F10 to exit the Hot-Plug Manager.

13. Run the **diag -a** command. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.

14. Place an empty cassette into the unused PCI slot for proper air flow. The procedure is complete.

    - To install an adapter in the system, see "Installing a PCI adapter contained in a cassette with the power on in the AIX environment" on page 71.

Removing a PCI adapter contained in a cassette from the system with the power on in the IBM i environment

You can remove a PCI adapter with the system power on in the IBM i environment.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

Important:

- If the adapter is the load source I/O adapter (IOA) or the load source I/O processor (IOP), or any other storage IOA or IOP with critical disk storage attached for the system or partition, follow the

on-screen instructions when you use HSM to power down the IOP or IOA. Instructions to use functions 68 and 69 on the control panel will be included.

- If the adapter is the console IOA or the console IOP for the system or partition, you must perform the maintenance from an IBM i operating system session connected through a different IOA or IOP, or you must power down the partition to perform maintenance.
- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166
- 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.

If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.

3. If you are removing a failing PCI adapter, see Identifying a failing part. If you are removing the PCI adapter for other reasons, continue to the next step.

4. Determine the location of PCI adapter in the system.

5. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:

   a. Type **strsst** on the command line of the Main Menu and press Enter.

   b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.

   c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.

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

   e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.

   f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.

   g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.

   h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.

   i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.

   j. Select **Toggle LED blink off/on** to stop the blinking LED.

   k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.

6. Remove the PCI adapter cassette from the system. Follow these substeps:

   a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 61.
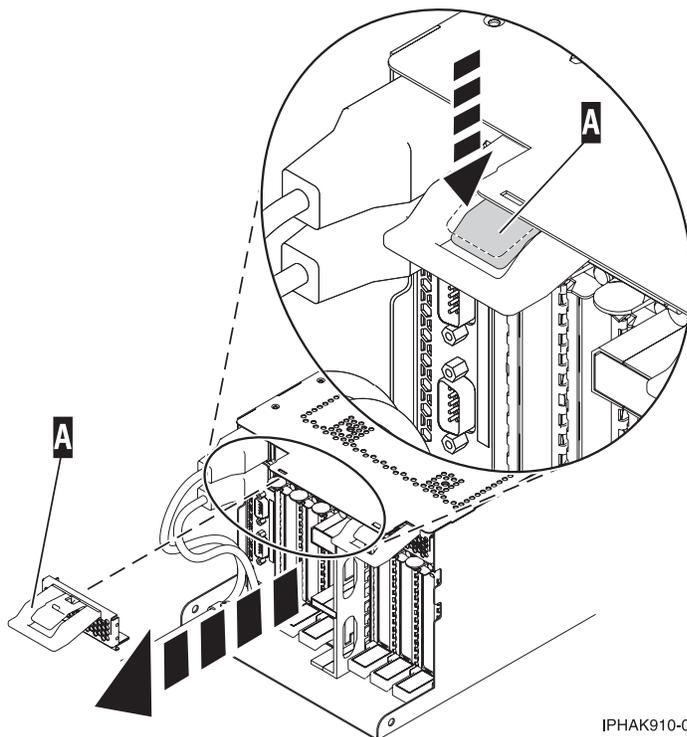
IPHAK910-0

Figure 61. Remove the EMC shield

b. Lift up the lower cassette handle **(B)** as shown in Figure 62. Pull the PCI cassette **(C)** out of the system.
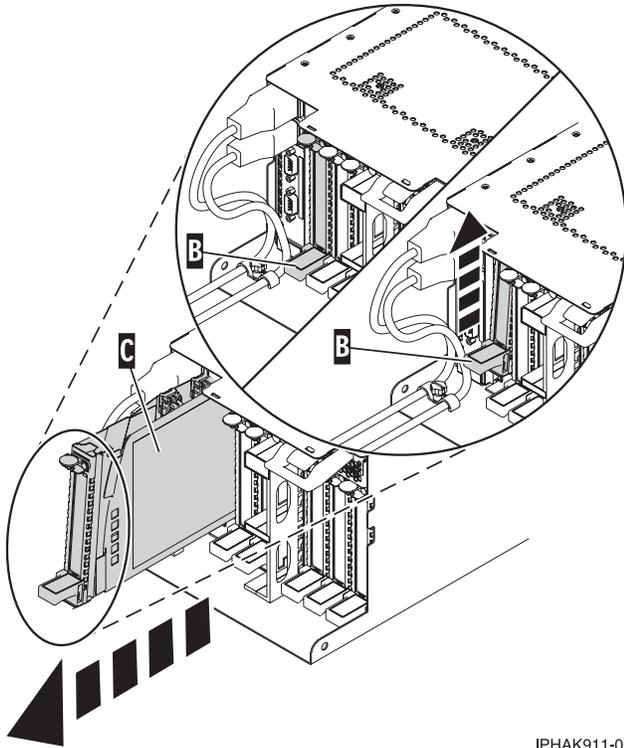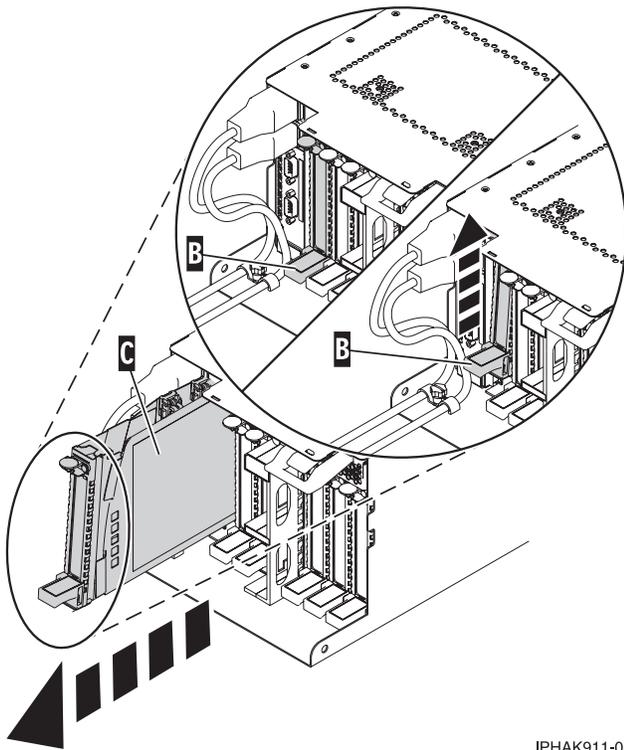

IPHAK911-0

Figure 62. PCI adapter cassette removed from the system unit

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

   Note: The cover will have a label on it.

8. Remove the adapter from the PCI adapter cassette.

To replace the adapter in the system, see "Replacing a PCI adapter contained in a cassette in the system" on page 94.

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

You can remove a PCI adapter with the system power on in the Linux environment.

If your system is managed by a HMC, use the HMC to complete the steps for removing a part from the system. For instructions, see "Removing a part by using the HMC" on page 177.
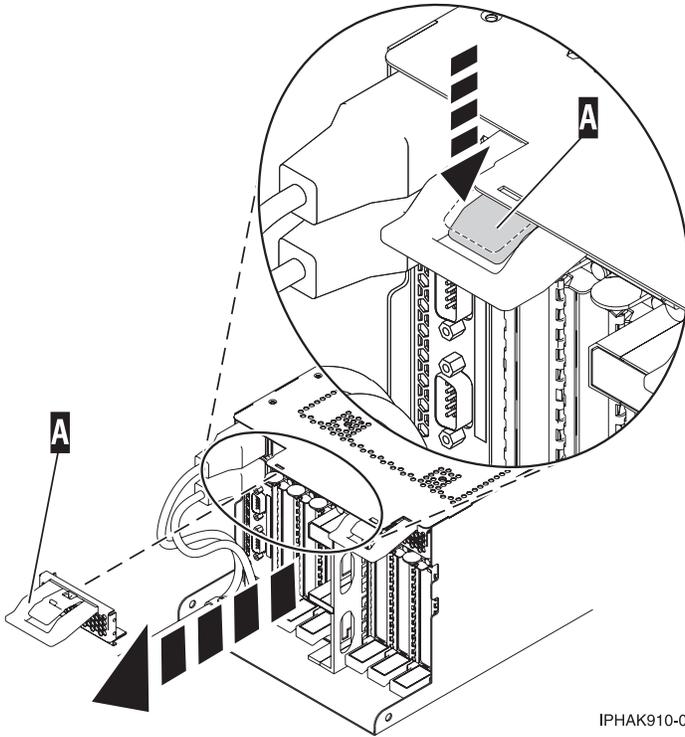
If you do not have an HMC, complete the following steps to remove a PCI adapter with the system power on in the Linux environment:

1. Ensure that the system meets the "Prerequisites for hot-plugging PCI adapters in Linux" on page 165.

2. Verify that the Linux, hot-plug PCI tools are installed. See "Verifying that the hot-plug PCI tools are installed for Linux" on page 165.

3. Complete the prerequisite tasks that are described in "Before you begin" on page 175.

4. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.

5. Determine the location of PCI adapter in the system.
6. Label, and then disconnect all cables attached to the adapter you plan to remove.
7. Run the **drmgr** 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:

   `drmgr -c pci -r -s locationcode`

   Follow the instructions on the display to complete the task.
8. Remove the PCI adapter cassette from the system. Follow these steps:

   a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 63.
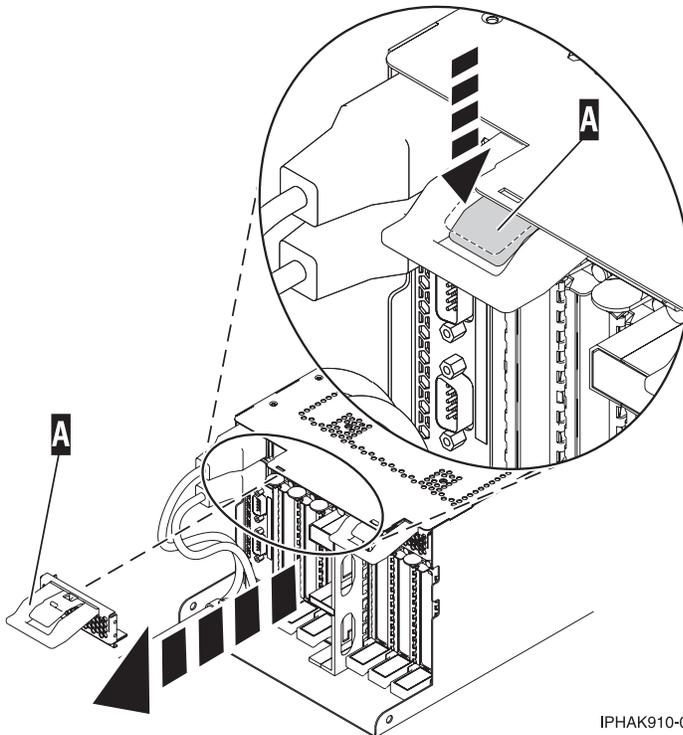
IPHAK910-0

Figure 63. Remove the EMC shield

   b. Lift up the lower cassette handle **(B)** as shown in Figure 64 on page 94. Pull the PCI cassette **(C)** out of the system.
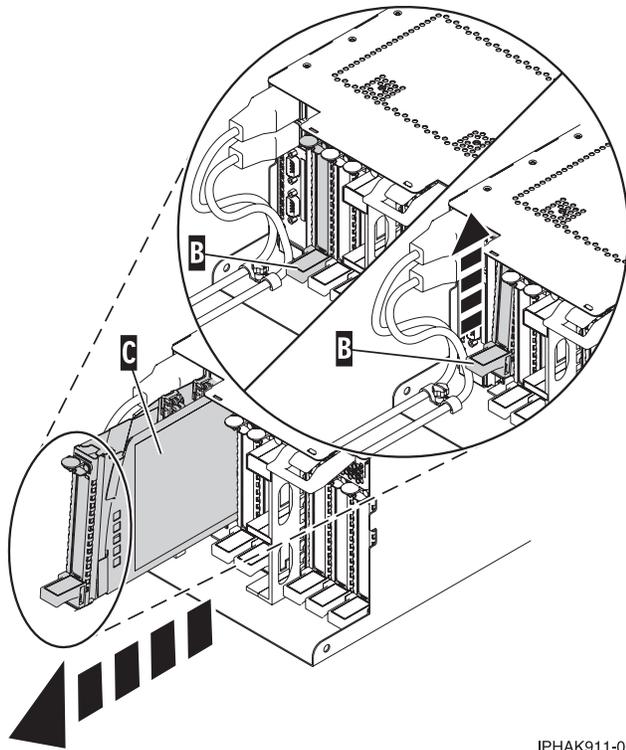
IPHAK911-0

Figure 64. PCI adapter cassette removed from the system unit

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

   Note: The cover will have a label on it.

10. Remove the adapter from the PCI adapter cassette.

To replace the adapter in the system, see "Replacing a PCI adapter contained in a cassette in the system with the power on in the Linux environment" on page 104.

Replacing a PCI adapter contained in a cassette in the system

You can replace a PCI adapter.

Important:

- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  - Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  - If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  – Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  – If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.

- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166

- 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.

Replacing a PCI adapter contained in a cassette in the system with the power off

You can replace a PCI adapter with the system power off.

Attention: You must have already completed the procedure "Removing a PCI adapter contained in a cassette from the system with the power off" on page 84 in order to have the slot powered off.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power off:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If the adapter needs to be placed in a PCI adapter cassette, see one of the following topics:
   - "PCI adapter single-width, third generation cassette" on page 107
   - "PCI adapter double-wide cassette" on page 120
4. At the rear of the system, identify the cassette slot you want to use.
5. 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.
6. Replace the PCI adapter cassette in the system by completing the following steps:
   a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 65 on page 96.

IPHAK910-0

Figure 65. Remove the EMC shield

b. Slide the cassette **(B)** into the cassette slot as shown in Figure 66 on page 97. 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.
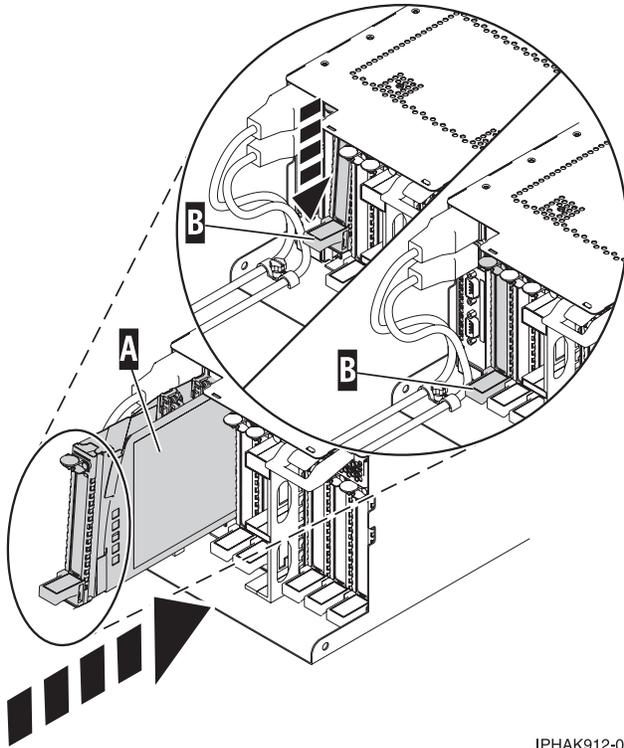
IPHAK912-0

Figure 66. PCI adapter cassette installed in the system

   c. Replace the EMC shield **(C)** as shown in Figure 67.
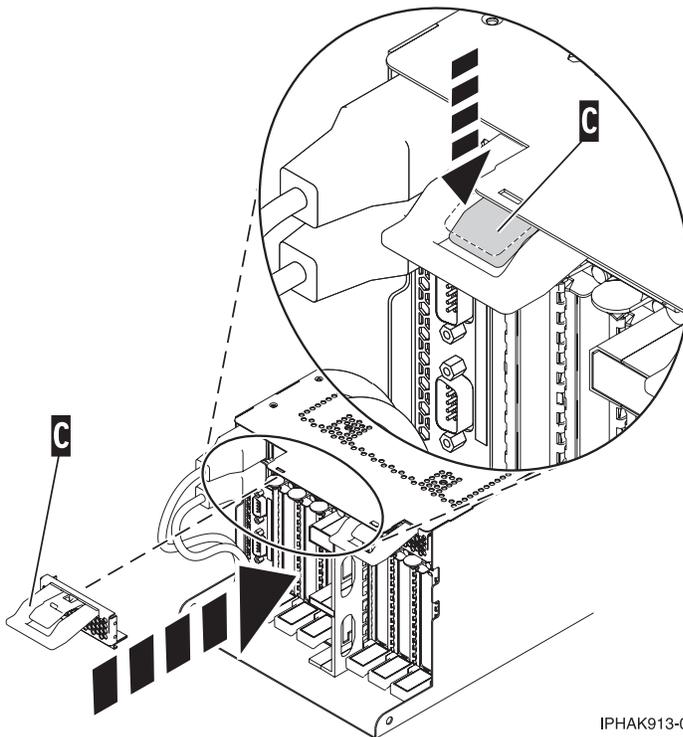
IPHAK913-0

Figure 67. PCI adapter EMC shield in the closed position

7. Reconnect the system to the power source.

8. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.

9. Verify the installed part.

   - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.

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

Removing and replacing a PCI adapter contained in a cassette in the system with the power on in the AIX environment

You can replace a PCI adapter with the system power on in the AIX environment.

Important:

1. Use this procedure if you intend to remove a failing PCI adapter and replace it with the same type of adapter.

2. If you plan to remove a failing adapter and leave the slot empty, see "Removing a PCI adapter contained in a cassette from the system with the power on in the AIX environment" on page 86.

3. This procedure should not be used to remove an existing adapter and install a different type of adapter. To install a different adapter, remove the existing adapter as described in "Removing a PCI adapter contained in a cassette from the system with the power on in the AIX environment" on page 86, and then install the new adapter as described in "Installing a PCI adapter contained in a cassette with the power on in the AIX environment" on page 71.

4. 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.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power on in the AIX environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.

2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.

3. Determine the location of the PCI adapter in the system.

4. Record the slot number and location of each adapter being removed.

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

5. Ensure that any processes or applications that might use the adapter are stopped.

6. Follow these steps to replace a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:

   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 YES 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 F3 (or Esc +3) 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 **Replace**. 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.

7. Label, and then disconnect all cables attached to the adapter you plan to remove.

8. Remove the PCI adapter cassette from the system. Follow these substeps:

a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 68.
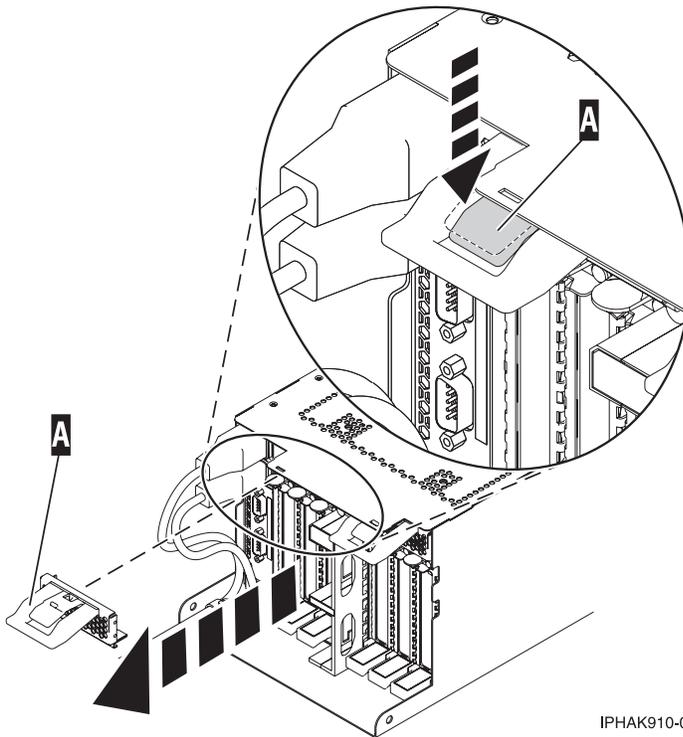
IPHAK910-0

Figure 68. Remove the EMC shield

b. Lift up the lower cassette handle **(B)** as shown in Figure 69 on page 100. Pull the PCI cassette **(C)** out of the system.
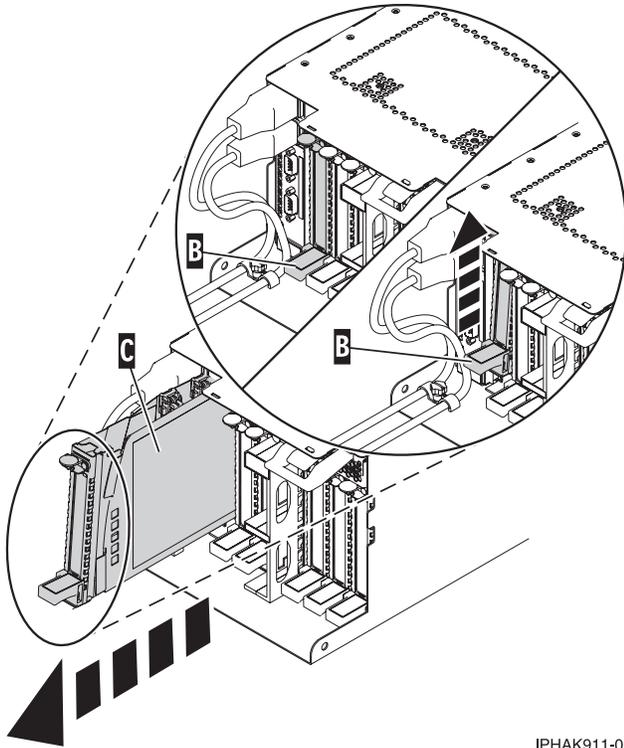
Figure 69. PCI adapter cassette removed from the system unit

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

   Note: The cover will have a label on it.

10. Install the adapter into the PCI adapter cassette. See the following topics:
    * "PCI adapter single-width, third generation cassette" on page 107
    * "PCI adapter double-wide cassette" on page 120

11. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.

12. 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.

13. Install the PCI adapter cassette by completing the following steps:

    a. Slide the cassette **(B)** into the cassette slot as shown in Figure 70 on page 101. 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.
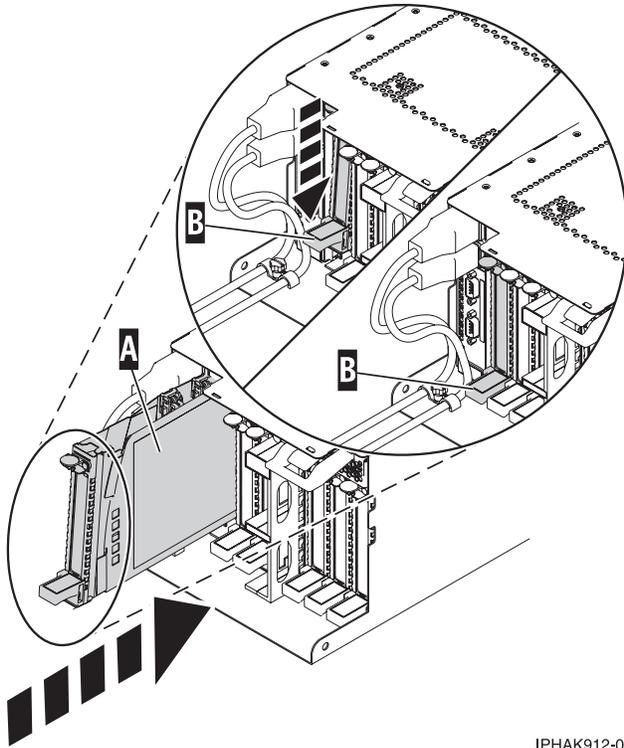
Figure 70. PCI adapter cassette installed in the system unit

  b. Replace the EMC shield **(C)** as shown in Figure 71.
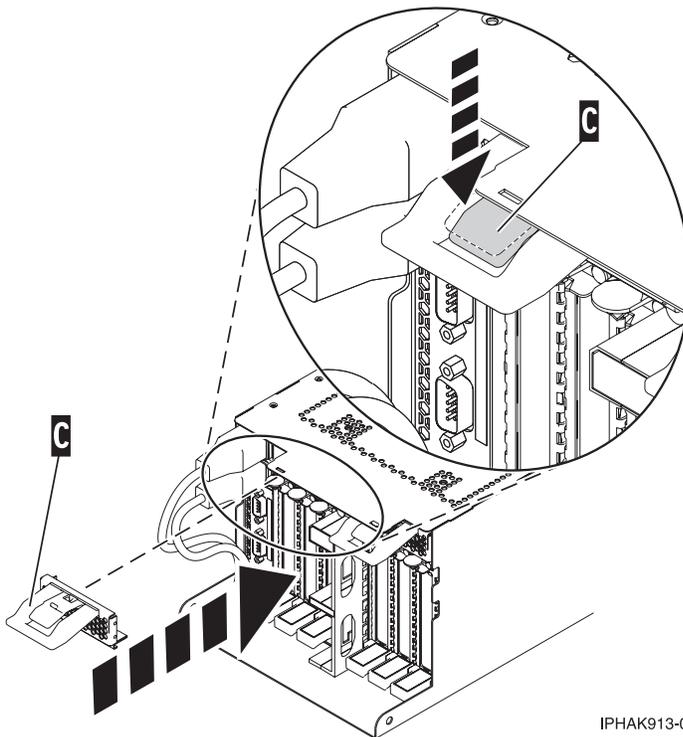
Figure 71. PCI adapter EMC shield in the closed position

14. Follow these steps to complete the PCI Hot Plug menus in the AIX Diagnostic tools and configure the device:

    a. Press enter and continue to follow the instructions in the system diagnostics until you receive a message that the replacement is successful. Successful replacement is indicated by the OK message displayed next to the **Command** field at the top of the menu.

    b. Press the F3 (or Esc+3) key to return to the **PCI Hot-Plug Manager** menu.

    c. Press the F3 (or Esc+3) key to return to the **TASK** selection list.

    d. Select **Log Repair Action**.

    e. Select the resource just replaced, press Enter, press Commit (F7 or ESC 7), then press Enter.

    f. Press F3 (or Esc+3) to return to **TASK Selection List**.

    g. Select **Hot Plug Task**, press enter.

    h. Select **PCI Hot Plug Manager**, then select **Configure a defined device**, then press Enter.

    i. Select the device just replaced from the list, then press Enter. The device is now configured.

    j. Press the F10 key to exit the diagnostic program.

    Note: If you are running the stand-alone diagnostics, do not exit the program completely.

15. Verify the PCI adapter by using the following instructions:

    a. Did you replace the adapter with the system power on?
       - Yes - Go to the next step.
       - No - Load the diagnostic program by doing the following:
         - If AIX is available, boot AIX, log in as root or CELOGIN, and then enter the **diag** command.

    b. Type the **diag** command if you are not already displaying the diagnostic menus

    c. Select **Advance Diagnostic Routines**, and then select **Problem Determination**.

    d. Select the name of the resource just replaced from the menu. If the resource just replaced is not shown, choose the resource associated with it. Press Enter, and then press **Commit** ((F7 or Esc+7)).

    e. Did the Problem Determination identify any problems?
       - No: Continue to the next step.
       - Yes: A problem is identified
         - If you are a customer, record the error information, and then contact your service provider.
         - If you are an authorized service provider, return to map 210-5.

16. Press the F10 key to exit the diagnostic program.

Replacing a PCI adapter contained in a cassette in the system with the power on in the IBM i environment

You can replace a PCI adapter with the system power on in the IBM i environment.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

Attention: You must have already completed the procedure "Removing a PCI adapter contained in a cassette from the system with the power on in the IBM i environment" on page 89 to have the slot powered off.

Important:

- If the adapter is the load source I/O adapter (IOA) or the load source I/O processor (IOP), or any other storage IOA or IOP with critical disk storage attached for the system or partition, follow the on-screen instructions when you use HSM to power down the IOP or IOA. Instructions to use functions 68 and 69 on the control panel will be included.

- If the adapter is the console IOA or the console IOP for the system or partition, you must perform the maintenance from an IBM i operating system session connected through a different IOA or IOP, or you must power down the partition to perform maintenance.
- If you are removing, installing or replacing a PCI-X double-wide, quad-channel Ultra320 SCSI RAID controller, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this double-wide adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  – Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  – If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.
- If you are removing, installing or replacing a PCI-X DDR 1.5 GB cache SAS RAID Adapter, note the following concurrent maintenance information before proceeding with the instructions provided here. Concurrent maintenance of this adapter is not supported through the HMC. Concurrent maintenance must be done from within the partition operating system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must manually power off and on each slot separately.

  Note:
  – Both PCI slots must be powered off when installing or removing this adapter with the system power on.
  – If this adapter is the load source IOA, or any other storage IOA with critical storage devices attached to the system, this concurrent maintenance procedure should be performed by a qualified service provider.
- Fibre Channel Adapters (5735 or 5774) installed in IBM i OS logical partitions will post errors at initial program load (IPL) if there is no device or wrap plug attached to each of the adapter's ports. Make sure that every Fibre Channel Adapter (5735 or 5774) that is installed in IBM i OS logical partition has either a wrap plug or a device attached to each of the adapter's ports. If you are exchanging a 5735 or 5774 Fibre Channel IOA, the external storage subsystem must be updated to use the worldwide port name of the new 5735 or 5774 IOA. For instructions, see "Updating the worldwide port name for a new 5735 or 5774 IOA." on page 166
- 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.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power on in the IBM i environment:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If the adapter needs to be placed in the PCI adapter cassette, see "PCI adapter single-width and double-width cassettes" on page 140.
4. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.

5. 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.
6. Remove the PCI adapter cassette from the system.
7. From the Hardware Resource Concurrent Maintenance display, complete the following steps:
   a. Select **Power on domain** and press Enter.
   b. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.
   c. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:

   ```
   Power on complete
   ```
8. Verify the installed part.
   - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
   - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Replacing a PCI adapter contained in a cassette in the system with the power on in the Linux environment

You can replace a PCI adapter.

You must have already completed the procedure "Removing a PCI adapter contained in a cassette from the system with the power on in the Linux environment" on page 92 in order to have the slot powered off.

Note: Use this procedure only when you are replacing an adapter with an identical adapter. If you are replacing an adapter with an adapter that is not identical to the adapter removed, go to "Removing a PCI adapter contained in a cassette from the system with the power on in the Linux environment" on page 92 and "Installing a PCI adapter contained in a cassette with the power on in the Linux environment" on page 80.

If your system is managed by an HMC, use the HMC to complete the steps for replacing the part in the system. For instructions, see "Replacing a part by using the HMC" on page 178.

If you do not have an HMC, complete the following steps to replace a PCI adapter with the system power on in the Linux environment:
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If the adapter needs to be placed in the PCI adapter cassette, see "PCI adapter single-width and double-width cassettes" on page 140.
4. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.
5. 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.
6. Run the **drmgr** command to enable an adapter to be replaced:

   For example, to replace the PCI adapter in slot U7879.001.DQD014E-P1-C3 run this command:

   ```
   drmgr -c pci -r -s locationcode
   ```

   Follow the instructions on the display to complete the task.
7. Remove the PCI adapter cassette from the system. Follow these substeps.
   a. Remove the PCI adapter EMC shield **(A)** as shown in Figure 72 on page 105.

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Figure 72. Remove the EMC shield

b. Slide the cassette **(B)** into the cassette slot as shown in Figure 73 on page 106. 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.

IPHAK912-0

Figure 73. PCI adapter cassette installed in the system

    c. Replace the EMC shield **(C)** as shown in Figure 74.

