



Power Systems  
Common service procedures







Power Systems

Common service procedures

**Note**

Before using this information and the product it supports, read the information in “Notices,” on page 177, the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125-5823.

This edition applies to IBM Power Systems™ servers that contain the POWER6 processor and to all associated models.

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## Safety notices

Safety notices may be printed throughout this guide:

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

### World Trade safety information

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

### German safety information

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

### Laser safety information

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

#### Laser compliance

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

#### CAUTION:

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

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

(C026)

#### CAUTION:

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

#### CAUTION:

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

**CAUTION:**

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

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

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

The equipment is suitable for installation in the following:

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

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

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

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

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

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## Common service procedures

These procedures are common to various isolation and repair procedures.

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### Starting a repair action

This is the starting point for repair actions. All repair actions should begin with this procedure. From this point, you are guided to the appropriate information to help you perform the necessary steps to repair the server. This procedure was formerly the starting a service call procedure.

**Note:** In this topic, **control panel** and **operator panel** are synonymous.

Before beginning, record information to help you return the server to the same state that the customer typically uses, such as:

- The IPL type that the customer typically uses for the server.
- The **IPL mode** that is used by the customer on this server.
- The way in which the server is configured or partitioned.

---

1. Has problem analysis been performed using the procedures in problem analysis?

- **Yes:** Continue with the next step.
- **No:** Perform problem analysis using the procedures in problem analysis.

---

2. Is the failing server managed by a Hardware Management Console (HMC)?

- **Yes:** Continue with step 6 on page 2.
- **No:** Continue with the next step.

---

3. Do you have a field replaceable unit (FRU), location code, and an action plan to replace a failing FRU?

- **Yes:** Go to Part locations and location codes
- **No:** Continue with the next step.

---

4. Do you have an action plan to perform an isolation procedure?

- **Yes:** Go to Isolation procedures.
- **No:** Continue with the next step.

---

5. Choose an action from the following symptom list:

- You have a reference code but no action plan - go to problem analysis.
- There is a hardware problem that does not generate a reference code - review the Isolation procedures to find an appropriate isolation procedure or contact your next level of support.
- To check your server's firmware level or to update it - see the system's operation guide.
- You have an engineering change (EC) or a hardware upgrade to apply - use the instructions provided with the change or upgrade.
- You suspect a software problem - contact software support
- To perform diagnostics or another service function - use the diagnostics tools available for your operating system.

**This ends the procedure.**

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## 6. Is the HMC connected and functional?

- **Yes:** Continue with the next step.
  - **No:** Start the HMC and attach it to the server. When the HMC is connected and functional, continue with the next step.
- 

## 7. Perform the following steps from the HMC that is used to manage the server. During these steps, refer to the service data that was gathered earlier:

1. In the Navigation Area, open **Service Management**.
2. Select **Manage Events**. The Manage Serviceable Events - Select Serviceable Events panel will be displayed.
3. Select the status of **Open**.
4. Select all other selections to **ALL** and click **OK**.
5. Scroll through the list and verify that there is a problem with the status of **Open** to correspond with the customer's reported problem.

**Note:** If you are unable to locate the reported problem, and there is more than one open problem near the time of the reported failure, use the earliest problem in the list.

Do you find the reported problem, or an open problem near the time of the reported problem?

- **Yes:** Continue with the next step.
  - **No:** Go to step 3 on page 1, or if a serviceable event was not found, see the appropriate problem analysis procedure for the operating system you are using.
    - If the server or partition is running the AIX® or Linux operating system, see AIX and Linux problem analysis.
    - If the server or partition is running the IBM i operating system, see IBM i problem analysis.
- 

## 8. Select the serviceable event you want to repair, and select **Repair** from the Selected menu.

Follow the instructions displayed on the HMC.

**Note:** If the **Repair** procedures are not available, go to step 3 on page 1.

After you complete the repair procedure, the system automatically closes the serviceable event. **This ends the procedure.**

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## Powering on and powering off a system

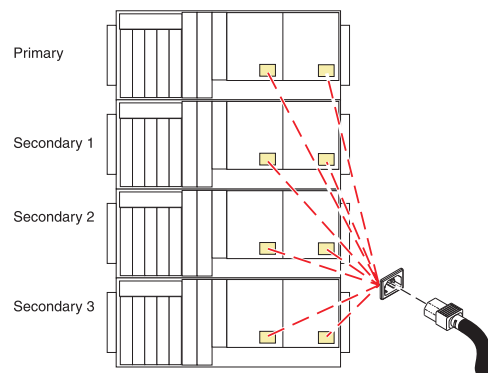
You can power on or power off a system with or without a Hardware Management Console (HMC) using this procedure.

**Attention:** If possible, have the customer shut down all applications and partitions before powering off the system. If you use the power-on button on the control panel, or enter commands at the Hardware Management Console (HMC) to stop the system, you might cause unpredictable results in the data files if you do not shut down all applications and partitions first. Also, the next time you start the system, it might take longer if all applications are not ended before stopping the system.

### Installing the power cords

**Note:** Before powering on a system, ensure that the power cords have been plugged in to all of the power supplies on all of the processor enclosures. Install the cords in the following order:

1. Secondary 2
2. Secondary 3
3. Primary
4. Secondary 1



### Powering on a system using a Hardware Management Console

To power on a managed system using a Hardware Management Console (HMC), complete the following steps.

1. In the navigation area, expand **Systems Management** → **Servers**.
2. Select the check box next to the name of the desired server to enable the tasks for that server.
3. From the **Tasks** menu, select **Operations** → **Power on**. Follow all additional instructions in the interface.

### Powering on a system without an HMC

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

1. On a rack-mounted system unit, open the front rack door, if necessary. On a standalone system unit, open the front door.
2. Before you press the power button on the control panel, ensure that power is connected to the system unit as follows:
  - All system power cables are connected to a power source.
  - The power-on light (F), as shown in the following figure, is slowly blinking.
  - The top of the display (D), as shown in the following figure, contains 01 V=F.

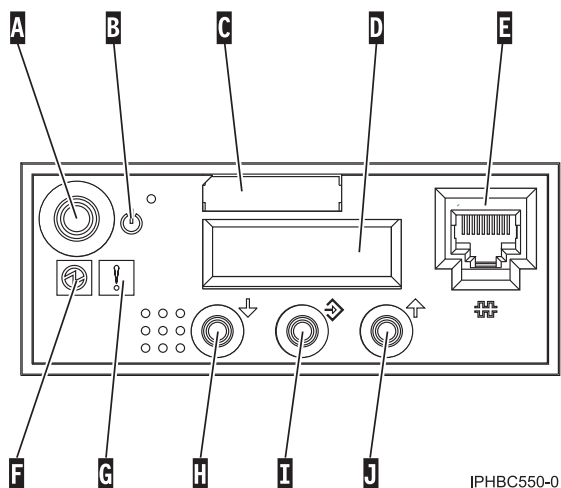


Figure 1. Control Panel with labels

3. Press the power button (A), as shown in the figure above, on the control panel.
4. Observe the following after pressing the power button:
  - The power-on light blinks slowly (standby) then becomes solid.
  - The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
  - Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops blinking and remains on, indicating that system power is on.

## Powering off a system using an HMC

**Attention:** If possible, have the customer shut down the running logical partitions on the managed system before powering off the managed system. Powering off the managed system without first shutting down the logical partitions causes the logical partitions to shut down abnormally and can cause data loss or an extended IPL for one or more of the partitions the next time the system is powered on.

1. In the navigation area, expand **Systems Management** → **Servers**.
2. Select the check box next to the name of the desired server to enable the tasks for that server.
3. From the Tasks menu, select **Operations** → **Power off**. Follow all additional instructions in the interface.
4. Continue with “Removing the power cords” on page 5

## Powering off a system without an HMC

1. If an operating system is running, proceed with step 2. Otherwise, press the power button (A), as shown in Figure 1 and hold for 5 seconds (a countdown is shown on the display panel). The system power turns off. Proceed to step 4.
2. Log in to the system as a user with the authority to run the shutdown command.
3. 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 IBM i operating system, type `PWRDWN SYS *IMMED`.
  - If your system is running the Linux operating system, type `shutdown -h now`.

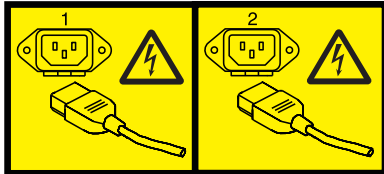
The command stops the operating system. The system power turns off.
4. The power-on light begins to slowly blink, and the system goes into standby.

5. Go to “Removing the power cords.”

## Removing the power cords

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

(L003)

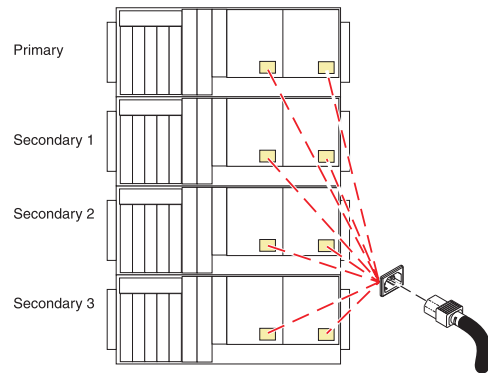


or



To remove the power cords, complete the following steps:

1. Unplug any power cables that are attached to the unit from electrical outlets.
2. Remove all power cords from all of the processor enclosures starting with the primary processor enclosure (topmost) and then each secondary enclosure working from top to bottom.



---

## Primary consoles or alternative consoles

The primary console is the first workstation that the system identifies. It is attached to the first input/output adapter (IOA) or input-output processor (IOP) that supports workstations. The alternative console is the workstation that functions as the console when the primary console is not operational.

A console is a workstation that is used to view and control system operations. The system can assign one or two alternative consoles. The first alternative console can only be a twinaxial workstation that is attached to the same IOP as the primary console. The second alternative console is a workstation that is attached to the next IOA or IOP that is capable of supporting workstations.

The IOA or IOP that supports a console must be on the system bus (bus 1).

If a workstation is not correctly attached to the first IOA or IOP that is capable of attaching workstations, the system will not assign a primary console. If it does not assign a primary console, the system displays a reference code on the control panel. If the system is set for manual mode, it stops during the initial program load (IPL).

For more information on how to determine the primary and alternative consoles, see “Identifying the consoles when the system is operational.”

## Primary console requirements

For a workstation to be the primary console, it must be operational and attached to the system bus. It must also have the correct port and address assigned. If the workstation is a personal computer, it must also have an active workstation emulation program.

The workstation requirements follow:

- Twinaxial workstation
  - Port 0, Address 0, Bus 1
- ASCII workstation
  - Port 0, Bus 1
- Personal computer attached to ASCII IOP
  - Port 0, Bus 1
  - Personal computer software to emulate a 316x or 3151 terminal
- Personal computer attached to twinaxial IOP
  - Port 0, Address 0, Bus 1
  - 5250 emulator software active on personal computer

For more information on how to determine the primary and alternative consoles, see “Identifying the consoles when the system is operational.”

## Identifying the consoles when the system is operational

When the system is operational, you can determine the primary console and alternative console by using one of the following options:

- Look at the display.
  - If the dominant operating system is IBM i, look for a sign-on display that shows DSP01 in the upper right corner. DSP01 is the name that the system assigns to the primary console.

**Note:** This resource name might have been changed by the customer.

- Use system commands to assist in identifying the consoles. See the system operation information for more details on commands.
- Use the hardware service manager function to assist in identifying the consoles:
  1. Select the System bus resources option on the Hardware Service Manager display. With the System Bus Resources display, you can view the logical hardware resources for the system bus.  
Look for the less than (<) symbol next to an IOP. The less than (<) symbol indicates that the console is attached to this IOP.
  2. Select the Resources associated with IOP and the Display detail options to collect more information about the consoles.



---

## Determining whether the system has logical partitions

Use this procedure to determine the existence of logical partitions.

To determine whether the system has logical partitions, follow these steps.

1. Is the system managed by an **HMC**?

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

**No:** The system does not have logical partitions. Return to the procedure that sent you here. **This ends the procedure.**

2. Determine whether the system has multiple logical partitions by performing the following from the **HMC**:

- a. In the navigation area, expand **Systems Management Servers**.

- b. Click the name of the managed system you are working with to display the partitions. The partitions will be displayed.

- c. Is there more than one logical partition listed?

**Yes:** The system has multiple logical partitions. Return to the procedure that sent you here. **This ends the procedure.**

**No:** The system does not have multiple logical partitions. Return to the procedure that sent you here. **This ends the procedure.**

---

## Separating the 571F/575B card set and moving the cache directory card

Use this procedure to separate the 571F/575B card set and to move the cache directory card.

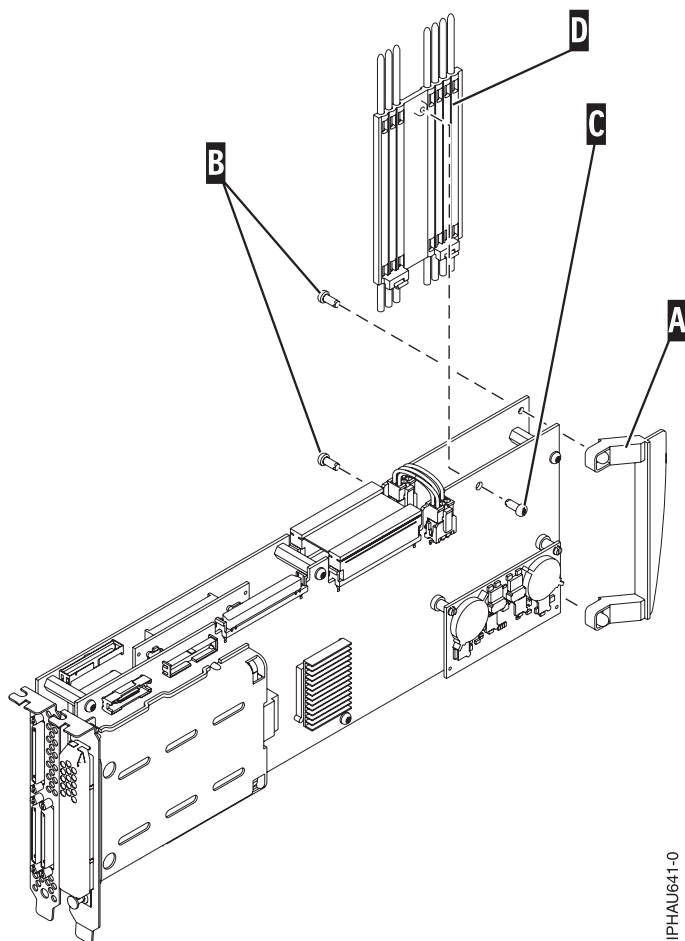
To complete this procedure, you need a special bit or driver (T-10 TORX).