IPHAK913-0

Figure 74. PCI adapter EMC shield in the closed position

8. 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
```

PCI adapter single-width, third generation 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.

Placing a PCI adapter in a single-width, third generation cassette

You can place a PCI adapter in a single-width cassette.

To place a PCI adapter in a cassette, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Remove any shipping handles or brackets attached to the adapter.
4. Remove the cassette cover by completing the following steps:
   a. Slide the cover latch **(A)** to disengage it from the pivot pin **(C)** as shown in Figure 75.
   b. Lift the cover **(B)** off of the pivot pin.
   c. Slide the cover off of the cassette.

IPHAK520-0
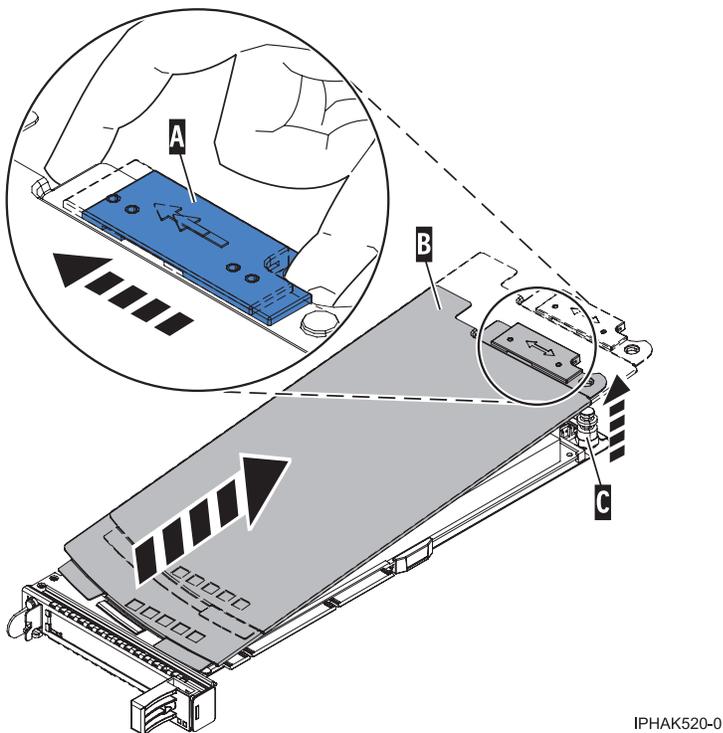
Figure 75. PCI adapter single-width cassette cover removed

5. Ensure the cassette is prepared to receive an adapter by doing the following actions:
   a. Ensure the cassette is empty by doing one of the following action:

- "Removing an adapter from the PCI adapter single-width, third generation cassette" on page 117.
- 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 76.

IPHAK533-0
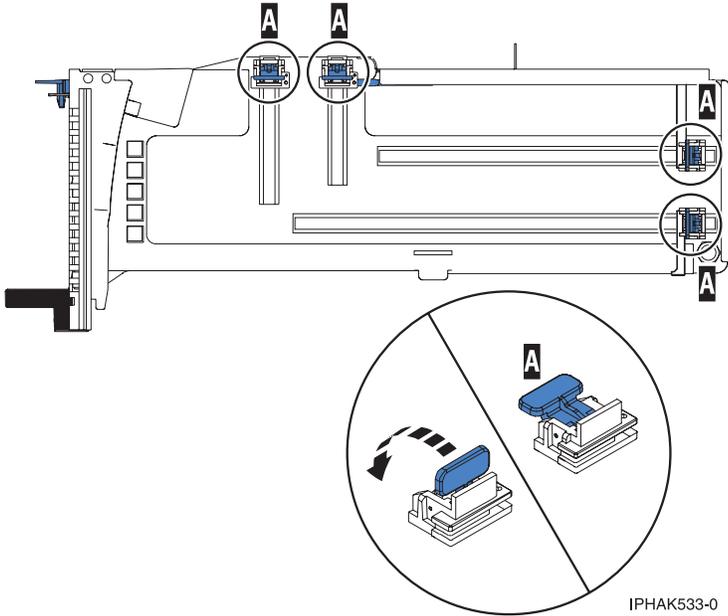
Figure 76. Adapter retainers

c. Rotate the tailstock clamp into the open position.
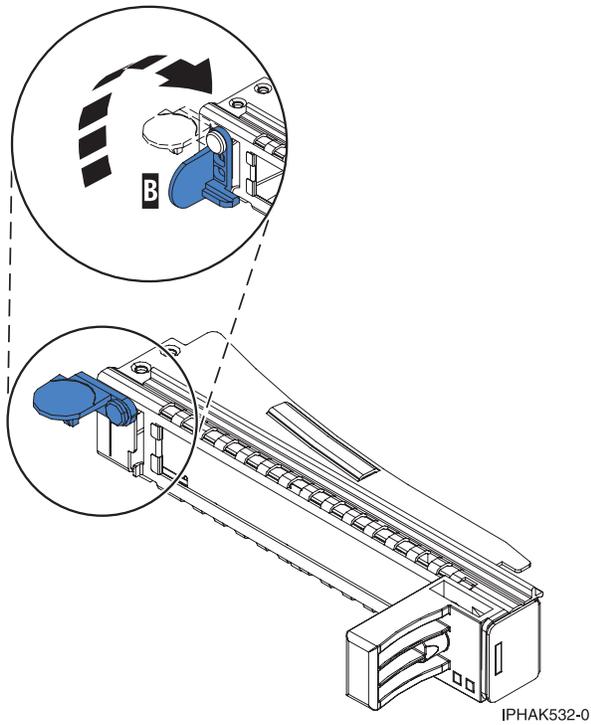
Figure 77. Tailstock clamp in the open position

6. Place the adapter in the cassette by completing the following steps:

   a. With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel **(A)**. See Figure 78 on page 110.

   b. Rotate the adapter toward the top of the cassette and into place.

   c. Close the tailstock clamp **(B)**. See Figure 78 on page 110.
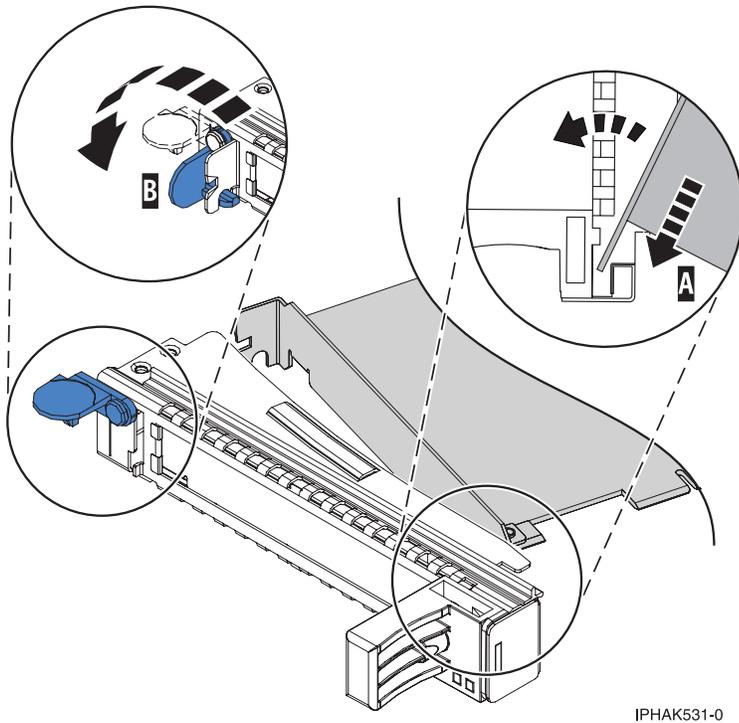
Figure 78. Adapter removed from the PCI adapter single-width cassette

d. Position the adapter retainers to support the adapter, and then rotate the retainer clip into the closed position.

Notes:

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 79 on page 111.

   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.
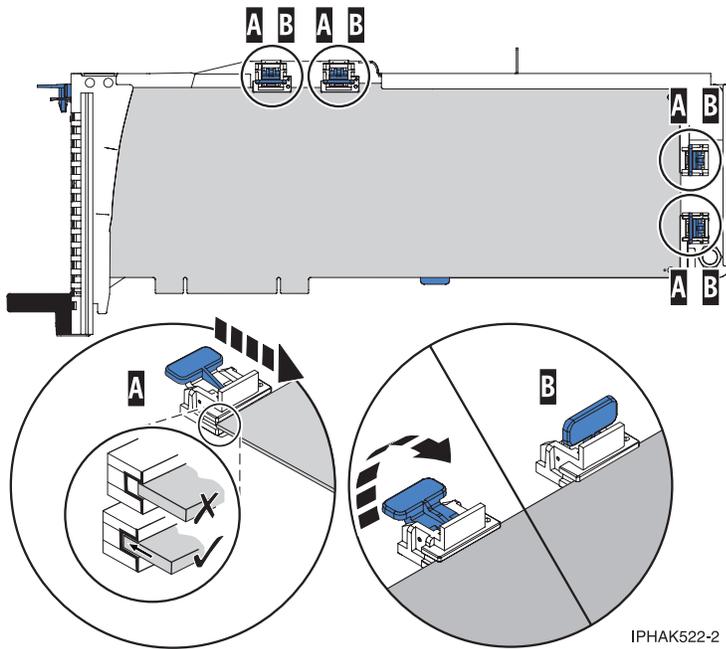
Figure 79. Large adapter in the PCI adapter cassette with the supports and stabilizer in place

Adapter-cassette retainer placement for medium-length adapters

a) Remove the adapter stabilizer **(C)**. See Figure 80 on page 112.

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.
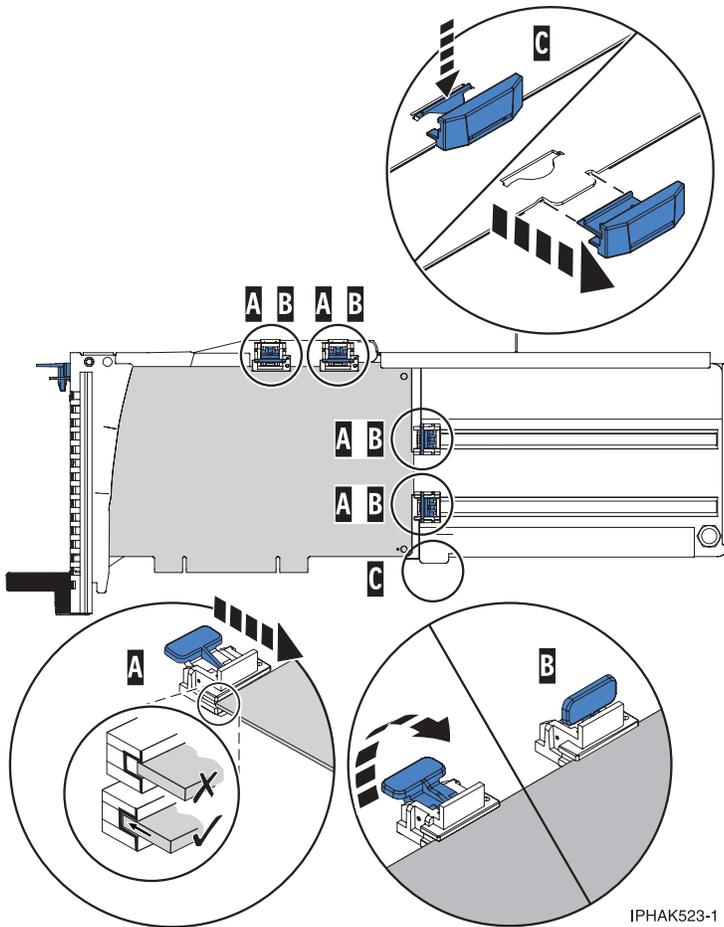
Figure 80. Medium-length adapter in the PCI adapter cassette with the supports in place

Adapter-cassette retainer placement for small adapters

a) Remove the adapter stabilizer **(C)**. See Figure 81 on page 113.

b) 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.

c) Place and lock the retainers **(B)**.

d) 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.

Figure 81. Small 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.
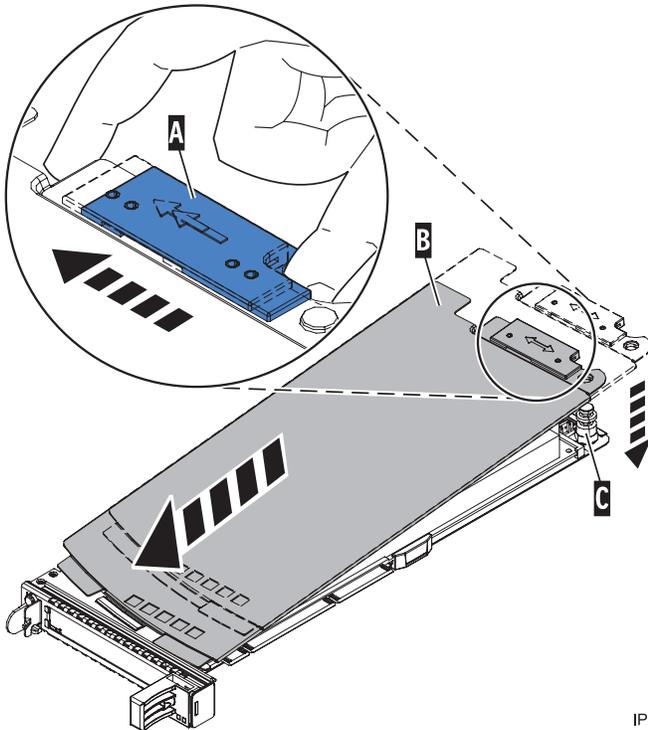
IPHAK530-0

Figure 82. PCI adapter cassette cover replaced

Placing a 4-Port USB PCI Express Adapter in a single-width, third generation cassette

You can place a 4-Port USB PCI Express Adapter (FC 2728; CCIN 57D1) in a single-width cassette.

To place a PCI adapter in a cassette, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Remove the cassette from the system.
4. Remove the cassette cover by doing the following steps:
   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.

Figure 83. PCI adapter single-width cassette cover removed

5. Ensure that the cassette is empty.
6. Place the adapter in the cassette by doing the following steps:
   a. With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel **(A)**. See Figure 84 on page 116.
   b. Rotate the adapter toward the top of the cassette and into place.
   c. Close the tailstock clamp **(B)**. See Figure 84 on page 116.
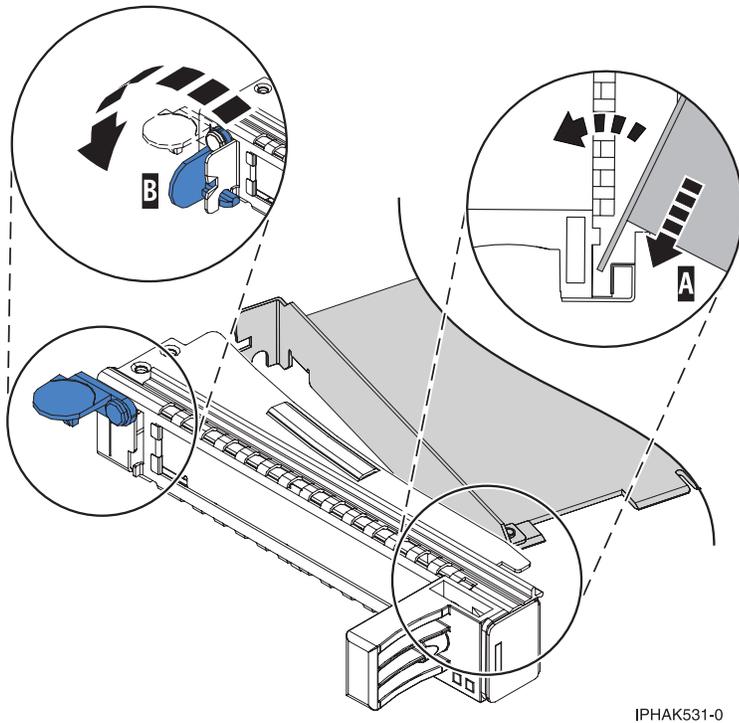
Figure 84. Placing the PCI adapter single-width cassette

    d. Position the adapter retainer to support the adapter.
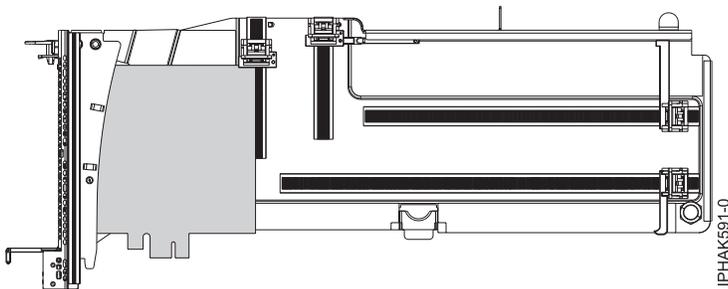
Figure 85. Side view of adapter in cassette

7. Replace the cassette cover by doing the following steps:
   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.
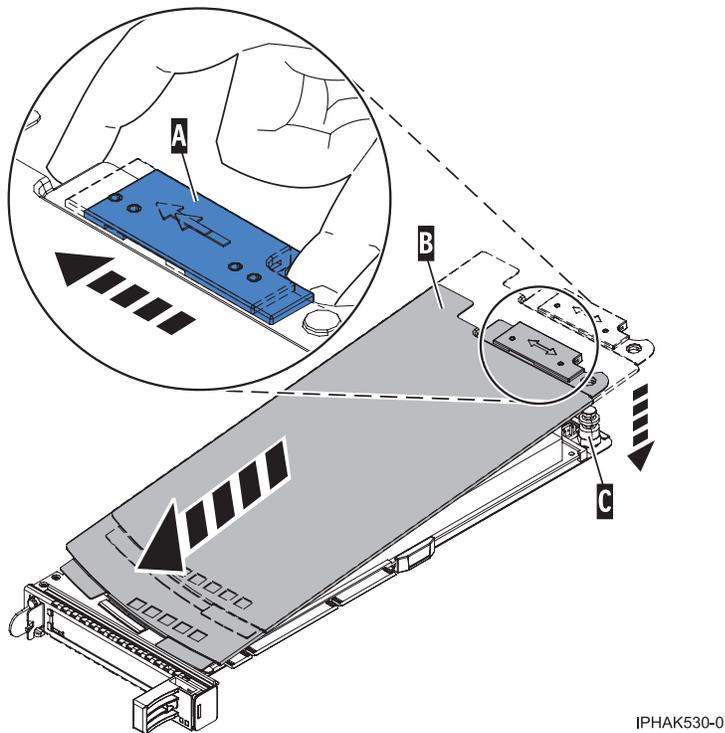
Figure 86. PCI adapter cassette cover replaced

8. Replace the PCI adapter cassette **(B)** in the system. See the following figure.

9. Install the EMC grill **(A)**.
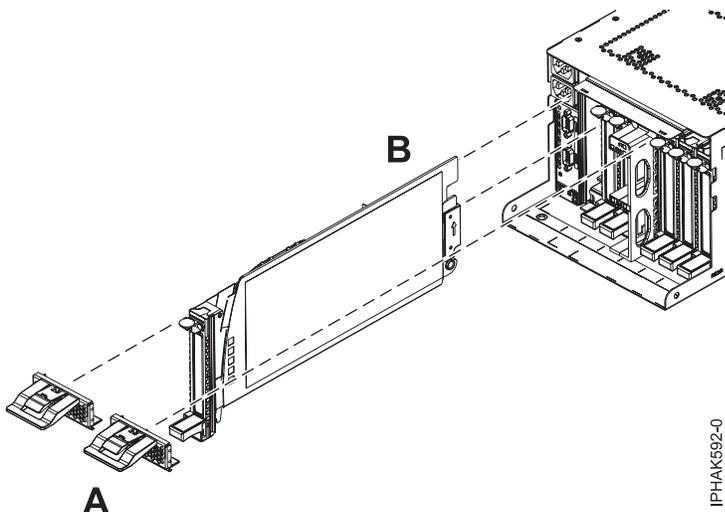
Figure 87. Replace the cassette and install the EMC grill

Removing an adapter from the PCI adapter single-width, third generation cassette

You can remove a PCI adapter from a single-width cassette.

To remove an adapter from the single-width cassette, do the following steps:
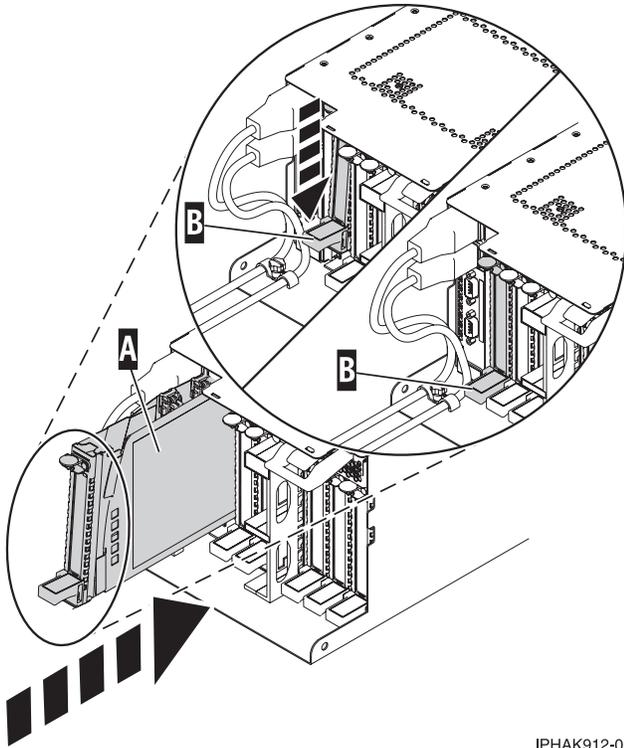
1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.

2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.

3. Remove the cassette from the system.
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 88. PCI adapter cassette cover removed

5. Remove the adapter from the cassette by completing the following steps:
   a. Unlock the adapter retainers by rotating the retainer clip **(A)** into the horizontal position. See Figure 89 on page 119.

      Notes:
      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 89. 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 or filler panel in the cassette. See "Placing a PCI adapter in a single-width, third generation cassette" on page 107.

   h. Replace the cassette cover by completing the following steps:

     1) Slide the cover **(B)** into position on the cassette.

     2) While you hold 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.
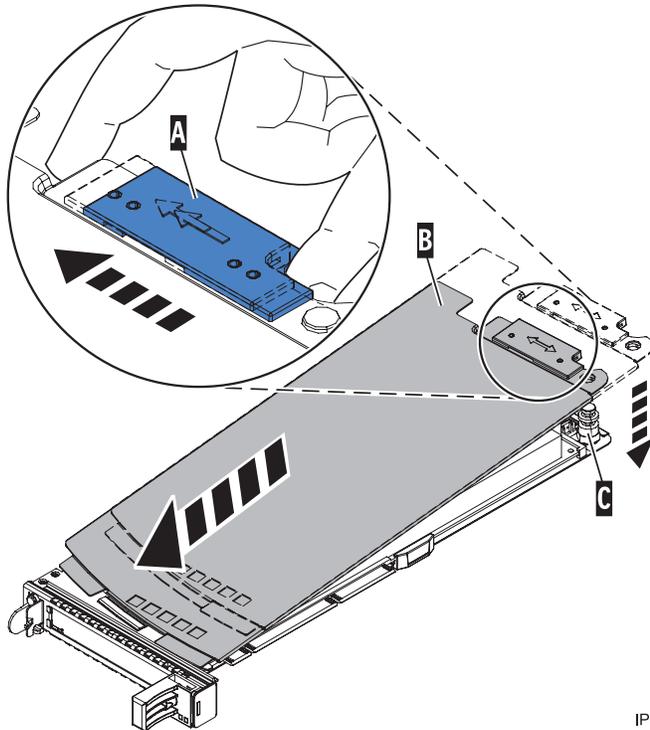
Figure 90. PCI adapter cassette cover replaced

PCI adapter double-wide cassette

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

Removing an adapter from the PCI adapter double-wide cassette

You might need to remove a PCI adapter from a double-wide cassette.

To remove an adapter from the cassette, do the following:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Remove the PCI adapter contained in a cassette from the system.
4. Remove any shipping handles or brackets attached to the adapter.
5. 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.

Figure 91. PCI adapter cassette cover removed

    d. Unscrew pivot pin **C** and put it in a safe place

6. 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 92 on page 122.

        Notes:

        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 rotating the adapter toward the bottom of the cassette.

    e. Lift the adapter out of the tailstock retaining channel.
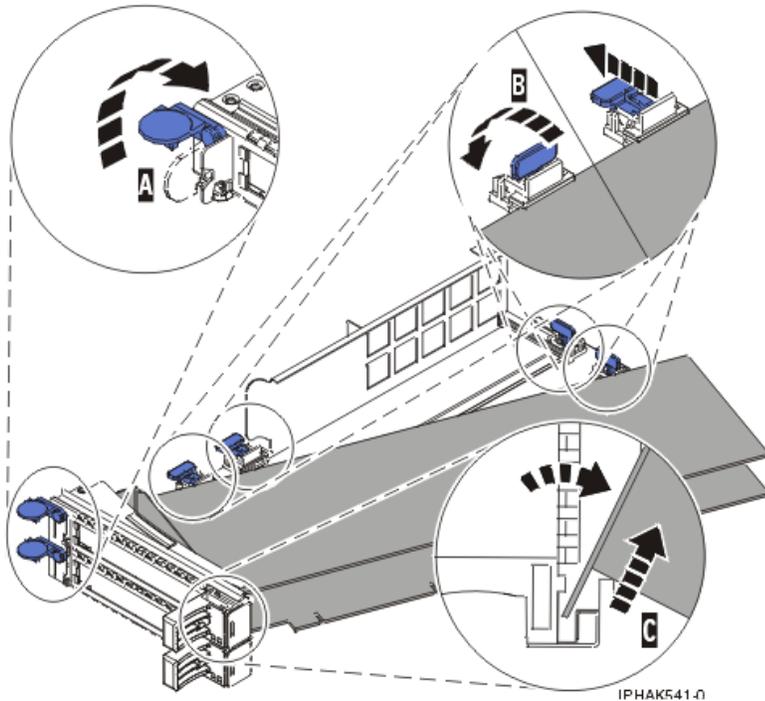
Figure 92. Adapter removed from the PCI adapter cassette

   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 the adapter in the PCI adapter double-wide cassette. For information, see "Placing an adapter in the PCI adapter double-wide cassette" on page 123.

     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) Screw pivot pin **C** into place.

     2) Slide the cover **B** into position on the cassette.

     3) While holding the cover latch **A** in the open position, place the cover over the pivot pin **C**.

     4) Release the cover latch to lock the cover into place.
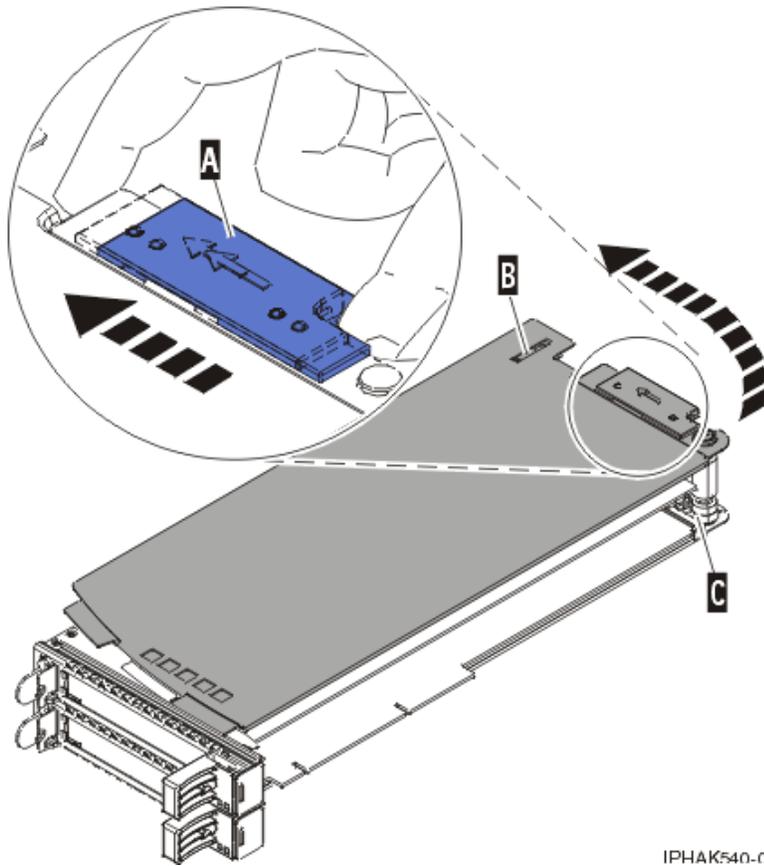
Figure 93. PCI adapter cassette cover replaced

Placing an adapter in the PCI adapter double-wide cassette

You might need to place a PCI adapter in a double-wide cassette.

To place an adapter in a cassette, perform the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Remove the PCI adapter contained in a cassette from the system.
3. 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.
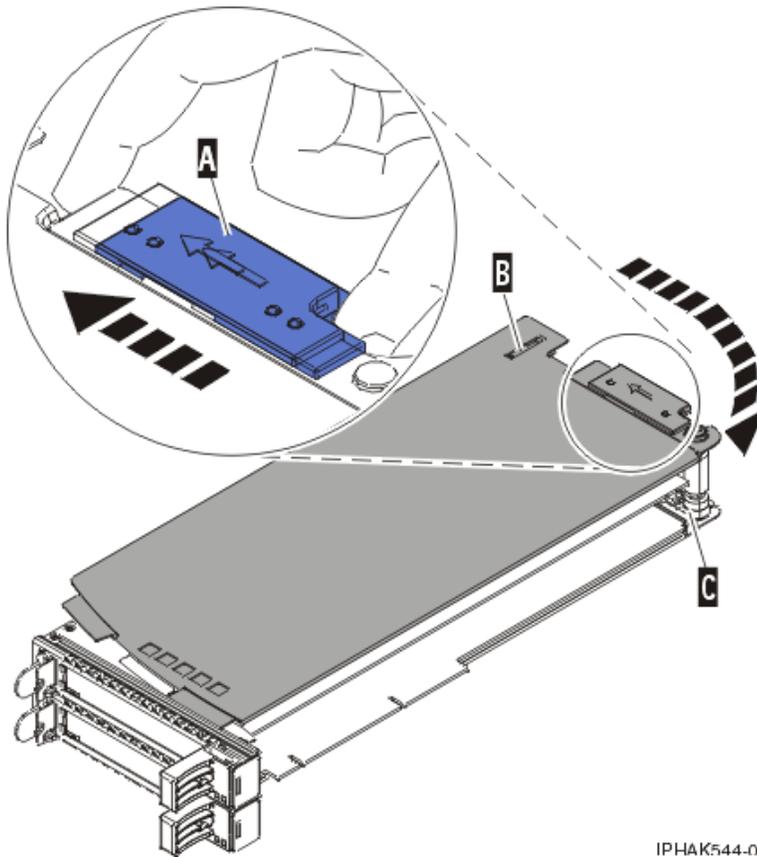
Figure 94. PCI adapter cassette cover removed

    d. Unscrew pivot pin **C** and put it in a safe place

4. 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 the adapter from the PCI adapter double-wide cassette. For information, see "Removing an adapter from the PCI adapter double-wide cassette" on page 120.

       • Remove the adapter filler panel from the cassette.

    b. Ensure that all of the adapter retainers have been pushed out to the edges of the cassette to allow the placement of the adapter.

    c. Place the tailstock clamp in the open position by pressing the cassette handle towards the retainer clip.

5. 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 95 on page 125.

    b. Rotate the adapter toward the top of the cassette and into place.

    c. Close the tailstock clamp.
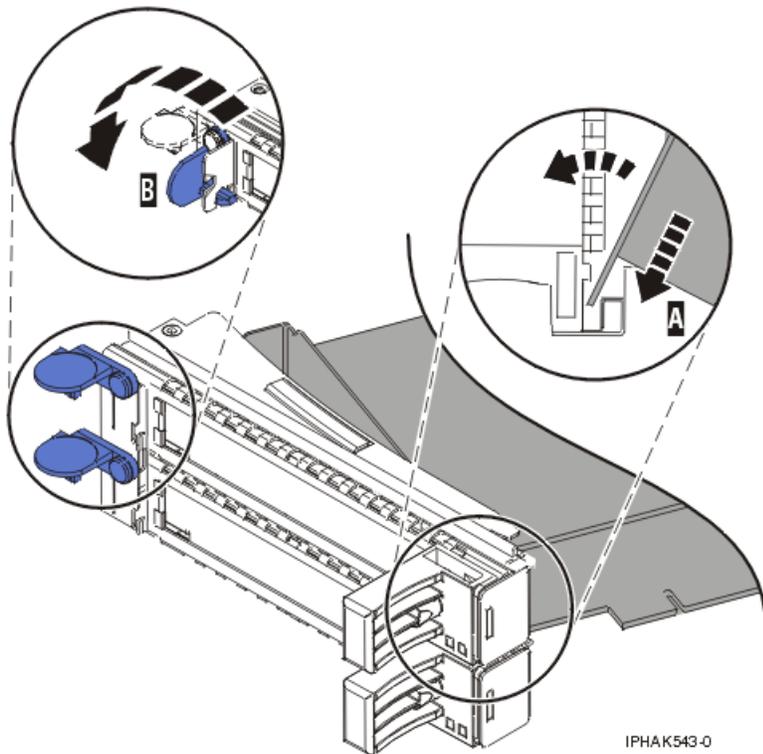
Figure 95. Adapter replaced in the PCI adapter cassette

d. Position the adapter retainers to support the adapter, and then rotate the retainer clip **B** into the closed position. See Figure 95.

Notes:

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 and lock the retainers **B**. See Figure 96 on page 126.

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.

4) 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.
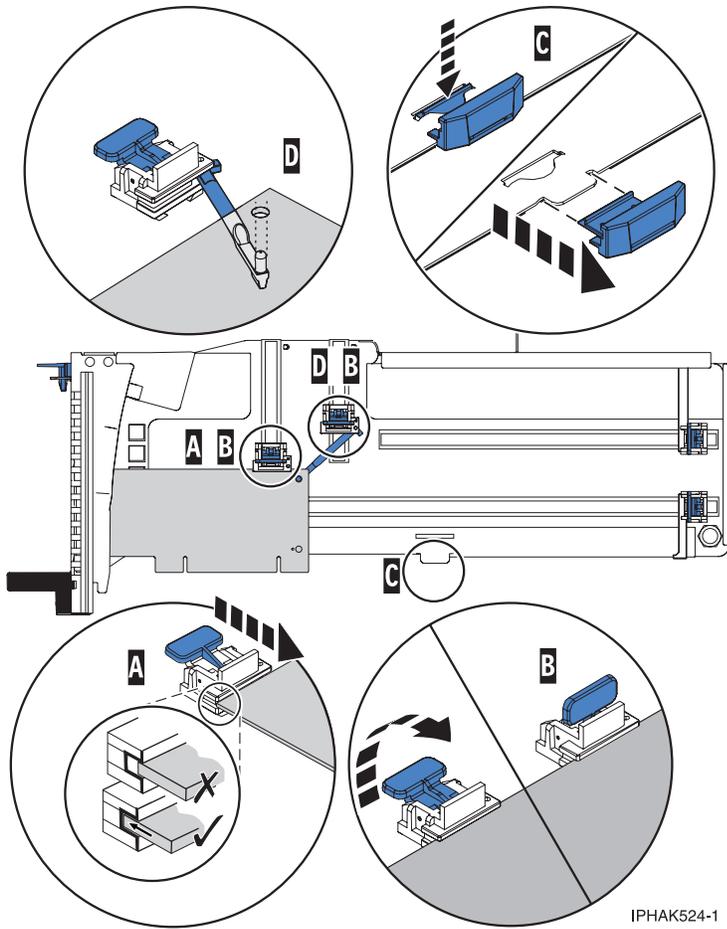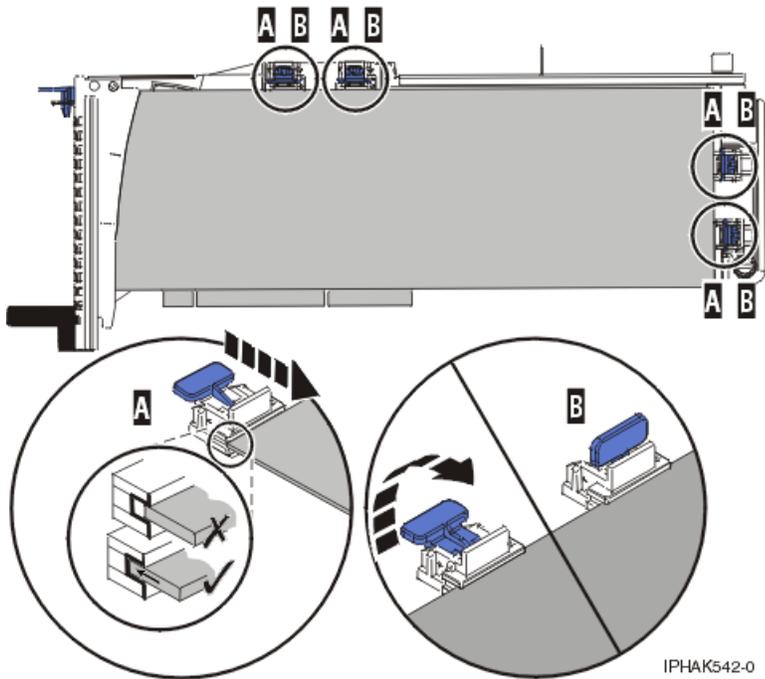
Figure 96. Long adapter in the PCI adapter cassette with the supports and stabilizer in place

6. After the retainers are placed, replace the cassette cover by doing the following:

   a. Screw pivot pin **C** into place.

   b. Slide the cover **B** into position on the cassette as shown in the following figure.

   c. While holding the cover latch **A** in the open position, place the cover over the pivot pin **C**.

   d. Release the cover latch to lock the cover into place.
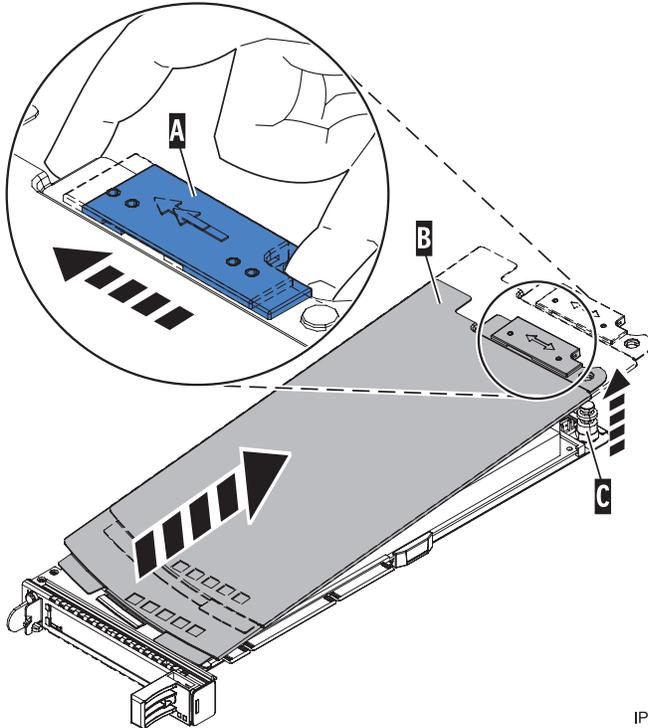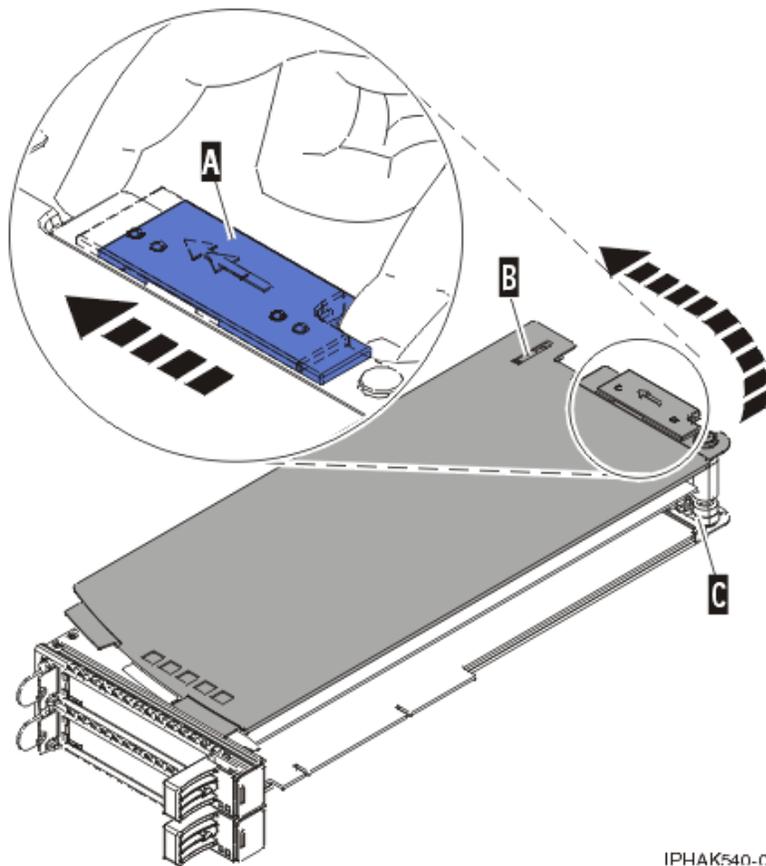
Figure 97. PCI adapter cassette cover replaced

7. Replace the PCI adapter contained in a cassette in 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.

Model 5802 and 5877 expansion units, PCI adapters, and cassettes

You can install, remove, replace PCI adapter cassettes in the 5802 and 5877 expansion units.

Preparing to install, remove, or replace a PCI adapter cassette

Learn about steps you must do before you install, remove, or replace a PCI adapter cassette in a 5802 or 5877 expansion unit.

If your system is managed by an HMC, use the HMC to complete the steps for installing the part in the system. For instructions, see "Installing a part by using the HMC" on page 177.

Notes:

- If the system is partitioned, you must determine the partition owning the I/O slot. Once the adapter is installed, the I/O slot must be powered on in the operating system.
- If an I/O slot on a partitioned system is not owned by a partition, then the I/O slot cannot be powered on.
- Adding an I/O slot to a partition using dynamic logical partitioning (DLPAR) will power on the I/O slot as part of the DLPAR add. For information about DLPAR, see Dynamic Logical Partitioning.
- To learn more about working in a partitioned environment, see Logical partitioning.

If you do not have an HMC, complete the following steps to install, remove or replace a PCI adapter:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. If you are installing a new adapter, determine in which slot to place the new adapter. See the PCI adapter placement.
4. If you are removing a failing PCI adapter, see Identifying a failing part.
5. If you are installing a PCI adapter in a rack-mounted system or expansion unit, open the rear rack door.
6. Determine the location of PCI adapter cassette in the system.

Installing a PCI adapter contained in a cassette

You can install a PCI adapter cassette in a 5802 or 5877 expansion unit.

Installing a PCI adapter cassette

You can install a PCI adapter cassette in a 5802 or 5877 expansion unit.

1. Ensure that the lower cassette handle **(C)** is pressed up toward the retainer clip as shown in Figure 98. This places the adapter in the correct position to be docked in the system.
2. Slide the cassette into the cassette slot.
3. When the cassette is fully inserted into the system, firmly press downward on the lower cassette handle **(C)** to lock the adapter in its connector.
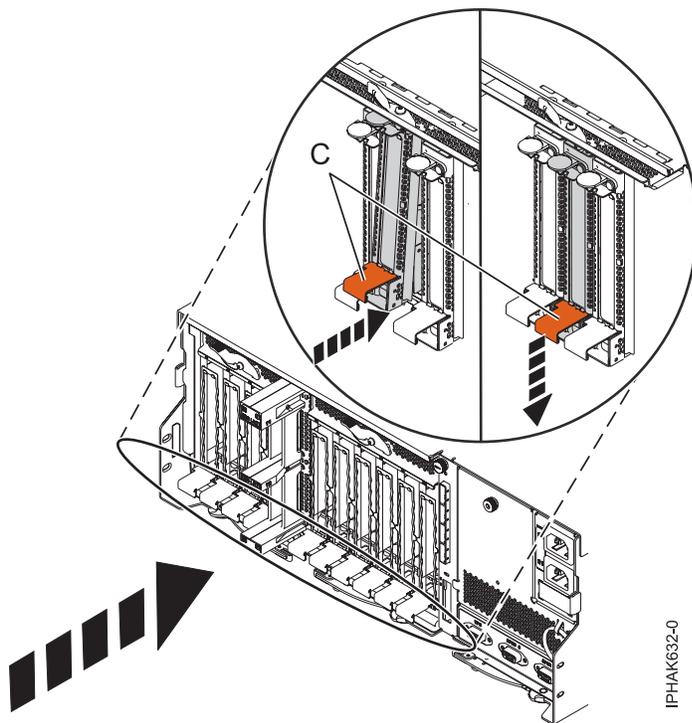
Figure 98. Installing the PCI adapter cassette

4. Lower the access door **(B)** into the closed position. Latch **(A)** automatically latches to hold the access door closed.
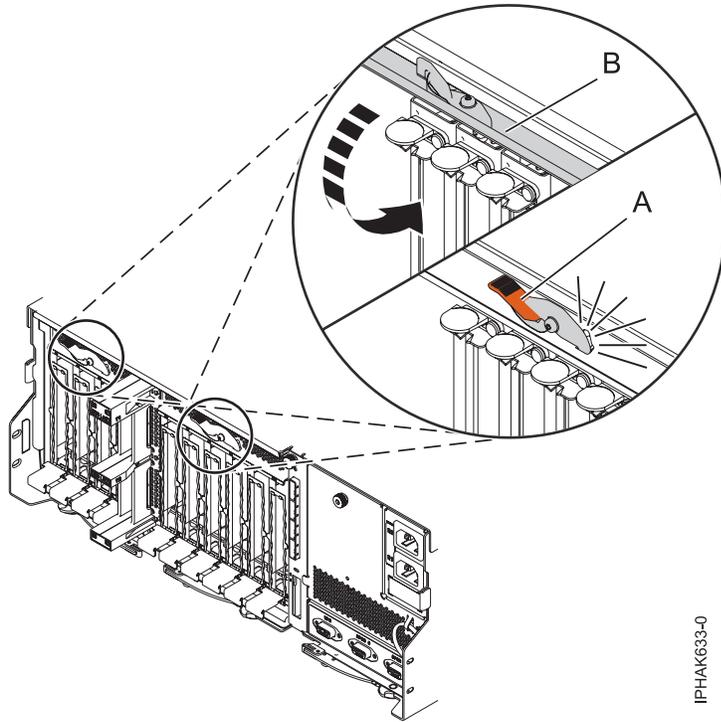
Figure 99. Closing the access door

5. Return to the procedure that sent you here.

Installing a PCI adapter cassette with the power off

You can install a PCI adapter cassette in a 5802 or 5877 expansion unit with the power off.

Before you begin: Prepare to install a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

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

1. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.
2. Disconnect the power source from the system by unplugging the system.
3. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.
4. Install the adapter into the PCI adapter cassette. Refer to "PCI adapter single-width and double-width cassettes" on page 140.
5. Install the PCI adapter cassette in the system. Refer to "Installing a PCI adapter contained in a cassette" on page 128.
6. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.
7. Verify the installed part.
   - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
   - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter contained in a cassette with the power on in the AIX environment

You can install a PCI adapter cassette in a 5802 or 5877 expansion unit that is running the AIX environment with the system power on.

Before you begin: Prepare to install a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

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

1. Refer to "PCI hot-plug manager access for AIX" on page 162, and follow the steps in the access procedure to select **PCI Hot Plug Manager**. Then return here to continue.
2. 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.
3. Select the appropriate PCI slot from the ones listed on the screen, and press Enter.
4. Locate the PCI adapter slot and cassette you want to use.
5. 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 "Removing a PCI adapter contained in a cassette from the expansion unit with the power on in AIX" on page 134.
6. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.
7. Install the adapter into the PCI adapter cassette. Refer to "PCI adapter single-width and double-width cassettes" on page 140.
8. 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 164.
9. Install the PCI adapter cassette in the system. Refer to "Installing a PCI adapter contained in a cassette" on page 128.
10. Enter cfgmgr to configure the adapter.
11. Verify the installed part.
    - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
    - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter contained in a cassette with the power on in the IBM i environment

You can install a PCI adapter cassette in a 5802 or 5877 expansion unit that is running the IBM i environment with the system power on.

Before you begin: Prepare to install a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

To install an adapter with the system power on in the i operating system, do the following steps:

1. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:
   a. Type **strsst** on the command line of the Main Menu and press Enter.
   b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
   c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
   d. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
   e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.

f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.

g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.

h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.

i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.

j. Select **Toggle LED blink off/on** to stop the blinking LED.

k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.

2. Locate the PCI adapter slot and cassette you want to use.

3. 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 "Removing a PCI adapter contained in a cassette from the expansion unit with the power on in IBM i" on page 135.

4. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.

5. Install the adapter into the PCI adapter cassette. Refer to "PCI adapter single-width and double-width cassettes" on page 140.

6. Install the PCI adapter cassette in the system. Refer to "Installing a PCI adapter contained in a cassette" on page 128.

7. From the Hardware Resource Concurrent Maintenance display, complete the following steps:

a. Select **Power on domain** and press Enter.

b. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.

c. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:

   `Power on complete`

8. Verify the installed part.

   - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
   - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Installing a PCI adapter contained in a cassette with the power on in the Linux environment

You can install a PCI adapter cassette in a 5802 or 5877 expansion unit that is running the Linux environment with the system power on.

Before you begin: Prepare to install a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

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

1. Log in to the system console as the root user.

2. Use the lsslot tool to list the hot-plug PCI slots that are available in the server or logical partition:

   `lsslot -c pci -a`

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

```
Slot                      Description                       Devices
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.

3. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.

4. Install the adapter into the PCI adapter cassette. Refer to "PCI adapter single-width and double-width cassettes" on page 140.

5. 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.

6. Enter drmgr to enable an adapter to be installed.

   For example, to install an adapter in slot U7879.001.DQD014E-P1-C3, enter:

   ```
   drmgr -c pci -r -s locationcode
   ```

   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.
   ```

7. 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.
   ```

8. Install the PCI adapter cassette in the system. Refer to "Installing a PCI adapter contained in a cassette" on page 128.

9. 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                    Devices
   U7879.001.DQD014E-P1-C3 PCI-X capable, 64 bit, 133MHz slot 0001:40:01.0
   ```

Removing a PCI adapter contained in a cassette from the expansion unit

You can remove a PCI adapter cassette from the 5802 or 5877 expansion unit.

Removing a PCI adapter contained in a cassette from the expansion unit with the system power off

You can remove a PCI adapter cassette from the 5802 or 5877 expansion unit with the system power off.

Before you begin: Prepare to remove a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

To remove an adapter, do the following steps:

1. Stop the system or logical partition. For instructions, see "Stopping a system or logical partition" on page 185.

2. Disconnect the power source from the system by unplugging the system.

3. Determine the location of PCI adapter in the system.

4. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.

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

6. To remove the adapter from the cassette, refer to "PCI adapter single-width and double-width cassettes" on page 140.

Removing a PCI adapter cassette from the expansion unit

You can remove a PCI adapter cassette from the 5802 or 5877 expansion unit.

To remove a PCI adapter cassette, do the following steps:

1. Press down on latch **(A)** to release the access door. The access door is spring loaded, which causes it to rotate up into the open position **(B)**.
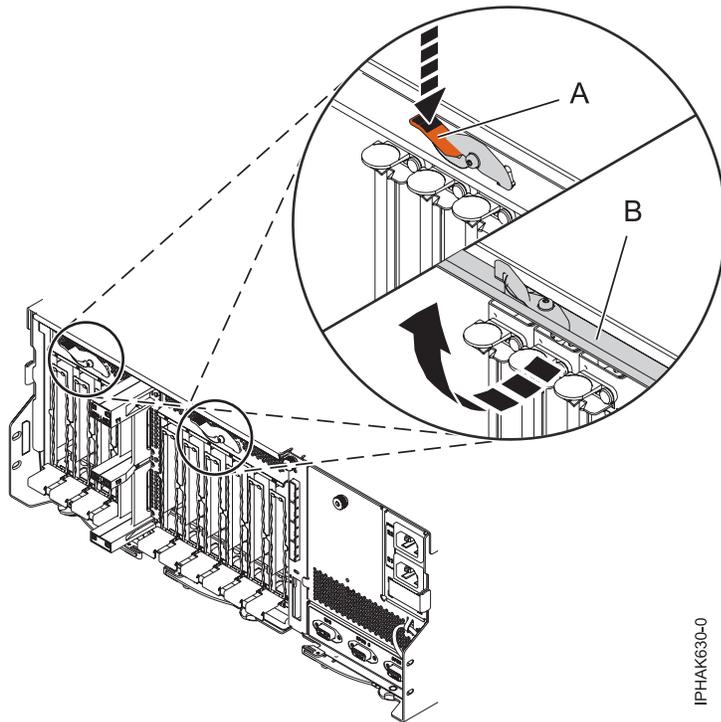
Figure 100. Opening the access door

2. Lift up the lower cassette handle **(C)** and pull the cassette out of the unit.
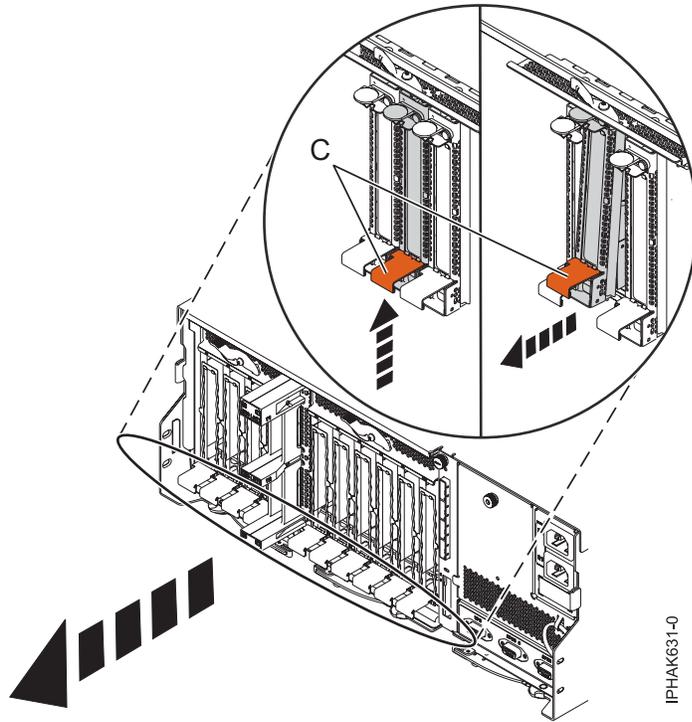
Figure 101. Removing a PCI adapter cassette

> **Attention:** A cassette that contains 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.

3. Return to the procedure that sent you here.

Removing a PCI adapter contained in a cassette from the expansion unit with the power on in AIX

You can remove or replace a PCI adapter cassette from the 5802 or 5877 expansion unit that is running the AIX operating system with the system power on.

Before you begin: Prepare to remove a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

Notes:

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, and then install the adapter as described in "Installing a PCI adapter contained in a cassette with the power on in the AIX environment" on page 130.
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 steps:

1. If you are removing a failing PCI adapter, see "Identifying a part" on page 180. If you are removing the PCI adapter for other reasons, continue to the next step.
2. Determine the location of PCI adapter in the system.
3. Record the slot number and location of each adapter being removed.

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

4. Ensure that any processes or applications that might use the adapter are stopped.

5. Follow these steps to remove a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:

   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.

6. Label, and then disconnect all cables attached to the adapter you plan to remove.

7. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.

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

9. Continue to follow the screen instructions until you receive a message that the adapter removal is successful. Successful removal is indicated by the message OK, which is displayed next to the **Command** field at the top of the screen.

10. 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 6.

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

11. Press F10 to exit the Hot-Plug Manager.

12. Enter **diag -a**. If the system responds with a menu or prompt, follow the instructions to complete the device configuration.

13. To remove the adapter from the cassette, see "PCI adapter single-width and double-width cassettes" on page 140.

14. Place an empty cassette into the unused PCI slot for proper air flow.

Removing a PCI adapter contained in a cassette from the expansion unit with the power on in IBM i

You can remove a PCI adapter cassette from the 5802 or 5877 expansion unit that is running the IBM i operating system with the system power on.

Before you begin: Prepare to remove a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

To remove an adapter, do the following steps:

1. Determine the location of PCI adapter in the system.
2. Access the concurrent maintenance procedures using the IBM i Hardware service manager (HSM) tools:
    a. Type **strsst** on the command line of the Main Menu and press Enter.
    b. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
    c. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
    d. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
    e. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.
    f. Select option **9** (Hardware contained within package) in the **System Unit** or **Expansion Unit** field of the unit where you are removing the card, and then press Enter.
    g. Select function **F7** (Include empty positions and not owned positions) on the unit where you are removing the card.
    h. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.
    i. Select **Toggle LED blink off/on**. A light-emitting diode (LED) blinks identifying the position you chose. Physically verify that this is the slot where you want to remove the adapter.
    j. Select **Toggle LED blink off/on** to stop the blinking LED.
    k. Select function **F9** (Power off domain), and when complete then ensure that the PCI-e card slot power LED is not lit.
3. Label, and then disconnect all cables attached to the adapter you plan to remove.
4. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.
5. Place the cassette with the cover facing up on an approved ESD surface.
6. To remove the adapter from the cassette, see "PCI adapter single-width and double-width cassettes" on page 140.

Removing a PCI adapter contained in a cassette from the expansion unit with the power on in Linux

You can remove a PCI adapter cassette from the 5802 or 5877 expansion unit that is running the Linux operating system with the system power on.

Do the following actions before beginning the procedure:
- Follow the steps in "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.
- Ensure that the system meets the "Prerequisites for hot-plugging PCI adapters in Linux" on page 165.
- Verify that the Linux, hot-plug PCI tools are installed. See "Verifying that the hot-plug PCI tools are installed for Linux" on page 165

To remove an adapter, do the following steps:
1. Determine the location of the PCI adapter in the system.
2. Label and then disconnect all cables attached to the adapter you plan to remove.
3. Enter `drmgr` to enable an adapter to be removed:

    For example, to remove the PCI adapter in slot U7879.001.DQD014E-P1-C3 enter:

    `drmgr -c pci -r -s locationcode`

    Follow the instructions on the display to complete the task.
4. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.
5. Place the cassette with the cover facing up on an approved ESD surface.

6. To remove an adapter from the cassette, refer to "PCI adapter single-width and double-width cassettes" on page 140.

Replacing a PCI adapter contained in a cassette from the expansion unit

You can replace a PCI adapter cassette from the 5802 or 5877 expansion unit.

Replacing a PCI adapter contained in a cassette from the expansion unit with the power off

You can replace a PCI adapter cassette from the 5802 or 5877 expansion unit with the system power off.

You must have already completed the procedure "Removing a PCI adapter contained in a cassette from the expansion unit with the system power off" on page 132 to have the slot powered off.

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

1. If the adapter needs to be placed in a PCI adapter cassette, see "PCI adapter single-width and double-width cassettes" on page 140.
2. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.
3. 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.
4. Install the PCI adapter cassette in the system. Refer to "Installing a PCI adapter contained in a cassette" on page 128.
5. Reconnect the system to the power source.
6. Start the system or logical partition. For instructions, see "Starting the system or logical partition" on page 189.
7. Verify the installed part.
   - If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.
   - If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Replacing a PCI adapter contained in a cassette from the expansion unit with the power on in AIX

You can remove or replace a PCI adapter cassette from the 5802 or 5877 expansion unit that is running the AIX operating system with the system power on.

Before you begin: Prepare to replace a PCI adapter cassette. See "Preparing to install, remove, or replace a PCI adapter cassette" on page 127.

Important:
- Use this procedure if you intend to remove a failing PCI adapter and replace it with the same type of adapter. If you plan to remove a failing adapter and leave the slot empty, see "Removing a PCI adapter contained in a cassette from the expansion unit with the power on in AIX" on page 134.
- Do not use this procedure to remove an existing adapter and install a different type of adapter. To install a different adapter, remove the existing adapter as described in "Removing a PCI adapter contained in a cassette from the expansion unit with the power on in AIX" on page 134, and then install the new adapter as described in "Installing a PCI adapter contained in a cassette with the power on in the AIX environment" on page 130.
- 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 replace an adapter, do the following steps:

1. Determine the location of the PCI adapter in the system.
2. Record the slot number and location of each adapter being removed.

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

3. Ensure that any processes or applications that might use the adapter are stopped.
4. Follow these steps to replace a PCI adapter using the PCI Hot-Plug Manager menu in the AIX Diagnostic tools:
   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 YES 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 F3 (or Esc +3) 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 **Replace**. 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.
5. Label, and then disconnect all cables attached to the adapter you plan to remove.
6. Remove the PCI adapter cassette from the system. Refer to "Removing a PCI adapter cassette from the expansion unit" on page 133.
7. Place the cassette with the cover facing up on an approved ESD surface.
8. Install the adapter into the PCI adapter cassette. Refer to "PCI adapter single-width and double-width cassettes" on page 140.
9. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.
10. 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.
11. Install the PCI adapter cassette in the system. Refer to "Installing a PCI adapter contained in a cassette" on page 128.
12. Follow these steps to complete the PCI Hot Plug menus in the AIX Diagnostic tools and configure the device:
    a. Press enter and continue to follow the instructions in the system diagnostics until you receive a message that the replacement is successful. Successful replacement is indicated by the OK message displayed next to the **Command** field at the top of the menu.
    b. Press the F3 (or Esc+3) key to return to the **PCI Hot-Plug Manager** menu.
    c. Press the F3 (or Esc+3) key to return to the **TASK** selection list.

d. Select **Log Repair Action**.

   e. Select the resource just replaced, press Enter, press Commit (F7 or ESC 7), then press Enter.

   f. Press F3 (or Esc+3) to return to **TASK Selection List**.

   g. Select **Hot Plug Task**, press enter.

   h. Select **PCI Hot Plug Manager**, then select **Configure a defined device**, then press Enter.

   i. Select the device just replaced from the list, then press Enter. The device is now configured.

   j. Press the F10 key to exit the diagnostic program.

   Note: If you are running the stand-alone diagnostics, do not exit the program completely.

13. Verify the PCI adapter by using the following instructions:

   a. Did you replace the adapter with the system power on?

      • Yes: Go to the next step.

      • No: Load the diagnostic program by doing the following steps:

         – If AIX is available, boot AIX, log in as root or CELOGIN, and then enter the **diag** command.

   b. Enter **diag** if you are not already displaying the diagnostic menus.

   c. Select **Advance Diagnostic Routines**, and then select **Problem Determination**.

   d. Select the name of the resource just replaced from the menu. If the resource just replaced is not shown, choose the resource associated with it. Press Enter, and then press **Commit** (F7 or Esc+7).

   e. Did the Problem Determination identify any problems?

      • No: Continue to the next step.

      • Yes: A problem is identified

         – If you are a customer, record the error information, and then contact your service provider.

         – If you are an authorized service provider, return to map 210-5.

14. Press the F10 key to exit the diagnostic program.

Replacing a PCI adapter contained in a cassette from the expansion unit with the power on in IBM i

You can replace a PCI adapter cassette from the 5802 or 5877 expansion unit that is running the IBM i operating system with the system power on.

You must have already completed the procedure "Removing a PCI adapter contained in a cassette from the expansion unit with the power on in IBM i" on page 135 to have the slot powered off.

To replace an adapter, do the following steps:

1. If the adapter needs to be placed in the PCI adapter cassette, see "PCI adapter single-width and double-width cassettes" on page 140.

2. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.

3. Install the PCI adapter cassette in the system. Refer to "Installing a PCI adapter contained in a cassette" on page 128.

4. Select **Power on domain** on the Hardware Resource Concurrent Maintenance display and press Enter.

5. Select **Assign to** on the resource that has an asterisk (*) on the Work with Controlling Resource display. Press Enter.

6. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message:

   `Power on complete`

7. Verify the installed part.

   • If you replaced the part because of a service action, verify the installed part. For instructions, see Verifying a repair.

   • If you installed the part for any other reason, verify the installed part. For instructions, see Verifying the installed part.

Replacing a PCI adapter contained in a cassette from the expansion unit with the power on in Linux

You can replace a PCI adapter cassette from the 5802 or 5877 expansion unit that is running the Linux operating system with the system power on.

You must have already completed the procedure "Removing a PCI adapter contained in a cassette from the expansion unit with the power on in Linux" on page 136 to have the slot powered off.

Note: Use this procedure only when you are replacing an adapter with an identical adapter. If you are replacing an adapter with an adapter that is not identical to the adapter removed, follow the steps in "Installing a PCI adapter contained in a cassette with the power on in the Linux environment" on page 131.

To replace an adapter with the power on in Linux, do the following steps:

1. If the adapter needs to be placed in the PCI adapter cassette, see "PCI adapter single-width and double-width cassettes."
2. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.
3. 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.
4. Enter `drmgr` to enable an adapter to be replaced:

   For example, to replace the PCI adapter in slot U7879.001.DQD014E-P1-C3 enter:

   `drmgr -c pci -r -s locationcode`
5. Follow the instructions on the display to complete the task. When you are instructed to insert the adapter in the adapter slot, see "Installing a PCI adapter cassette" on page 128.
6. Enter `lsslot` 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                       Devices
   U7879.001.DQD014E-P1-C3 PCI-X capable, 64 bit, 133MHz slot 0001:40:01.0
   ```

PCI adapter single-width and double-width cassettes

You can remove, replace, or install PCI adapters in a cassette.