**Attention:** To avoid loss of cache data, do not remove the cache battery during this procedure.

To separate the 571F/575B card set and move the cache directory card, do the following steps:

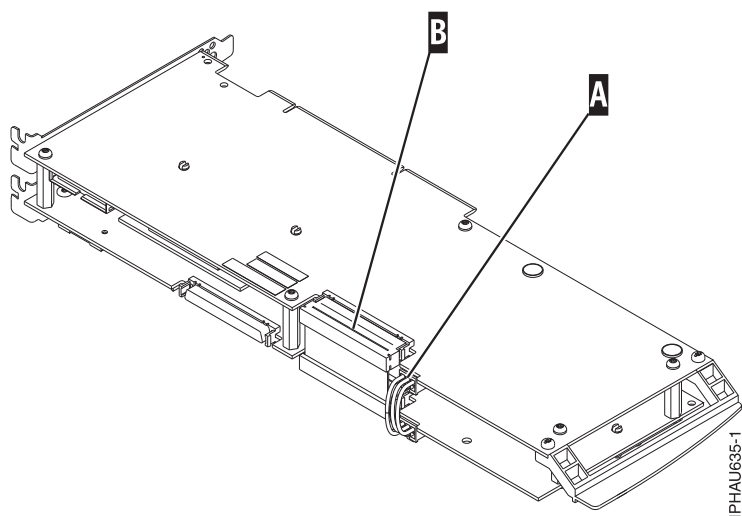
**Important:** All cards are sensitive to electrostatic discharge.

1. Label both sides of the card before separating them.
2. Go to the next step if you are not servicing a 571F/575B card set containing a light pipe assembly. If you are servicing a 571F/575B card set that contains a light pipe assembly, you will need to remove the light pipes. To remove the light pipes, do the following:
  - a. Place the 571F/575B card set adapter on an electrostatic discharge (ESD) protective surface.
  - b. Remove the light pipe retaining screw **(C)** from the 571F/575B card set.
  - c. Slide the light pipe assembly **(D)** from between the 571F/575B cards.
  - d. Put both the screw and the light pipe assembly in a safe place.



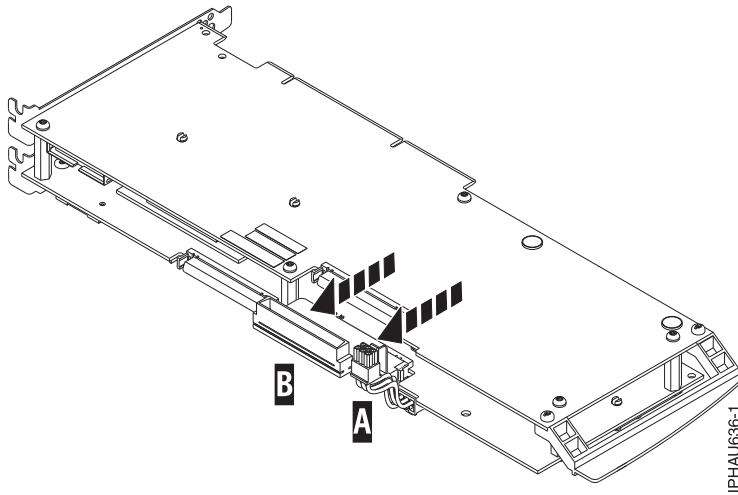
IPHAU641-0

3. Place the 571F/575B card set adapter on an ESD protective surface and orient it as shown in the following figure.

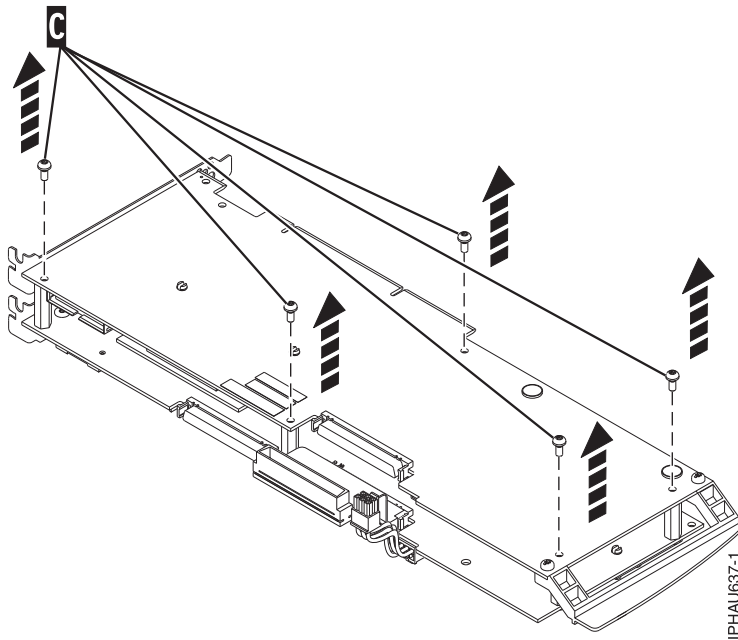


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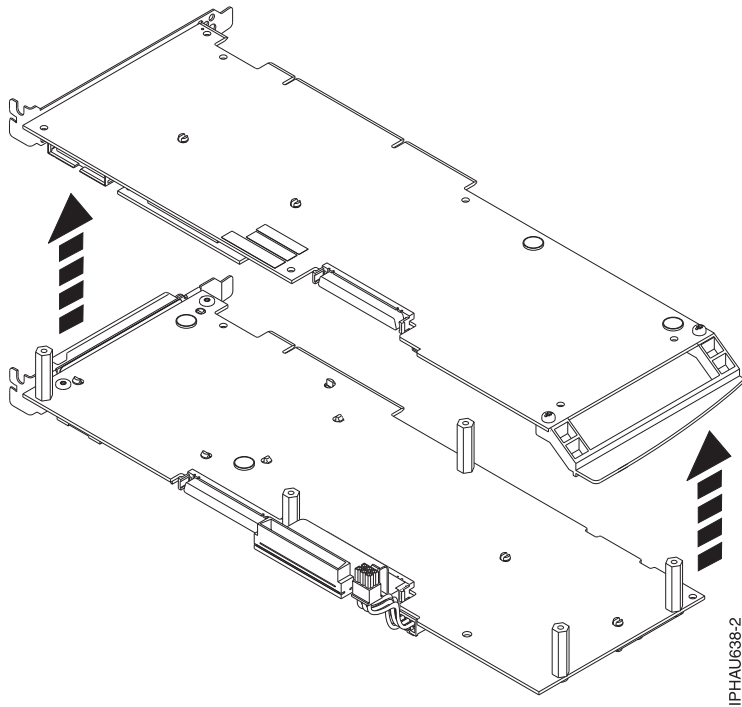
4. Disconnect battery cable (A) and the SCSI cable (B) from the 571F storage adapter. Leave the other end of the cables attached to the 575B auxiliary cache adapter.



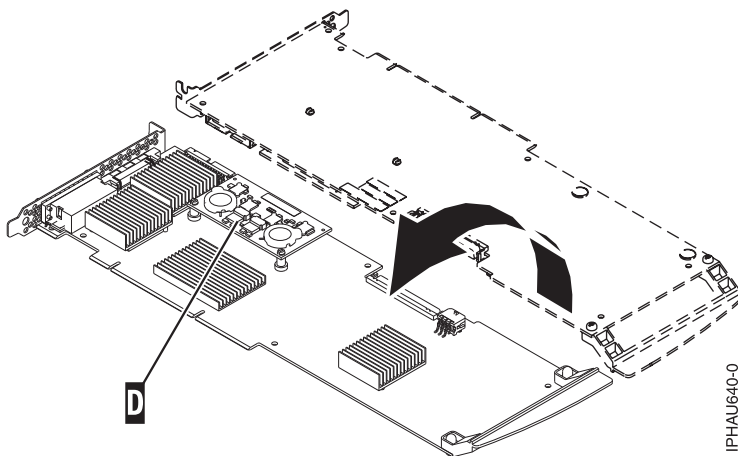
5. To prevent possible card damage, first loosen all five retaining screws (C) before removing them. After all five retaining screws have been loosened, remove the screws (C) from the 571F storage adapter.



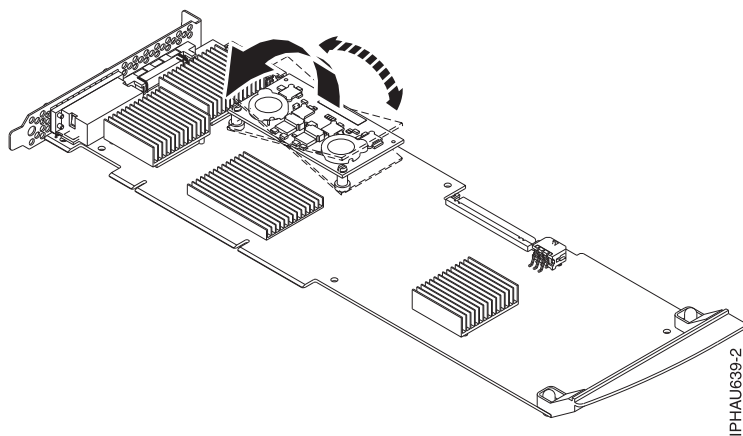
6. Carefully lift the 571F storage adapter off the standoffs and set it on the ESD protective surface.



7. Turn the 571F storage adapter over so that the components are facing up, and locate the cache directory card (D) on the 571F storage adapter. It is the small rectangular card mounted on the I/O card.



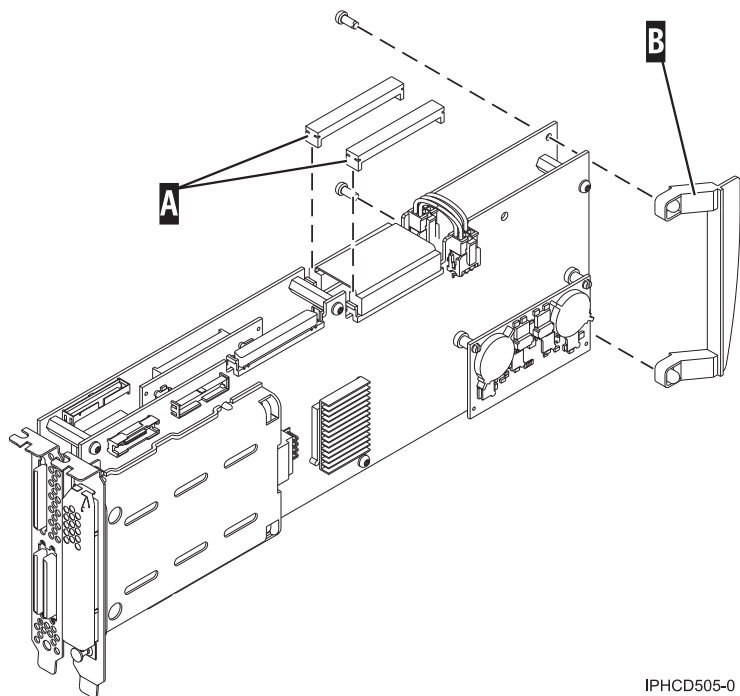
8. Unseat the connector on the cache directory card by wiggling the two corners that are farthest from the mounting pegs. To disengage the mounting pegs, pivot the cache directory card back over the mounting peg.



9. Move the cache directory card to the replacement 571F storage adapter and seat it on the connector and mounting pegs.
10. To reassemble the cards, perform steps 1 - 9 in reverse order. To prevent possible card damage, insert all five screws (C) before tightening any of them.

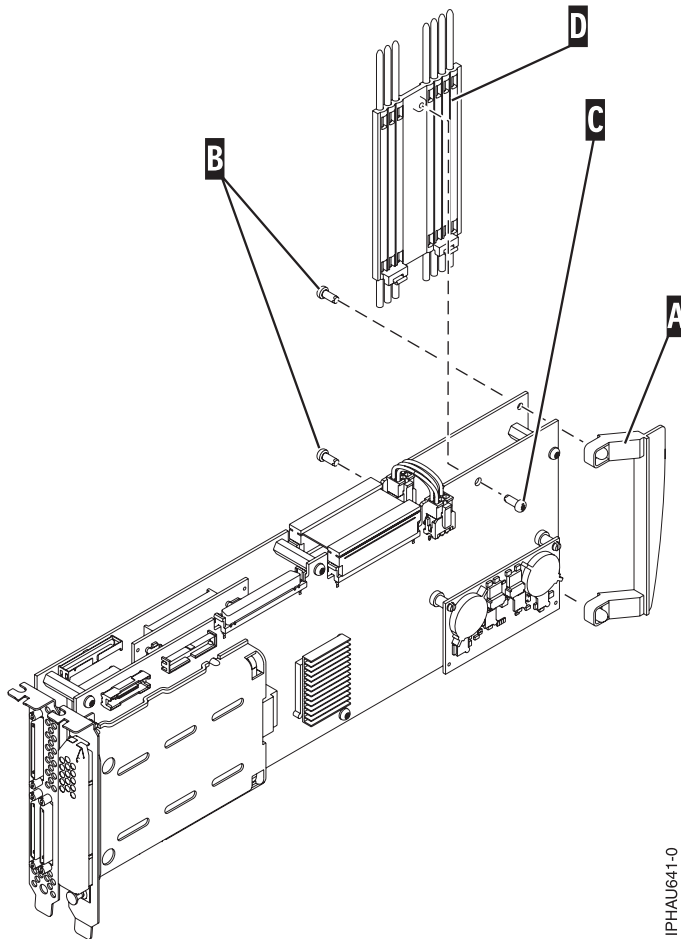
**Note:** If you are installing the 571F/575B card set adapter into a cassette, do the following steps:

- a. Remove the adapter handle (B) as shown in the following figure.
- b. If applicable, remove the light-pipe assembly.
- c. Remove the two plastic covers from the SCSI jumper cable (A) as shown in the following figure.



- d. Ensure that the battery cable (A) and the SCSI cable (B) are reconnected to the 575B auxiliary cache adapter.
- e. Go to Place an adapter in the PCI adapter double-wide cassette to complete the installation.
11. If applicable, to replace the light pipes, do the following steps:
  - a. Ensure that the 571F/575B cards are correctly assembled.
  - b. If necessary, remove the 571F/575B card handle (A) from the back of the card set.

- c. Slide the light pipe assembly (D) between the 571F/575B cards. Ensure that the threaded screw hole located on the light pipe assembly is aligned with the screw clearance hole located on the card.



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12. Return to the procedure that sent you here. **This ends this procedure.**

## Determining which processor is the secondary service processor

Use this procedure to determine which service processor on your system is the secondary service processor.

1. Locate the HMC1 and HMC2 port pairs for service processor zero and for service processor one. (See Part locations and location codes for your specific model).
2. Is only one service processor with cables attached to the HMC ports?  
**No:** Continue to the next step.  
**Yes:** The secondary service processor is the service processor with no cables attached to the HMC ports. **This ends the procedure.**
3. Which console do you want to use to check for the secondary service processor?  
**Advanced System Management Interface (ASMI):** Continue to the next step.  
**Hardware management console (HMC):** Go to step 5.
4. Use the HMC to access the ASMI to determine which service processor is the secondary service processor.
  - a. Verify ASMI connectivity by logging onto ASMI.

- b. When you are at the ASMI Welcome screen, an entry appears showing the primary service processor location (for example, Service Processor: Primary (Location U789D.001.DQDMLMM-P1-C11). The other location is the secondary service processor. **This ends the procedure.**
5. Use the HMC to determine which service processor is the secondary service processor.
  - a. Logon to the HMC.
  - b. Select **Systems management** → **Servers** → *servername* (name of server you want to examine).
  - c. Under **Tasks**, click **Connections**. A window displays the primary and secondary processor in the Service processor role column. **This ends the procedure.**

---

## System reference code format description

The format of the system reference code (SRC) that you see depends on the model of your system.

## System reference code information

Use this information to understand how system reference codes (SRCs) work.

An SRC is a sequence of data words (codes) that perform the following actions:

- Identifies a system status
- Describes a detected hardware, Licensed Internal Code, or software failure
- Describes the unit that is reporting the failure and its location. The SRCs can be displayed on the control panel, appear in a system console message, or appear in the product activity log.

SRCs can display on the control panel, appear in a system console message, or appear in the product activity log.

The system uses the following procedure to gather information about errors:

1. The system gathers information about an error as the system detects the error.
2. The product activity log (PAL) records and stores the error information. When using IBM i the Service Action Log (SAL) serves a similar purpose as the PAL. The SAL uses an error analysis framework to analyze the error and details the recommended repair actions. When using IBM i, the SAL should always reviewed first before using the PAL.
3. An SRC encodes information that is used to evaluate or identify a system-detected hardware or software error, failure, or status. The failure information might include the failing condition or part (or unit) that can be exchanged or replaced and its location.
4. The SRC links to the problem determination procedure when the element detecting the failure cannot isolate the failing condition.
5. The SRC link completes the isolation process.

In summary, the SRC provides the first-failure-data-capture information. The customer or support representative uses SRCs during problem determination, repair actions, and verification. The SRC provides a link to the problem determination procedures (hardcopy or softcopy). Use the SRC and the problem determination procedures to isolate the problem.

## Determining system reference code address formats

Use this procedure to determine the IOP, IOA, or device address from either a control panel or a console display.

To determine the IOP, IOA, or device address from either a control panel or a console display, complete these steps.

1. Was the SRC and addressing information obtained from a control panel display, the Main Storage Dump Manager display, or the HMC Partition Properties Reference Code Words display?
  - **No:** Continue with the next step.

- **No:** Contact your next level of support. **This ends the procedure.**
- **Yes:** Addressing information is in the Bus-Bus-Bus-Bus/Card-card/board-board (BBBBCcbb) format as follows:
  - If characters 7 and 8 of the top 16-character line of function 12 (word two) are 60:
    - The direct select address is characters 1 - 8 of the bottom 16-character line of function 12 (word four) in the format "BBBBCcbb".
    - The device address is characters 9 - 16 of the bottom 16-character line of function 12 (word five) in the format "abcd efgh".
  - If characters 7 and 8 of the top 16-character line of function 12 (word two) are 13, 17, 27, or 29:
    - The direct select address is characters 9 - 16 of the top 16-character line of function 12 (word three) in the format "BBBBCcbb".
    - The device address is characters 1 - 8 of the bottom 16-character line of function 12 (word four) in the format "abcd efgh".
  - If characters 7 and 8 of the top 16-character line of function 12 (word two) are 62:
    - The direct select address may be characters 9 - 16 of the top 16-character line of function 13 (word seven) in the format "BBBBCcbb".
    - The device address may be characters 1 - 8 of the top 16-character line of function 13 (word six) in the format "abcd efgh".

Go to step 9 on page 16.

2. Are you using the HMC?

**Yes:** Open the server with the problem, and then go to the IBM i partition with the problem and use the service action log (SAL) to find the entry related to this problem (see "Searching the service action log" on page 23), and then go to step 7 on page 15.

**No:** Continue with the next step.

3. Are you using the service action log (SAL)?

**Yes:** Go to step 7 on page 15.

**No:** Continue with the next step.

4. Are you using IBM i communication-diagnostic displays that are shown by the commands VFYCMN, WRKPRB, or ANZPRB?

**Yes:** Go to step 11 on page 17.

**No:** Continue with the next step.

5. Addressing information is in the bus, board, and card format.

**Note:** This format shows the system bus number in decimal form.

If no address information is available in the console error message, check the product activity log (PAL) entry that is associated with the console error message. The following figures show examples of a PAL display for a storage device. Other devices (for example, workstations or communications) have similar displays. For more information about the PAL, see "Using the product activity log" on page 25 in "Service functions" on page 63.

Figure 2. Example of product activity log display example

Display Address Information for Resource				
Name	Type	Model	Serial Number	Resource Name
STORAGE	6718	050	83-00834	DD001
Physical Location:				
U7879.001.10ABCDE-P3-D3				



Logical Address:			
PCI Bus:		Storage:	
System Bus . . . . .	3	I/O Adapter . . . . .	2
System Board . . . . .	0	I/O Bus . . . . .	1
System Card . . . . .	32	Controller. . . . .	4
		Device . . . . .	0

In the previous example, the contents of Storage are defined as follows.

Table 1. Storage definitions

Reference	Definition
I/O bus	The bus to which the device is connected.
I/O adapter	The adapter that the I/O bus connects to on the I/O processor. <b>Note:</b> For SAS I/O adapters, this field is not applicable.
Controller	The logical controller for the addressed device.
Device	The <i>logical</i> device that is attached to the <i>logical</i> device controller.

- Use the following figure to understand how addresses in the bus/board/card format relate to the bus-bus-bus-bus/card-card/board-board format. You can also use the figure to understand how addresses in the bus, board, and card format relate to the direct select addresses used in Part locations and location codes.

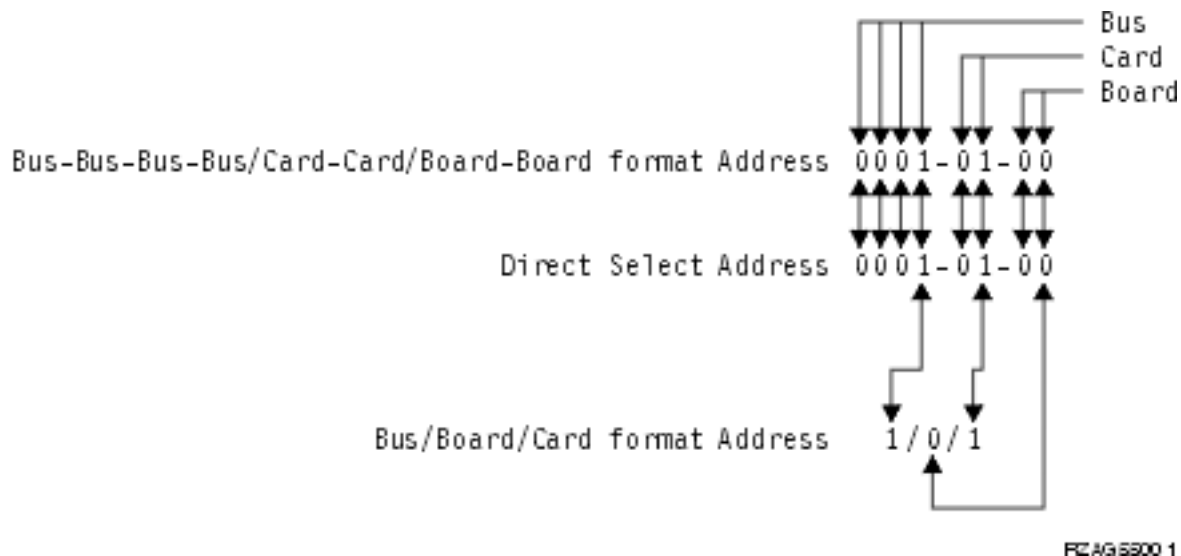


Figure 3. Format conversion

**Note:** When converting from bus/board/card format to bus-bus-bus-bus/card-card/board-board format, the numbers must be converted from Decimal to Hexadecimal.

Go to step 10 on page 16 for IOA and device address information.

- Display the field-replaceable unit (FRU) details for the problem that you are attempting to fix. The location information in the FRU detail is only available for IOPs, IOAs, and devices.

Is the FRU an IOP, IOA, or device, and is there location information in the **Location** field of the display?

**Yes:** Use the location information and return to the procedure that sent you here. **This ends the procedure.**

**No:** Continue with the next step.

8. If there is no location information in the Location field, are there additional words displayed at the top of the screen?

- **Yes:** Use the additional words to find the address information:
  - If characters 7 and 8 of word two are 60:
    - The direct select address is word four in the format "BBBBCcbb".
    - The device address is word five in the format "abcd efgh".
  - If characters 7 and 8 of word two are 13, 17, 27, or 29:
    - The direct select address is word three in the format "BBBBCcbb".
    - The device address is word four in the format "abcd efgh".
  - If characters 7 and 8 of word two are 62:
    - The direct select address might be word seven in the format "BBBBCcbb".
    - The device address might be word six in the format "abcd efgh".

Continue with the next step.

- **No:** Go to "Hexadecimal product activity log data" on page 31 in "Service functions" on page 63 to obtain the address information. Then return here and continue with the next step.
9. The BBBBCcbb format is the hexadecimal direct select address of a card location in the system unit. The format definition is:
    - BBBB: System bus
    - Cc: System card
    - bb: System board

Continue with the next step for IOA and device address information.

10. Unit (device) address definitions are explained in an "abcd efgh" format. For example, if the unit address is 0001 00FF, the address relates to the "abcd efgh" format as follows:

```

0 0 0 1    0 0 F F
(a b c d    e f g h)

```

Figure 4. Example of unit (device) address definitions

The characters "abcd efgh" can have different meanings, depending on the subsystem that reports the problem. However, they define the information that is contained in the unit (device) address as follows.

Table 2. Character definitions

SCSI-attached disk, tape, or optical	
a	I/O adapter
b	I/O bus
cd	Controller
ef	Device
gh	FF
SAS-attached disk, tape, or optical	
Not applicable	I/O adapter
ab	I/O bus
cd	Controller
ef	Device
gh	FF
Communications	

Table 2. Character definitions (continued)

SCSI-attached disk, tape, or optical	
a	I/O bus
b	Adapter
c	0
d	Port
e	0
f	Channel
GH	FF
Workstation	
a	I/O bus
b	Adapter
cd	Port
e	0
f	Device
g	0
h	Session

11. IBM i communication-diagnostic displays that are shown by the commands VFYCMN, WRKPRB, and ANZPRB use the following address format. Values for *x* are explained in the following table.

x1 x2 x3x4

Table 3. Decimal address values

Value	Description
x1 = System bus	The 1-, 2-, or 3-digit decimal representation of the hexadecimal <b>Bus</b> value of the <b>Bus-Bus-Bus-Bus/Card-Card/Board-Board format address</b> at the top of Figure 3 on page 15.
x2 = System board	The 1- or 2-digit decimal representation of the hexadecimal <b>Board</b> value of the <b>Bus-Bus-Bus-Bus/Card-Card/Board-Board format address</b> at the top of Figure 3 on page 15.
x3 = System card	The 1- or 2-digit decimal representation of the hexadecimal <b>Card</b> value of the <b>Bus-Bus-Bus-Bus/Card-Card/Board-Board format address</b> at the top of Figure 3 on page 15.
x4 = Adapter location	The 1- or 2-digit decimal representation of the hexadecimal <b>b adapter</b> value of the <b>Communications unit address</b> value in step 9 on page 16 (See step 10 on page 16).

12. Return to the procedure that sent you here. **This ends the procedure.**

**Note:** See “Hardware system reference code formats” for more formatting information.

## Hardware system reference code formats

Provides system reference code (SRC) format examples.

### Notes:

- Other formats exist. If necessary, contact your next level of support.
- For more information on formats 60–63, see “Problem reference code formats detected by Licensed Internal Code” on page 20.

Table 4. SRC format examples

SRC word number	Panel function, digits x to y (from left to right)	IOP SRC format 13	IOP SRC format 17	Device SRC format 27	IOP detected a failure format 29	LIC <sup>1</sup> SRC format 60	LIC <sup>1</sup> SRC format 61	LIC <sup>1</sup> SRC format 62	LIC <sup>1</sup> SRC format 63
1	11, 1 - 8	TTTT RRRR	TTTT RRRR	tttt rrrr	B0XX RRRR	A6xx RRRR	B6xx RRRR	B6xx RRrr or B7xx Rrrr	A600 RRRR
2	12, 1 - 8	MIGV EP13	MIGV EP17	MIGV EP27	MIGV EP29	MIGV EP60	MIGV EP61	MIGV EP62	MIGV EP63
3	12, 9 - 16	BBBB Ccbb	BBBB Ccbb	BBBB Ccbb	BBBB Ccbb	PPPP 0000	cccc cccc	cccc cccc	AAAA BBBB
4	12, 17 - 24	aaaa aaaa	aaaa aaaa	aaaa aaaa	SAPP UUFF	BBBB Ccbb	pppp pppp	pppp pppp	CCCC DDDD
5	12, 25 - 32	TTTT LMMM	TTTT LMMM	tttt lmmm	TTTT FMMV	aaaa aaaa	qqqq qqqq	qqqq qqqq	EEEE FFFF
6	13, 1 - 8	uuuu uuuu	tttt lmmm	TTTT LMMM	tttt lmmm	tttt mmmm	qqqq qqqq	qqqq qqqq	GGGG HHHH
7	13, 9 - 16	uuuu uuuu	ZZZZ rrrr	ZZZZ RRRR	zzzz rrrr	ssss ssss	0000 0000	BBBB Ccbb	JJJJ KKKK
8	13, 17 - 24	uuuu uuuu	ssss ssss	ssss ssss	0sss ssss	NNNN 0000	0000 0000	TTTT MMMM	TTTT 0MMM
9	13, 25 - 32	uuuu uuuu	uuuu uuuu	uuuu uuuu	uuuu uuuu	0000 0000	0000 0000	0000 0000	SSSS SSSS
<b>Note:</b>									
1. Licensed internal code									

Table 5. Description of SRC format examples

SRC format	Description
AAAA	Type of I/O bus (see “Logical address format” on page 19 — field A).
aaaa	Unit address.
BBBB	System bus number (see “Logical address format” on page 19 — field B).
BBBBCcbb	Bus, bus, bus, bus, card, card, and board, board address (direct select address or DSA). <ul style="list-style-type: none"> <li>For PCI system buses 0001-0003 and 0018-FFFF, the Cc field is a 1-digit multiadapter bridge number and a 1-digit multiadapter bridge function number.</li> <li>For SPD system buses 0004-0017 the Cc field is a two digit card number.</li> </ul>
CCCC	System board number (see “Logical address format” on page 19 — field C).
cccc cccc	Component reference code. Format 62 varies by component.
DDDD	System Card Number (see “Logical address format” on page 19 — field D).
EEEE	“Logical address format” on page 19 — Unit Address type — field E.
FFFF	“Logical address format” on page 19 — Unit Address type — field F.
GGGG	“Logical address format” on page 19 — Unit Address type — field G.
HHHH	“Logical address format” on page 19 — Unit Address type — field H.
JJJJ	“Logical address format” on page 19 — Unit Address type — field J.
KKKK	“Logical address format” on page 19 — Unit Address type — field K.

Table 5. Description of SRC format examples (continued)

SRC format	Description
LMMM	Level indicator plus 3-digit model number (for example, 0001).
lmmm	Level indicator plus 3-digit model number of failing device.
0MMM	Model number of failing device (that is, MMM=001).
MIGV EP	General system status.
NNNN	Number of disk device facilities that are missing.
PPPP	Cause code.
pppp pppp	Programming reference code.
qqqq qqqq	Programming reference code qualifier.
RRRR	Unit reference code (URC).
rrrr	Outboard failing unit reference code (URC).
SAPP UUFF	Unit address.
SSSSSSSS	System Reference Code. This SRC is used to determine why the primary console failed to respond.
ssss	Serial number of failing unit.
TTTT	Type number or card identification number (hexadecimal).
tttt	Outboard failing unit type number (that is, 6607).
uuuu	Unit-specific data.
ww	SRC type.
ZZZZ	Reserved.

### Logical address format:

Use the logical address to identify the resource entry.

To sort by logical address, select the Analyze log option on the product activity log display. Then select the F9 key (Sort by...) and sort by logical address. For more information on the address, use the address information function.