Removing an adapter from the PCI adapter single-width cassette

You can remove a PCI adapter from a single-width cassette.

To remove an adapter from the single-width cassette, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Remove the cassette from the system.
4. Remove the cassette cover by doing the following steps:

   a. Slide the cover latch **(A)** to disengage the lug and 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.

Figure 102. PCI adapter cassette cover removed

5. Remove the adapter from the cassette by doing the following steps:

   a. Unlock the adapter retainers by rotating the retainer clip **(A)** into the horizontal position. See Figure 103 on page 142.

   > **Notes:**
   > 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 103. 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 or filler panel in the cassette. See "Placing a PCI adapter in a single-width cassette" on page 143.

   h. Replace the cassette cover by doing the following steps:

      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.
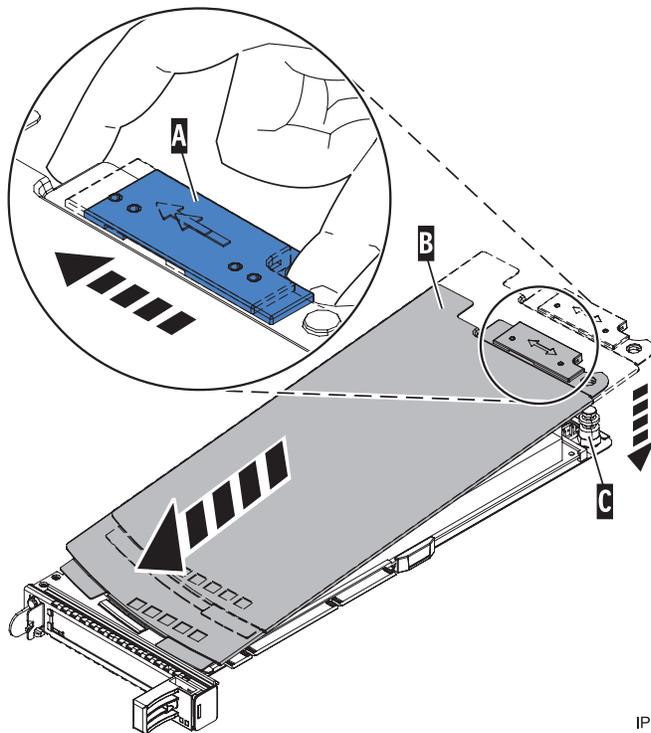
IPHAK530-0

Figure 104. PCI adapter cassette cover replaced

Placing a PCI adapter in a single-width cassette

You can place a PCI adapter in a single-width cassette.

To place a PCI adapter in a cassette, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Remove any shipping handles or brackets attached to the adapter.
4. Remove the cassette cover by doing the following steps:
   a. Slide the cover latch **(A)** to disengage the lug and 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.

Figure 105. PCI adapter single-width cassette cover removed

5. Ensure the cassette is prepared to receive an adapter by doing the following steps:
   a. Ensure the cassette is empty by doing one of the following steps:
      - "Removing an adapter from the PCI adapter single-width cassette" on page 140.
      - 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 106 on page 145.
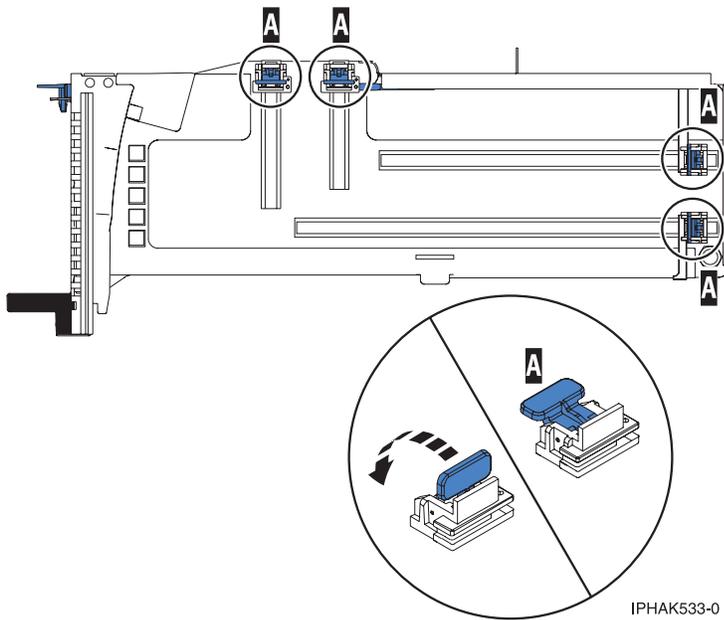
Figure 106. Adapter retainers

   c. Rotate the tailstock clamp into the open position.
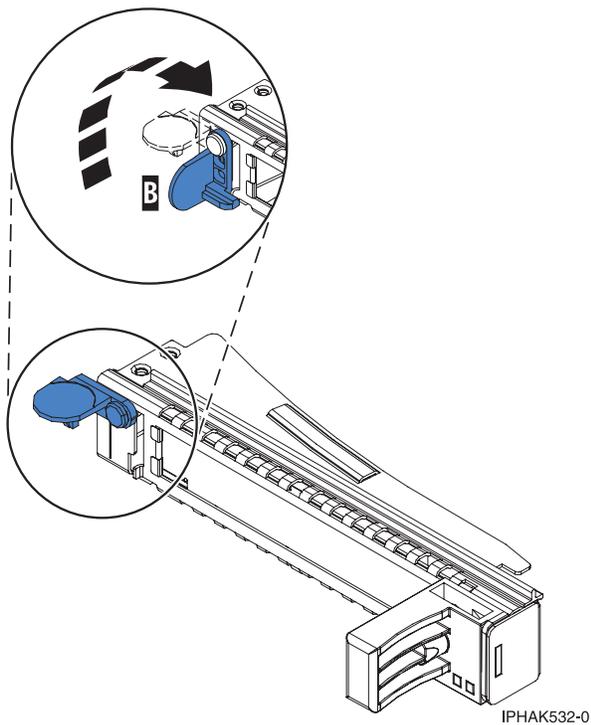
Figure 107. Tailstock clamp in the open position

6. Place the adapter in the cassette by doing the following steps:

   a. With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel **(A)**. See Figure 108 on page 146.

   b. Rotate the adapter toward the top of the cassette and into place.

c. Close the tailstock clamp **(B)**. See Figure 108.
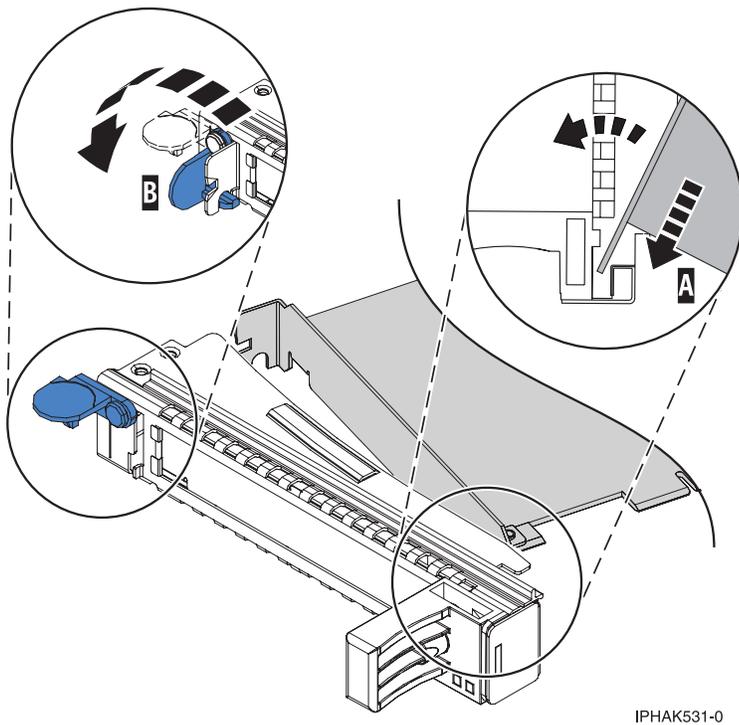
IPHAK531-0

Figure 108. 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.

Notes:

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 109 on page 147.

      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.
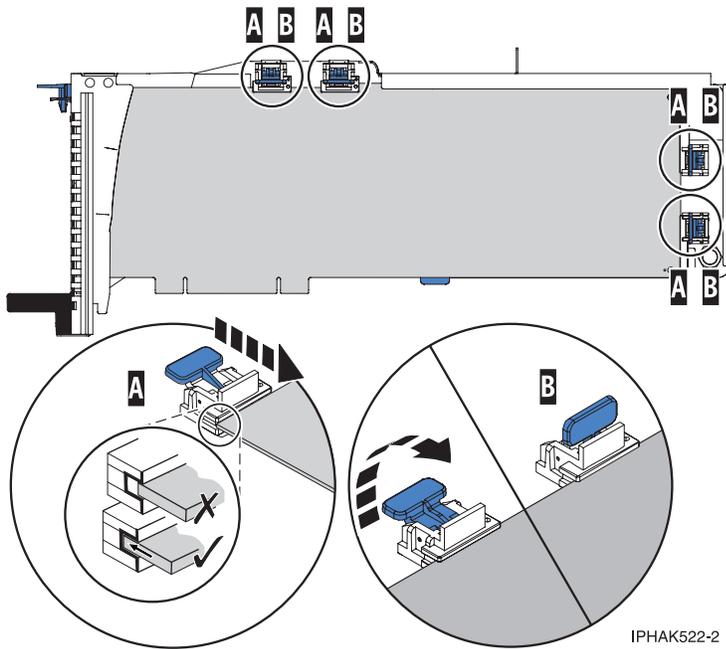
Figure 109. Large adapter in the PCI adapter cassette with the supports and stabilizer in place

Adapter-cassette retainer placement for medium-length adapters

a) Remove the adapter stabilizer **(C)**. See Figure 110 on page 148.

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.
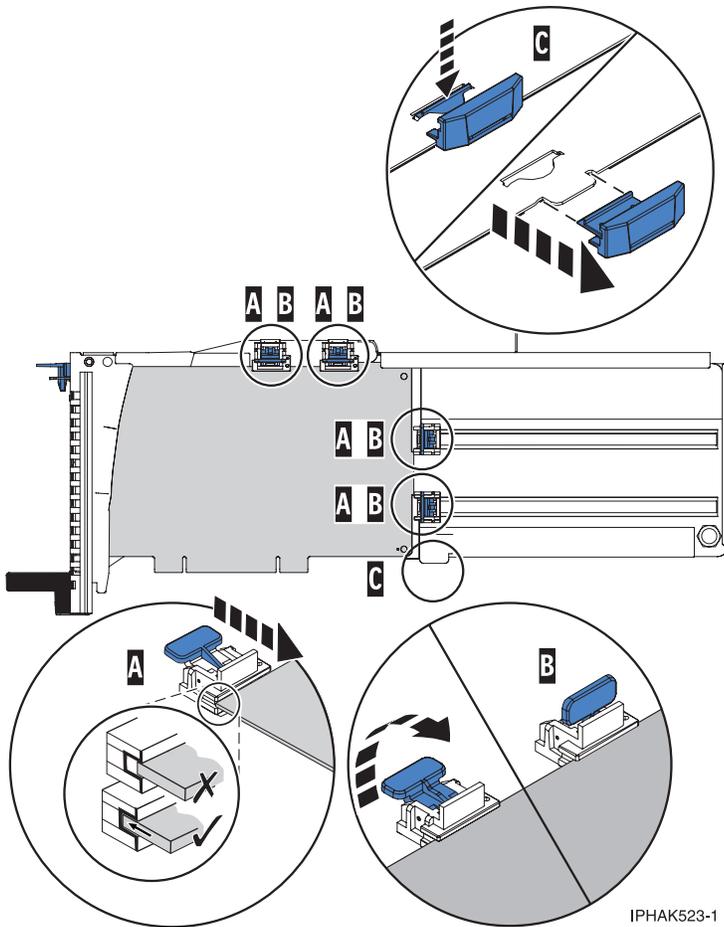
Figure 110. Medium-length adapter in the PCI adapter cassette with the supports in place

Adapter-cassette retainer placement for small adapters

a) Remove the adapter stabilizer **(C)**. See Figure 111 on page 149.

b) 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.

c) Place and lock the retainers **(B)**.

d) 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.
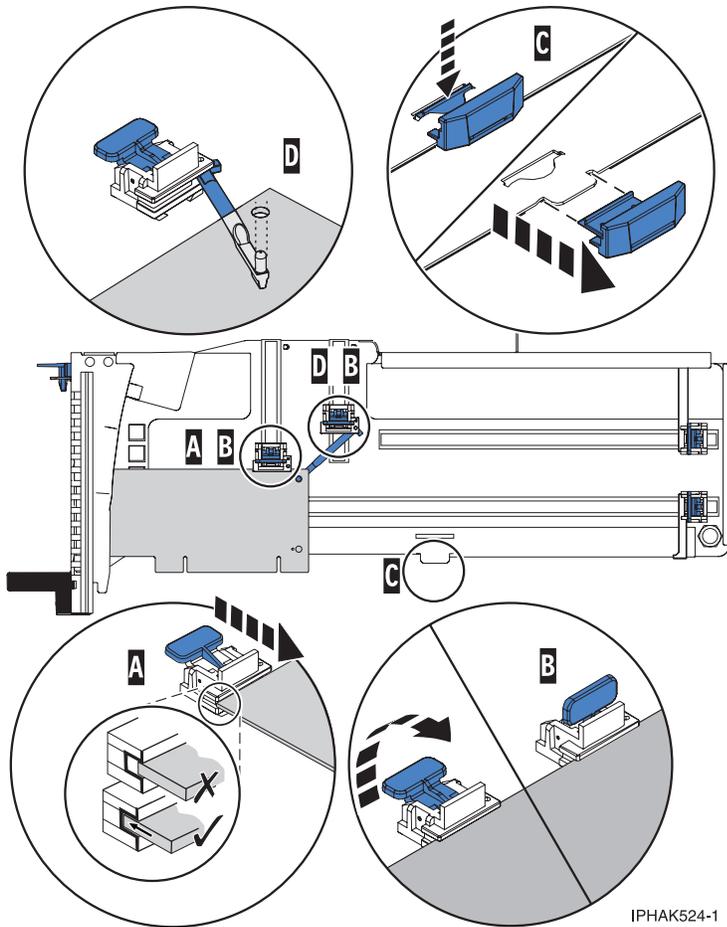
Figure 111. Small adapter in the PCI adapter cassette with the supports and the hookarm in place

7. Replace the cassette cover by doing the following steps:

   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.
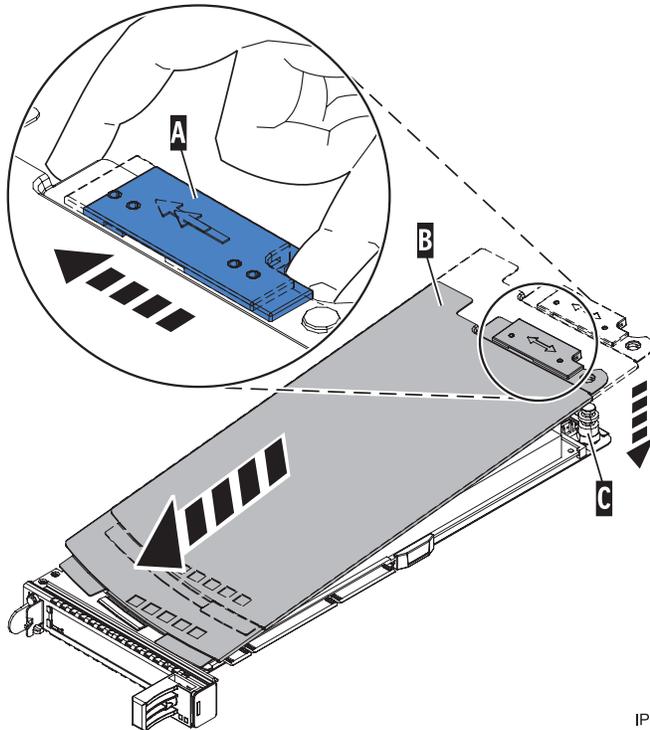
Figure 112. PCI adapter cassette cover replaced

Removing an adapter from the PCI adapter double-wide cassette

You can remove a PCI adapter from a double-wide cassette.

To remove an adapter from the cassette, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Take appropriate precautions for avoiding electric shock and handling static-sensitive devices. For information, see "Avoiding electric shock" on page 158 and "Handling static-sensitive devices" on page 159.
3. Remove the PCI adapter contained in a cassette from the system.
4. Remove any shipping handles or brackets attached to the adapter.
5. Remove the cassette cover by doing the following steps:
   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.

Figure 113. PCI adapter cassette cover removed

    d. Unscrew pivot pin **(C)** and put it in a safe place

6. Remove the adapter from the cassette by doing the following steps:

    a. Unlock the adapter retainers **(B)** by rotating the retainer clips **(A)** into the horizontal position. See Figure 114 on page 152. If you are removing a PCIe RAID and SSD SAS adapter, see Figure 115 on page 152.

    Notes:

    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 **(A)**.

    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 **(C)**.
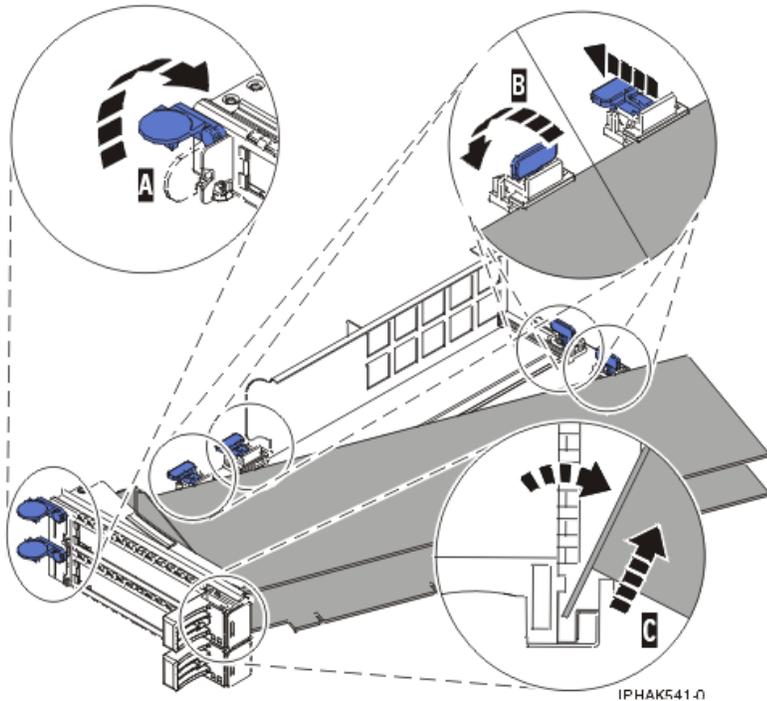
Figure 114. Adapter removed from the PCI adapter cassette
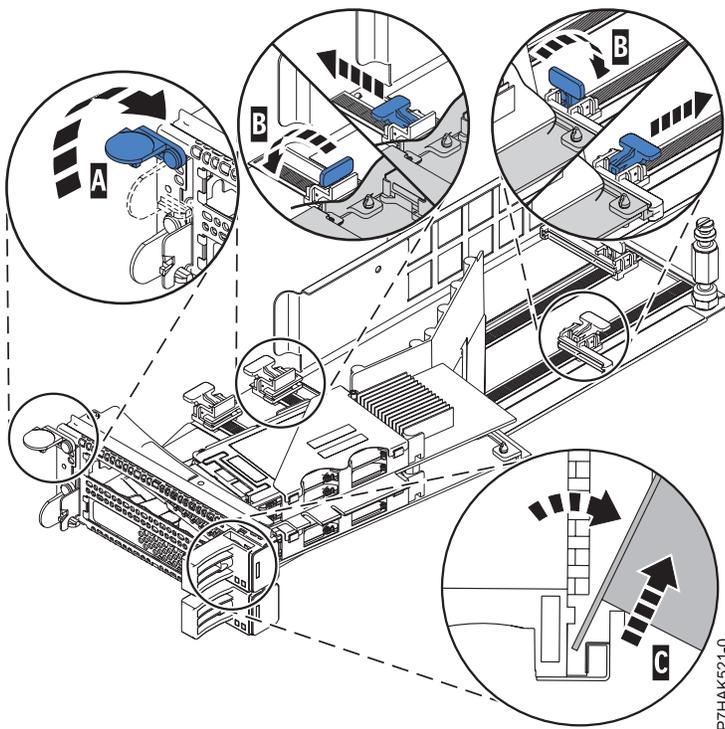
Figure 115. PCIe RAID and SSD SAS adapter removed from the PCI adapter cassette

    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 the adapter in the PCI adapter double-wide cassette. For information, see "Placing an adapter in the PCI adapter double-wide cassette."

   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 steps:

   1) Screw pivot pin **(C)** into place.

   2) Slide the cover **(B)** into position on the cassette.

   3) While holding the cover latch **(A)** in the open position, place the cover over the pivot pin **(C)**.

   4) Release the cover latch to lock the cover into place.

IPHAK540-C
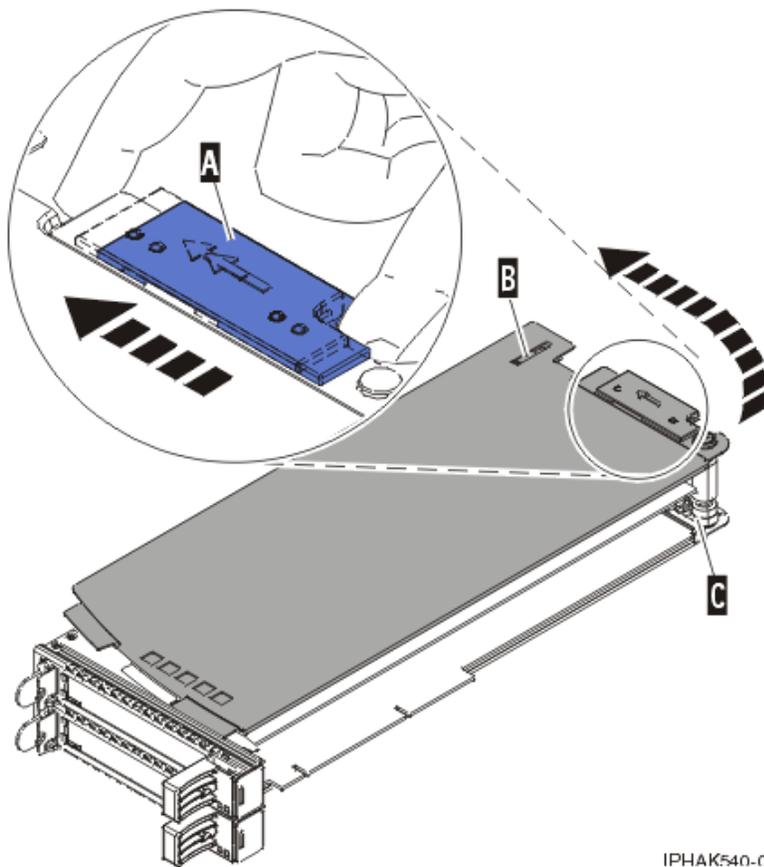
Figure 116. PCI adapter cassette cover replaced

Placing an adapter in the PCI adapter double-wide cassette

You can place a PCI adapter in a double-wide cassette.

To place an adapter in a cassette, do the following steps:

1. Complete the prerequisite tasks that are described in "Before you begin" on page 175.
2. Remove the PCI adapter contained in a cassette from the system.
3. Remove the cassette cover by doing the following steps:

   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.
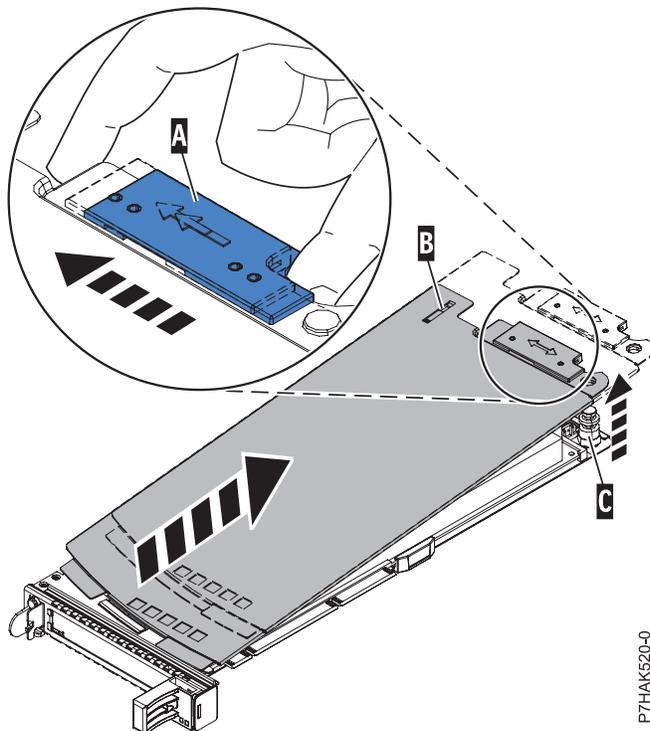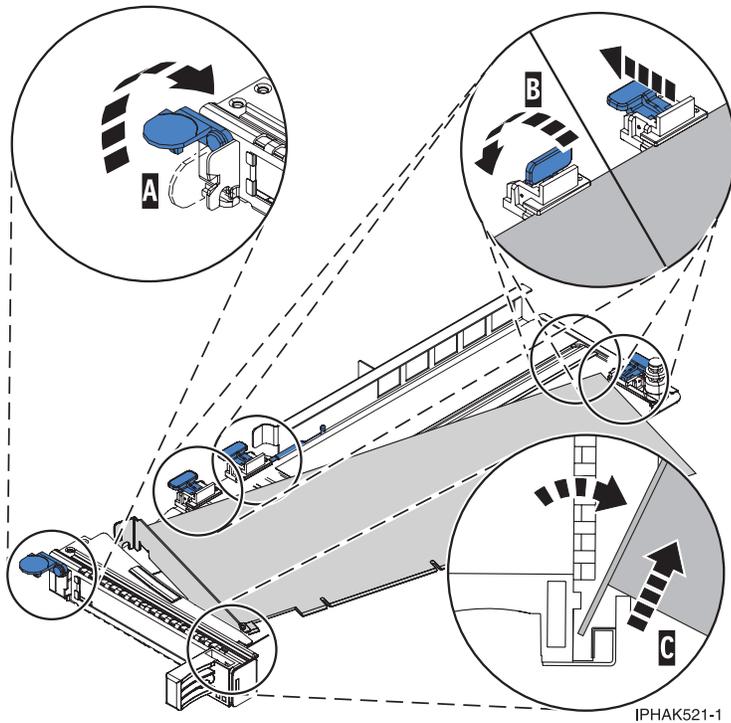
   c. Slide the cover off of the cassette.
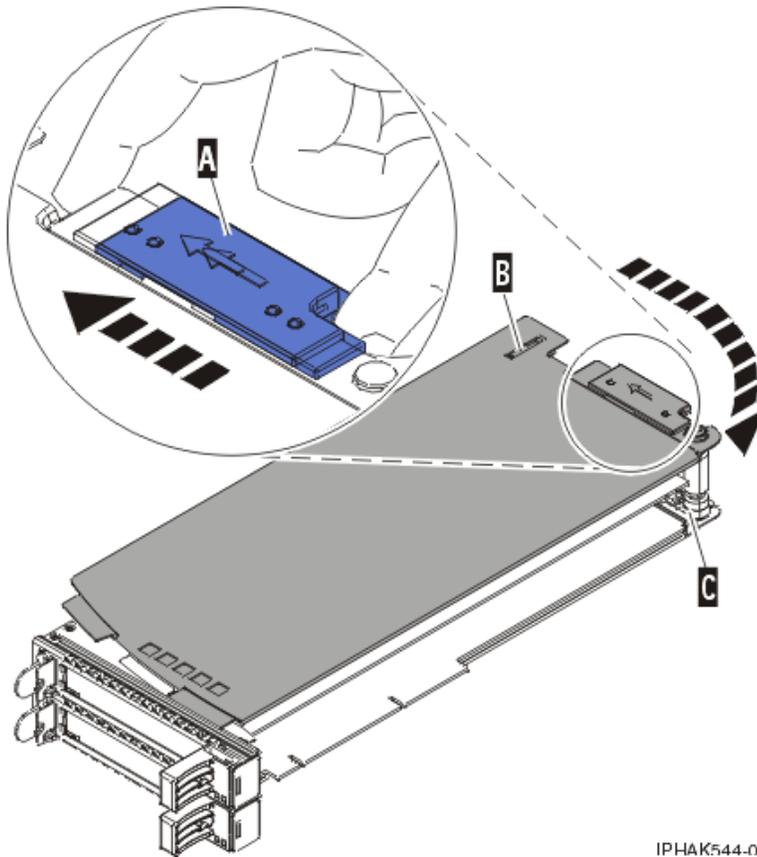
Figure 117. PCI adapter cassette cover removed

    d. Unscrew pivot pin **(C)** and put it in a safe place.

4. Ensure the cassette is prepared to receive an adapter by doing the following steps:

    a. Ensure the cassette is empty by doing one of the following steps:

       • Remove the adapter from the PCI adapter double-wide cassette. For information, see "Removing an adapter from the PCI adapter double-wide cassette" on page 150.

       • Remove the adapter filler panel from the cassette.

    b. Ensure that all of the adapter retainers have been pushed out to the edges of the cassette to allow the placement of the adapter.

    c. Place the tailstock clamp in the open position by pressing the cassette handle towards the retainer clip.