The logical address format, A/B/C/D-E/F/G/H/J/K, has the following definitions:

- A** Type of I/O bus (transport)
- B** System bus number
- C** System board number (for busses that connect card enclosures)
- D** System card (bus unit) number
- Separates the bus address from the unit address
- E** Unit address type
- FGHJK** Unit address data

The values of F, G, H, J, and K vary, depending on the unit address type (E). Use the following information to determine the unit address data (FGHJK) representation.

Table 6. Unit address (E) definitions

Unit address value	Unit address definition	Unit address data				
E		F	G	H	J	K
0	Reserved	-	-	-	-	-
1	Communications	I/O bus	Adapter	Port	Channel	-
2	Storage	I/O adapter	I/O bus	Controller	Device	-
3	Workstation	I/O bus	Adapter	Port	Device	Session
4	Auxiliary processor	I/O bus	Auxiliary processor	Adapter	Port	-
5	Library	I/O adapter	I/O bus	Library	Controller	Device
6	Cryptography	I/O bus	Adapter	Device	-	-

The Logical address field contains the bus address and the unit address. The bus address describes the hardware bus, board, and card information. The unit address describes the subsystem and identifying data (see Table 6).

**Note:** To locate a device or card that is within the system unit, use the physical address information.

#### Problem reference code formats detected by Licensed Internal Code:

Use this topic to understand problem reference code formats that are detected by Licensed Internal Code.

Formats 60–63 in Table 4 on page 18 represent the formats for Licensed Internal Code SRCs.

- Format 60 is used for Licensed Internal Code Attention SRCs.
- Format 61 is used when Licensed Internal Code detects a Licensed Internal Code programming problem.
- Format 62 is used when Licensed Internal Code detects an IOP Bus or IOP programming problem.

**RRRR** Licensed Internal Code *unit reference code*.

**cccc** Licensed Internal Code *Component Reference Code*. Identifies the Licensed Internal Code component and subcomponent that generated the SRC.

**pppp** Licensed Internal Code *Program Reference Code* (PRC). Identifies the Licensed Internal Code class or component that generated the SRC and the specific error detected.

**qqqq** Licensed Internal Code *Program Reference Code Qualifier*. Identifies SRC words found at functions 15-3 through 19-3 or 15-3 and 16-3, depending on the format, provide additional error isolation information that is specific to the Program Reference Code. One or more of these words may be 0000 0000. Format 61 has up to 5 words of PRC Qualifier, in words 5 - 9. The PRC determines the number of PRC qualifier words. The content of words 5 - 9 is dependent on the value in word 4. Format 62 has the PRC qualifier only in words 5 - 6. Physical address and type information is included in words 7 - 9.

#### **BBBB Ccbb**

Bus, card, and board identifiers of failing component (direct select address)

**@@@@** Unit address.

**ssss** Serial number of failing unit.

**TTTT** Type number or card identification number of failing component (hex 2xxx through 9FFF). This value might be 0000 if system data is not available at the time the SRC is signaled.

**ZZZZ** Reserved.

**mmmm**

Model number of failing component (hex 2xxx through 9FFF). This value might be 0000, if system data is not available at the time the SRC is signaled.

**CCCC** Cause code.

**NNNN**

Number of disk device facilities missing

**MIGV EP**

General system status (see “System reference code information” on page 13 for more information).

**x** Any hexadecimal number

**Notes:**

1. For information about functions 11 and 12, refer to “System reference code information” on page 13.
2. Format 60 might contain data in a format other than that shown. Format 60 is an old vertical Licensed Internal Code (VLIC) format, which some new Licensed internal code (LIC) components use. It does not have the component reference code and program reference code that formats 61 and 62 have (61 and 62 were specifically defined for the new licensed internal code). Format 60 is mostly component-specific with no key information to indicate format (the developer has to interpret it). Refer to Licensed internal code isolation procedures and perform the problem isolation procedure used by the reference code to further define any significant data.

---

## Removing and replacing FRUs

Use these procedures to remove and replace failing parts.

Before you begin a replacement, perform these tasks:

1. If you are performing a replacement procedure that might put your data at risk, ensure, if possible, that you have a current backup of your system or logical partition (including operating systems, licensed programs, and data).
2. Review the installation or replacement procedure for the feature or part.
3. 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.
4. Ensure that you have access to a medium, flat-blade screwdriver.
5. If parts are incorrect, missing, or visibly damaged, contact your service provider or next level of support.

## DANGER

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

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

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

To Disconnect:

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

To Connect:

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

(D005)

## Attention:

Failure to follow the step-by-step sequence for FRU removal or installation may result in FRU or system damage.

Use the following precautions whenever you handle electronic components or cables.

- The electrostatic discharge (ESD) kit and the ESD wrist strap must be used when handling logic cards, SCMs, MCMs, electronic boards, and disk drives.
- Keep all electronic components in the shipping container or envelope until you are ready to install them.
- If you remove, then reinstall an electronic component, temporarily place the component on an ESD pad or blanket.

External cables

Control panel

Disk drive

Disk unit enclosure



Fans  
I/O Backplane  
Media device enclosure  
Memory DIMM  
RIO/HSL adapter and 12X host channel adapter  
PCI adapter  
C6 PCI adapter  
Power supply  
Removable media  
Service processor assembly and time-of-day battery  
Service processor cable  
SMP cable  
System backplane  
System processor assembly  
Voltage regulator assembly  
VPD Card  
VPD pass-through card

---

## Searching the service action log

Use this procedure to search for an entry in the service action log that matches the time, reference code, or resource of the reported problem.

1. On the command line, enter the start system service tools (STRSST) command. If you cannot get to system service tools (SST), use function 21 to get to dedicated service tools (DST).
2. On the Start Service Tools Sign On display, type in a user ID with QSRV authority and password.
3. Select **Start a Service Tool** → **Hardware Service Manager** → **Work with service action log**.
4. On the Select Timeframe display, change the From: **Date** and **Time** to a date and time prior to when the customer reported having the problem.
5. Search for an entry that matches one or more conditions of the problem:
  - Reference code
  - Resource
  - Time
  - Failing item list
6. Perform the following actions:

- Choose **Display the failing item information** to display the service action log entry.
- Use the **Display details** option to display part location information.

All new entries in the service action log represent problems that require a service action. It may be necessary to handle any problem in the log even if it does not match the original problem symptom.

The information displayed in the date and time fields are the **Date** and **Time** for the first occurrence of the specific reference code for the resource displayed during the time range selected.

7. Did you find an entry in the service action log?
  - **Yes:** Continue with the next step.
  - **No:** Go to "Problems with noncritical resources" on page 24. **This ends the procedure.**
8. Does "See the service information system reference code tables for further problem isolation" appear near the top of the display or are there procedures in the field replaceable unit (FRU) list?
  - **Yes:** Perform the following steps:

- a. Go to the list of reference codes and use the reference code that is indicated in the log to find the correct reference code table and unit reference code.
- b. Perform all actions in the Description/Action column before replacing failing items.

**Note:** When replacing failing items, the part numbers and locations found in the service action log entry should be used.

**This ends the procedure.**

- **No:** Display the failing item information for the service action log entry. Items at the top of the failing item list are more likely to fix the problem than items at the bottom of the list.

**Notes:**

- a. Some failing items are required to be replaced in groups until the problem is solved.
- b. Other failing items are flagged as mandatory exchange and must be replaced before the service action is complete, even if the problem appears to have been repaired.
- c. Use the **Part Action Code** field in the service action log display to determine if failing items are to be replaced in groups or as mandatory exchanges.
- d. Unless the **Part Action Code** of a FRU indicates group or mandatory exchange, exchange the failing items one at a time until the problem is repaired. Use the help function to determine the meaning of part action codes.

Continue with the next step.

9. Perform the following steps to help resolve the problem:

- a. To display location information, choose the function key for **Additional details**. If location information is available, go to Part locations and location codes for the model you are working on to determine what removal and replacement procedure to perform. To turn on the failing item's identify light, use the indicator on option.

**Note:** In some cases where the failing item does not contain a physical identify light, a higher level identify light is activated (for example, the planar or unit containing the failing item). The location information should then be used to locate the actual failing item.

- b. If the failing item is Licensed Internal Code, contact your next level of support for the correct fix to apply.

10. After exchanging an item, perform the following steps:

- a. Go to Verifying a repair.
- b. If the failing item indicator was turned on during the removal and replacement procedure, use the indicator off option to turn off the indicator.
- c. If all problems have been resolved for the partition, use the Acknowledge all errors function at the bottom of the service action log display.
- d. Close the log entry by selecting **Close a NEW entry** on the service action log Report display. **This ends the procedure.**

## Problems with noncritical resources

Use this procedure to help you determine the cause of problems with noncritical resources.

1. Is there an SRC in an 8-character format available on the problem summary form?

**Note:** If the operator has not filled out the problem summary form, go to the problem reporting procedure for the operating system in use.

**No:** Continue with the next step.

**Yes:** Perform problem analysis using the SRC. **This ends the procedure.**

2. Does the problem involve a workstation resource?

- **No:** Continue with the next step.

- **Yes:** Perform the following steps:
  - Check that the workstation is operational.
  - Verify that the cabling and addressing for the workstation is correct.
  - Perform any actions indicated in the system operator message.
 If you need further assistance, contact your next level of support. **This ends the procedure.**
- 3. Does the problem involve a removable media resource?
  - No:** Continue with the next step.
  - Yes:** Go to “Using the product activity log” to resolve the problem. **This ends the procedure.**
- 4. Does the problem involve a communications resource?
  - **No:** Contact your next level of support. **This ends the procedure.**
  - **Yes:** Are there any system operator messages that indicate a communications-related problem has occurred?
    - **No:** Contact your next level of support. **This ends the procedure.**
    - **Yes:** Perform any actions indicated in the system operator message. If you need further assistance, contact your next level of support. **This ends the procedure.**

---

## Using the product activity log

This procedure can help you learn how to use the product activity log (PAL).

1. To locate a problem, find an entry in the product activity log for the symptom you are seeing.
  - a. On the command line, enter the Start System Service Tools command:
 

```
STRSST
```

 If you cannot get to SST, select DST.
 

**Note:** Do not IPL the system or partition to get to DST.
  - b. On the Start Service Tools Sign On display, type in a User ID with service authority and password.
  - c. From the System Service Tools display, select **Start a Service Tool** → **Product activity log** → **Analyze log**.
  - d. On the Select Subsystem Data display, select the option to view **All Logs**.
 

**Note:** You can change the From: and To: Dates and Times from the 24-hour default if the time that the customer reported having the problem was more than 24 hours ago.
  - e. Use the defaults on the Select Analysis Report Options display by pressing the Enter key.
  - f. Search the entries on the Log Analysis Report display.

**Note:** For example, a 6380 Tape Unit error would be identified as follows:

**System Reference Code:** 6380CC5F

**Class:** Perm

**Resource Name:** TAP01

2. Find an SRC from the product activity log that best matches the time and type of the problem the customer reported.

Did you find an SRC that matches the time and type of problem the customer reported?

**Yes:** Use the SRC information to correct the problem. **This ends the procedure.**

**No:** Contact your next level of support. **This ends the procedure.**

---

## System service tools

This information describes how to use system service tools (SST).

The system service tools (SST) run one or more Licensed Internal Code or hardware service functions under the control of the operating system. SST performs service functions concurrently with the customer's application programs. The printer that is used for output must be an SCS-type data stream printer that is attached to the same workstation input/output processor (IOP) or storage media unit.

## Working with a communications trace

You can start or stop a communication line trace on a configuration object.

After you run the trace, the data can be formatted. You can view the formatted data by printing it.

You should use communications trace for the following situations:

- To isolate errors that you cannot isolate by using the communications verification procedure
- To collect more data when the problem analysis procedures do not provide enough information on the problem
- If you suspect a violation of the communications protocol or some other communications line problem
- If you suspect line noise
- When the error messages indicate that there is an SNA BIND problem

Running and interpreting the communications trace requires detailed knowledge of communications protocols. To obtain the most accurate sample of your line status, whenever possible, start the communications trace before varying on the lines.

**Note:** Use the online help from the Work with Communications Trace to view a list of protocols.

## Options and function keys

The Work with Communications Traces display has the following options and function keys:

- Start trace (F6)  
This function key starts the tracing of the data on a communications configuration object. The Start Trace display appears after you press this function key. For more information, see "Starting a communications trace" on page 28.
- Stop trace (option 2)  
This option appears only on the Work with Communications Traces display. With this option, you can end the trace and stop collecting data. A trace must be stopped before you can format, print, or delete the data. To ensure that the trace is stopped, press the Refresh function key and check the trace status field.
- Delete trace (option 4)  
The trace must be stopped (option 2) before you can use this option. Select this option to delete the trace information when you no longer need the data. Traces are not automatically deleted when you leave a communications trace function. Delete trace releases system space so that you can start other traces without having to increase the maximum amount of storage provided for the communications trace. Traces that are not deleted are listed on the Work with Communications Traces display.
- Format and print trace (option 6)  
Use this option to format and print the trace. For more information on the Format and print trace option, see page "Format and print trace" on page 29.
- Display message (option 7)  
Use this option to view a message that indicates the status of the trace that stopped because of an error.
- Restart trace (option 8)  
Use this option to start a trace that has been stopped.
- Change size (F10)

Use this function key to change the amount of storage that all traces use. You might want to increase the amount of storage, if your system has many active traces or traces that will be active for a long time.

- Display buffer size or display trace status (F11)

With this function key, you can select and alternate between buffer size and trace status.

- Refresh (F5)

This function key updates the data on the display.

## Status conditions

After the Work with communications trace option is selected from the Start a Service Tool display, the Work with Communications Traces display appears.

Work with Communications Traces

Type choice, press Enter.

2=Stop trace            4=Delete trace    6=Format and print trace  
7=Display message    8=Restart trace

Configuration

Opt	Object	Type	Trace Description	Protocol	Trace Status
—	LosAngeles	Line	Test LosAngeles Line	SDLC	Active
—	Mpls	NWI	Test Mpls	ISDN	Stopped
—	Tucson	Line	Test Tucson Line	ASYN	Waiting

F3=Exit    F5=Refresh    F6=Start trace    F10=Change size  
F11=Display buffer size    F12=Cancel

Figure 5. Example of the Work with Communications Trace display

Details of the trace, including status, are displayed. The trace status can be one of the following options:

## Condition description

### Waiting

The trace is waiting for the configuration object to be varied on (not collecting data).

**Active** The trace data is being collected.

### Stopping

The trace is stopping.

### Stopped

The trace has stopped (not collecting data).

**Error** An error occurred on the configuration object while the trace was collecting data. The data might or might not be collected. The trace stopped.

### Starting

The trace is being started by another user. You cannot stop or delete this trace.

### Formatting

Trace is being formatted.

## Starting a communications trace

The following is an example of a Start Trace display.

```

                                Start Trace
Configuration object . . . . . _____
Type . . . . . 1 1=Line 2=Network interface
3=Network server

Trace description . . . . . _____

Buffer size (in kilobytes) . . . . . 1 1=128, 2=256, 3=2M, 4=4M,
5=6M, 6=8M, 7=16M, 8=32M, 9=64M

Stop on buffer full . . . . . N Y=Yes, N=No

Data direction . . . . . 3 1=Sent, 2=Received, 3=Both

Number of bytes to trace
Beginning bytes . . . . . *CALC VALUE, *CALC
Ending bytes . . . . . *CALC VALUE, *CALC

Type choices, press Enter.

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

Enter the name of a communications configuration object description in the **Configuration object** field.

Describe the trace in the **Trace description** field. This field can help you identify the trace.

You can select a buffer size to hold the communications data that the trace collects. The default buffer size is 1=128KB. Base the size of the buffer on the speed of the communications line and on the amount of time necessary to trace the data. For high speed lines or long periods of tracing, a larger buffer size is recommended.

If you specify Yes in the field, the trace stops when the buffer is full. This option is useful for viewing the initial data that is coming across a line. If you specify No, the trace continues until you stop it. In this case, the data in the buffer will be written over each time the buffer is full.

You can select the direction of data to be traced by specifying one of the three selections in the Data direction field:

- Only data that the system is sending (option 1)
- Only data that the system is receiving (option 2)
- Both the data sent and received by the system (option 3)

**Note:** If you specify option 1 (Sent ) for lines that are in SDLC short hold mode, the trace does not include controller names.

You can select how much data is traced in a frame of data. The value that is entered is the amount that is saved as part of the trace. The minimum value that is allowed for both the beginning and the end value is 36 bytes. Those 36-byte minimum values include the protocol header. The configuration object you are tracing determines the maximum value that is allowed.

### Notes:

1. The BSC protocol ignores the beginning and ending byte values.
2. The SDLC, high-level data link control (HDLC), X.25, frame relay, Ethernet, distributed data interface (DDI), ATM, and token-ring protocols ignore the ending byte value.

3. The minimum value that is allowed for the beginning byte value for local area network (LAN) protocols (including frame relay protocols and ATM protocols) is 72 bytes.

When all required options are complete, press the Enter key. The Work with Communications Trace display appears.

If the communications object being traced is in varied off status when you start the trace, the trace remains in waiting status until you vary the communications object on. If the object is varied on, the trace will immediately go to the active state, and the system will begin to collect trace data.

The trace remains active until one of the following occurs:

- You select the option to stop the trace on the Work with Communications Traces display.
- You vary off the configuration object being traced.
- The configuration object being traced has an error.
- The trace buffer is full, and the option to stop on buffer full was selected.

**Note:** You can exit the communications trace function to do other work while the trace is active.

Traces are not automatically deleted when you exit a communications trace function. To return to the communications trace:

1. Select the **Start a service tool** option from the service tools (SST or DST) display.
2. Select the **Work with communications traces** option.
3. From the Work with Communications Traces display, you can check the status of the trace or select to stop the trace.

## Format and print trace

You must select the Stop Trace option before you format or print the trace. With the Format and print trace option, you can select various formatting options and prepare the trace data for printing. The options vary for each protocol. The following is an example of the Format Trace Data display.

Format Trace Data

Configuration object . . . . . TRNLINE

Type . . . . . LINE

Type choices, press Enter.

Controller . . . . . \*ALL \*ALL, name

Data representation . . . . . 3 1=ASCII, 2=EBCDIC, 3=\*CALC

Format RR, RNR commands . . . . N Y=Yes, N=No

Format Broadcast data . . . . . Y Y=Yes, N=No

Format MAC or SMT data only. . . N Y=Yes, N=No

Format UI data only . . . . . N Y=Yes, N=No

Format TCP/IP data only . . . . . N Y=Yes, N=No

F3=Exit F5=Refresh F12=Cancel

Figure 6. Example of Format a Trace Data Display

**Notes:**

1. To view all the data associated with the trace, press the Enter key without changing to the defaults on the Format a Trace Data display . The information is not in any special format.
2. Select the option to format and print only the data that you want to see.
3. All options available for formatting depend on the protocol of the line that is being traced. Only valid choices appear for each protocol.
4. Not all combinations of options are valid for all protocols. If you select an option that is not valid, messages appear. If an error message appears, you must change your selections. Press F5 (Refresh) function key to restore all options to their default values.
5. For more information about these options, use online help .

When the format of the trace data is complete, the output can be printed on the console printer (the printer that is attached to the same I/O processor as the console). Only SCS-type data streams are supported.

The format of the trace data is:

- An introduction page that contains, for example, configuration object, type, protocol, start and stop dates and times, trace options, and formatting options.
- A help page, to assist in understanding the output. Help information for a specific protocol is given because the trace data differs for each communications protocol.

The formatted appears as follows.

Record Number	S/R	Data Length	Record Status	Record Timer	Data Type	Controller Name/Number	Command	Number Sent	Number Received	Poll/Final
7	R	69	00000000	12:29:56.72963	EBCDIC	ZSDLLC30 /01	XID	00000007000E0DF4	0	ON
Data . . . . . : 3245056150080000 0084C00000000000 01010B0000010900 00000007000E0DF4 *.&...D{.....4*										
DADBCC4BDACBCDCE EFCGC5F31017F116 1101130011F9F4F0 F6F5F0F0F1F0F1F0 *ABC.ABCDEFG..1.....94065001010*										
C4C6C44040 *DFD *										
8	S	0	00000000	12:29:56.76081	EBCDIC	ABCLLC30 /01	SNRM		0	ON
9	R	0	00000000	12:29:56.78450	EBCDIC	ABCLLC30 /01	UA		0	ON
52	S	110	00000000	12:29:57.76210	EBCDIC	ABCLLC30 /01	I	0	0	ON
Data . . . . . : 2D00010200006B81 0031001307B0B051 3107878686870706 0200000000000000 *.....A.....GFFG.....*										
944300000CDADBCC 4BEAEBCCD3D3C4F3 F02E000902E2D5C1 E2E5C3D4C7090300 *M...ABC.ABCLLD30...SNASVCMG...*										
00BCF9CAD600000D 04DADBCC4BEAEBCC D3D3C4F3F00A1300 7B00BCF9CAD60000 *.9.0...ABC.ABCLLD30...#.9.0.*										
000CDADBCC4BEAEB CCD3D3C4F4F0 *.ABC.ABCLLD40 *										
53	R	110	00000000	12:29:57.80065	EBCDIC	ABCLLC30 /01	I	0	1	ON
Data . . . . . : 2F00010200006B81 0031001307B0B051 3107878686870706 0200000000000000 *.....A.....GFFG.....*										
944300000CDADBCC 4BEAEBCCD3D3C4F4 F02E000902E2D5C1 E2E5C3D4C7090300 *M...ABC.ABCLLD40...SNASVCMG...*										
00BCF9D56600000D 04DADBCC4BEAEBCC D3D3C4F4F00A1300 7B00BCF9D5660000 *.9N.....ABC.ABCLLD40...#.9N...*										
000CDADBCC4BEAEB CCD3D3C4F3F0 *.ABC.ABCLLD30 *										
***** END OF EXAMPLE PRINTOUT *****										

Figure 7. Example of Formatted Trace Data Output for SDLC

The width of the file is 132 characters. The data is in hexadecimal representation and either American National Standard Code for Information Interchange (ASCII) or EBCDIC character representation. The columns of the trace output that are common to all protocols follows:

#### Record number

The number of the trace record. Shows if the record type is sent (S) or received (R).

#### Notes:

1. The letter C in this column indicates that an X.21 short hold mode connection was cleared.
2. If an M appears, a modem change occurred.

#### Data length

The amount of data, in decimal, that the record contains.

#### Record status

The protocol-dependent return code for the trace record. 00000000 is successful; no errors were found. Other return codes are listed in the functional specification for the protocol that is running or in the port manager.



**Record timer**

The time that each event occurs. Depending on the communications hardware that is being used, the record timer is one of the following values:

1. A time of day value, *HH:MM:SS.NNNNN* (where *H*=hours, *M*=minutes, *S*=seconds, and *N*=subseconds), based on the system time when the trace was stopped.
2. A relative time in decimal seconds. This timer value provides the relative time between events.

**Data type**

Shows whether the traced data is printed in ASCII or EBCDIC character representation. If the character representation of the data is mostly periods, you might want to format the data again using the other option for data representation.

**Controller name/number**

Indicates which controller originated the frame or record. In some conditions, this data is not available, and the column remains blank.

**Note:** The formatted trace output is not security protected. Customer passwords are shown when they cross communications lines.

---

## Hexadecimal product activity log data

Use the display hexadecimal report function or follow the steps in this procedure to display hexadecimal error log dump data.

To display hexadecimal error log dump data, complete these steps:

1. Find an entry in the product activity log for the system reference code (SRC) you are using to locate the problem.
  - a. Select System Service Tools (SST).  
If you cannot get to SST, select DST.

**Note:** Do not use an IPL of the system to get to DST.

- b. On the Service Tools display, select the Start a service tool option.
- c. Select the Product activity log option on the Start a Service Tool display.
- d. Select the Analyze log option on the Product Activity Log display.
- e. On the Select Subsystem Data display, select the option to view All Logs.

**Note:** If the SRC you are using occurred more than 24 hours ago, change the From and To Dates and Times from the 24-hour default.

- f. Use the defaults on the Select Analysis Report Options display by pressing the Enter key.
  - g. Find the entry in the product activity log that matches that SRC.
2. Select the Display Detail Report for Resource display. (See the following figures.)

#### Display Detail Report for Resource

Name	Type	Model	Serial Number	Resource Name
STORAGE	6512	001	10-4294009	SI05

Log ID . . . . .	:	06020132	Sequence . . . . .	:	2248
Date . . . . .	:	05/20/95	Time . . . . .	:	08:37:55
Reference code . . . . .	:	3400	Secondary code . . . . .	:	00000000
Table ID . . . . .	:	65120001	IPL source/state . . . . .	:	B/7

Class . . . . . : Permanent  
 System Ref Code . . . . . : 65123400  
 I/O processor card detected device error

Press Enter to continue.

F3=Exit  
 F9=Address Information  
 F6=Hexadecimal report  
 F10=Previous detail report  
 F12=Cancel

Figure 8. Example of hexadecimal detail report for resource

#### 3. Press F6 to display the hexadecimal report.

The direct select address (DSA) is in the format *BBBB-Cc-bb*:

- *BBBB* = means hexadecimal offsets 4C and 4D
- *Cc* = means hexadecimal offset 51
- *bb* = means hexadecimal offset 4F

#### Display Hexadecimal Report for Resource

Name	Type	Model	Serial Number	Resource Name
STORAGE	6512	001	10-4294009	SI05

Offset	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	EBCDIC
000000	C5D3F0F4	00000160	00E00180	77B7695E	EL04...	-.....;											
000010	E8A70000	000008C8	20E00602	01320000	Y.....	H.....											
000020	34000000	11000000	00000000	009C0000	.....												
000030	F6F5F1F2	F0F0F140	F1F060F4	F2F9F4F0	6512001	10-42940											
000040	F0F9F6F5	F1F20000	00000001	00060000	096512.....												
000050	00020000	FFFFFFFF	FFFFFFFF	FFFF0000	.....												
000060	00000000	00000000	00000000	F4404040	.....4												
000070	40000000	00000000	00000000	00000000	.....												
000080	00000000	00000000	00000000	00000000	.....												
000090	00000000	00000000	00000000	00000000	.....												
0000A0	00000000	00000000	00000000	00000000	.....												
0000B0	00000000	00000000	40404040	40404040	.....												

More...  
 Press Enter to continue.

F3=Exit  
 F12=Cancel

Figure 9. Example of hexadecimal report for resource

#### 4. Is offset 170 - 173 = 00000000?

- **Yes:** Continue with step 5.
- **No:** Continue with step 6 on page 33.

#### 5. Page forward until you locate the offset location X'000180'.

If the rightmost hexadecimal digit of offset 000182 is 8, then the unit address is hexadecimal offset 18C through 18F.

If the rightmost hexadecimal digit of offset 000182 is 2, then the unit address is hexadecimal offset 192 through 195

Record this address information. Return to the procedure that sent you here, if one.

Display Hexadecimal Report for Resource										
Name	Type	Model	Serial	Resource						
STORAGE	6512	001	10-4294009	SI05						
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F	EBCDIC					
000180	D0007800	65120001	34000620	1100FFFF	}.....					
000190	FFFFFFFF	31090000	00001100	03C00000	.....{.					
0001A0	00000000	00000000	00000000	00000000	.....					
0001B0	00000000	00000000	00000000	00000000	.....					
0001C0	00000000	00000000	00000000	E0000008	.....					
0001D0	00000000	00000000	00000000	00000000	.....					
0001E0	00000018	00000002	E00401F0	10002000	.....0....					
0001F0	00000000	40000000	00000000	000002CC	.... ..					
000200	CCCC0000	00000000	00800000	00000000	.....					
000210	08100000	00000000	F0200040	00800000	.....0.. ..					
000220	00000000	04000000	08000040	E000E221	..... ..S.					
000230	800084F3	00000002	0000001B	110003C0	...3.....{					
More...										
Press Enter to continue.										
F3=Exit            F12=Cancel										

Figure 10. Example of hexadecimal report for resource offset location (where the rightmost hexadecimal digit of offset 000182 is 8)

Display Hexadecimal Report for Resource										
Name	Type	Model	Serial	Resource						
STORAGE	571A	001	10-4294009	DC01						
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F	EBCDIC					
000180	F8407200	F5F7F1C1	F0F0F0F1	3400031D	8 ..571A0001....					
000190	00233104	00FFFFFF	F0F0F0F0	F0F0F0F0	.....40000000					
0001A0	1104E255	F0F0F0F0	F0F0F0F0	40404040	..S.00000000					
0001B0	40404000	00FF0000	04440000	A1D0038D	.....}..					
0001C0	0713000C	00000000	00000000	70000200	.....					
More...										
Press Enter to continue.										
F3=Exit            F12=Cancel										

Figure 11. Example of hexadecimal report for resource offset location (where the rightmost hex digit of offset 000182 is 2)

- Using hexadecimal arithmetic, add the value in offsets 170 - 173, the value in offsets 174 - 177, and 00000002. For example, 000001C8 + 00000410 + 00000002 = 000005DA

If the value of the rightmost hexadecimal digit at this offset is 8: Using hexadecimal arithmetic, add 0000000A to the offset you calculated. This will be the location of the unit address in the form abcdefgh. For example, 00005DA + 0000000A = 00005EA.

If the value of the rightmost hexadecimal digit at this offset is 2: Using hexadecimal arithmetic, add 00000010 to the offset you calculated. This will be the location of the unit address in the form abcdefgh. For example, 00005DA + 00000010 = 00005EA.

Record this address information. If you were sent here from another procedure, return to the procedure that sent you here.

**This ends the procedure.**

---

## Examples: Obtaining additional information from hexadecimal reports

You can get additional information for IOP 90xx reference code product activity log entries at DST by using a type D IPL.