5. If necessary, remove the new adapter from the antistatic package.

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

6. Place the new adapter, component-side up, on a flat, static-protective surface.

7. For PCIe RAID and SSD SAS adapters, install the new air dam onto the new adapter.

    a. Slide the air dam **(A)** between the two cards and align the three holes in the air dam with the three holes on the card edges. See the following figure.

    b. Insert the three plastic rivets **(B)** into the card and air dam holes.

    c. Insert the three plastic push pins **(C)** into the three plastic rivets.

    d. Label the location of each solid state disk (SSD) while you transfer the SSDs from the replaced adapter to the same location on the new adapter you are installing. For information about replacing SSDs, see Replacing an SSD module on the PCIe RAID and SSD SAS adapter. Repeat this step for each SSD.
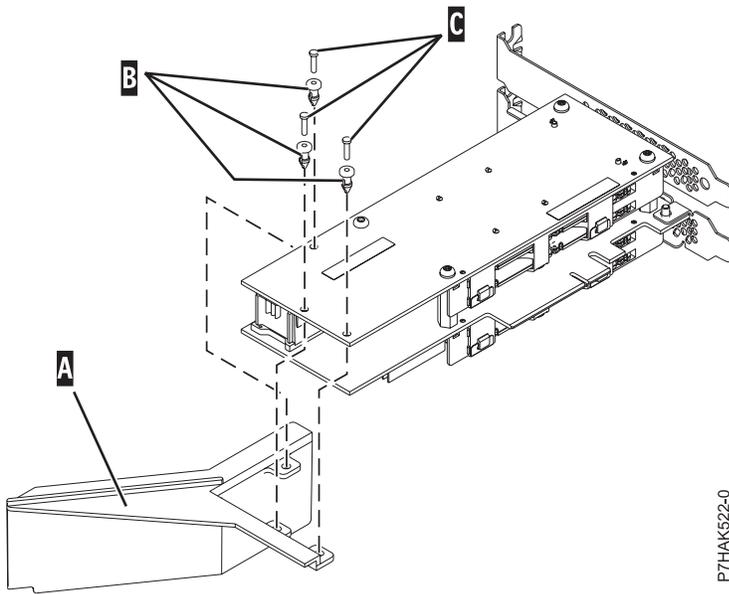
Figure 118. Installing an air dam onto the new PCIe RAID and SSD SAS adapter

8. Place the adapter in the cassette by doing the following steps:

   a. With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel **(A)**. For a typical PCI adapter, see Figure 119 on page 156. For a PCIe RAID and SSD SAS adapter, see Figure 120 on page 156.

   b. Rotate the adapter toward the top of the cassette and into place.

   c. Close the tailstock clamp **(C)**.
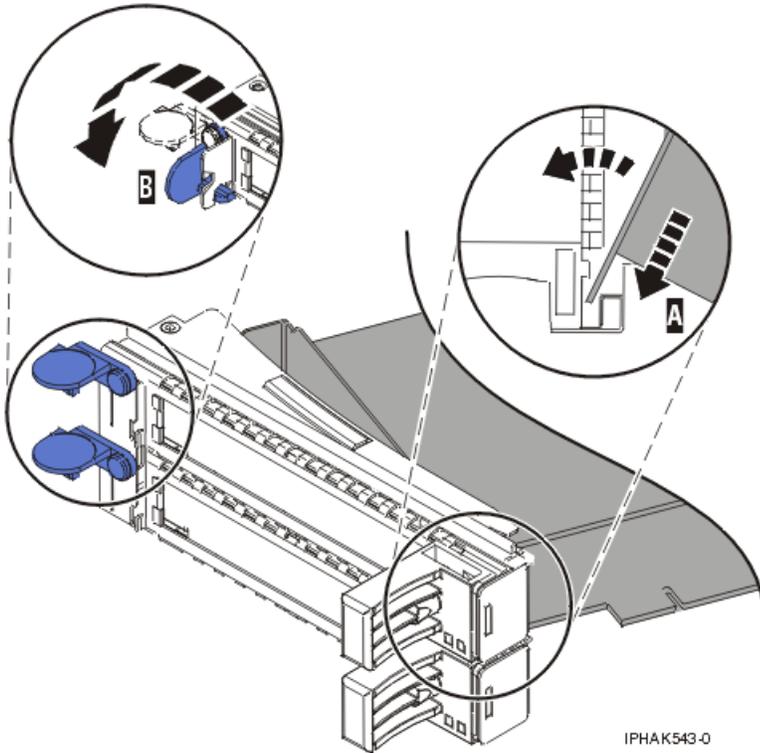
Figure 119. Adapter replaced in the PCI adapter cassette
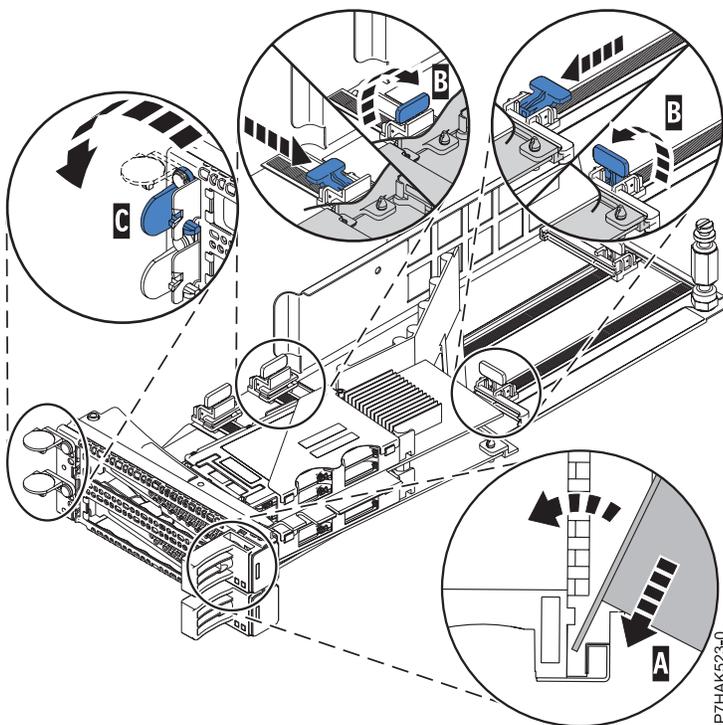
Figure 120. Replacing a PCIe RAID and SSD SAS adapter into the PCI adapter cassette

    d. Position the adapter retainers to support the adapter, and then rotate the retainer clip **(B)** into the closed position.

Notes:

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 and lock the retainers **(B)**. See Figure 121.

   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.

4) 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.
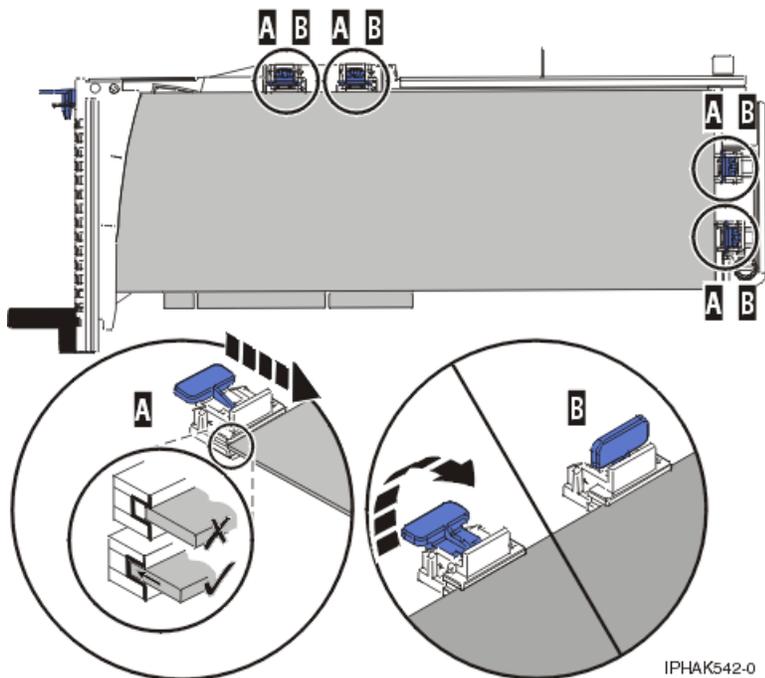
Figure 121. Long adapter in the PCI adapter cassette with the supports and stabilizer in place

9. After the retainers are placed, replace the cassette cover by doing the following steps:
   a. Screw pivot pin **(C)** into place.
   b. Slide the cover **(B)** into position on the cassette as shown in the following figure.
   c. While holding the cover latch **(A)** in the open position, place the cover over the pivot pin **(C)**.
   d. Release the cover latch to lock the cover into place.
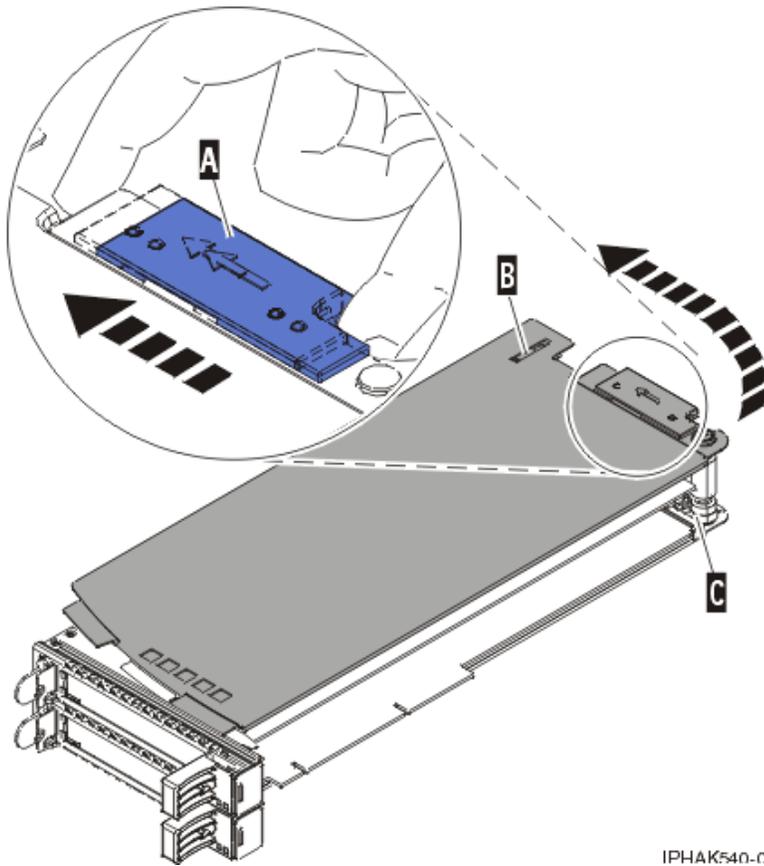
Figure 122. PCI adapter cassette cover replaced

10. Replace the PCI adapter contained in a cassette in 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.

Related procedures for installing and removing PCI adapters

These procedures are related to installing and removing PCI adapters.

Avoiding electric shock

Learn about precautions you should take to avoid electric shock when working on our around a computer system.

DANGER

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

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

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

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

(D005)

Handling static-sensitive devices

Learn about precautions you should take to prevent damage to electronic components from static electricity discharge.

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 before 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 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.

Installing or replacing a PCI adapter with the system power on in Virtual I/O Server

You can install or replace a PCI adapter in the Virtual I/O Server logical partition or in the Integrated Virtualization Manager management partition.

The Virtual I/O Server includes a PCI Hot Plug Manager that is similar to the PCI Hot Plug Manager in the AIX operating system. The PCI Hot Plug Manager allows you to hot plug PCI adapters into the server and then activate them for the logical partition without having to reboot the system. Use the PCI Hot Plug Manager for adding, identifying, or replacing PCI adapters in the system that are currently assigned to the Virtual I/O Server.

Getting started

Prerequisites:
- If you are installing a new adapter, an empty system slot must be assigned to the Virtual I/O Server logical partition. This task can be done through dynamic logical partitioning (DLPAR) operations.
  - If you are using a Hardware Management Console (HMC), you must also update the logical partition profile of the Virtual I/O Server so that the new adapter is configured to the Virtual I/O Server after you restart the system.
  - If you are using the Integrated Virtualization Manager, an empty slot is probably already assigned to the Virtual I/O Server logical partition because all slots are assigned to the Virtual I/O Server by default. You only need to assign an empty slot to the Virtual I/O Server logical partition if you previously assigned all empty slots to other logical partitions.
- If you are installing a new adapter, ensure that you have the software required to support the new adapter and determine whether there are any existing PTF prerequisites to install. To do this, use the IBM Prerequisite website at http://www-912.ibm.com/e_dir/eServerPrereq.nsf
- If you need help determining the PCI slot in which to place a PCI adapter, see the PCI adapter placement.

Follow these steps to access the Virtual I/O Server, PCI Hot Plug Manager:
1. If you are using the Integrated Virtualization Manager, connect to the command-line interface.
2. Use the **diagmenu** command to open the Virtual I/O Server diagnostic menu. The menus are similar to the AIX diagnostic menus.
3. Select **Task Selection**, then press Enter.
4. At the Task Selection list, select **PCI Hot Plug Manager**.

Installing a PCI adapter
To install a PCI adapter with the system power on in Virtual I/O Server, do the following steps:
1. From the PCI Hot Plug Manager, select **Add a PCI Hot Plug Adapter**, then press Enter. The Add a Hot-Plug Adapter window is displayed.
2. Select the appropriate empty PCI slot from those listed, and press Enter. A fast-blinking amber LED located at the back of the server near the adapter indicates that the slot has been identified.
3. Follow the instructions on the screen to install the adapter until the LED for the specified PCI slot is set to the Action state.
   a. Set the adapter LED to the action state so that the indicator light for the adapter slot flashes

    b. Physically install the adapter

    c. Finish the adapter installation task in **diagmenu**.

4. Enter **cfgdev** to configure the device for the Virtual I/O Server.

If you are installing a PCI, Fibre Channel adapter, it is now ready to be attached to a SAN and have LUNs assigned to the Virtual I/O Server for virtualization.

Replacing a PCI adapter

Prerequisite: Before you can remove or replace a storage adapter, you must unconfigure that adapter. See "Unconfiguring storage adapters" for instructions.

To replace a PCI adapter with the system power on in Virtual I/O Server, do the following steps:

1. From the PCI Hot Plug Manager, select **Unconfigure a Device**, then press Enter.
2. Press F4 (or Esc +4) to display the **Device Names** menu.
3. Select the adapter you are removing in the **Device Names** menu.
4. In the **Keep Definition** field, use the Tab key to answer Yes. In the **Unconfigure Child Devices** field, use the Tab key again to answer YES, then press Enter.
5. Press Enter to verify the information on the **ARE YOU SURE** screen. Successful unconfiguration is indicated by the OK message displayed next to the Command field at the top of the screen.
6. Press F4 (or Esc +4) twice to return to the Hot Plug Manager.
7. Select **replace/remove PCI Hot Plug adapter**.
8. Select the slot that has the device to be removed from the system.
9. Select **replace**. A fast-blinking amber LED located at the back of the machine near the adapter indicates that the slot has been identified.
10. Press Enter which places the adapter in the action state, meaning it is ready to be removed from the system.

Unconfiguring storage adapters

Before you can remove or replace a storage adapter, you must unconfigure that adapter. Storage adapters are generally parent devices to media devices, such as disk drives or tape drives. Removing the parent requires that all attached child devices either be removed or placed in the define state.

Unconfiguring a storage adapter involves the following tasks:

- Closing all applications that are using the adapter you are removing, replacing, or moving
- Unmounting file systems
- Ensuring that all devices connected to the adapter are identified and stopped
- Listing all slots that are currently in use or a slot that is occupied by a specific adapter
- Identifying the adapter's slot location
- Making parent and child devices unavailable
- Making the adapter unavailable

If the adapter supports physical volumes that are in use by a client logical partition, then You can perform steps on the client logical partition before unconfiguring the storage adapter. For instructions, see "Preparing the client logical partitions" on page 162. For example, the adapter might be in use because the physical volume was used to create a virtual target device, or it might be part of a volume group used to create a virtual target device.

Follow these steps to unconfigure SCSI, SSA, and Fibre Channel storage adapters:

1. Connect to the Virtual I/O Server command-line interface.
2. Enter oem_setup_env to close all applications that are using the adapter you are unconfiguring.

3. Type `lsslot-c pci` to list all the hot plug slots in the system unit and display their characteristics.
4. Type `lsdev -C` to list the current state of all the devices in the system unit.
5. Type `unmount` to unmount previously mounted file systems, directories, or files using this adapter.
6. Type `rmdev -l adapter -R` to make the adapter unavailable.

   Attention: Do not use the -d flag with the `rmdev` command for hot plug operations because this action removes your configuration.

Preparing the client logical partitions

If the virtual target devices of the client logical partitions are not available, the client logical partitions can fail or they might be unable to perform I/O operations for a particular application. If you use the HMC to manage the system, you might have redundant Virtual I/O Server logical partitions, which allow for Virtual I/O Server maintenance and avoid downtime for client logical partitions. If you are replacing an adapter on the Virtual I/O Server and your client logical partition is dependent on one or more of the physical volumes accessed by that adapter, then You can take action on the client before you unconfigure the adapter.

The virtual target devices must be in the define state before the Virtual I/O Server adapter can be replaced. Do not remove the virtual devices permanently.

To prepare the client logical partitions so that you can unconfigure an adapter, complete the following steps depending on your situation.

Table 1. Situations and steps for preparing the client logical partitions

Situation	Steps
You have redundant hardware on the Virtual I/O Server for the adapter.	No action is required on the client logical partition.
HMC-managed systems only: You have redundant Virtual I/O Server logical partitions that, in conjunction with virtual client adapters, provide multiple paths to the physical volume on the client logical partition.	No action is required on the client logical partition. However, path errors might be logged on the client logical partition.
HMC-managed systems only: You have redundant Virtual I/O Server logical partitions that, in conjunction with virtual client adapters, provide multiple physical volumes that are used to mirror a volume group.	See the procedures for your client operating system. For example, for AIX, see Replacing a disk on the Virtual I/O Server in the IBM System p® Advanced POWER® Virtualization Best Practices Redpaper. The procedure for Linux is similar to this procedure for AIX.
You do not have redundant Virtual I/O Server logical partitions.	Shut down the client logical partition. For instructions, see the following topics about shutting down logical partitions: • For systems that are managed by the HMC, see "Shutting down AIX logical partitions using the HMC", "Shutting down IBM i logical partitions using the HMC", and "Shutting down Linux logical partitions using the HMC" in the Logical partitioning.[1] • For systems that are managed by the Integrated Virtualization Manager, see Shutting down logical partitions.
[1]The Logical partitioning can be found on the Hardware Information website at http://publib.boulder.ibm.com/infocenter/systems/scope/hw/topic/p7hdx/power_systems.htm.	

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.

Accessing hot-plug management functions

You can use PCI Hot Plug Manager to service PCI adapters with the system power on in AIX. Use the procedures in this section to perform this task.

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 access the hot-plug menus, do the following:

1. Log in as root user.
2. At the command line, type `smitty`.
3. Select **Devices**.
4. Select **PCI Hot Plug Manager** and press Enter.
5. The PCI Hot-Plug Manager menu displays. Return to the procedure that directed you here. The following section describes the menu options.

PCI hot-plug manager menu

You can use PCI Hot Plug Manager to service PCI adapters with the system power on in AIX. The following options are available from the PCI Hot Plug Manager menu.

Note: For information about the PCI slot LED states, see "Component LEDs" on page 164.

List PCI hot-plug slots

Provides a descriptive list of all slots that support PCI hot-plug capability. If the listing for a slot indicates it holds an unknown device, select the **Install/configure Devices added after IPL** to configure the adapter in that slot.

Add a PCI hot-plug adapter

Allows the user to add a new PCI hot-plug-capable adapter to the slot with the system turned on. You will be asked to identify the PCI slot that you have selected prior to the actual operation. The selected PCI slot will go into the Action state and finally into the On state.

Note: The system will indicate the slot holds an unknown device until you perform the **Install/configure devices added after IPL** option to configure the adapter.

Replace/remove a PCI hot-plug adapter

Allows the user to remove an existing adapter, or replace an existing adapter with an identical one. For this option to work, the adapter must be in the Defined state (see the "Unconfigure a Device" option).

You will be asked to identify the PCI slot prior to the actual operation. The selected PCI slot will go into the Action state.

Identify a PCI hot-plug slot

Allows the user to identify a PCI slot. The selected PCI slot will go into the Identify state. See "Component LEDs."

Unconfigure a device

Allows the user to put an existing PCI adapter into the Defined state if the device is no longer in use.

This step must be completed successfully before starting any removal or replacement operation. If this step fails, the customer must take action to release the device.

Configure a defined device

Allows a new PCI adapter to be configured into the system if software support is already available for the adapter. The selected PCI slot will go into the On state.

Install/configure devices added after IPL

The system attempts to configure any new devices and tries to find and install any required software from a user-selected source.

The add, remove, and replace functions return information to the user indicating whether the operation was successful. If additional instructions are provided on the screen, complete the recommended actions. If the instructions do not resolve the problem, do the following:

* If the adapter is listed as Unknown, perform the **Install/configure devices Added After IPL** option to configure the adapter.
* If you receive a warning indicating that needed device packages are not installed, the system administrator must install the specified packages before you can configure or diagnose the adapter.
* If you receive a failure message indicating a hardware error, the problem might be either the adapter or the PCI slot. Isolate the problem by retrying the operation in a different PCI slot, or trying a different adapter in the slot. If you determine that you have failing hardware, call your service representative.
* *Do not* use **Install/configure devices added after IPL** if your system is set up to run HACMP™ clustering. Consult with your system administrator or software support to determine the correct method to configure the replacement device.

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.

Resetting the LEDs in AIX:

Individual LEDs are located on or near the failing components. You can use this procedure to reset the LEDs after you have completed a repair action.

After the repair action is completed, do the following:

1. Log in as root user.
2. At the command line, type `diag`.
3. Select **Task Selection**.
4. Select **Log Repair Action**.
5. Select the device that was repaired.
6. Press F10 to exit diagnostics.

If the Attention LED remains on after you have completed the repair action and reset the LEDs, call for service support.

Prerequisites for hot-plugging PCI adapters in Linux

In the course of installing, removing, or replacing a PCI adapter with the system powered on in aLinux operating system, you might need to 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 that the file systems on those devices are unmounted. After hot-plugging adapters for storage devices, ensure that 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 later, 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 (http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html).

Verifying that the hot-plug PCI tools are installed for Linux

In the course of installing, removing, or replacing a PCI adapter with the system power on in Linux operating system 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
   - drmgr -c pci
4. Return to the procedure that sent you here.

Updating the worldwide port name for a new 5735 or 5774 IOA.

If you have exchanged a 5735 or 5774 Fibre Channel Input/Output Adapter (IOA), the IBM external storage subsystem must be updated to use the worldwide port name (WWPN) of the new 5735 or 5774 IOA. Any SAN hardware using WWPN zoning might also need updating.

For instructions on how to update the external storage subsystem or SAN hardware configurations, see the documentation for those systems.

The WWPN for the Fibre Channel IOA can be found using the Hardware Service Manager in SST or DST. Display detail on the 5735 or 5774 IOA Logical Hardware Resource information, and use the port worldwide name field.

The 16-digit WWPN can also be determined by appending the digits 1000 to the beginning of the 12-digit IEEE address found on the tailstock label of the Fibre Channel IOA.

PCI-X double-wide, quad-channel Ultra320 SCSI RAID Controller (FC 5739, 5778, 5781, 5782; CCIN 571F, 575B)

Learn about the features, specifications, and installation notes for the PCI-X double-wide, quad-channel Ultra320 SCSI RAID Controller.

The PCI-X double-wide, quad-channel Ultra320 SCSI RAID Controller is a high-performance SCSI adapter combined with an auxiliary-write cache adapter to form a double-wide, adapter pair. The two adapters are screwed together. This topic contains the following sections:

- "Features" on page 167
- "Specifications" on page 167
- "Placement information" on page 168
- "Logical partitioning" on page 168
- "Placing the adapter in a double-wide cassette" on page 168
- "Installing a cassette that contains an adapter in a system" on page 169
- "Placing the double-wide adapter in a system that does not use cassettes" on page 169
- "Power LED" on page 170
- "Concurrent maintenance procedure" on page 170

Features

- 3 external U320 SCSI ports
- 1 internal U320 SCSI port dedicated to connecting the controller to the auxiliary-write cache adapter
- Up to 36 direct access storage devices (DASD) can be externally attached per adapter
- 320 MB data rate per SCSI bus
- Supports low voltage differential (LVD) disk devices only
- Supports RAID 5 and 6 (3–18 drive sets)
- 390 MB/1.5 GB compressed write cache
- 415 MB/1.6 GB compressed read cache
- PCI-X DDR support (storage adapter side)
- IOP or IOPless (5739 requires an IOP. 5778 does not.)
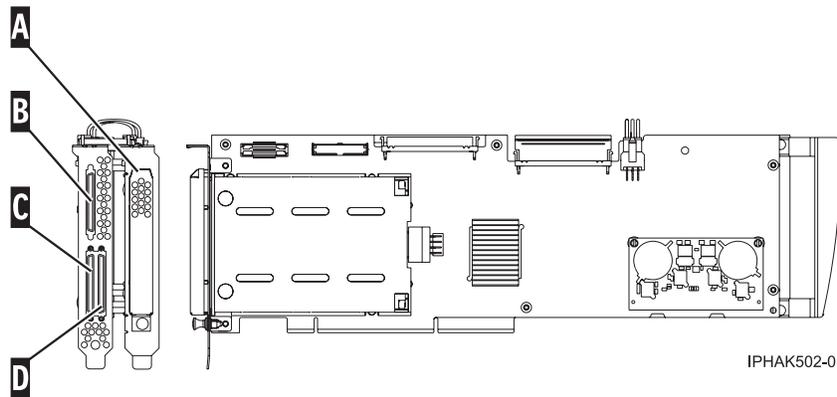
Figure 123. Adapter

(A)   Battery cover

(B)   SCSI port 2

(C)   SCSI port 0

(D)   SCSI port 1

Specifications

Item	Description
Adapter FRU number	42R6578
Cache battery FRU number	42R3965
Unit description	64 bit, 133 MHz, 3.3 V - PCI-X 2.0 compliant - Double-wide adapter, requires 2, adjacent, long slots. The SCSI controller side of the adapter pair requires a 64-bit slot. (The controller side is the side with the external SCSI connectors.) - The auxiliary-write cache adapter contains a dual, concurrently maintainable, cache-battery pack, which maintains cache memory on both adapters in the event of an abnormal termination.

Item	Description
Operating system or partition requirements	• IBM i V5R3, V5R3M5, and V5R4 with PTFs. • AIX 5L™ Version 5.2 with the 5200-10 Technology Level, or later • AIX 5L Version 5.3 with the 5300-06 Technology Level, or later • Red Hat Enterprise Linux version 4 U4, or later • SUSE Linux Enterprise Server 10, or later Check the IBM Prerequisite website at http://www-912.ibm.com/e_dir/eServerPrereq.nsf for further details and updates.
Maximum number	See "Placement information."

Placement information

See the following topics for the placement rules if the adapter is supported on that system:
- PCI adapter placement rules and slot priorities in the 8202-E4B, 8202-E4C, 8202-E4D, 8205-E6B, 8205-E6C, or 8205-E6D
- PCI adapter placement rules and slot priorities in the 8231-E2B, 8231-E1C, 8231-E1D, 8231-E2C, 8231-E2D, or 8268-E1D
- PCI adapter placement rules and slot priorities in the 8233-E8B
- PCI adapter placement rules and slot priorities in the 8236-E8C
- PCI adapter placement rules and slot priorities in the 9117-MMB, 9117-MMC, or 9117-MMD
- PCI adapter placement rules and slot priorities in the 9179-MHB, 9179-MHC, or 9179-MHD

Logical partitioning

When used in a logical partition (LPAR) environment, this double-wide adapter must have both slots of the adapter assigned to the same logical partition. When implementing dynamic logical partitioning (DLPAR), both slots of the adapter must be managed together.

Placing the adapter in a double-wide cassette

To place this double-wide adapter in a double-wide cassette, first remove the adapter handle **(B)**, and the two plastic covers from the SCSI jumper cable **(A)**, as shown in the following figure. (The two plastic covers are only found on adapters made before August 2008.) Then follow the general procedures to place a double-wide adapter in a double-wide cassette. See Placing an adapter in the PCI adapter double-wide cassette.
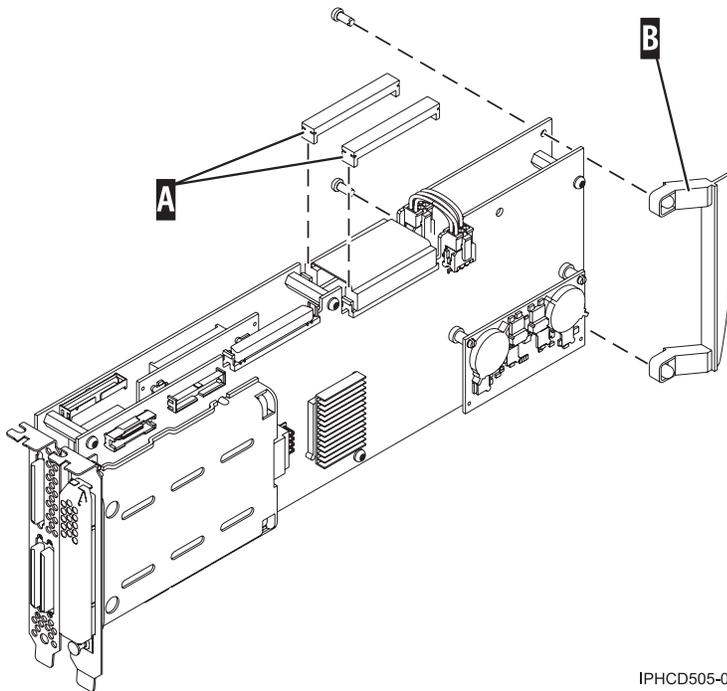
Figure 124. Preparing the adapter for placement in a cassette

Installing a cassette that contains an adapter in a system

To install a cassette that contains an adapter into a system unit or expansion unit, follow the procedures in 5796 and 7314-G30 expansion units, Removing and replacing a PCI adapter contained in a cassette. For instructions, see PCI adapters.

Placing the double-wide adapter in a system that does not use cassettes

If you are installing the double-wide adapter in the internal PCI slots, remove the lower, right standoff shown in Figure 125.
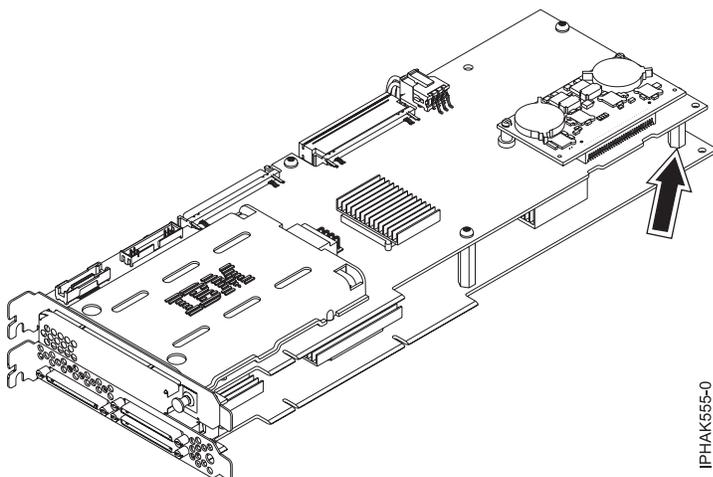
Figure 125. Removing the standoff

Power LED

For a double-wide adapter, there is only one power LED visible for both slots.

Concurrent maintenance procedure

Concurrent maintenance of this double-wide adapter is only supported if you are using the IBM i operating system. It is not supported through the Hardware Management Console (HMC). Concurrent maintenance must be done from the Hardware Service Manager (HSM) of the system or owning partition. The HSM automatically powers off and on both PCI slots when either slot is selected. If you are using the AIX or Linux operating system you must manually power off and on each slot separately.

Important:
- Both PCI slots must be powered off when installing or removing this adapter with the system power on.
- If the adapter is the load source IOA, or under the load source IOP, or any other storage IOA/IOP with critical DASD attached for the system, have a qualified service provider perform the concurrent maintenance procedure. At step 12, the HSM directs you to use control panel functions 68 and 69 to power off the domain.

The following steps are a general concurrent maintenance procedure for installing, removing, or replacing an adapter in a system that is running the IBM i operating system. If you were sent here by another procedure, additional specific instructions for removing and replacing a PCI adapter can be found in that procedure.

1. Start an IBM i session for the system or partition that contains the adapter and sign on to the system or partition.
2. Type **strsst** on the command line of the Main menu and then press Enter.
3. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display and press Enter.
4. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
5. Select **Hardware service manager** from the Start a Service Tools display and press Enter.
6. Select **Logical hardware resources (system, frames, cards)** from the Hardware Service Manager display and press Enter.
7. Select **System bus resources** and press Enter. The display changes to the Logical Hardware Resources on System Bus display.
8. Page down and locate the **IOP** that controls the IOA to be serviced.

   If you are installing a new IOPless adapter in an empty slot, the IOP is not shown.
9. Enter 9 in the Opt field for the **IOP** to be serviced.
10. Locate the **Storage IOA** resource for the adapter to be serviced and enter 8 in the Opt field for that resource.
11. Enter 3 for **Concurrent maintenance** in the Opt field for the **Storage IOA** resource to be serviced. The display changes to the Hardware Resource Concurrent Maintenance display.
12. Press F9 to power off the domain.

    In some cases, the card slots are already powered off if empty.
13. Press Enter to start power off. The display changes to the Hardware Resource Concurrent Maintenance Status display, which shows the status of the power off.