### Notes:

- The term I/O processor indicates an IOP or an IOA.
- Formatting is available (F4=Additional Information) for IPL from disk (type A or B IPL). Formatting is not available in DST from a type D IPL.

Use the following information and the display examples to interpret the hexadecimal dump information that begins at offset hex 000180.

If the rightmost hexadecimal digit of the offset 000182 is 8, get the format from offset 00019F, and then use the following table to determine which figure to refer to.

*Table 7. Format number to figure usage*

Format number	Refer to the following figures
01	Figure 12 on page 35 Figure 13 on page 36 Figure 14 on page 36
02	Figure 15 on page 37 Figure 16 on page 38 Figure 17 on page 38
03	Figure 18 on page 39 Figure 19 on page 39 Figure 20 on page 39
04	Figure 21 on page 40 Figure 22 on page 41 Figure 23 on page 41

If the rightmost hexadecimal digit of offset 000182 is 2, get the format number from offset 0001B5, and then use the following table to determine which table to refer to.

*Table 8. Mapping of format number to table reference*

Format number	Reference the following tables
01	Table 9 on page 41
02	Table 10 on page 42
03	Table 11 on page 43
04	Table 12 on page 44
11	Table 13 on page 44
12	Table 14 on page 45
13	Table 15 on page 45
14	Table 16 on page 46
17	Table 17 on page 48

Table 8. Mapping of format number to table reference (continued)

Format number	Reference the following tables
20	Table 18 on page 49

## Example: Device formatting log (unformatted information)

Display Hexadecimal Report for Resource									
Name	Type	Model	Serial Number	Resource Name					
STORAGE	6607	070	00-68753						
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F	EBCDIC				
000180	F8407800	65320001	90920210	010400FF	8 .....k.....				
000190	66070000	00001306	87531400	123D0001	.....g.....				
0001A0	00000000	00000000	CA000003	00000000	.....				
0001B0	65320001	07050011	00000000	00000000	.....				
0001C0	00000004	00000003	00000000	00000000	.....				
0001D0	F6F6F0F7	13068753	010400FF	00000000	6607..g.....				
0001E0	00000000	65320001	07050011	47000001	.....				
0001F0	07069205	C0004000	00000021	00000030	..k.{. ....				
000200	00000000	00000000	F6F6F0F7	00071575	.....6607....				
000210	010300FF	00000000	00000000	65320001	.....				
000220	07050011	47000001	07069205	C0004000	.....k.{. .				
000230	00000000	00000000	00000000	00000000	.....				
000240	F6F6F0F7	00259DE8	010200FF	00000000	6607...Y.....				
000250	00000000	65320001	07050011	47000001	.....				
000260	07069205	C0404040	00000000	00000000	..k.{. ....				
000270	00000000	00000000	E2E5C3C4	D6C3E2C3	.....SVCDOCSC				
000280	D7D7F2F9	C1F800D5	00000000	00000000	PP29A8.N.....				
000290	00000000	00000000	00000000	00000000	.....				
0002A0	00000000	00000000	00000000	00000000	.....				
0002B0	00000000	00000000	00000000	00000000	.....				
0002C0	00000000	00000000	00000000	00000000	.....				
0002D0	00000000	00000000	C3D7D7F8	F9F2F9D5	.....CPP8929N				
0002E0	F6F5F3F2	F9F0F9F2	F0F0F0F0	F0F0F0F0	6532909200000000				
0002F0	F0F0F0F0	F0F1F6C3	F0F1F3F3	0000D5D5	0000016C0133..NN				
000300	00000000	00000000	00000000	00000000	.....				

Figure 12. Example of hexadecimal report, device formatting log (unformatted information)

## Example: Device formatting log template

Display Hexadecimal Report for Resource									
Name	Type	Model	Serial	Resource					
STORAGE	6607	070	00-68753	Name					
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F					
000180	-----	-----	-----	-----					
000190	-----	-----	-----	-----	-01				
0001A0	-----	-----	-----	-----					
0001B0	-----	-----	-----	-----					
0001C0	# errors	# errors	-----	-----					
	detected	logged	-----	-----					
0001D0	Device1	Device1	Device1	New Dev1					
	Type	Serial	UnitAddr	Type					
0001E0	New Dev1	IOP type	IOP	Cache					
	Serial	& model	Serial	Type/Mod					
0001F0	Cache	-----	-----	-----					
	Serial	-----	-----	-----					
000200	-----	-----	Device2	Device2					
	-----	-----	Type	Serial					
000210	Device2	New Dev2	New Dev2	IOP type					
	UnitAddr	Type	Serial	& model					
000220	IOP	Cache	Cache	-----					
	Serial	Type/Mod	Serial	-----					
000230	-----	-----	-----	-----					
	-----	-----	-----	-----					
000240	Device3	Device3	Device3	New Dev3					
	Type	Serial	UnitAddr	Type					
000250	New Dev3	IOP type	IOP	Cache					
	Serial	& model	Serial	Type/Mod					
000260	Cache	-----	-----	-----					
	Serial	-----	-----	-----					

Figure 13. Example of hexadecimal report, device formatting log template

## Example: Device formatting log (as formatted information for A or B IPL)

Display Additional Information for Resource				
Name	Type	Model	Serial Number	Resource Name
STORAGE	6607	070	00-68753	
Device Errors detected . . . . . :			4	
Device Errors logged . . . . . :			3	
Device . . . . . :		1	2	3
Unit Address . . . . . :	010400FF	010300FF	010200FF	
Type . . . . . :	6607	6607	6607	
Serial Number . . . . :	13068753	00071575	00259DE8	
New Device Information:				
Type . . . . . :	****	****	****	
Serial Number . . . . :	00000000	00000000	00000000	
I/O Processor Information:				
Type . . . . . :	6532	6532	6532	
Serial Number . . . . :	07050011	07050011	07050011	
Cache Adaptor Card Information:				
Type . . . . . :	4700	4700	4700	
Serial Number . . . . :	07069205	07069205	07069205	

Figure 14. Example of hexadecimal report, device formatting (as formatted information for type A or B IPL)

## Example: Array member formatting log (unformatted information)

Display Hexadecimal Report for Resource									
Name	Type	Model	Serial	Resource					
STORAGE	6532	001	00-50011	Name					
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F	EBCDIC				
000180	F4407800	65320001	90210210	0FFFFFFF	4	.....			
000190	00000000	00000000	00001400	12400002	.....	..			
0001A0	00000000	00000000	CA000003	00000000	.....				
0001B0	65320001	07050011	00000000	00000000	.....				
0001C0	F6F6F0F7	0025ED09	000200FF	000200FF	6607	.....			
0001D0	F6F6F0F7	00158135	000100FF	000100FF	6607	..a.....			
0001E0	F6F6F0F7	00259DE8	010200FF	00000000	6607	...Y.....			
0001F0	F6F6F0F7	00008326	010100FF	00000000	6607	..c.....			
000200	F6F6F0F7	00071575	010300FF	00000000	6607	.....			
000210	F6F6F0F7	13068753	010400FF	00000000	6607	..g.....			
000220	00000000	00000000	00000000	00000000	.....				
000230	00000000	00000000	00000000	00000000	.....				
000240	00000000	00000000	00000000	00000000	.....				
000250	00000000	00000000	00000000	00000000	.....				
000260	000000FF	00000004	00000000	00000000	.....				
000270	00000000	E2E5C3C4	D6C3E2C3	D7D7F2F9	...	SVCDOCSCPP29			
000280	C1F800D5	00000000	00000000	00000000	A8	N.....			
000290	00000000	00000000	00000000	00000000	.....				
0002A0	00000000	00000000	00000000	00000000	.....				
0002B0	00000000	00000000	00000000	00000000	.....				
0002C0	00000000	00000000	00000000	00000000	.....				
0002D0	00000000	C3D7D7C5	C1F0F2D5	F6F5F3F2	...	CPPEA02N6532			
0002E0	F9F0F2F1	F0F0F0F0	F0F0F0F0	F0F0F0F0	9021000000000000				
0002F0	F0F0C4F4	F0F1F3F3	0000D5D5	00000000	00D40133	..NN....			
000300	00000000	00000000	00000000	00000000	.....				

Figure 15. Example of hexadecimal report, array member formatting log (unformatted information)

## Example: Array member formatting log template

Display Hexadecimal Report for Resource									
Name	Type	Model	Serial Number				Resource Name		
STORAGE	6532	001	00-50011						
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F					
000180	-----	-----	-----	-----					
000190	-----	-----	-----	-----02					
0001A0	-----	-----	-----	-----					
0001B0	-----	-----	-----	-----					
0001C0	Member0	Member0	Expected	Current					
	Type	Serial	Address	Address					
0001D0	Member1	Member1	Expected	Current					
	Type	Serial	Address	Address					
0001E0	Member2	Member2	Expected	Current					
	Type	Serial	Address	Address					
0001F0	Member3	Member3	Expected	Current					
	Type	Serial	Address	Address					
000200	Member4	Member4	Expected	Current					
	Type	Serial	Address	Address					
000210	Member5	Member5	Expected	Current					
	Type	Serial	Address	Address					
000220	Member6	Member6	Expected	Current					
	Type	Serial	Address	Address					
000230	Member7	Member7	Expected	Current					
	Type	Serial	Address	Address					
000240	Member8	Member8	Expected	Current					
	Type	Serial	Address	Address					
000250	Member9	Member9	Expected	Current					
	Type	Serial	Address	Address					

Figure 16. Example of hexadecimal report, array member formatting log template

## Example: Array member formatting log (as formatted information for type A or B IPL)

Display Additional Information for Resource									
Name	Type	Model	Serial Number			Resource Name			
STORAGE	6532	001	00-50011						
Array Member	. . . . .	:	0	1	2	3	4		
Type	. . . . .	:	6607	6607	6607	6607	6607		
Serial Number	. . . . .	:	0025ED09	00158135	00259DE8	00008326	00071575		
Unit Address:									
Current	. . . . .	:	000200FF	000100FF	00000000	00000000	00000000		
Expected	. . . . .	:	000200FF	000100FF	010200FF	010100FF	010300FF		
Array Member	. . . . .	:	5	6	7	8	9		
Type	. . . . .	:	6607	****	****	****	****		
Serial Number	. . . . .	:	13068753	00000000	00000000	00000000	00000000		
Unit Address:									
Current	. . . . .	:	00000000	00000000	00000000	00000000	00000000		
Expected	. . . . .	:	010400FF	00000000	00000000	00000000	00000000		

Figure 17. Example of hexadecimal report, array member formatting (as formatted information for type A or B IPL)



## Example: Configuration formatting log (unformatted information)

Display Hexadecimal Report for Resource						
Name	Type	Model	Serial Number	Resource Name		
STORAGE	6532	001	00-50011			
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F	EBCDIC	
000180	50407800	65320001	90120210	0FFFFFFF	& .....	
000190	00000000	00000000	00001400	123C0003	.....	
0001A0	00000000	00000000	CA000003	00000000	.....	
0001B0	65320001	07050011	00000000	00000000	.....	
0001C0	00000000	00000000	47000001	07069205	.....k.	
0001D0	F8F6C7F8	F1F4F9C3	D7D7F8F9	F8F100D5	86G8149CPP8981.N	
0001E0	00000000	00000000	00000000	00000000	.....	
0001F0	00000000	00000000	00000000	00000000	.....	
000200	00000000	00000000	00000000	00000000	.....	
000210	00000000	00000000	00000000	00000000	.....	
000220	00000000	00000000	00000000	00000000	.....	
000230	C3D7D7C5	C1F0F2D5	F6F5F3F2	F9F0F1F2	CPPEA02N65329012	
000240	F0F0F0F0	F0F0F0F0	F0F0F0F0	F0F0C4F4	00000000000000D4	
000250	F0F1F3F4	0000E8D5	00000000	00000000	0134..YN.....	

Figure 18. Example of hexadecimal report, configuration formatting log (unformatted information)

## Example: Configuration formatting log template

Display Hexadecimal Report for Resource						
Name	Type	Model	Serial Number	Resource Name		
STORAGE	6532	001	00-50011			
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F		
000180	-----	-----	-----	-----		
000190	-----	-----	-----	-----03		
0001A0	-----	-----	-----	-----		
0001B0	Current	Current	Current	Current		
	IOP type	IOP	Cache	Cache		
	& model	serial	type	serial		
0001C0	Expected	Expected	Expected	Expected		
	IOP type	IOP	Cache	Cache		
	& model	serial	type	serial		

Figure 19. Example of hexadecimal report, configuration formatting log template

## Configuration formatting log (as formatted information for type A or B IPL)

Display Additional Information for Resource				
Name	Type	Model	Serial Number	Resource Name
STORAGE	6532	001	00-50011	
Configuration . . . . .		Current		Expected
I/O Processor Information:				
Type . . . . .	6532		0000	
Serial Number . . . .	07050011		00000000	
Cache Adaptor Card Information:				
Type . . . . .	0000		4700	
Serial Number . . . .	00000000		07069205	

Figure 20. Example of hexadecimal report, configuration formatting log (as formatted information for type A or B IPL)

## Example: Array addendum formatting log (unformatted information)

Display Hexadecimal Report for Resource									
Name	Type	Model	Serial	Resource					
STORAGE	2757	001	10-0322005	DC03					
Offset	0 1 2 3	4 5 6 7	8 9 A B	C D E F	EBCDIC				
000000	C5D3F0F5	000000A0	00E00180	82745D0F	EL05.....b.).				
000010	1FD78000	00002CE0	20100084	049F0000	.P.....d....				
000020	902F0000	11000000	00000000	00C70000	.....G..				
000030	F2F7F5F7	F0F0F140	F1F060F0	F3F2F2F0	2757001 10-03220				
000040	F0F50000	0000F2F7	F5F70002	00020000	05....2757.....				
000050	00200000	0002FFFF	FFFFFFFF	0004FFFF	.....				
000060	00000000	00000000	00000000	40404040	.....				
000070	40404040	40400000	00000000	00000000	.....				
000080	00000000	00000000	00000000	00000000	.....				
000090	00000000	00000000	00000000	00000000	.....				
0000A0	00000000	00000000	00000000	00000000	.....				
0000B0	00000000	00000000	00000000	40404040	.....				
0000C0	40404040	40404040	40404040	40404040					
0000D0	40404040	40404040	40404040	40404040					
0000E0	F2F7F5F7	F0F0F0F1	0000E2D3	C9C3C9D6	27570001..SLICIO				
0000F0	4040E5F5	D9F2D4F0	40400000	00000000	V5R2M0 .....				
000100	00B90000	00000000	000000C7	00000000	.....G....				
000110	00000000	00000000	00000000	00000000	.....				
000120	00000000	00000000	00000000	00000000	.....				
000130	00000000	00000000	00000000	00000000	.....				
000140	C4C3F0F3	40404040	40404040	40404040	DC03				
000150	D5C5C5C4	E5C1D3C9	C4D740D5	00070001	NEEDVALIDP N....				
000160	00000000	A0200007	00000000	00000000	.....				
000170	00000000	00000000	0003001E	000000A0	.....				
000180	A0407800	27570001	902F0200	4FFFFFFF	. ....*..... ...				
000190	00000000	00000000	00001400	623E0004	.....				
0001A0	F6F6F0F7	0026121D	410500FF	410500FF	6607.....				
0001B0	F6F6F0F7	00248B85	410400FF	410400FF	6607...e.....				
0001C0	F6F6F0F7	0014BE1F	410300FF	410300FF	6607.....				
0001D0	F6F6F0F7	0014C0F0	410200FF	410200FF	6607..{0.....				
0001E0	F6F6F0F7	001403C8	410100FF	410100FF	6607...H.....				
0001F0	F6F6F0F7	0014BEA4	410800FF	410800FF	6607...u.....				
000200	00000000	00000000	00000000	00000000	.....				
000210	00000000	00000000	00000000	00000000	.....				

Figure 21. Example of hexadecimal report, array addendum formatting log (unformatted information)

## Example: Array addendum log template

Display Hexadecimal Report for Resource									
Name	Type	Model	Serial Number	Resource Name					
STORAGE	6532	001	00-50011						
Offset	0	1	2	3	4	5	6	7	8 9 A B C D E F
000180	-----	-----	-----	-----					
000190	-----	-----	-----	-----	-04				
0001A0	Member10	Member10	Expected	Current					
	Type	Serial	Address	Address					
0001B0	Member11	Member11	Expected	Current					
	Type	Serial	Address	Address					
0001C0	Member12	Member12	Expected	Current					
	Type	Serial	Address	Address					
0001D0	Member13	Member13	Expected	Current					
	Type	Serial	Address	Address					
0001E0	Member14	Member14	Expected	Current					
	Type	Serial	Address	Address					
0001F0	Member15	Member15	Expected	Current					
	Type	Serial	Address	Address					
000200	Member16	Member16	Expected	Current					
	Type	Serial	Address	Address					
000210	Member17	Member17	Expected	Current					
	Type	Serial	Address	Address					

Figure 22. Example of hexadecimal report, array addendum formatting log template

## Example: Array addendum log (as formatted information for type A or B IPL)

Display Additional Information for Resource							
Name	Type	Model	Serial Number	Resource Name			
STORAGE	2757	001	10-0322005	DC03			
Array Member	. . . . .	:	10	11	12	13	14
Type	. . . . .	:	6607	6607	6607	6607	6607
Serial Number	. . . .	:	0026121D	00248B85	0014BE1F	0014C0F0	001403C8
Unit Address:							
Current	. . . . .	:	410500FF	410400FF	410300FF	410200FF	410100FF
Expected	. . . . .	:	410500FF	410400FF	410300FF	410200FF	410100FF
Array Member	. . . . .	:	15	16	17		
Type	. . . . .	:	6607	****	****		
Serial Number	. . . .	:	0014BEA4	00000000	00000000		
Unit Address:							
Current	. . . . .	:	410800FF	00000000	00000000		
Expected	. . . . .	:	410800FF	00000000	00000000		

Figure 23. Example of hexadecimal report, array addendum formatting (as formatted information for type A or B IPL)

Table 9. Format 01

Description	Hex offset
Device errors detected	0001D6 - 0001D9
Device errors logged	0001DA - 0001DD
Device 1 type	0001E6 - 0001E9
Device 1 serial number	0001EA - 0001ED
Device 1 unit address	0001EE - 0001F1
New device 1 type	0001F2 - 0001F5

Table 9. Format 01 (continued)

Description	Hex offset
New device 1 serial number	0001F6 - 0001F9
Device 1 IOA type and model	0001FA - 0001FD
Device 1 IOA serial number	0001FE - 000201
Device 1 Cache type and model	000202 - 000205
Device 1 Cache serial number	000206 - 000209
Device 2 type	00021E - 000221
Device 2 serial number	000222 - 000225
Device 2 unit address	000226 - 000229
New device 2 type	00022A - 00022D
New device 2 serial number	00022E - 000231
Device 2 IOA type and model	000232 - 000235
Device 2 IOA serial number	000236 - 000239
Device 2 cache type and model	00023A - 00023D
Device 2 cache serial number	00023E - 000241
Device 3 type	000256 - 000259
Device 3 serial number	00025A - 00025D
Device 3 unit address	00025E - 000261
New device 3 type	000262 - 000265
New device 3 serial number	000266 - 000269
Device 3 IOA type and model	00026A - 00026D
Device 2 IOA serial number	00026E - 000271
Device 3 cache type and model	000272 - 000275
Device 3 cache serial number	000276 - 000279

Table 10. Format 02

Description	Hex offset
Array member 0 type	0001D6 - 0001D9
Array member 0 serial number	0001DA - 0001DD
Array member 0 expected unit address	0001DE - 0001E1
Array member 0 current unit address	0001E2 - 0001E5
Array member 1 type	0001E6 - 0001E9
Array member 1 serial number	0001EA - 0001ED
Array member 1 expected unit address	0001EE - 0001F1
Array member 1 current unit address	0001F2 - 0001F5
Array member 2 type	0001F6 - 0001F9
Array member 2 serial number	0001FA - 0001FD
Array member 2 expected unit address	0001FE - 000201
Array member 2 current unit address	000202 - 000205
Array member 3 type	000206 - 000209
Array member 3 serial number	00020A - 00020D

Table 10. Format 02 (continued)

Description	Hex offset
Array member 3 expected unit address	00020E - 000211
Array member 3 current unit address	000212 - 000215
Array member 4 type	000216 - 000219
Array member 4 serial number	00021A - 00021D
Array member 4 expected unit address	00021E - 000221
Array member 4 current unit address	000222 - 000225
Array member 5 type	000226 - 000229
Array member 5 serial number	00022A - 00022D
Array member 5 expected unit address	00022E - 000231
Array member 5 current unit address	000232 - 000235
Array member 6 type	000236 - 000239
Array member 6 serial number	00023A - 00023D
Array member 6 expected unit address	00023E - 000241
Array member 6 current unit address	000242 - 000245
Array member 7 type	000246 - 000249
Array member 7 serial number	00024A - 00024D
Array member 7 expected unit address	00024E - 000251
Array member 7 current unit address	000252 - 000255
Array member 8 type	000256 - 000259
Array member 8 serial number	00025A - 00025D
Array member 8 expected unit address	00025E - 000261
Array member 8 current unit address	000262 - 000265
Array member 9 type	000266 - 000269
Array member 9 serial number	00026A - 00026D
Array member 9 expected unit address	00026E - 000271
Array member 9 current unit address	000272 - 000275

Table 11. Format 03

Description	Hex offset
Current I/O card type	0001C6 - 0001C7
Current I/O card serial number	0001CA - 0001CD
Current cache type	0001CE - 0001CF
Current cache serial number	0001D2 - 0001D5
Expected I/O card type	0001D6 - 0001D7
Expected I/O card serial number	0001DA - 0001DD
Expected cache type	0001DE - 0001DF
Expected cache serial number	0001E2 - 0001E5

Table 12. Format 04

Description	Hex offset
Array member 10 type	0001B6 - 0001B9
Array member 10 serial number	0001BA - 0001BD
Array member 10 expected unit address	0001BE - 0001C1
Array member 10 current unit address	0001C2 - 0001C5
Array member 11 type	0001C6 - 0001C9
Array member 11 serial number	0001CA - 0001CD
Array member 11 expected unit address	0001CE - 0001D1
Array member 11 current unit address	0001D2 - 0001D5
Array member 12 type	0001D6 - 0001D9
Array member 12 serial number	0001DA - 0001DD
Array member 12 expected unit address	0001DE - 0001E1
Array member 12 current unit address	0001E2 - 0001E5
Array member 13 type	0001E6 - 0001E9
Array member 13 serial number	0001EA - 0001ED
Array member 13 expected unit address	0001EE - 0001F1
Array member 13 current unit address	0001F2 - 0001F5
Array member 14 type	0001F6 - 0001F9
Array member 14 serial number	0001FA - 0001FD
Array member 14 expected unit address	0001FE - 000201
Array member 14 current unit address	000202 - 000205
Array member 15 type	000206 - 000209
Array member 15 serial number	00020A - 00020D
Array member 15 expected unit address	00020E - 000211
Array member 15 current unit address	000212 - 000215
Array member 16 type	000216 - 000219
Array member 16 serial number	00021A - 00021D
Array member 16 expected unit address	00021E - 000221
Array member 16 current unit address	000222 - 000225
Array member 17 type	000226 - 000229
Array member 17 serial number	00022A - 00022D
Array member 17 expected unit address	00022E - 000231
Array member 17 current unit address	000232 - 000235

Table 13. Format 11

Description	Hex offset
SCSI sense data	0001C4 - 0001E3
Worldwide ID of device with problem	0001E4 - 001EB
Unit address of device with problem	0001EC - 0001EF
SCSI command descriptor block	0001F4 - 000203
Problem description	000204 - 000223

Table 14. Format 12

Description	Hex offset
Current I/O card type and model	0001C4 - 0001CB
Current I/O card serial number	0001CC - 0001D3
Current I/O card worldwide ID	0001D4 - 0001DB
Current cache type and model	0001DC - 0001E3
Current cache serial number	0001E4 - 0001EB
Current cache worldwide ID	0001EC - 0001F3
Previous I/O card type and model	0001FC - 000203
Previous I/O card serial number	000204 - 00020B
Previous I/O card worldwide ID	00020C - 000213
Previous cache type and model	000214 - 00021B
Previous cache serial number	00021C - 000223
Previous cache worldwide ID	000224 - 00022B

Table 15. Format 13

Description	Hex offset
Device errors detected	0001FC - 0001FF
Device errors logged	000200 - 000203
Device 1 type	000204 - 000207
Device 1 serial number	000208 - 00020F
Device 1 worldwide ID	000210 - 000217
Device 1 unit address	000218 - 00021B
New device 1 type	00021C - 00021F
New device 1 serial number	000220 - 000227
New device 1 worldwide ID	000228 - 00022F
Device 1 IOA type and model	000230 - 000237
Device 1 IOA serial number	000238 - 00023F
Device 1 IOA worldwide ID	000240 - 000247
Device 1 cache type and model	000248 - 00024F
Device 1 cache serial number	000250 - 000257
Device 1 cache worldwide ID	000258 - 00025F
Device 2 type	000260 - 000263
Device 2 serial number	000264 - 00026B
Device 2 worldwide ID	00026C - 000273
Device 2 unit address	000274 - 000277
New device 2 type	000278 - 00027B
New device 2 serial number	00027C - 000283
New device 2 worldwide ID	000284 - 00028B
Device 2 IOA type and model	00028C - 000293
Device 2 IOA serial number	000294 - 00029B
Device 2 IOA worldwide ID	00029C - 0002A3

Table 15. Format 13 (continued)

Description	Hex offset
Device 2 cache type and model	0002A4 - 0002AB
Device 2 cache serial number	0002AC - 0002B3
Device 2 cache worldwide ID	0002B4 - 0002BB
Device 3 type	0002BC - 0002BF
Device 3 serial number	0002C0 - 0002C7
Device 3 worldwide ID	0002C8 - 0002CF
Device 3 unit address	0002D0 - 0002D3
New device 3 type	0002D4 - 0002D7
New device 3 serial number	0002D8 - 0002DF
New device 3 worldwide ID	0002E0 - 0002E7
Device 3 IOA type and model	0002E8 - 0002EF
Device 3 IOA serial number	0002F0 - 0002F7
Device 3 IOA worldwide ID	0002F8 - 0002FF
Device 3 cache type and model	000300 - 000307
Device 3 cache serial number	000308 - 00030F
Device 3 cache worldwide ID	000310 - 000317

Table 16. Format 14

Description	Hex offset
RAID number	000204 - 00020B
Array member 0 type	00020C - 00020F
Array member 0 serial number	000210 - 000217
Array member 0 worldwide ID	000218 - 00021F
Array member 0 expected unit address	000220 - 000223
Array member 0 current unit address	000224 - 000227
Array member 1 type	000228 - 00022B
Array member 1 serial number	00022C - 000233
Array member 1 worldwide ID	000234 - 00023B
Array member 1 expected unit address	00023C - 00023F
Array member 1 current unit address	000240 - 000243
Array member 2 type	000244 - 000247
Array member 2 serial number	000248 - 00024F
Array member 2 worldwide ID	000250 - 000257
Array member 2 expected unit address	000258 - 00025B
Array member 2 current unit address	00025C - 00025F
Array member 3 type	000260 - 000263
Array member 3 serial number	000264 - 00026B
Array member 3 worldwide ID	00026C - 000273
Array member 3 expected unit address	000274 - 000277
Array member 3 current unit address	000278 - 00027B



Table 16. Format 14 (continued)

Description	Hex offset
Array member 4 type	00027C - 00027F
Array member 4 serial number	000280 - 000287
Array member 4 worldwide ID	000288 - 00028F
Array member 4 expected unit address	000290 - 000293
Array member 4 current unit address	000294 - 000297
Array member 5 type	000298 - 00029B
Array member 5 serial number	00029C - 0002A3
Array member 5 worldwide ID	0002A4 - 0002AB
Array member 5 expected unit address	0002AC - 0002AF
Array member 5 current unit address	0002B0 - 0002B3
Array member 6 type	0002B4 - 0002B7
Array member 6 serial number	0002B8 - 0002BF
Array member 6 worldwide ID	0002C0 - 0002C7
Array member 6 expected unit address	0002C8 - 0002CB
Array member 6 current unit address	0002CC - 0002CF
Array member 7 type	0002D0 - 0002D3
Array member 7 serial number	0002D4 - 0002DB
Array member 7 worldwide ID	0002DC - 0002E3
Array member 7 expected unit address	0002E4 - 0002E7
Array member 7 current unit address	0002E8 - 0002EB
Array member 8 type	0002EC - 0002EF
Array member 8 serial number	0002F0 - 0002F7
Array member 8 worldwide ID	0002F8 - 0002FF
Array member 8 expected unit address	000300 - 000303
Array member 8 current unit address	000304 - 000307
Array member 9 type	000308 - 00030B
Array member 9 serial number	00030C - 000313
Array member 9 worldwide ID	000314 - 00031B
Array member 9 expected unit address	00031C - 00031F
Array member 9 current unit address	000320 - 000323
Array member 10 type	000324 - 000327
Array member 10 serial number	000328 - 00032F
Array member 10 worldwide ID	000330 - 000337
Array member 10 expected unit address	000338 - 00033B
Array member 10 current unit address	00033C - 00033F
Array member 11 type	000340 - 000343
Array member 11 serial number	000344 - 00034B
Array member 11 worldwide ID	00034C - 000353
Array member 11 expected unit address	000354 - 000357
Array member 11 current unit address	000358 - 00035B

Table 16. Format 14 (continued)

Description	Hex offset
Array member 12 type	00035C - 00035F
Array member 12 serial number	000360 - 000367
Array member 12 worldwide ID	000368 - 00036F
Array member 12 expected unit address	000370 - 000373
Array member 12 current unit address	000374 - 000377
Array member 13 type	000378 - 00037B
Array member 13 serial number	00037C - 000383
Array member 13 worldwide ID	000384 - 00038B
Array member 13 expected unit address	00038C - 00038F
Array member 13 current unit address	000390 - 000393
Array member 14 type	000394 - 000397
Array member 14 serial number	000398 - 00039F
Array member 14 worldwide ID	0003A0 - 0003A7
Array member 14 expected unit address	0003A8 - 0003AB
Array member 14 current unit address	0003AC - 0003AF
Array member 15 type	0003B0 - 0003B3
Array member 15 serial number	0003B4 - 0003BB
Array member 15 worldwide ID	0003BC - 0003C3
Array member 15 expected unit address	0003C4 - 0003C7
Array member 15 current unit address	0003C8 - 0003CB
Array member 16 type	0003CC - 0003CF
Array member 16 serial number	0003D0 - 0003D7
Array member 16 worldwide ID	0003D8 - 0003DF
Array member 16 expected unit address	0003E0 - 0003E3
Array member 16 current unit address	0003E4 - 0003E7
Array member 17 type	0003E8 - 0003EB
Array member 17 serial number	0003EC - 0003F3
Array member 17 worldwide ID	0003F4 - 0003FB
Array member 17 expected unit address	0003FC - 0003FF
Array member 17 current unit address	000400 - 000403

Table 17. Format 17

Description	Hex offset
Associated IOA type and model	0001C4 - 0001CB
Associated IOA serial number	0001CC - 0001D3
Associated IOA worldwide ID	0001D4 - 0001DB
Type of adapter connection (1 = Dual storage IOA pair, 2 = Storage IOA to auxiliary cache)	0001DC - 0001DC
Problem description	0001E0 - 00021F

Table 18. Format 20

Description	Hex offset
Problem description	0001C4 - 000203
Path 1 adapter port	00020A
Path active (00 = Unknown, 01 = Yes, 10 = No, 11 = Unknown)	00020D, bit 0 - 1
Path state (0000 = Unknown, 0001 = Operational, 0010 = Degraded, 0011 = Failed)	00020D, bit 4 - 7
Node 1 port type (0000 = Empty, 0001 = Adapter, 0010 = Expander, 0011 = Device, 0100 = LUN)	000210, bit 0 - 3
Node 1 status (0000 = Operational, 0001 = Degraded, 0010 = Failed, 0011 = Suspect, 0100 = Missing, 0101 = Not valid)	000210, bit 4 - 7
Node 1 phy	000212
Node 1 information (1000 = 1.5 Gbps, 1001 = 3.0 Gbps)	000213, bit 4 - 7
Path 1 node 1 SAS address	000214 - 00021B
Additional nodes are self defining	

## Reclaiming I/O processor cache storage

Use this procedure to reclaim I/O processor (IOP) cache storage.

1. If you are not already using dedicated service tools (DST), perform an IPL to DST. If you cannot perform a type A or B IPL, perform a type D IPL from removable media.

Did you get to DST with a Type D IPL?

- **No:** Continue with the next step.
- **Yes:** Perform the following steps:
  - a. Select **Work with disk units** → **Reclaim IOP cache storage**.
  - b. Follow the on-line instructions to reclaim cache storage. The system will automatically perform an IPL to a Disk Configuration Attention Report or a Disk Configuration Warning Report display. Select the option to display the report. Because the Reclaim Cache Storage was selected after a type D IPL, the system will now require another Reclaim Cache Storage to be performed.

2. Select **Work with disk units** → **Work with disk unit recovery** → **Reclaim IOP Cache Storage**.
3. Follow the online instructions to reclaim cache storage. Depending on the reason for performing the Reclaim IOP Cache procedure, there may be a message requiring the ASP be cleared before performing this option, or a message stating the number of lost sectors.

**Note:** If there are lost sectors, some objects may be damaged. The customer may have to load the damaged objects again.

When the IOP performs a reset or reload, if there is a storage IOA attached that is running the local load source, Cxxx xxxx codes will be displayed in the system control panel. The DST console may then have a blank screen with 01B displayed on the system control panel for up to 15 minutes before it is restored. **This ends the procedure.**

## Dedicated service tools

Dedicated service tools (DST) is used to service Licensed Internal Code, work with disk units, work with configuration and resources, verify devices and communications, and display logs on the system.

DST operates in stand-alone, limited, and full paging environments. The DST tools and functions vary depending on the paging environment and the release level of the operating system.

## Dedicated service tools requirements

**Note:** It is a requirement to change the password the first time anyone signs on to DST or SST. The authorized service provider needs to give the new (changed) password to the customer or have the customer change the password.

To use DST, you must have the following items:

- The disk that contains the Licensed Internal Code (the load-source disk).

**Note:** When you perform an alternate initial program load (IPL) to DST, you do not need the load-source disk.

- An operational workstation on bus 1 as either a primary console or an operations console.
- One workstation capable of communicating with each system partition.
- A valid service tools user ID and password to sign on to DST. IBM supplies service tools user IDs that have different levels of privileges.