    When the power off is complete, the display returns to the Hardware Resource Concurrent Maintenance display. The display shows that the **Power Status** is off for **Storage IOA**. Leave this display on the HSM while you install, remove, or replace the adapter.
14. Check the slot power LED state for the slot in which the adapter resides to verify that the adapter is powered off.

For a double-wide adapter, there is only one power LED visible for both slots.

15. Install, remove, or replace the adapter. Follow the procedures in 5796 and 7314-G30 expansion units, Removing and replacing a PCI adapter contained in a cassette. For instructions, see PCI adapters.

16. After the replacement is complete, return to the Hardware Resource Concurrent Maintenance display on the HSM.

17. If you were previously instructed to use operator panel function 69 to power on the adapter, do so now. Then go to step Installing PCI adapters, otherwise continue with next step.

18. Enter F10 to power the adapter on.

19. Press Enter to begin power on.

20. If the Work with Controlling Resource display is displayed, enter 7 in the Opt field for the **IOP** to assign the IOA to.

    The Hardware Resource Concurrent Maintenance Status display shows the status of the power on.

21. When the power on is complete, the display returns to the Hardware Resource Concurrent Maintenance display. The display shows that the **Power Status** is on for the **Storage IOA**.

22. Check the LED status to verify that the adapter is powered on.

    For a double-wide adapter, there is only one power LED visible for both slots.

23. Return to the procedure that sent you here.

PCI-X DDR 1.5 GB cache SAS RAID Adapter (FC 5904, 5906, 5908; CCIN 572F and 575C)

Learn about the specifications and operating system requirements for the 5904, 5906, and 5908 adapter.

Overview

The PCI-X DDR 1.5 GB cache SAS RAID Adapter is a SAS disk controller with a maximum of 1.5 GB compressed write cache and a maximum 1.6 GB compressed read cache. Auxiliary write cache and concurrent battery maintenance are provided. The controller is implemented by using two physical adapters that are securely connected to form a double-wide adapter. The double-wide adapter requires two adjacent Peripheral Component Interconnect-X (PCI-X) slots. The auxiliary write cache side of the double-wide adapter contains a dual, concurrently maintainable cache battery pack which maintains cache memory on both adapters in the event of an abnormal termination.

When used in a logical partition (LPAR) environment, this double-wide adapter must have both slots of the adapter assigned to the same logical partition. When implementing dynamic LPAR (DLPAR), both slots of the adapter must be managed together.

Feature 5904, 5906, and 5908 are all feature codes that represent the same PCI-X DDR 1.5 GB cache SAS RAID Adapter. Different feature codes indicate whether a blind swap cassette is used and its type:
- Feature 5904 indicates no blind swap cassette. The feature is used in enclosures that do not use blind swap cassettes.
- Feature 5906 indicates a gen-2.5 blind swap cassette. The feature is used in the 5797 and 5798 enclosures.
- Feature 5908 indicates a gen-3 blind swap cassette. This feature is used in the 5790 and 5796 enclosures.

572F is the CCIN number on the RAID adapter side of the double-wide adapter pair. 575C is the CCIN number on the write-cache adapter.

The adapter provides RAID 0, RAID 5, RAID 6, and RAID 10 for the AIX and Linux operating systems. Under the IBM i operating system, mirroring and data spreading are provided by the operating system, and RAID 5 and RAID 6 are provided by the adapter. [1]

The adapter provides three mini-SAS 4x connectors for the attachment of SAS drives in 5886 EXP 12S Expansion Drawers. The adapter supports a maximum of five 5886 EXP 12S Expansion Drawers.[1] With correct cabling and configuration, multiple wide ports are used to provide redundant paths to each dual port SAS drive. The adapter manages SAS path redundancy and path switching if a SAS failure occurs.

With the optional pairing of adapter sets, an even higher level of protection is provided by using a dual controller I/O configuration[1] to protect against the failure of an entire adapter set. In such a high availability I/O configuration, SAS X cables are used to attach 5586 EXP 12S Expansion Drawers. The fourth mini-SAS connector on each card set is used to directly connect the card sets by using a SAS AA cable.

Important: For more information and important considerations for multi-initiator and high availability or dual storage IOA configurations, see the SAS RAID controllers for AIX, SAS RAID controllers for Linux, or SAS RAID controllers for IBM i topics.

The following figure shows the adapter.
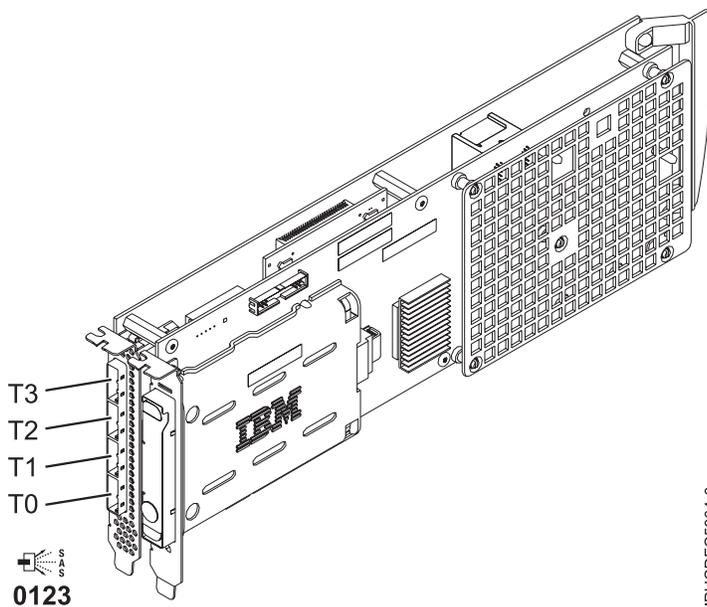
Figure 126. PCI-X DDR 1.5GB cache SAS RAID Adapter

Note: Port T3 does not support any device attachment. T3 is only used in dual controller I/O configurations for adapter to adapter communication.

Specifications

Item   Description
Adapter FRU number
>   44V8622 (Adapter only - Designed to comply with RoHS requirement.)

>   42R4008 (Gen-3 blind swap cassette only)

>   44V7627 (Adapter in gen-2.5 blind swap cassette)
Battery FRU number
>   42R3965 or 74Y5665 (Designed to comply with RoHS requirement.)
I/O bus architecture
>   PCI-X
Slot requirement
>   Two, long, adjacent PCI-X slots.

Cables

SAS device attachment requires specific cables that are provided with the subsystem or device features that are being attached. Special cabling is required for multi-initiator and high availability configurations. See Serial-attached SCSI cable planning

Voltage

3.3V

Form factor

Long

Maximum number

See PCI adapter placement.

Attributes

* SAS speed: 3 Gbps
* SAS, SAS Serial SCSI Protocol (SSP), and Serial Management Protocol (SMP) supported
* Single controller supported with SAS y cables (3692, 3693, 3694)
* Dual controller supported with SAS x cables (3661, 3662, 3663) and SAS 2:6 cable (3681, 3682)
* Single controller supports mirrored write cache data with auxiliary cache
* Dual controller supports mirrored-write cache data and mirrored-RAID parity footprints between card sets
* Removable media devices are not supported

Operating system or partition requirements

This adapter is supported for the following operating systems:

* AIX:
  * AIX 5L Version 5.3 with the 5300-07 Technology Level and Service Pack 8, or later
  * AIX 5L Version 5.3 with the 5300-08 Technology Level and Service Pack 6, or later
  * AIX 5L Version 5.3 with the 5300-09 Technology Level and Service Pack 2, or later
  * AIX 5L Version 5.3 with the 5300-10 Technology Level, or later
  * AIX 6.1 and Service Pack 8, or later
  * AIX Version 6.1 with the 6100-01 Technology Level and Service Pack 4, or later
  * AIX 6.1 with the 6100-02 Technology Level and Service Pack 3, or later
  * AIX 6.1 with the 6100-03 Technology Level, or later
* Linux:
  * Red Hat Enterprise Linux version 4, with update 7, or later
  * Red Hat Enterprise Linux version 5, with update 2, or later
  * SUSE Linux Enterprise Server 10, with service pack 2, or later
* IBM i
  * IBM i V5R4M5 and Resave F, or later
  * IBM i 6.1 and Resave F, or later

This adapter requires the following device drivers:

* AIX: devices.pci.1410bd02 device driver package
* Linux:
  * iprutils version 2.4.1 and ipr driver version 2.0.11.6 (or newer) for RHEL4 kernels
  * iprutils version 2.4.1 and ipr driver version 2.2.0.2 (or newer) for RHEL5 kernels
  * iprutils version 2.4.1 and ipr driver version 2.2.0.2 (or newer) for SLES10 kernels

If you are installing a new feature, ensure that you have the software that is required to support the new feature and that you determine whether there are any prerequisites for this feature and attaching devices. To check for the prerequisites, see IBM Prerequisite website (www-912.ibm.com/e_dir/eServerPrereq.nsf).

Concurrent maintenance procedure

Concurrent maintenance of this double-wide adapter is not supported through the Hardware
Management Console (HMC). Concurrent maintenance must be done from within the partition operating
system. In IBM i, the Hardware Service Manager (HSM) of the system or owning partition will
automatically power off or on both PCI slots when either slot is selected. In AIX or Linux, you must
manually power off and on each slot separately.

Important:
* Both PCI slots must be powered off when installing or removing this adapter with the system power
  on.
* If this adapter is the load source IOA, or any other storage IOA with critical DASD attached for the
  system, this concurrent maintenance procedure should be performed by a qualified service provider.

Common procedures for installable features

Use these procedures to help you remove and replace PCI adapters.

Before you begin

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

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

DANGER

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

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

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

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

  (D005)

DANGER

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

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

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

CAUTION

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

(R001)

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

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

Blue or terra-cotta on a part of the hardware indicates a touch point where you can grip the hardware to remove it from or install it in the system, open or close a latch, and so on. Terra-cotta might also indicate that the part can be removed and replaced with the system or logical partition power on.

5. Ensure that you have access to a medium flat-blade screwdriver, a Phillips screwdriver, and a pair of scissors.

6. If parts are incorrect, missing, or visibly damaged, do the following:
   - If you are replacing a part, contact the provider of your parts or next level of support.
   - If you are installing a feature, contact one of the following service organizations:
     – The provider of your parts or next level of support.
     – In the United States, the IBM Rochester Manufacturing Automated Information Line (R–MAIL) at 1–800–300–8751.

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

   http://www.ibm.com/planetwide

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

8. If you are installing new hardware in a logical partition, you need to understand and plan for the implications of partitioning your system. For information, see Logical Partitioning.

Removing a part by using the HMC

You can use the Hardware Management Console (HMC) to perform many service actions, including the removal of a field replaceable unit (FRU) or part.

To remove a part in a system or expansion unit that is managed by HMC Version 7, or later, complete the following steps:

1. In the navigation area, expand **Systems Management** > **Servers**.
2. Select the managed system from which you are removing a part.
3. In the **Tasks** area, expand **Serviceability** > **Hardware** > **MES Tasks** > **Remove FRU**
4. In the Add/Install/Remove Hardware - Remove FRU, Select FRU Type window, select the system or enclosure from which you are removing the part.
5. Select the type of part that you are removing, and click **Next**.
6. Select the location of the part that you are removing, and click **Add**.
7. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to remove the part.

   Note: The HMC might open the information center instructions for removing the part. If so, follow those instructions to remove the part.

Installing a part by using the HMC

You can use the Hardware Management Console (HMC) to perform many service actions, including the installation of a new feature or part.

To install a feature or part into a system or expansion unit that is managed by HMC Version 7, or later, complete the following steps:

1. In the navigation area, expand **Systems Management** > **Servers**.
2. Select the managed system on which you will install the part.

Note: If your part is in a miscellaneous equipment specification (MES), continue with step 3. If your part is contained in the install done by the system services representative (SSR) or in a ship group, go to step 8.

3. In the Tasks area, expand **Serviceability** > **Hardware** > **MES Tasks** > **Open MES**.

4. Click **Add MES Order Number**.

5. Enter the number, and click **OK**.

6. Click the newly created order number, and click **Next**. The details of the order number are displayed.

7. Click **Cancel** to close the window.

8. In the Tasks area, expand **Serviceability** > **Hardware** > **MES Tasks**.

9. Select **Add FRU** (field replaceable unit).

10. In the Add/Install/Remove Hardware-Add FRU, Select FRU Type window, select the system or enclosure into which you are installing the feature.

11. Select the type of feature you are installing, and click **Next**.

12. Select the location code where you will install the feature, and click **Add**.

13. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to install the feature.

   Note: The HMC might open external instructions for installing the feature. If so, follow those instructions to install the feature.

Replacing a part by using the HMC

You can use the Hardware Management Console (HMC) to perform many service actions, including exchanging a field replaceable unit (FRU) or part.

If you are exchanging a part to repair a serviceable event, follow those instructions. If you are exchanging a part as a part of any other procedure by using HMC Version 7, or later, complete the following steps:

1. In the navigation area, expand **Systems Management** > **Servers**.

2. Select the managed system in which you are exchanging a part.

3. In the **Tasks** area, expand **Serviceability** > **Hardware** > **Exchange FRU**.

4. Select the system or enclosure from which you want to exchange the part.

5. In the Replace Hardware - Replace FRU, Select FRU Type window, select the type of part that you will exchange from the menu, and click **Next**.

6. Select the location code of the part that you will exchange, and click **Add**.

7. After the part is listed in the **Pending Actions** section, 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 those instructions to replace the part.

Removing a part by using the SDMC

You can use the IBM Systems Director Management Console (SDMC) to perform many service actions, including the removal of a field-replaceable unit (FRU) or part.

To remove a part in a system or expansion unit that is managed by an SDMC, complete the following steps:

1. In the Power Systems Resources area, select the managed system from which you are removing a part.

2. From the **Actions** menu, expand **Service and Support** > **Hardware** > **MES Tasks** > **Remove FRU**.

3. On the Remove FRU page, select the enclosure from which you want to remove the part from the **Installed Enclosures** list.
4. Select the type of the part that you are removing, and click **Next**.
5. Select the location of the part that you are removing, and click **Add**.
6. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to remove the part.

   Note: The SDMC might open external instructions for removing the part. If so, follow those instructions to remove the part.

Installing a part by using the SDMC

You can use the IBM Systems Director Management Console (SDMC) to perform many service actions, including the installation of a new field-replaceable unit (FRU) or part.

To install a part into a system or expansion unit that is managed by an SDMC, complete the following steps:
1. In the Power Systems Resources area, select the system on which you want to install a part.
2. From the **Actions** menu, expand **Service and Support** > **Hardware** > **MES Tasks** > **Add FRU**.
3. On the Add FRU page, select the system or enclosure type from the **Enclosure type** list.
4. Select the FRU type that you are installing, and click **Next**.
5. Select the location code for the location to install, and click **Add**.
6. After the part is placed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to install the part.

   Note: The SDMC might open external instructions for installing the feature. If so, follow those instructions to install the part.

Replacing a part by using the SDMC

You can use the IBM Systems Director Management Console (SDMC) to perform many service actions, including exchanging a field-replaceable unit (FRU) or part.

To replace a part by using the SDMC, complete the following steps:
1. In the Power Systems Resource area, select the managed system in which you are exchanging a part.
2. Select one of the following options:
   - If you are replacing a part that is not part of a serviceable event from the **Actions** menu, expand **Service and Support** > **Hardware** > **Exchange FRU**.
   - If you are exchanging a part to repair a serviceable event, see Starting a repair action.
3. On the Exchange FRU page, select the enclosure from which you want to replace the part from the **Installed Enclosure Types** list.
4. Select the type of part that you want to exchange, and click **Next**.
5. Select the location code of the part that you want to exchange, and click **Add**.
6. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to exchange the part.

   Note: The SDMC might open external instructions for replacing the part. If so, follow those instructions to replace the part.

Identifying a part

Use these instructions to learn how to identify the location of a failed part, the location of a part to be removed, or the location to install a new part on your system or expansion unit using the appropriate method for your system.

For IBM Power Systems™ servers that contain the POWER7® processor, the light-emitting diodes (LEDs) can be used to identify or verify the location of a part that you are removing, servicing, or installing.

The combination identify and fault LED (amber color) shows the location of a field replaceable unit (FRU). When removing a FRU, first verify whether you are working on the correct FRU by using the identify function in the management console or other user interface. When removing a FRU by using the hardware management console, the identify function is activated and deactivated automatically at the correct times.

The identify function causes the amber LED to flash. When you turn off the identify function, the LED returns to the state it was previously. For parts that have a blue service button, the identify function sets LED information for the service button so that when the button is pressed, the correct LEDs on that part flash.

If you need to use the identify function, use the following procedures.

Control panel LEDs

Use this information as a guide to the control panel LEDs and buttons.

The control panel has LEDs that indicate various system status.
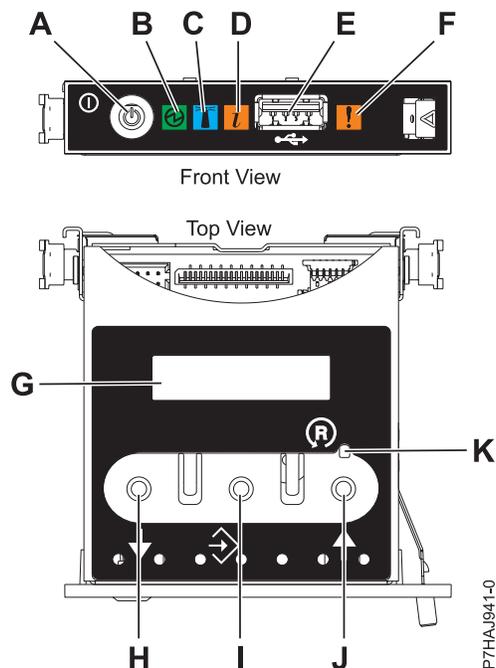
Figure 127. Control panel

- **A**: Power-on button
- **B**: Power LED
  - A constant light indicates full system power to the unit.

– A flashing light indicates standby power to the unit.

Note: There is approximately a 30-second transition period from the time the power-on button is pressed to when the power LED goes from flashing to solid. During the transition period, the LED might flash faster.

- **C**: Enclosure identify light
  - A constant light indicates the identify state, which is used to identify a part.
  - No light indicates that the system is operating normally.
- **D**: System information light
  - No light indicates that the system is operating normally.
  - Light on indicates that the system requires attention.
- **E**: USB port
- **F**: Enclosure fault roll-up light
  - A constant light indicates a fault in the system unit.
  - No light indicates that the system is operating normally.
- **G**: Function/Data display
- **H**: Decrement button
- **I**: Enter button
- **J**: Increment button
- **K**: Pinhole reset button

Related concepts:

Identifying a failing part
Use these instructions to learn how to locate and identify a failing part on your system or expansion unit using the appropriate method for your system.

Identifying a failing part in an AIX system or logical partition

Use these instructions to learn how to locate a failing part, and then activate the indicator light for that part on a system or logical partition running the AIX operating system.

Locating a failing part in an AIX system or logical partition

You might need to use AIX tools, before activating the indicator light, to locate a part that is failing.

1. Log in as root user or `celogin-`.
2. At the command line, type `diag` and press Enter.
3. From the Function Selection menu, select **Task Selection** and press Enter.
4. Select **Display Previous Diagnostic Results** and press Enter.
5. From the Display Previous Diagnostic Results display, select **Display Diagnostic Log Summary**. The Display Diagnostic Log display shows a chronological list of events.
6. Look in the **T** column for the most recent **S** entry. Select this row in the table and press Enter.
7. Select **Commit**. The details of this log entry are shown.
8. Record the location information and the SRN value shown near the end of the entry.
9. Exit to the command line.

Use the location information for the failing part to activate the indicator light that identifies the failing part. See "Activating the indicator light for the failing part."

Activating the indicator light for the failing part

Use these instructions to help physically identify the location of a part you are servicing.

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

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. From the **Task Selection** menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter.
6. Select **Commit**. This turns on the system attention and indicator light for the failing part.
7. Exit to the command line.

Deactivating the failing-part indicator light

Use this procedure to turn off any indicator light that you turned on as a part of a service action.

To deactivate the indicator light, complete the following steps:

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. From the **Task Selection** menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter. When a light is activated for a failing part, an I character precedes the location code.
6. Select **Commit**. This turns off the system attention and indicator light for the failing part.
7. Exit to the command line.

Identifying a failing part in an IBM i system or logical partition

You can activate or deactivate the indicator light by using IBM i to assist in locating a failing part.

Activating the failing-part indicator light

You can search the service action log for an entry that matches the time, reference code, or resource of a problem, and then activate the indicator light for a failing part.

1. Sign on to an IBM i session, **with at least service level authority**.
2. On the command line of the session, type `strsst` and press Enter.

   Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by a Hardware Management Console (HMC), use the Service Focal Point™ utilities to get to the Dedicated Service Tools (DST) display.
3. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display and press Enter.

   Remember: The service tools password is case-sensitive.
4. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
5. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
6. Select **Work with service action log** from the Hardware Service Manager display and press Enter.
7. On the Select Timeframe display, change the **From: Date and Time** field to a date and time prior to when the problem occurred.
8. Search for an entry that matches one or more conditions of the problem:
   • System reference code
   • Resource
   • Date and time
   • Failing item list
9. Select option **2** (Display failing item information) to display the service action log entry.

10. Select option **2** (Display details) to display location information for the failing part to be replaced. The information displayed in the date and time fields is the date and time for the first occurrence of the specific system reference code for the resource displayed during the time range selected.

11. If location information is available, select option **6** (Indicator on) to turn on the failing part's indicator light.

    Tip: If the failing part does not contain a physical indicator light, a higher-level indicator light is activated. For example, the indicator light for the backplane or unit that contains the failing part might be lit. In this case, use the location information to locate the actual failing part.

12. Look for the enclosure indicator light to locate the enclosure that contains the failing part.

Deactivating the failing-part indicator light

Use this procedure to turn off any indicator light that you turned on as a part of a service action.

To deactivate the indicator light, follow these steps:

1. Sign on to an IBM i session, **with at least service level authority**.
2. On the command line of the session, type `strsst` and press Enter.

   Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by a Hardware Management Console (HMC), use the Service Focal Point utilities to get to the Dedicated Service Tools (DST) display.

3. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display and press Enter.

   Remember: The service tools password is case-sensitive.

4. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
5. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
6. Select **Work with service action log** from the Hardware Service Manager display and press Enter.
7. On the Select Timeframe display, change the **From: Date and Time** field to a date and time prior to when the problem occurred.
8. Search for an entry that matches one or more conditions of the problem:
   - System reference code
   - Resource
   - Date and time
   - Failing item list
9. Select option **2** (Display failing item information) to display the service action log entry.
10. Select option **2** (Display details) to display location information for the failing part to be replaced. The information displayed in the date and time fields is the date and time for the first occurrence of the specific system reference code for the resource displayed during the time range selected.
11. Select option **7** (Indicator off) to turn off the indicator light.
12. Select the **Acknowledge all errors** function at the bottom of the Service Action Log display, if all problems have been resolved.
13. Close the log entry by selecting option **8** (Close new entry) on the Service Action Log Report display.

Identifying a failing part in a Linux system or logical partition

If the service aids have been installed on a system or logical partition, you can activate or deactivate the indicator lights to locate a part or complete a service action.

Locating a failing part in a Linux system or logical partition

If the service aids have been installed on a system or logical partition, you need to activate the indicator lights to locate a part.

To activate the indicator light, follow these steps:

1. Log in as root user.
2. At the command line, type /usr/sbin/usysident -s identify -l *location_code* and press Enter.
3. Look for the system attention light to identify the enclosure that contains the failing part.

Related information:

➡ Service and productivity tools for PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

Finding the location code of a failing part in a Linux system or logical partition

To retrieve the location code of the failing part, if you do not know the location code, use the procedure in this topic.

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

1. Log in as root user.
2. At the command line, type grep diagela /var/log/platform and press Enter.
3. Look for the most recent entry that contains a system reference code (SRC).
4. Record the location information.

Related information:

➡ Service and productivity tools for PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

Activating the indicator light for the failing part

If you know the location code of the failing part, activate the indicator light to help you locate which part to replace.

To activate the indicator light, follow these steps:

1. Log in as root user.
2. At the command line, type /usr/sbin/usysident -s identify -l *location_code* and press Enter.
3. Look for the system attention light to identify the enclosure that contains the failing part.

Related information:

➡ Service and productivity tools for PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

Deactivating the failing-part indicator light

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

To deactivate the indicator light, follow these steps:

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

Related information:

➡ Service and productivity tools for PowerLinux servers from IBM
IBM provides hardware diagnostic aids and productivity tools, and installation aids for Linux operating systems on IBM Power Systems servers.

Locating a failing part in a Virtual I/O Server system or logical partition

You can use Virtual I/O Server (VIOS) tools, before activating the indicator light, to locate a part that is failing.

To locate the failing part, follow these steps:

1. Log in as root user or `celogin-`.
2. At the command line, type `diagmenu` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. Select **Display Previous Diagnostic Results** and press Enter.
5. From the **Display Previous Diagnostic Results** display, select **Display Diagnostic Log Summary**. A **Display Diagnostic Log** display appears. This display contains a chronological list of events.
6. Look in the **T** column for the most recent **S** entry. Select this row in the table and press Enter.
7. Choose **Commit**. The details of this log entry are shown.
8. Record the location information and the SRN value shown near the end of the entry.
9. Exit to the command line.

Use the location information for the failing part to activate the indicator light that identifies the failing part. For instructions, see "Identifying a part by using the Virtual I/O Server."

Identifying a part by using the Virtual I/O Server

You can use Virtual I/O Server (VIOS) tools to physically locate a part.

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

1. Log in as root user.
2. At the command line, type `diagmenu` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. From the **Task Selection** menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter.
6. Select **Commit**. This turns on the system attention and indicator light for the failing part.
7. Exit to the command line.

Stopping a system or logical partition

Learn how to stop a system or logical partition as a part of a system upgrade or service action.

Attention: Using either the power-on button on the control panel or entering commands at the Hardware Management Console (HMC) to stop the system can cause unpredictable results in the data files. Also, the next time you start the system, it might take longer if all applications are not ended before stopping the system.

To stop the system or logical partition, select the appropriate procedure.

Stopping a system that is not managed by an HMC or an SDMC

You might need to stop the system to perform another task. If your system is not managed by the Hardware Management Console (HMC) or the IBM Systems Director Management Console (SDMC), use these instructions to stop the system by using the power button or the Advanced System Management Interface (ASMI).

Before you stop the system, follow these steps:

1. If an Integrated xSeries Adapter (IXA) is present on the system, shut it down using IBM i options.

2. Ensure that all jobs are completed and end all applications.
3. Ensure that the operating system is stopped.

   Attention: Failure to do so can result in the loss of data.
4. If a Virtual I/O Server (VIOS) logical partition is running, ensure that all clients are shut down or that the clients have access to their devices by using an alternate method.

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

1. Log in to the system as a user with the authority to run the **shutdown** or **pwrdwnsys** (Power Down System) command.
2. At the command line, enter one of the following commands:
   - If your system is running the AIX operating system, type **shutdown**.
   - If your system is running the Linux operating system, type `shutdown -h now`.
   - If your system is running the IBM i operating system, type `PWRDWNSYS`. If your system is partitioned, use the PWRDWNSYS command to power down each of the secondary partitions. Then, use the PWRDWNSYS command to power down the primary partition.

   The command stops the operating system. The system power turns off, the power-on light begins to slowly flash, and the system goes into a standby state.
3. At the Linux command line, type `shutdown -h now`.

   The command stops the operating system. The system power turns off, the power-on light begins to slowly flash, and the system goes into a standby state.
4. Record the IPL type and the IPL mode from the control panel display to help you return the system to this state when the installation or replacement procedure is completed.
5. Set the power switches of any devices connected to the system to off.
6. Unplug any power cables that are attached to the peripheral devices, such as printers and expansion units.

   Important: The system may be equipped with a second power supply. Before continuing with this procedure, ensure that all power sources to the system have been disconnected.
   (L003)
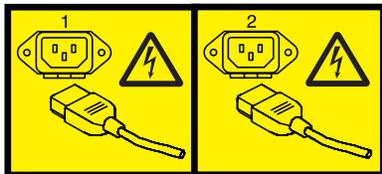
   or

Stopping a system by using the HMC

You can use the Hardware Management Console (HMC) to stop the system or a logical partition.

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

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

To power off a managed system, you must be a member of one of the following roles:
- Super administrator
- Service representative
- Operator
- Product engineer

Use the following steps to stop the system by using the HMC:
1. In the navigation area, expand the **Systems Management** folder.
2. Click the **Servers** icon.
3. In the Contents area, select the managed system.
4. Select **Tasks** > **Operations** > **Power Off**.
5. Select the appropriate power-off mode and click **OK**.

Related information:

Shutting down and restarting logical partitions

Stopping a system by using the SDMC

You can use the IBM Systems Director Management Console (SDMC) to stop the system or a virtual server.

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

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

To power off a managed system, you must be a member of one of the following roles:
- Super administrator
- Service representative
- Operator
- Product engineer

Use the following steps to stop the system by using the SDMC.
1. In the Power Systems Resource area, select the managed system you want to power off.
2. From the **Actions** menu, select **Operations** > **Power Off**.
3. Select the appropriate power-off mode and click **OK**.

Shutting down logical partitions

You can use the Integrated Virtualization Manager to shut down the logical partitions or to shut down the entire managed system.

Use any role other than View Only to perform this task.

The Integrated Virtualization Manager provides the following types of shutdown options for logical partitions:
- Operating System (recommended)
- Delayed
- Immediate

The recommended shutdown method is to use the client operating systems shutdown command. Use the immediate shutdown method only as a last resort because using this method causes an abnormal shutdown which might result in data loss.

If you choose the Delayed shutdown method, then be aware of the following considerations:
- Shutting down the logical partitions is equivalent to pressing and holding the white control-panel power button on a server that is not partitioned.
- Use this procedure only if you cannot successfully shut down the logical partitions through operating system commands. When you use this procedure to shut down the selected logical partitions, the logical partitions wait a predetermined amount of time to shut down. This allows the logical partitions time to end jobs and write data to disks. If the logical partition is unable to shut down within the predetermined amount of time, it ends abnormally, and the next restart might take a long time.

If you plan to shut down the entire managed system, shut down each client logical partition, then shut down the Virtual I/O Server management partition.

To shut down a logical partition, complete the following steps in the Integrated Virtualization Manager:

1. In the navigation area, select **View/Modify Partitions** under **Partition Management**. The View/Modify Partitions page is displayed.
2. Select the logical partition that you want to shut down.
3. From the Tasks menu, click **Shutdown**. The Shutdown Partitions page is displayed.
4. Select the shutdown type.
5. Optional: Select **Restart after shutdown completes** if you want the logical partition to start immediately after it shuts down.
6. Click **OK** to shut down the partition. The View/Modify Partitions page is displayed, and the logical partition state has a value of shutdown.

Starting the system or logical partition

Learn how to start a system or logical partition after performing a service action or system upgrade.

Starting a system that is not managed by an HMC or an SDMC

You can use the power button or the Advanced System Management Interface (ASMI) to start a system that is not managed by a Hardware Management Console (HMC) or an IBM Systems Director Management Console (SDMC).

To start a system that is not managed by a HMC or SDMC, follow these steps:
1. Open the front rack door, if necessary.
2. Before you press the power button on the control panel, ensure that power is connected to the system unit as follows:
   - All system power cables are connected to a power source.
   - The power LED, as shown in the following figure, is slowly flashing.
   - The top of the display, as shown in the following figure, shows 01 V=F.
3. Press the power button **(A)**, as shown in the following figure, on the control panel.
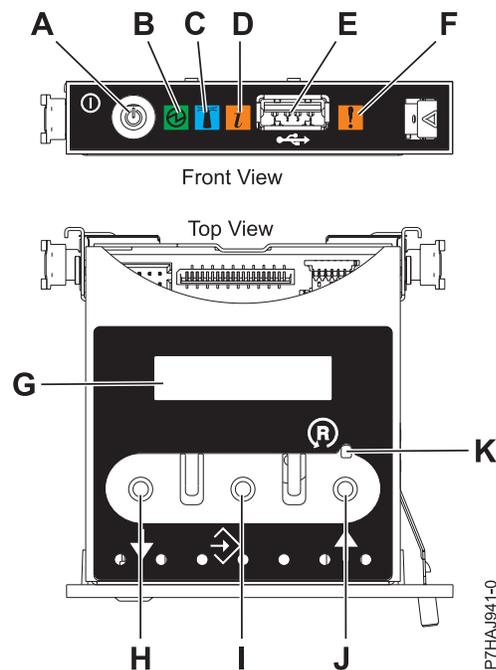
Figure 128. Control panel

- **A**: Power-on button
- **B**: Power LED
  - A constant light indicates full system power to the unit.
  - A flashing light indicates standby power to the unit.

    Note: There is approximately a 30-second transition period from the time the power-on button is pressed to when the power LED goes from flashing to solid. During the transition period, the LED might flash faster.
- **C**: Enclosure identify light
  - A constant light indicates the identify state for the enclosure or for a resource within the enclosure.
  - No light indicates that no resources in the enclosure are being identified.
- **D**: Attention light
  - No light indicates that the system is operating normally.
  - A solid light indicates that the system requires attention.
- **E**: USB port
- **F**: Enclosure fault roll-up light
  - A constant light indicates a fault indicator active in the system.
  - No light indicates that the system is operating normally.
- **G**: Function/Data display
- **H**: Decrement button
- **I**: Enter button
- **J**: Increment button
- **K**: Pinhole reset button

4. Observe the following aspects after pressing the power button:
   - The power-on light begins to flash faster.
   - The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
   - Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops flashing and remains on, indicating that the system power is on.

Tip: If pressing the power button does not start the system, do the following steps to start the system by using the Advanced System Management Interface (ASMI):

1. Access the ASMI. For instructions, see Accessing the ASMI without an HMC.
2. Start the system by using the ASMI. For instructions, see Powering the system on and off.

Starting a system or logical partition by using the HMC

You can use the Hardware Management Console (HMC) to start the system or logical partition after the required cables are installed and the power cables are connected to a power source.

For instructions on working with the HMC, see Managing the Hardware Management Console. For instructions on starting a logical partition, see Logical partitioning. For instructions on starting the system, see Powering on the managed system.

Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. When the power-on light on the control panel stops blinking and remains on, the system power is on.

Starting a system or virtual server by using the SDMC

You can use the IBM Systems Director Management Console (SDMC) to start the system or virtual server after the required cables are installed and the power cables are connected to a power source.

For instructions on working with the SDMC, see Managing and configuring the SDMC. For instructions on starting a virtual server, see Managing virtual servers. For instructions on shutting down and restarting virtual servers, see Shutting down and restarting virtual servers.

Progress indicators, also known as checkpoints, display on the control panel while the system is being started. When the power-on light on the control panel stops flashing and remains on, the system power is on.

Verifying a repair

Use these procedures to verify hardware operation after making repairs to the system.

Choose from the following options:
- To verify the repair of a system that is currently powered off, go to step 1.
- To verify the repair of a system that is currently powered on with no operating system loaded, go to step 3.
- To verify the repair of a system that is currently powered on and that has an operating system loaded, go to step 5 on page 192.

1. Power on the server and all attached I/O enclosures.

Did all the enclosures power on?
Yes: Go to step 3.↓ Go to step 3.
No: Continue with the next step.

2. Choose from the following options:

- If the original problem was that an enclosure would not power on and you have another FRU to replace, locate and replace the next field-replaceable unit (FRU).
- If the next FRU in the FRU list is an isolation procedure, perform the isolation procedure.
- If the original problem was that an enclosure would not power on and you have an isolation procedure to complete, perform the isolation procedure.
- If the original problem was that an enclosure would not power on and there are no more FRUs or isolation procedures in the FRU list, contact your next level of support.
- If you have a new problem, perform problem analysis and repair the new problem.

3. Load the operating system.

Did the operating system load successfully?
Yes: Go to step 5.
No: Continue with the next step.

4. Choose from the following options:

- If the original problem was a failing disk drive that contained the operating system software, go to step 5.
- If the original problem was that the operating system would not load and you have another FRU to replace, go to your FRU locations section to locate the next FRU.
- If the next FRU in the FRU list is an isolation procedure, perform the isolation procedure.
- If the original problem was that the operating system would not load and you have an isolation procedure to complete, perform the isolation procedure.
- If the original problem was that the operating system would not load and there are no more FRUs or isolation procedures in the FRU list, contact your next level of support.
- If you have a new problem, perform problem analysis and repair the new problem.

5. Choose from the following options:
   - "Verifying the repair in AIX"
   - "Verifying the repair in Linux" on page 197
   - "Verifying a repair by using an IBM i system or logical partition" on page 195

Verifying the repair in AIX

You can use this procedure to verify that a repair is complete using the AIX operating system.

Use this maintenance analysis procedure (MAP) to check out the server after a repair is completed.

1. Did you replace a disk drive in the root volume group?

No   Go to step 3.

Yes   Continue with the next step.

2. Run stand-alone diagnostics either from a CD or from a Network Installation Management (NIM) server.

Did you encounter any problems?

No   Reinstall the operating system and continue with step 5.

Yes   If the original problem still exists, replace the field-replaceable unit (FRU) or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

          If a new problem has occurred, go to Beginning problem analysis.

3. Did you replace a FRU with the power turned on and concurrently with system operations?

No   Go to step 5.

Yes   Continue with the next step.

4. Did you use an AIX diagnostics service aid hot-swap operation to change the FRU?

Yes   Go to step 6 on page 193.

No   Go to step 7 on page 193.

Note: The AIX diagnostic service aid was used if a resource was removed by using the **Hot Plug** task.

5. If any FRUs have been removed that should be reinstalled, reinstall them now:

1. If the system is not powered on, power it on now.
2. Perform a slow boot.
3. Wait until the AIX operating system login prompt is displayed or until system activity on the operator panel or display has stopped.
4. Did you encounter any problems?

No   Continue at step 6.

Yes   If the original problem still exists, replace the FRU or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

        If a new problem occurs, go to Beginning problem analysis.

---

6. If the Resource Repair Action menu is already displayed, go to step 9 on page 194; otherwise, perform the following steps:

1. Log into the operating system either with root authority (if needed, ask the customer to enter the password) or use the CE login.
2. Enter `diag -a` command and check for missing resources. Follow any instructions that are displayed. If an SRN displays, suspect a loose card or connection. If no instructions are displayed, no resources were detected as missing. Continue with the next step.

---

7. Perform the following steps:

1. Enter `diag` at the command prompt.
2. Press Enter.
3. Select the **Diagnostics Routines** option.
4. When the Diagnostic Mode Selection menu is displayed, select **System verification**.
5. When the Diagnostic Selection menu is displayed, select the **All Resources** option or test the FRUs you exchanged and any devices that are attached to the FRUs you exchanged by selecting the diagnostics for the individual FRU.

Did the Resource Repair Action menu (801015) display?

No   Continue with the next step.

Yes   Go to step 9 on page 194.

---

8. Did the TESTING COMPLETE, no trouble was found menu (801010) display?

Yes   Use the **Log Repair Action** option, if not previously logged, in the TASK SELECTION menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action.

        If the resource associated with your action is not displayed on the resource list, select **sysplanar0**.
        Note: If the system attention indicator is on, this action will set it back to the normal state.

        Go to step 11 on page 194.

No   If the original problem still exists, replace the FRU or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

        If a new problem occurs go to Beginning problem analysis.

9. When a test is run on a resource in system verification mode, that resource has an entry in the AIX error log. If the test on that resource was successful, the Resource Repair Action menu is displayed.

After replacing a FRU, you must select the resource for that FRU from the Resource Repair Action menu. This updates the AIX error log to indicate that a system-detectable FRU has been replaced.

Note: If the system attention indicator is on, this action will set it back to the normal state.

Perform the following steps:

1. Select the resource that has been replaced from the Resource Repair Action menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the resource list, select **sysplanar0**.
2. Press **Commit** after you make your selections.

Did another Resource Repair Action (801015) display?

No   If the No Trouble Found menu displays, go to step 11.

Yes   Continue with the next step.

10. The parent or child of the resource you just replaced might also require that you run the Resource Repair Action service aid on it.

When a test is run on a resource in system verification mode, that resource has an entry in the AIX error log. If the test on the resource was successful, the Resource Repair Action menu displays.

After replacing that FRU, you must select the resource for that FRU from the Resource Repair Action menu. This updates the AIX error log to indicate that a system-detectable FRU has been replaced.

Note: If the system attention indicator is on, this action will set it back to the normal state.

Perform the following steps:

1. From the RESOURCE REPAIR ACTION menu, select the parent or child of the resource that has been replaced. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the resource list, select **sysplanar0**.
2. Press COMMIT after you make your selections.
3. If the No Trouble Found menu is displayed, continue with the next step.

11. If you changed the service processor or network settings, as instructed in previous MAPs, restore the settings to the value they had prior to servicing the system. If you ran stand-alone diagnostics from CD-ROM, remove the stand-alone diagnostics CD-ROM from the system.

Did you perform service on a RAID subsystem that involvedchanging of the PCI RAID adapter cache card or changing the configuration?

Note: This information does not apply to the PCI-X RAID adapter or cache.

No   Go to the close of call procedure.

Yes   Continue with the next step.

12. Use the **Recover Options** selection to resolve the RAID configuration. To do this, perform the following steps:

1. On the PCI SCSI Disk Array Manager display, select **Recovery options**.
2. If a previous configuration exists on the replacement adapter, this must be cleared. Select **Clear PCI SCSI Adapter Configuration** and press F3.
3. On the Recovery Options screen, select **Resolve PCI SCSI RAID Adapter Configuration**.
4. On the Resolve PCI SCSI RAID Adapter Configuration screen, select **Accept Configuration on Drives**.
5. On the PCI SCSI RAID Adapter selections menu, select the adapter that you changed.
6. On the next screen, press Enter.
7. When you see the Are You Sure selection menu, press Enter to continue.
8. If you see a `Failed` status message, verify that you selected the correct adapter, and then repeat this procedure. When the recovery is complete, exit the operating system.
9. Go to the Closing a service call procedure.

Verifying a repair by using an IBM i system or logical partition

Use this procedure to verify a repair by using the IBM i operating system.

1. Was the system powered off during the repair?

   Yes: Continue with the next step.

   No: Continue with step 3.

2. Perform the following tasks:

   a. Verify that the power cable is plugged into the power outlet.

   b. Verify that power is available at the customer's power outlet.

3. Was the partition powered off during the repair?

   Yes: Continue with the next step.

   No: Continue with step 6.

4. Select the IPL type and mode for the system or logical partition that the customer uses (see IPL type mode and speed options in the Service functions).

5. Start an IPL by powering on the system or partition (see Powering on and powering off). Did the system complete the IPL?

   Yes: Continue with the next step.

   No: This might be a new problem. Go to the Starting a repair action. **This ends the procedure.**

6. Did the system or partition remain running throughout the repair, and was the I/O processor, I/O adapter, or storage device replaced?

   Yes: Continue with step 10.

   No: Continue with the next step.

7. Use the service action log or serviceable event view (if the system is managed by an HMC) to look for any reference codes that are related to this IPL (see Searching the service action log). Are there any reference codes that are related to this IPL?

   Yes: Continue with the next step.

   No: If the problem was related to removable media or communications, perform the verification procedures in the Service functions to verify that the problem is corrected. Then return the system to the customer and have the customer verify the system date and time. **This ends the procedure.**

8. Is the new reference code the same as the original reference code?

   Yes: Continue with the next step.

   No: A new symptom might have occurred. Go to the Start of call procedure. **This ends the procedure.**

9. Are there any other failing items that remain to be replaced?

   Yes: Replace the next failing item listed for this reference code. **This ends the procedure.**

   No: Contact your next level of support for assistance. **This ends the procedure.**

10. Was concurrent maintenance performed on an optical storage unit?

    Yes: The product activity log and service action log, in most cases, contain a reference code for the optical storage unit when concurrent maintenance is performed. You can ignore this reference code. Perform the following:

    - Perform the verification procedures in the Service functions topic to verify that the problem is corrected.

    - Return the system to the customer and have the customer verify the system date and time. **This ends the procedure.**

    No: Continue with the next step.

11. Use the service action log to look for any new reference codes (see Using the Service Action Log). Are there any new reference codes?

    Yes: Continue with the next step.

    No: Go to step 14.

12. Is the new reference code the same as the original reference code?

    Yes: Continue with the next step.

    No: A new symptom might have occurred. Go to the Start of call procedure to determine the cause of the problem. **This ends the procedure.**

13. Are there any other failing items that need to be replaced?

    Yes: Replace the next failing item listed for the reference code. **This ends the procedure.**.

    No: Contact your next level of support for assistance. **This ends the procedure.**

14. Are you working with a tape device?

    Yes: Perform the verification procedures in the Service functions to verify that the problem is corrected. After the verification test is complete, the tape device description will be set to the failed state because a resource change was detected. Perform the following tasks:

    - Vary the tape device description off and then on.

    - Return the system to the customer and have the customer verify the system date and time. Then go to Verifying the repair from the HMC. **This ends the procedure.**

    No: Continue with the next step.

15. Are you working with an IOP or an IOA?

    Yes: Use the display hardware configuration service function to check for any missing or failed hardware:

    - On the command line, enter the STRSST (Start System Service Tools command). If you cannot get to SST, select DST. Do not IPL the system or partition to get to DST.

    - On the Start Service Tools Sign On display, enter the user ID with the service authority and password.

    - Select **Start a service tool** > **Hardware service manager** > **Logical hardware resources** > **System bus resources**.

    - Select the function key for **Include nonreporting resources**.

    - If the IOP and IOA that you just replaced is a failed or nonreporting resource, the problem has not been fixed. Continue to the next failing item in the failing item list. **This ends the procedure.**

No: Perform the verification procedures in the Service functions topics to verify that the problem is corrected. Resources that usually vary on automatically during an IPL, or that were previously varied on manually, might need to be varied on again after the verification procedures are complete. Return the system to the customer and have the customer verify the system date and time. **This ends the procedure.**

Verifying the repair in Linux

You can use this procedure to verify that a repair is complete by using the Linux operating system.

1. Run stand-alone diagnostics from either a CD or from a Network Installation Management (NIM) server. See Running the stand-alone diagnostics from CD-ROM.

Did you encounter any problems?

No   Reboot the operating system and continue with the close of call procedure.

Yes   If the original problem still exists, replace the field-replaceable unit (FRU) or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

        If a new problem has occurs go to Beginning problem analysis and repair the new problem.

Verifying the repair from the management console

Perform these procedures to close problem numbers, clear hardware messages, and prepare the server to return to the customer by using the management console.

Follow this checklist before performing the procedures:

- You return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.

  Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every 2 hours.

- While you were performing the problem analysis on the original serviceable event, other serviceable-event numbers might have been opened. Close all serviceable events that were opened as a result of your service activity.

- Server verification has been performed and there are no problems that require additional service actions.

- If the repair was done by using the HMC online repair procedures, ensure that the original serviceable event is now closed.

1. Is a management console used to manage the server that you are servicing?

- **Yes:** Continue with the next step.
- **No:** Return to the "Verifying a repair" on page 191. **This ends the procedure.**

2. Are you closing a service event that was a repair on the management console personal computer?

- **Yes:** Continue with the next step.
- **No:** Go to step 4.

3. Power on the management console. Did the power-on process complete without errors?

- **Yes:** Ensure that the management console can be used to perform server management tasks, and return the management console to normal operations. Go to "Closing a service call" on page 210. **This ends the procedure.**
- **No**: Go to the *HMC isolation procedures*. **This ends the procedure.**

4. Log into the management console as the service representative. If invalid user or invalid password is displayed, get the correct login information from the system administer.

1. If logged into the System Manager, select **Exit from the Console**, located in the System Manager window.
2. Log in to the System Manager with the following:
   - User identification - `service`
   - Password - `service mode`

5. View Serviceable Event Details.

1. In the navigation area, click **Service Applications**.
2. In the navigation area, click **Service Focal Point**.
3. In the Contents area, click **Manage Serviceable Events**.
4. Designate the set of Serviceable Events you want to view. When you are finished, click **OK**. The **Service Event Overview** window opens.

Note: Only the events that match all of the criteria you specify are shown.

6. Close open or delayed events.

1. Select the problem to close in the Service Event Overview window.
2. Select the **Selected** menu, located on the menu bar.
3. Click **Close Event**.
4. Enter your comments in the **Serviceable Event Comments** window, and click **Close Event**.
5. Close all events associated with the problem on which you were working.

7. Did the Service Event Overview window contain the event or events on which you were working?

- **Yes:** Return the HMC to normal operations. Go to "Closing a service call" on page 210. **This ends the procedure.**
- **No:** Go to Detecting problems. **This ends the procedure.**

Verifying the installed part

You can verify a newly installed or replaced part on your system, logical partition, or expansion unit by using the operating system, stand-alone diagnostics, or the Hardware Management Console (HMC).

Verifying an installed feature or replaced part in an AIX system or logical partition

If you installed feature or replaced a part, you might want to use the tools in the AIX operating system to verify that the feature or part is recognized by the system or logical partition.

To verify the operation of a newly installed feature or replacement part, select the appropriate procedure:
- Verify the installed feature using AIX
- Verifying the replaced part using AIX

Verify the installed feature by using the AIX operating system:
1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. Select **Advanced Diagnostics Routines** and press Enter.
4. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
5. When the **Advanced Diagnostic Selection** menu appears, do one of the following:
   - To test a single resource, select the resource that you just installed from the list of resources and press Enter.

- To test all the resources available to the operating system, select **All Resources** and press Enter.
6. Select **Commit**, and wait until the diagnostic programs run to completion, responding to any prompts that appear.
7. Did the diagnostics run to completion and display the message `No trouble was found`?
   - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the installation procedures to ensure that the new feature is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system is running in logical partitioning (LPAR) mode, note the logical partition in which you installed the feature. Contact your service provider for assistance.
   - **Yes:** The new device is installed correctly. Exit the diagnostic programs and return the system to normal operations.

Verify the replacement part by using the AIX operating system:

To verify the operation of a newly installed feature or replacement part, follow these steps:
1. Did you use either the AIX operating system or the online diagnostics service aid concurrent (hot-swap) service to replace the part?

   No: Go to step 2.

   Yes: Go to step 5.
2. Is the system powered off?

   No: Go to step 4.

   Yes: Continue with the next step.
3. Start the system and wait until the AIX operating system login prompt is displayed or until apparent system activity on the operator panel or display has stopped.

   Did the AIX login prompt display?
   - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the procedures for the part that you replaced to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system does not start or you have no login prompt, see: Problems with loading and starting the operating system.

     If the system is partitioned, note the logical partition in which you replaced the part. Contact your service provider for assistance.
   - **Yes:** Go to step 4.
4. At the command prompt, type `diag –a` and press Enter to check for missing resources. If you see a command prompt, go to step 5.

   If the **Diagnostic selection** menu is shown with **M** appearing next to any resource, follow these steps:
   a. Select the resource and press Enter.
   b. Select **Commit**.
   c. Follow any instructions that are shown.
   d. If the *Do you want to review the previously displayed error?* message is shown, select **Yes** and press Enter.
   e. If an SRN is shown, suspect a loose card or connection. If no obvious problem is shown, record the SRN and contact your service provider for assistance.
   f. If no SRN is shown, go to step 5.
5. Test the part by doing the following steps:
   a. At the command line, type `diag` and press Enter.
   b. From the **Function Selection** menu, select **Advanced Diagnostics Routines** and press Enter.
   c. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.

d. Select **All Resources**, or select the diagnostics for the individual part to test only the part you replaced and any devices that are attached to the part you replaced and press Enter.

Did the **Resource Repair Action** menu appear?

No: Go to step 6.

Yes: Go to step 7.

6. Did the *Testing Complete, No trouble was found* message appear?

- **No:** There is still a problem. Contact your service provider. **This ends the procedure.**

- **Yes:** Select **Log Repair Action**, if not previously logged, from the **Task Selection** menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the resource list, select **sysplanar0** and press Enter.

  Tip: This action changes the indicator light for the part from the fault state to the normal state.

  Go to step 9.

7. Select the resource for the replaced part from the **Resource Repair Action** menu. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

   Note: On systems with an indicator light for the failing part, this action changes the indicator light to the normal state.

   a. Select the resource that has been replaced from the **Resource Repair Action** menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select **sysplanar0** and press Enter.

   b. Select **Commit** after you make your selections. Did another **Resource Repair Action** display appear?

      No: If the **No Trouble Found** display appears, go to step 9

      Yes: Go to step 8.

8. Select the parent or child of the resource for the replaced part from the **Resource Repair Action** menu if necessary. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

   Note: This action changes the indicator light for the part from the fault state to the normal state.

   a. From the **Resource Repair Action** menu, select the parent or child of the resource that has been replaced. If the repair action was to reseat a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select **sysplanar0** and press Enter.

   b. Select **Commit** after you make your selections.

   c. If the **No Trouble Found** display appears, go to step 9.

9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the values they had prior to servicing the system.

10. Did you do any hot-plug procedures before doing this procedure?

       No: Go to step 11.

       Yes: Go to step 12 on page 201.

11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?

No: Contact your service provider. **This ends the procedure.**

Yes: Go to step 12.

12. Are the indicator lights still on?
    - **No. This ends the procedure.**
    - **Yes.** Turn off the lights. See the following for instructions: Changing service indicators.

Verifying the installed part in an IBM i system or logical partition

If you have installed a new feature or part, verify that the system recognizes the feature or part by using the IBM i system service tools.

To verify the installed part, follow these steps:

1. Deactivate the failing item indicator light. For instructions, see "Deactivating the failing-part indicator light" on page 183.
2. Sign on **with at least service level authority**.
3. On the command line of the IBM i session, type `strsst` and press Enter.

   Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by Hardware Management Console (HMC), use the Service Focal Point Utilities to get to the Dedicated Service Tools (DST) display.

4. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display and press Enter.

   Note: The service tools password is case-sensitive.

5. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
6. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
7. Select **Logical hardware resources (buses, IOPs, controllers)** from the Hardware Service Manager display and press Enter. This option allows you to display and work with logical resources. Logical hardware resources are the functional resources of the system used by the operating system.

With the Logical Hardware Resources display, you can show logical hardware resource status or information, and associated packaging hardware resources. Use the online Help information to better understand specific functions, fields, or symbols.

Deactivating the failing-part indicator light

Use this procedure to turn off any indicator light that you turned on as a part of a service action.

To deactivate the indicator light, follow these steps:

1. Sign on to an IBM i session, **with at least service level authority**.
2. On the command line of the session, type `strsst` and press Enter.

   Note: If you cannot get to the System Service Tools display, use function 21 from the control panel. Alternatively, if the system is managed by a Hardware Management Console (HMC), use the Service Focal Point utilities to get to the Dedicated Service Tools (DST) display.

3. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display and press Enter.

   Remember: The service tools password is case-sensitive.

4. Select **Start a service tool** from the System Service Tools (SST) display and press Enter.
5. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
6. Select **Work with service action log** from the Hardware Service Manager display and press Enter.

7. On the Select Timeframe display, change the **From: Date and Time** field to a date and time prior to when the problem occurred.
8. Search for an entry that matches one or more conditions of the problem:
   - System reference code
   - Resource
   - Date and time
   - Failing item list
9. Select option **2** (Display failing item information) to display the service action log entry.
10. Select option **2** (Display details) to display location information for the failing part to be replaced. The information displayed in the date and time fields is the date and time for the first occurrence of the specific system reference code for the resource displayed during the time range selected.
11. Select option **7** (Indicator off) to turn off the indicator light.
12. Select the **Acknowledge all errors** function at the bottom of the Service Action Log display, if all problems have been resolved.
13. Close the log entry by selecting option **8** (Close new entry) on the Service Action Log Report display.

Verifying the installed part in a Linux system or logical partition

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

To verify the newly installed or replaced part, continue with "Verifying an installed part by using stand-alone diagnostics."

Verifying an installed part by using stand-alone diagnostics

If you have installed or replaced a part, verify that the system recognizes the new part. You can use stand-alone diagnostics to verify an installed part in an AIX or Linux system, expansion unit, or logical partition.

- If this server is directly attached to another server or attached to a network, ensure communications with the other servers have stopped.
- The stand-alone diagnostics require use of all of the logical partition resources. No other activity can be running on the logical partition.
- The stand-alone diagnostics require access to the system console.

You access these diagnostics from a CD-ROM or from the Network Installation Management (NIM) server. This procedure describes how to use the diagnostics from a CD-ROM. For information on running diagnostics from the NIM server, see Running stand-alone diagnostics from a Network Installation Management server.

To use stand-alone diagnostics, follow these steps:

1. Stop all jobs and applications and then stop the operating system on the system or logical partition.
2. Remove all tapes, diskettes, and CD-ROM.
3. Turn off the system unit power. The next step boots the server or logical partition from the stand-alone diagnostics CD-ROM. If the optical drive is not available as a boot device on the server or logical partition on which you are working, follow these steps:
   a. Access the ASMI. For information on using the ASMI, see Accessing the ASMI.
   b. On the ASMI main menu, click **Power/Restart Control**.
   c. Click **Power On/Off System**.
   d. Select the **Service mode boot from default boot list** option in the AIX or Linux logical partition mode boot drop-down menu.
   e. Click **Save settings and power on**. When the optical drive is powered on, insert the stand-alone diagnostic CD-ROM.

f. Go to step 5.

4. Turn on the system unit power and immediately insert the diagnostics CD-ROM into the optical drive.

5. After the **keyboard** POST indicator displays on the system console and before the last POST indicator (**speaker**) displays, press the numeric 5 key on the system console to indicate that a service mode boot must be initiated by using the default-service mode boot list.

6. Enter any requested password.

7. At the **Diagnostic Operating Instructions** display, press Enter.

    Tip: If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection.

    Note: If you received an SRN or any other reference code when you attempted to start the system, contact your service provider for assistance.

8. If the terminal type is requested, select the **Initialize Terminal** option on the Function Selection menu to initialize the operating system.

9. From the Function Selection menu, select **Advanced Diagnostics Routines** and press Enter.

10. From the Diagnostic Mode Selection menu, select **System Verification** and press Enter.

11. When the Advanced Diagnostic Selection menu appears, select **All Resources**, or test only the part you replaced, and any devices that are attached to the part you replaced, by selecting the diagnostics for the individual part and press Enter.

12. Did the `Testing Complete, No trouble was found` message appear?

     - **No:** There is still a problem. Contact your service provider.
     - **Yes:** Go to step 13.

13. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the value they had prior to servicing the system.

14. If the indicator lights are still on, follow these steps:

     a. Select **Identify and Attention Indicators** from the Task Selection menu to turn off the system attention and indicator lights and press Enter.

     b. Select **Set System Attention Indicator to NORMAL** and press Enter.

     c. Select **Set All Identify Indicators to NORMAL** and press Enter.

     d. Choose **Commit**.

         Note: This changes the system attention and identify indicators from the *Fault* state to the *Normal* state.

     e. Exit to the command line.

Verifying the installed part by using the HMC

If you have installed or replaced a part, use the Hardware Management Console (HMC) to update your HMC records after you have completed a service action on your server. If you have reference codes, symptoms, or location codes that you used during the service action, locate the records for use during this procedure.

To verify the installed part, complete these steps:

1. At the HMC, examine the service action event log for any open service action events. See "Viewing serviceable events by using the HMC" on page 205 for details.

2. Are there any service action events that are open?

    No: If the system attention LED is still on, use the HMC to turn off the LED. See "Activating and deactivating LEDs by using the HMC" on page 204. **This ends the procedure.**

    Yes: Continue with the next step.

3. Record the list of open service action events.
4. Examine the details of the open service action event. Is the error code associated with this service action event the same as you gathered earlier.
   - **No**: Select one of the following options:
     – Review the other serviceable events, find one that does match, and continue with the next step.
     – If the log does not match what you had gathered earlier, contact your service provider.
   - **Yes**: Continue with the next step.
5. Select and highlight the service action event from the Error Associated With This Serviceable Event window.
6. Click **Close Event**.
7. Add comments for the serviceable event. Include any unique additional information. Click **OK**.
8. Did you replace, add, or modify a field replaceable unit (FRU) of the open service action event?
   - **No**: Select the **No FRU Replaced for this Serviceable Event** option, and click **OK** to close the service action event.
   - **Yes**: Perform the following steps:
     a. From the FRU list, select a FRU that you need to update.
     b. Double-click the FRU and update the FRU information.
     c. Click **OK** to close the service action event.
9. If you continue to have problems, contact your service provider.

Activating and deactivating LEDs by using the HMC

Use this procedure to activate or deactivate LEDs by using Service Focal Point from the Hardware Management Console (HMC).

Deactivating a system attention LED or partition LED by using the HMC:
You can deactivate the attention LED for a system or logical partition if you decide that a problem is not a high priority and you decide to repair the problem at a later time. The deactivation also allows the LED to be activated again when another problem occurs.

To deactivate a system attention LED by using HMC, complete the following steps:
1. In the navigation area, open **Systems Management**.
2. Open **Servers** and select the required system.
3. In the content area, select the required partition.
4. Select **Tasks** > **Operations** > **Deactivate Attention LED**. A confirmation window is displayed with an indication that there still might be open problems with the system.
5. Click **OK** to continue with the deactivation. A window is displayed that provides the details of the system or partition, and a confirmation that the system or logical partition attention LED was deactivated.

Activating or deactivating an identify LED by using the HMC:
The system provides several LEDs that help identify various components, such as enclosures or field replaceable units (FRUs), in the system. For this reason, they are called *identify LEDs*.

You can activate or deactivate the following types of identify LEDs:
- **Identify LED for an enclosure** If you want to add an adapter to a specific drawer (enclosure), you need to know the machine type, model, and serial number (MTMS) of the drawer. To determine whether you have the correct MTMS for the drawer that needs the new adapter, you can activate the LED for a drawer and verify that the MTMS corresponds to the drawer that requires the new adapter.

- **Identify LED for a FRU associated with a specified enclosure** If you want to hook up a cable to a specific I/O adapter, you can activate the LED for the adapter which is a field replaceable unit (FRU), and then physically check to see where you should hook up the cable. This is especially useful when you have several adapters with open ports.

To activate or deactivate an identify LED for an enclosure or FRU, follow these steps:

1. In the navigation area, open **Systems Management**.
2. Select **Servers**.
3. In the content area, check the box for the appropriate System.
4. Select **Tasks** > **Operations** > **LED Status** > **Identify LED**.
5. To activate or deactivate an identify LED for an enclosure, select an enclosure from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
6. To activate or deactivate an identify LED for a FRU, select an enclosure from the table and click **List FRUs**.
7. Select one or more FRUs from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Viewing serviceable events by using the HMC

Use this procedure to view a serviceable event, including details, comments, and service history.

To view serviceable events and other information about the events, you must be a member of one of the following roles:
- Super administrator
- Service representative
- Operator
- Product engineer
- Viewer

To view serviceable events, follow these steps:

1. In the navigation area, select **Service Management**.
2. Select **Manage Serviceable Events**.
3. Select the criteria for the serviceable events that you want to view, and click **OK**. The Serviceable Event Overview window opens. The list shows all serviceable events that match your selection criteria. You can use the menu options to perform actions on the serviceable events.
4. Select a line in the Serviceable Event Overview window, and select **Selected** > **View Details**. The Serviceable Event Details window opens, showing detailed information about the serviceable event. The upper table shows information, such as problem number and reference code. The lower table shows the field replaceable units (FRUs) associated with this event.
5. Select the error for which you want to view comments and history, and follow these steps:
   a. Select **Actions** > **View Comments**.
   b. When you are finished viewing the comments, click **Close**.
   c. Select **Actions** > **View Service History**. The Service History window opens, showing service history associated with the selected error.
   d. When you are finished viewing the service history, click **Close**.
6. When you are finished, click **Cancel** twice to close the Serviceable Event Details window and the Serviceable Event Overview window.

Verifying the installed part by using the SDMC

If you installed or replaced a part, use the IBM Systems Director Management Console (SDMC) to update your SDMC records after you have completed a service action on your server. If you have reference codes, symptoms, or location codes that you used during the service action, locate the records for use during this procedure.

To verify the installed part, complete these steps:

1. From the SDMC, examine the service action event log for any open service action events. See "Viewing serviceable events by using the SDMC" on page 207 for details.
2. Are there any service action events that are open?

   No: If the system attention LED is still on, use the SDMC to turn off the LED. See "Activating and deactivating LEDs by using the SDMC." **This ends the procedure.**

   Yes: Continue with the next step.
3. Record the list of open service action events.
4. Examine the details of the open service action event. Is the error code associated with this service action event the same as you gathered earlier.

   - **No**: Select one of the following options:
     - Review the other serviceable events, find one that does match, and continue with the next step.
     - If the log does not match what you had gathered earlier, contact your service provider.
   - **Yes**: Continue with the next step.
5. Select and highlight the service action event from the Error Associated With This Serviceable Event window.
6. Click **Delete** or **Ignore**.

   Note: These options are only available from the problem event log.

Activating and deactivating LEDs by using the SDMC

Use this procedure to activate or deactivate LEDs by using the IBM Systems Director Management Console (SDMC).

Deactivating a system attention LED or partition LED by using the SDMC:
You can deactivate a system attention LED or a logical partition LED. For example, you might determine that a problem is not a high priority and decide to repair the problem at a later time. However, you want to be alerted if another problem occurs, so you must deactivate the system attention LED so that it can be activated again if another problem occurs.

To deactivate the system attention LED, complete the following steps:

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions** > **Service and Support** > **Hardware** > **System Attention LED**.
3. Select **Deactivate System Attention LED**. A confirmation window is displayed that provides the following information:
   - A verification that the system attention LED was deactivated.
   - An indication that there still might be open problems within the system.
   - An indication that you cannot activate the system attention LED.
4. Select one of the virtual servers, and select **Deactivate System Attention LED**. A confirmation window is displayed that provides the following information:
   - A verification that the system attention LED was deactivated.
   - An indication that there still might be open problems within the logical partition.
   - An indication that you cannot activate the virtual server LED.

Activating or deactivating an identify LED by using the SDMC:
The system provides several LEDs that help identify various components, such as enclosures or field replaceable units (FRUs). For this reason, they are called *identify LEDs*.

You can activate or deactivate the following types of identify LEDs:

*   **Identify LED for an enclosure** If you want to add an adapter to a specific drawer (enclosure), you need to know the machine type, model, and serial number (MTMS) of the drawer. To determine whether you have the correct MTMS for the drawer that needs the new adapter, you can activate the LED for a drawer and verify that the MTMS corresponds to the drawer that requires the new adapter.
*   **Identify LED for a FRU associated with a specified enclosure** If you want to hook up a cable to a specific I/O adapter, you can activate the LED for the adapter which is a field replaceable unit (FRU), and then physically check to see where you should hook up the cable. This is especially useful when you have several adapters with open ports.

To activate or deactivate an identify LED for an enclosure or FRU, follow these steps:

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions** > **Service and Support** > **Hardware** > **Identify LED**.
3. In the Identify LED, Select Enclosure window, select the system unit or enclosure.
4. To activate or deactivate an identify LED, click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
5. To activate or deactivate an identify LED for a FRU, select a system or enclosure from the table, and then click **List FRUs**.
6. Select one or more FRUs from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Viewing serviceable events by using the SDMC

Use this procedure to view a serviceable event, including details, comments, and service history.

To view serviceable events, follow these steps:

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions** > **System Status and Health** > **Event Log**.
3. Optional: You can narrow the event criteria by using the Event filter menu.
4. Select a line in the Events window, and select **Actions** > **Properties**. The Properties window opens, showing detailed information about the serviceable event. The table shows information, such as problem number, reference code, and the field replaceable units (FRUs) associated with this event.

Verifying an installed part or replaced part on a system or logical partition by using Virtual I/O Server tools

If you installed or replaced a part, you might want to use the tools in Virtual I/O Server (VIOS) to verify that the part is recognized by the system or logical partition.

Verifying the installed part by using VIOS

You can verify the operation of a newly installed part or a replacement part.

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

1. Log in as root user.
2. At the command line, type `diagmenu` and press Enter.
3. Select **Advanced Diagnostics Routines** and press Enter.
4. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
5. When the **Advanced Diagnostic Selection** menu appears, do one of the following steps:

- To test a single resource, select the resource that you just installed from the list of resources and press Enter.
- To test all the resources available to the operating system, select **All Resources** and press Enter.

6. Select **Commit**, and wait until the diagnostic programs run to completion, responding to any prompts that appear.

7. Did the diagnostics run to completion and display the message `No trouble was found`?
   - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the installation procedures to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system is running in LPAR mode, note the logical partition in which you installed the part. Contact your service provider for assistance.
   - **Yes:** The new device is installed correctly. Exit the diagnostic programs and return the system to normal operations.

Verify the replacement part by using VIOS

To verify the operation of a newly installed part or replacement part, complete the following steps:

1. Did you replace the part by using either VIOS or the online diagnostics service aid's concurrent (hot-swap) service operation?
   - **No:** Go to step 2.
   - **Yes:** Go to step 5.

2. Is the system powered off?
   - **No:** Go to step 4.
   - **Yes:** If the system supports slow boot, set the system to perform a slow boot. For information, see Performing a slow boot.

3. Start the system and wait until the VIOS operating system login prompt displays or until apparent system activity on the operator panel or display has stopped. Did the VIOS login prompt display?
   - **No:** If an SRN or other reference code is displayed, suspect a loose adapter or cable connection. Review the procedures for the part that you replaced to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system does not start or you have no login prompt, see Problems with loading and starting the operating system.

     If the system is partitioned, note the logical partition in which you replaced the part. Contact your service provider for assistance.
   - **Yes:** Go to step 4.

4. At the command prompt, type `diag –a` and press Enter to check for missing resources. If you see a command prompt, go to step 5.

   If the **Diagnostic selection** menu is shown with **M** appearing next to any resource, follow these steps:
   a. Select the resource and press Enter.
   b. Select **Commit**.
   c. Follow any instructions that are shown.
   d. If a *Do you want to review the previously displayed error?* message is shown, select **Yes** and press Enter.
   e. If an SRN is shown, suspect a loose card or connection. If no obvious problem is shown, record the SRN and contact your service provider for assistance.
   f. If no SRN is shown, go to 5.

5. Test the part by doing the following:
   a. At the command line, type `diagmenu` and press Enter.
   b. From the **Function Selection** menu, select **Advanced Diagnostics Routines** and press Enter.

c. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.

d. Select **All Resources**, or select the diagnostics for the individual part to test only the part you replaced, and any devices that are attached to the part you replaced and press Enter.

Did the **Resource Repair Action** menu appear?

- **No:** Go to step 6.
- **Yes:** Go to step 7.

6. Did the *Testing Complete, No trouble was found* message appear?

- **No:** There is still a problem. Contact your service provider. **This ends the procedure.**
- **Yes:** Select **Log Repair Action**, if not previously logged, from the **Task Selection** menu to update the error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the Resource List, select **sysplanar0** and press Enter.

  Tip: This action changes the indicator light for the part from the fault state to the normal state. Go to step 9.

7. Select the resource for the replaced part from the **Resource Repair Action** menu. When a test is run on a resource in system verification mode, and that resource has an entry in the error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the error log to indicate that a system-detectable part has been replaced. On systems with a indicator light for the failing part, this changes the indicator light to the normal state.

a. Select the resource that has been replaced from the **Resource Repair Action** menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**. Press Enter.

b. Select **Commit** after you make your selections. Did another **Resource Repair Action** display appear?

- **No:** If the **No Trouble Found** display appears, go to step 9.
- **Yes:** Go to step 8.

8. Select the parent or child of the resource for the replaced part from the **Resource Repair Action** menu if necessary. When a test is run on a resource in system verification mode, and that resource has an entry in the error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the error log to indicate that a system-detectable part has been replaced. This changes the indicator light for the part from the fault state to the normal state.

a. From the **Resource Repair Action** menu, select the parent or child of the resource that has been replaced. If the repair action was to reseat a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**. Press Enter.

b. Select **Commit** after you make your selections.

a. If the **No Trouble Found** display appears, go to step 9.

9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the values they had prior to servicing the system.

10. Did you do any hot-plug procedures before doing this procedure?

- **No:** Go to step 11.
- **Yes:** Go to step 12.

11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?

- **No:** Contact your service provider. **This ends the procedure.**
- **Yes:** Go to step 12.

12. Are the indicator lights still on?

- **No:** This ends the procedure.
- **Yes.** Turn off the lights. For instructions, see Changing service indicators.

Closing a service call

Perform these procedures to close serviceable events, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedure:

- Return the server to the state that the customer normally uses such as IPL type, IPL mode, and the way the system is configured or partitioned.

  Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.

- While you were performing the problem analysis on the original serviceable event, other serviceable events might have been opened. Close all serviceable events that were opened as a result of your service activity.
- Ensure that server verification has been performed and no problems require additional service actions.
- If the repair was done using the management console online repair procedures, ensure that the original serviceable event is now closed.
  1. Record the system reference code (SRC), or symptom, and the location code of the field-replaceable unit (FRU) you replaced, for future reference. Is the server managed by a management console?

- **Yes:** Continue with the next step.
- **No:** Do one of the following steps:
  - If the server is managed by Integrated Virtualization Manager (IVM), go to "Closing a service call by using Integrated Virtualization Manager" on page 218.
  - If the server is not partitioned and is running the AIX or Linux operating system, go to "Closing a service call by using AIX or Linux" on page 214.

  2. On the Hardware Management Console (HMC), open **Manage Serviceable Events** and examine the service action event log for any open service action events.

  3. Are any service action events open?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 222. Return the system to the customer. **This completes the repair.**

  4. Record the list of open service action events.

  5. From the list of serviceable events recorded in step 4, complete the following steps 6 - step 32 on page 213 for each open service action event.

  6. Determine the error class of the serviceable event. Record for future use.

  7. Examine the details of the open service action event.

Is the error code that is associated with this service action event the same as recorded in step 1 on page 210?

- **Yes:** Go to step 11.
- **No:** Continue with the next step.

8. Examine the FRU list of the service action event. Are any FRUs listed for the service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 11.

9. Is the FRU list identical that is, the same FRUs, same number of FRUs, and same order of FRUs) to the FRU list of the error code recorded in step 1 on page 210?

- **Yes:** Go to step 11.
- **No:** Continue with the next step.

10. The FRU list is different. Is the FRU you replaced and recorded in step 1 on page 210 in the list of FRUs for this service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 on page 213.
  Note: Some service action events will remain open when you leave this MAP. Further service actions might be required to complete the repair.

11. Examine the details of this service action event, and record the partitions involved in this service action event for use in a later step.

12. Is the error code associated with this service action event of the form A11-xxx or A01-xxx?

- **Yes:** Continue with the next step.
- **No:** Go to step 17 on page 212.

13. Have you begun a list of A*xx* partitions from prior service action events that you processed in this MAP?

- **Yes:** Go to step 15.
- **No:** Continue with the next step.

14. Begin a new list of A*xx* partitions by copying the list of partitions obtained in step 11. Go to step 16.

15. Add the partition list obtained in step 11 to the existing list of A*xx* partitions obtained from processing previous service action events in this maintenance analysis procedure (MAP).

16. Remove all entries in the list of all partitions you recorded in step 11. If you are referred to the list of partitions obtained in step 11 in future steps, the list is empty. Go to step 17 on page 212.

17. Select and highlight the service action event from the Error Associated With This Serviceable Event window.

18. Click **Close Event**.

19. Add comments for the serviceable event. Include any unique additional information. Click **OK**. The following steps will add or update FRU information.

20. Did you replace, add, or modify a FRU of the open service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 22.

21. From the FRU list, select a FRU that you need to update. Double-click the FRU, and update the FRU information. Go to step 23.

22. Select the **No FRU Replaced for this Serviceable Event** option.

23. Click **OK** to close the service action event.

24. Is the list of all partitions you recorded in step 11 on page 211 empty?

- **Yes:** Go to step 32 on page 213.
- **No:** Continue with the next step.

25. Does the list of all partitions you recorded in step 11 on page 211 contain more than one entry?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 on page 213.

26. Is the error class recorded in step 25 AIX?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 on page 213.

27. Perform all the following steps for each entry in the list of all partitions you recorded in step 11 on page 211, except for the partition you were using to debug the original problem.

28. From the list of all partitions, open the HMC virtual terminal window of a partition, and then type diag at the AIX command prompt.

29. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
3. Select the **Log Repair** option.
4. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
5. Click **Commit** after you make your selection.

Note: If the terminal type is not defined, you are prompted to define it before you can proceed.

30. Exit from diagnostics in this partition and return to the AIX command prompt.

31. Have all the partitions in the list of all the partitions you recorded in step 11 on page 211 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 24 on page 212 to process the next partition in the list you recorded in step 11 on page 211.

32. Have all the serviceable events recorded in step 4 on page 210 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 5 on page 210 and process the next service action event in the list of serviceable events recorded in step 4 on page 210.

33. While processing all service action events, were you directed to step 14 on page 211?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 222. Return the system to the customer. **This completes the repair.**
  Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

34. Perform all the following steps for each entry in the list of A*xx* partitions you began recording in step 14 on page 211, except for the partition you were using to debug the original problem.

35. From the list of A*xx* partitions, open the management console virtual terminal window of a partition , and then type `diag` at the AIX command prompt.

36. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
   Note: If the terminal type is not defined, you are prompted to define it before you can proceed.
3. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
4. Click **Commit** after you make your selection.

37. Exit from diagnostics in this partition and return to the AIX command prompt.

38. Have all the partitions in the list of A*xx* partitions you began recording in step 14 on page 211 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 34 on page 213 to process the next partition in the list you recorded in step 14 on page 211.

39. If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 222. **This completes the repair.** Return the system to the customer.

    Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

Closing a service call by using AIX or Linux

If the server is not connected to a management console and not using Integrated Virtualization Manager (IVM), perform these procedures to close serviceable events, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedure:
- Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.
  Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.
- While you were performing the problem analysis on the original serviceable event, other serviceable-event numbers might have been opened. Close all serviceable events that were opened as a result of your service activity.
- Ensure that server verification has been performed and that no problems require additional service actions.
- If the repair was done by using the IVM online repair procedures, ensure that the original serviceable event is now closed.
  1. Did you use a hot-swap operation by using an AIX diagnostics service aid to change the FRU?

- **Yes:** Go to step 4 on page 215
- **No:** Continue with the next step.

2. Do you have any field-replaceable units (FRUs) (for example cards, adapters, cables, or devices) that were removed during problem analysis that you want to put back into the system?

   Note: If the system backplane or battery has been replaced and you are loading diagnostics from a server over a network, it might be necessary for the customer to set the network boot information for this system before diagnostics can be loaded. Also, set the system time and date information after the repair is completed.

- **Yes:** Reinstall all of the FRUs that were removed during problem analysis. Go to step 3
- **No:** Continue with the next step.

3. Is the system or logical partition that you are performing a repair action on running the AIX operating system?

- **Yes:** Continue with the next step.
- **No:** Go to step 5.

4. Does the system or logical partition you are performing a repair action on have the AIX operating system installed?

   Note: If you have just replaced a hard disk in the root volume group, answer no to this question.

- **Yes:** Go to step 7 on page 216.
- **No:** Continue with the next step.

5. Run stand-alone diagnostics in problem determination mode from either a CD-ROM or from a Network Installation Management (NIM) server.

   Note: For instructions about running stand-alone diagnostics from a CD and not by using an HMC, go to Running the stand-alone diagnostics from CD on a server without an HMC attached.

   For instructions about running stand-alone diagnostics from a NIM server, go to Running the stand-alone diagnostics from a Network Installation Management server.

   Did you encounter any problems?

- **Yes:** Go to Problem analysis.
- **No:** Continue with the next step.

6. The system hardware is functioning correctly.

If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 222.

This completes the repair.
Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned. This might require you to reboot the operating system.

Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.

7. Complete the following steps:

1. If the system supports, do a slow boot on the system. For instructions, see Performing a slow boot. If the system does not support a slow boot, do a normal boot.
2. Power on the system.
3. Wait until the AIX operating system login prompt is displayed or until system activity on the operator panel or display has stopped.

Did the AIX Login Prompt display?

- **Yes:** Continue with the next step.
- **No:** Go to Problem analysis.

8. If the Resource Repair Action menu is already displayed, go to 12 on page 217; otherwise, complete the following steps:

1. Log into the operating system, either with root authority (if needed, ask the customer to enter the password) or use the CE login.
2. Enter the `diag -a` command and check for missing resources. Follow any instructions that are displayed. If a system request number (SRN) is displayed, suspect a loose card or connection. If no instructions are displayed, no resources were detected as missing. Continue with step 9.

9. Complete the following steps:

1. Enter `diag` at the command prompt and press **Enter**.
2. Select the **Diagnostics Routines** option.
3. When the Diagnostic Mode Selection menu is displayed, select **Problem determination**.
4. When the Advanced Diagnostic Selection menu is displayed, select the **All Resources** option. Alternatively, test the FRUs you exchanged and any devices that are attached to the FRUs you exchanged by selecting the diagnostics for the individual FRU.

Did the Resource Repair Action menu (801015) display?

- **Yes:** Go to step 13 on page 217.
- **No:** Continue with the next step.

10. Did the TESTING COMPLETE, no trouble was found menu (801010) display?

- **Yes:** Continue with the next step.
- **No:** There is still a problem. Go to Problem analysis.

11. Select the **Log Repair Action** option, if not previously logged, in the TASK SELECTION menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action.

If the resource associated with your action is not displayed on the
resource list, select **sysplanar0**.
Note: If the system attention indicator is on, this will set it back to
the normal state. Go to step 14 on page 218.

12. Run a test on a resource that has an entry in the AIX error log, in the system verification mode. If
the test on the resource was successful, the Resource Repair Action menu is displayed.

After replacing a FRU, select the resource for that FRU from the Resource Repair Action menu. This updates the AIX
error log to indicate that a system-detectable FRU has been replaced.
Note: If the system attention indicator is on, this action will set it back to the normal state.

To select the resource for the replaced FRU, complete the following steps:
1. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
2. Click **Commit** after you make your selection.

Did another Resource Repair Action (801015) display?

- **Yes:** Continue with the next step.
- **No:** If the No Trouble Found menu is displayed, go to step 14 on page 218.

13.

Run a test on a resource that has an entry in the AIX error log, in the
system verification mode. If the test on the resource was successful,
the Resource Repair Action menu is displayed.
Note: The parent or child of the resource you just replaced might
also require that you run the Resource Repair Action service aid on
it.

After replacing that FRU, select the resource for that FRU from the
Resource Repair Action menu. This updates the AIX error log to
indicate that a system-detectable FRU has been replaced.
Note: If the system attention indicator is on, this action will set it
back to the normal state.

To select the resource for the replaced FRU, complete the following
steps:
1. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the
     resource associated with that repair action.
   - If the resource associated with your repair action is not
     displayed on the Resource List, select **sysplanar0**.
2. Click **Commit** after you make your selection.

Did the No Trouble Found menu display?

- **Yes:** Continue with the next step.
- **No:** Go to Problem analysis.

14. If you changed the service processor or network settings, as instructed in previous MAPs, restore the settings to the value they had prior to servicing the system. If you ran stand-alone diagnostics from CD-ROM, remove the stand-alone diagnostics CD-ROM from the system.

Did you perform service on a RAID subsystem that involved changing the PCI RAID adapter cache card or changing the configuration?
Note: This does not refer to the PCI-X RAID adapter or cache.

- **Yes:** Continue with the next step.
- **No:** Go to step 16.

15. Use the **Recover Options** selection to resolve the RAID configuration. To do this, complete the following steps:

   1. On the PCI SCSI Disk Array Manager dialog, select **Recovery options**.
   2. Select **Clear PCI SCSI Adapter Configuration** and press F3 to clear any previous configuration data that exists on the replacement adapter.
   3. On the Recovery Options dialog, select **Resolve PCI SCSI RAID Adapter Configuration**.
   4. On the Resolve PCI SCSI RAID Adapter Configuration dialog, select **Accept Configuration on Drives**.
   5. On the PCI SCSI RAID Adapter selections menu, select the adapter that you changed.
   6. On the next dialog, press Enter.
   7. When you see the Are You Sure selection menu, press Enter to continue. When the recovery action is complete, the status message of **OK** is shown.
   8. If you receive a status message of Failed, verify that you selected the correct adapter, and then repeat this procedure. When recovery is complete, exit the operating system.
   9. Go to step 16.

16. The system hardware is functioning correctly. Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.

Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.

Closing a service call by using Integrated Virtualization Manager

Perform these procedures to close serviceable events, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedure:
- Return the server to the state that the customer normally uses, such as IPL type, IPL mode, and the way the system is configured or partitioned.

   Attention: Before returning the system to the customer, remove the system from service mode. If the system is left in service mode, it automatically places a call for service every two hours.
- While you were performing the problem analysis on the original serviceable event, other serviceable-event numbers might have been opened. Close all serviceable events that were opened as a result of your service activity.
- Ensure that server verification has been performed and there are no problems that require additional service actions.
- If the repair was done by using the Integrated Virtualization Manager (IVM) online repair procedures, ensure that the original serviceable event is now closed.
   1. Record the system reference code (SRC), or symptom, and the location code of the field-replaceable unit (FRU) you replaced for future reference.

2. On the IVM, open **Manage Serviceable Events** and look at existing serviceable events.

3. Are there any service action events that are open?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs" on page 222. Return the system to the customer. **This completes the repair.**

4. Record the list of open service action events.

5. From the list of serviceable events recorded in step 4, complete steps 6 - 30 on page 221 for each open service action event.

6. Determine the error class of the serviceable event. Record it for future use.

7. Examine the details of the open service action event.

Is the error code associated with this service action event the same as recorded in step 1 on page 218?

- **Yes:** Go to step 11.
- **No:** Continue with the next step.

8. Examine the FRU list of the service action event. Are any FRUs listed for the service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 11.

9. Is the FRU list identical that is, the same FRUs, same number of FRUs, and same order of FRUs) to the FRU list of the error code recorded in step 1 on page 218?

- **Yes:** Go to step 11.
- **No:** Continue with the next step.

10. Is the FRU you replaced and recorded in step 1 on page 218 in the list of FRUs for this service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 30 on page 221.
  Note: Some service action events remain open when you leave this MAP. Further service actions might be required to complete the repair.

11. Examine the details of this service action event, and record the partitions involved in this service action event for use in a later step.

12. Is the error code associated with this service action event of the form A11-xxx or A01-xxx?

- **Yes:** Continue with the next step.
- **No:** Go to step 17.

13. Have you begun a list of A*xx* partitions from prior service action events that you processed in this maintenance analysis procedure (MAP)?

- **Yes:** Go to step 15.
- **No:** Continue with the next step.

14. Begin a new list of A*xx* partitions by copying the list of partitions obtained in step 11 on page 219. Go to step 16.

15. Add the partition list obtained in step 11 on page 219 to the existing list of A*xx* partitions obtained from processing previous service action events in this MAP.

16. Remove all entries in the list of all partitions you recorded in step 11 on page 219. If you are referred to the list of partitions obtained in step 11 on page 219 in future steps, the list is empty. Go to step 17.

17. Select and highlight the service action event from the Manage Serviceable Events window.

18. Click **Close Event**.

19. Add comments for the serviceable event. Include any unique additional information. Click **OK**.

20. Add or update the FRU information:

Did you replace, add, or modify a FRU of the open service action event?

- **Yes:** Continue with the next step.
- **No:** Go to step 22.

21. Click **OK** to close the service action event.

22. Is the list of all partitions you recorded in step 11 on page 219 empty?

- **Yes:** Go to step 30.
- **No:** Continue with the next step.

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23. Does the list of all partitions you recorded in step 11 on page 219 contain more than one entry?

- **Yes:** Continue with the next step.
- **No:** Go to step 30.

---

24. Is the error class recorded in step 23?

- **Yes:** Continue with the next step.
- **No:** Go to step 30.

---

25. Perform all the following steps for each entry in the list of all partitions you recorded in step 11 on page 219, except for the partition you were using to debug the original problem.

---

26. From the list of all partitions, open the IVM virtual terminal window of a partition, and then type `diag` at the AIX command prompt.

---

27. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
3. Select the **Log Repair** option.
4. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
5. Click **Commit** after you make your selection.

Note: If the terminal type is not defined, you are prompted to define it before you can proceed.

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28. Exit from diagnostics in this partition and return to the AIX command prompt.

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29. Have all the partitions in the list of all partitions you recorded in step 11 on page 219 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 25 to process the next partition in the list you recorded in step 11 on page 219.

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30. Have all the serviceable events recorded in step 4 on page 219 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 5 on page 219 and process the next service action event in the list of serviceable events recorded in step 4 on page 219.

---

31. While processing all service action events, were you directed to step 14 on page 220?

- **Yes:** Continue with the next step.
- **No:** If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs."
  Return the system to the customer. **This completes the repair.**
  Note: If during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

32. Complete all the following steps for each entry in the list of A*xx* partitions you began recording in step 14 on page 220, except for the partition you were using to debug the original problem.

33. From the list of A*xx* partitions, open the management console virtual terminal window of a partition , and then type `diag` at the AIX command prompt.

34. When the diagnostic operating instructions are displayed, complete the following steps:

1. Press Enter.
2. Select the **Task Selection** option.
   Note: If the terminal type is not defined, you are prompted to define it before you can proceed.
3. Select the **Log Repair** option.
4. Select the resource associated with the repair action:
   - If the repair action was reseating a cable or adapter, select the resource associated with that repair action.
   - If the resource associated with your repair action is not displayed on the Resource List, select **sysplanar0**.
5. Click **Commit** after you make your selection.

35. Exit from diagnostics in this partition and return to the AIX command prompt.

36. Have all the partitions in the list of A*xx* partitions you began recording in step 14 on page 220 been processed?

- **Yes:** Continue with the next step.
- **No:** Go to step 32 to process the next partition in the list you recorded in step 14 on page 220.

37. If the system attention LED is still on, turn off the LED as described in "Activating and deactivating LEDs." **This completes the repair**. Return the system to the customer.

Note: If, during the processing of the list of open service action events, some service action events remained open, further service actions might be required to complete the repair.

Activating and deactivating LEDs

You can use these procedures to activate or deactivate light-emitting diodes (LEDs) by using the management console or the Advanced System Management Interface (ASMI).

For IBM Power Systems servers that contain the POWER7 processor, the LEDs can be used to identify or verify a part that you are servicing. The error and identify function (amber) LED indicates an error and corresponds to the location code in the system reference code (SRC). The LED is activated and deactivated automatically.

Additionally, the following procedures can also be used to activate and deactivate LEDs.
- "Deactivating a system attention LED or partition LED by using the management console"
- "Activating or deactivating an identify LED by using the management console" on page 224
- "Deactivating a system attention LED or logical partition LED by using the Advanced System Management Interface" on page 224
- "Activating or deactivating an identify LED by using the Advanced System Management Interface" on page 225

Deactivating a system attention LED or partition LED by using the management console

You can deactivate a system attention LED or a logical partition LED if you decide that a problem is not a high priority and you decide to repair the problem at a later time. You can do this task from the Hardware Management Console (HMC) or the IBM Systems Director Management Console (SDMC).

If you want to be alerted if another problem occurs, you must deactivate the system attention LED so that it can be activated again if another problem occurs.

To deactivate a system attention LED by using the HMC, complete the following steps:
1. In the navigation area, open **Systems management**.
2. Select the server you are working on.
3. Open **Operations** > **LED Status**.
4. Select **View System Attention**. The System attention LED window opens. The selected system and its LED state are displayed in the upper part of the window. The logical partition and its LED state are displayed in the lower part of the window. From the system attention LED window, you can deactivate both the System attention LED and the logical partition LED.
5. Select **Deactivate System Attention LED** from the **Action** menu. A confirmation window is displayed that provides the following information:
   - A verification that the system attention LED was deactivated.
   - An indication that there still might be open problems within the system.
   - An indication that you cannot activate the system attention LED.
6. Select one of the logical partitions in the lower table, and select **Deactivate partition LED** from the **Partition Operations** menu. A confirmation window is displayed that provides the following information:
   - A verification that the logical partition LED was deactivated.
   - An indication that there still might be open problems within the logical partition.
   - An indication that you cannot activate the logical partition LED.

To deactivate a system attention LED by using the SDMC, complete the following steps:
1. On the **Welcome** page, under the **Resources** tab, select the server.
2. Click **Actions** > **Service and Support** > **Hardware** > **System Attention LED**.
3. Click **OK**.

Activating or deactivating an identify LED by using the management console

You can activate or deactivate an identify LED for components attached to the system from the Hardware Management Console (HMC) or from the IBM Systems Director Management Console (SDMC).

The system provides several LEDs that help identify various components in the system, such as enclosures or field-replaceable units (FRUs). For this reason, they are called *identify LEDs*.

You can activate or deactivate the following types of identify LEDs:

- **Identify LED for an enclosure**. If you want to add an adapter to a specific drawer (enclosure), you need to know the machine type, model, and serial number (MTMS) of the drawer. To determine whether you have the correct MTMS for the drawer that needs the new adapter, you can activate the LED for a drawer and verify that the MTMS corresponds to the drawer that requires the new adapter.
- **Identify LED for a FRU associated with a specified enclosure**. If you want to hook up a cable to a specific I/O adapter, you can activate the LED for the adapter, which is a field replaceable unit (FRU), and then physically check to see where you should connect the cable. This is especially useful when you have several adapters with open ports.

To activate or deactivate an identify LED for an enclosure or FRU by using the HMC, follow these steps:

1. In the navigation area, open **Systems management**.
2. Select the server you are working on.
3. Click **Operations** > **LED Status** > **Identify LED**. The Identify LED, Select Enclosure window opens.
4. To activate or deactivate an identify LED for an enclosure, select an enclosure from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
5. To activate or deactivate an identify LED for a FRU, select an enclosure from the table, and then select **Selected** > **List FRUs**.
6. Select one or more FRUs from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

To activate or deactivate an identify LED for an enclosure or FRU by using the SDMC, complete these steps:

1. On the **Welcome** page, under the **Resources** tab, select the server.
2. Click **Actions** > **Service and Support** > **Hardware** > **Identify LED**.
3. To activate or deactivate an identify LED for an enclosure, select an enclosure from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
4. To activate or deactivate an identify LED for a FRU, select an enclosure from the table, and then click **List FRUs**.
5. Select one or more FRUs from the table, and then click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Deactivating a system attention LED or logical partition LED by using the Advanced System Management Interface

You can deactivate a system attention LED or a logical partition LED by using the Advanced System Management Interface (ASMI).

The system attention indicator provides a visual signal that the system as a whole requires attention or service. Each system has a single system attention indicator. When an event occurs that either needs your intervention or that of service and support, the system attention indicator lights continuously. The system attention indicator is turned on when an entry is made in the service processor error log. The error entry is transmitted to the system error log and to the operating system error log.

To perform this operation, your authority level must be one of the following levels:

* Administrator
* Authorized service provider

To turn off the system attention indicator, do the following steps:

1. In the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **System Configuration** > **Service Indicators** > **System Attention Indicator**.
3. In the right pane, click **Turn off system attention indicator**. If the attempt is unsuccessful, an error message is displayed.

Activating or deactivating an identify LED by using the Advanced System Management Interface

You can activate or deactivate an identify LED by using the Advanced System Management Interface (ASMI).

You can specify the location code of any indicator to view or modify its current state. If you provide the wrong location code, the advanced system manager attempts to go to the next higher level of the location code.

The next level is the base-level location code for that field replaceable unit (FRU). For example, a user types the location code for the FRU located on the second I/O slot of the third enclosure in the system. If the location code for the second I/O slot is incorrect (the FRU does not exist at this location), an attempt to set the indicator for the third enclosure is initiated. This process continues until a FRU is located or no other level is available.

To perform this operation, your authority level must be one of the following levels:

* Administrator
* Authorized service provider

To change the current state of an indicator, do the following steps:

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **System Configuration** > **Service Indicators** > **Indicators by Location code**.
3. In the right pane, enter the location code of the FRU and click **Continue**.
4. Select the preferred state from the list.
5. Click **Save settings**.

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Federal Communications Commission (FCC) statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

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```
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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
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Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
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Generelle Informationen:

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
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Armonk, New York 10504
Tel: 914-499-1900

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Technical Regulations, Abteilung M372
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 7032 15 2941
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Generelle Informationen:

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