Attach the printer to the workstation I/O processor or storage media unit that is performing the service function. The printer that is used with DST for service tool output must be an SCS-type data stream printer.

## Accessing dedicated service tools

This information covers how to start dedicated service tools (DST).

You can start DST in the following ways:

- Performing an IPL to DST (see “Performing an IPL to dedicated service tools” on page 52).
- Pressing the System Request key while the system is operational.
- Selecting function 21 while the system is operational (see “Selecting function 21 from the control panel”).

This is available from the primary partition only.

- Performing an alternate IPL to DST (type D IPL) (see “Performing an alternate IPL to DST (type D IPL)” on page 53).

After performing a type D IPL on a primary partition, the first step in DST must be configuration recovery.

- Pressing F16, which is not displayed, while in DST debug mode during a step-mode IPL.

## Selecting function 21 from the control panel

This topic provides detailed instructions on selecting function 21 while the system is operational.

Perform the following steps:

1. Select control panel function 21 (Make DST available).

Select manual mode, then push the increment (↑) or decrement (↓) button on the control panel until 21 appears in the Function/Data display. Press the Enter button on the control panel.

### Notes:

- a. If you enter Function 21 and the primary console is powered off or not usable, reference code A600 500x is shown on the control panel. Enter Function 21 again to force the DST Sign On display to be shown on one of the alternative consoles.
2. Primary console or alternate console shows the DST sign-on display.

**Note:** For more information on how to identify the primary console, see “Primary consoles or alternative consoles” on page 5.

3. Sign on to DST.

Type QSRV as the valid user ID and get the password from the customer. If the customer has changed the full DST authority user ID or password, ask the customer for the correct values.

**Note:**

- If prompted for a password, be sure to give the new (changed) password to the customer.
- Since V5R1 of the operating system, you are limited to three sign-on attempts to DST. After three unsuccessful attempts, the service tools user ID is disabled. The system administrator with QSECOFR authority needs to reset the ID.

The Use Dedicated Service Tools (DST) display is shown. The system is in the full paging environment. **This ends the procedure.**

## Control panel function codes on the Hardware Management Console

Control panel function codes are used to indicate status and function options for a system that is managed by a Hardware Management Console (HMC).

If you are managing the system with the HMC, use the HMC to perform control panel functions. Servers without physical panels require the HMC to perform the equivalent control panel functions. The HMC affects the physical control panel in the following ways:

- Except for some limited auto-platform override function, such as auto power on restart and timed power on, the system operating mode value no longer has meaning.
- The operating system IPL-type value is disabled in functions 01 and 02.
- Functions 11 - 19 do not display partition system reference codes (SRCs). They continue to display SRCs from the platform Licensed Internal Code.
- Functions 21, 22, 34, and 65 - 70 are not selectable on the physical control panel.

The following table lists the control panel functions that you can perform on the HMC.

Function	Description
01	1. Displays the currently selected IPL type (and logical key mode on some system types). 2. Displays the currently selected IPL speed override for the next IPL.  This function is available in both normal and manual operating mode.
02	Performs a slow boot. This function is available in both normal and manual operating mode.
03	Performs a re-IPL. The IPL uses the selected IPL options. This function is available only in manual operating mode and when the system power is on.
04	Performs a lamp test; all displays and indicators are switched on. This function is available in both normal and manual operating mode.
05 - 06	Reserved.
07	Allows you to set SPCN configuration IDs. This function is available only in manual operating mode when the system is in standby.
08	Causes a fast power off. This function is available only when the system is in manual operating mode and the system power is on.
09 - 10	Reserved.
11 - 19	Displays a system reference code (SRC) on the control panel. These functions are available in both normal and manual operating mode when an SRC is available.
20	Displays the machine type, model, processor feature code, processor class indicator, and IPL path description. This function is available in both normal and manual operating mode.

Function	Description
21	Causes the Use Dedicated Service Tool display to appear on the system console. This function is available only in the manual operating mode and when activated by the operating system.
22	Forces a partition dump. This function is available only in the manual operating mode and when activated by the operating system.
23 - 24	Reserved.
25 - 26	Not applicable.
27 - 29	Reserved.
30	Displays system unit FSP IP address and location. This function is available only in the manual operating mode and when activated by the FSP.
31 - 33	Reserved.
34	Retries the partition dump. This function is available only in the manual operating mode and when activated by the operating system.
35 - 41	Reserved.
42 - 43	Not applicable.
44 - 49	Reserved.
50 - 52	Reserved.
53	Unconfigures an intermittently failing processor (repeat GARD function). This function is available only in the manual operating mode.
54	Reserved.
55	Platform dump override. This function is available only in the manual operating mode when activated by the FSP and when CE scroll ranges are enabled.
56-62	Reserved.
63	Progress indicator history. This function is available only in the manual operating mode.
64	Diagnostic status SRC trace. This function is available only in the manual operating mode.
65	Deactivates remote service. This function is available only in the manual operating mode when activated by the operating system and when CE scroll ranges are enabled.
66	Activates remote service. This function is available only in the manual operating mode when activated by the operating system and when CE scroll ranges are enabled.
67	Disk unit I/O processor (IOP) reset/reload is enabled only by specific disk unit SRCs. This function is available only in the manual operating mode when activated by the operating system and when CE scroll ranges are enabled.
68	Turns off power domains during concurrent maintenance of IOPs and IOAs. This function is available only in the manual operating mode when activated by the operating system and when CE scroll ranges are enabled.
69	Turns on power domains during concurrent maintenance of IOPs and IOAs. This function is available only in the manual operating mode when activated by the operating system and when CE scroll ranges are enabled.
70	Dump service processor control storage. These functions initiate an I/O processor (IOP) dump; enabled by specific error conditions. This function is available only in the manual operating mode when activated by the operating system and when CE scroll ranges are enabled.

## Performing an IPL to dedicated service tools

Use this procedure to perform an initial program load (IPL) to dedicated service tools (DST).

This procedure is for the entire system, or if logical partitions are installed, for the primary partition.

Perform the following steps:

1. Select a type B IPL in manual mode.

**Attention:** For systems with logical partitions, performing an IPL on the primary partition causes the secondary partitions to be powered down. Failing to power down these secondary partitions causes an abnormal power-down on the secondary partitions and the possible loss of data.

2. Perform one of the following options:

- **If there is a problem log entry after powering on the system**, perform a delayed power-off. (This is the data for problem analysis.) When the system is off, press the Power button on the control panel to perform an IPL. Select Function 03 if the delayed power-off takes longer than 40 minutes to complete.

**Attention:** Performing function 03 might cause damage to objects, and it might also cause data loss.

- **If there is an attention light after powering on the system**, use the increment (↑) or decrement (↓) button to select control panel function 03. Press Enter on the control panel to perform an IPL.
- **When the system is powered off**, press the Power button on the control panel to perform an IPL. The IPL or Install the System display is shown on the primary console.

3. Select the Use Dedicated Service Tools option. The DST Sign On display is shown.

For more information on how to identify the primary console, see “Primary consoles or alternative consoles” on page 5.

4. Sign on to DST with a valid user ID and password.

**Remember:** Enter a valid user ID and get the password from the customer. If the customer has changed the full DST authority, user ID, or password, ask the customer for the correct values.

**Note:**

- If prompted for a password, be sure to give the new (changed) password to the customer.
- You are limited to three sign-on attempts to DST. After three unsuccessful attempts, the service tools user ID is disabled. A user ID with a service tool security privilege must reset the ID.

The Use Dedicated Service Tools (DST) display is shown.

**Restriction:** The system is in the limited paging environment.

**This ends the procedure.**

## Performing an alternate IPL to DST (type D IPL)

You can use this procedure to perform a type D initial program load (IPL).

An alternate IPL to DST is called a type D IPL or a stand-alone IPL by service representatives.

To perform a type D IPL, complete the following steps:

1. To use an alternate installation device, select the DST option Work with alternate installation device. This option is available in DST from control panel function 21 or a type D IPL.
2. Determine the removable media unit or units for an alternate IPL. Power on the removable media units.
3. Place the media that contains the Licensed Internal Code (first tape of the customer's system save, the SAVLIC, ISMD tapes, or optical device) in the removable media units. Load the media and make the media units ready. See the device information for instructions on loading the removable media.
4. Power off the system. If the system is running, end all jobs and perform the power-down procedure.
5. Select a type D IPL in manual mode.

For information on how to select IPL options, see “IPL type, mode, and speed options” on page 55.

6. Power on the console.

For more information on how to identify the primary console, see “Primary consoles or alternative consoles” on page 5.



7. Load the media and make the media unit ready.
8. Press the Power button to power on the system.

**Notes:**

- a. Some types of removable media units automatically reset. In this condition, SRC A100 1933 (Media device not ready) might be displayed.
  - b. If the installation device is an optical device, you might need to start the system again. This action will make the unit ready.  
`pwrdownsys restart(*yes) IPL(D)`
  - c. If the installation device is a tape unit, system reference code (SRC) A1001933 is displayed until the device automatically makes itself ready.
  - d. The removable media becomes active. There is a delay while the system loads information from the load source. While running a process, the system continuously updates SRCs on the control panel that show the status.
9. Wait for the Install Licensed Internal Code display to shown on the console. The wait varies depending on the speed of the removable media unit and the processor speed for the specific system model.

**Notes:**

- a. If SRC A600 500x is displayed on the control panel, the system was not able to locate the console. Ensure that the console is powered on (repair if necessary). Select F21 (function 21) on the control panel (see “Selecting function 21 from the control panel” on page 50) to make DST available.
- b. If an SRC other than A600 500x is displayed on the control panel, go to “Starting Point for All Problems” in the problem analysis information for your system.

The Install Licensed Internal Code display appears on the console.

- If you want to access DST, select the Work with Dedicated Service Tools (DST) option and continue to the next step of this procedure.
- If you want to install or restore Licensed Internal Code, select the Install Licensed Internal Code option and continue with the installation or restore instructions.
- If you want to define the device from which the system Licensed Internal Code should be installed, select the Define alternate installation device option. This option also enables or disables the alternate installation device.

10. Reapply PTFs.

11. Sign on to DST as QSRV.

Type QSRV as the valid user ID and get the password from the customer. If the customer has changed the full DST authority user ID or password, ask the customer for the correct values.

**Note:**

- a. If prompted for a password, be sure to give the new (changed) password to the customer.
- b. You are limited to three sign-on attempts to DST. After three unsuccessful attempts, the service tools user ID is disabled. The system administrator with QSECOFR authority needs to reset the ID.

The Use Dedicated Service Tools (DST) display is shown. Options are limited because the system is in the stand-alone environment. **This ends the procedure.**

## Starting a service tool

Use this procedure to start a service tool.

Select this option from the Use Dedicated Service (DST) Tools display.



**Note:** The Start a service tool option is also available from the System Service Tools (SST) display.

The following options are available from the Start a Service Tool display:

- Display/alter dump
- Licensed Internal Code log
- Licensed Internal Code trace
- Hardware service manager
- Main storage dump manager
- Product activity log
- Operator panel functions
- Performance data collector (available only on systems with SST)

## **IPL type, mode, and speed options**

Set the initial program load (IPL) options from function 02 on the control panel. To permanently change the IPL speed use the CHGIPLA command.

**Note:** Systems managed by the Hardware Management Console (HMC) should use the HMC to perform control panel functions.

- Use function 01 to display the current IPL option, including IPL speed. This is the option and speed that the system will use at the next IPL.
- Use the HDWDIAG (hardware diagnostics) parameter of the CHGIPLA command to permanently change the IPL speed. The values are: The default shipped value \*MIN (minimal) for fast diagnostics and \*ALL for all (full) diagnostics.

## **IPL speed recommendations**

- Use CHGIPLA \*MIN, or function 02 F or V=F for most IPLs (to perform a fast IPL that uses minimum diagnostics).
- Use CHGIPLA \*ALL, or function 02 S or V=S, if you change hardware or suspect an intermittent hardware failure (to perform a slow IPL that uses all diagnostics).
- Use CHGIPLA \*ALL, or function 02 S or V=S during the first IPL. You can set this at the panel with Function 02; it affects only the one IPL because the next IPL will again pick up the value set with CHGIPLA.

---

## **Printing the system configuration list and details of the system bus, main storage, or processor**

This information describes the system configuration list and how to print the list.

The System Configuration List printout consists of the following sections (80-character width):

1. System information
  - System type, model, serial number, and release
2. Packaging hardware resource information
  - Resource name, type-model, serial number, part number, frame ID, card position, and device position
3. Logical hardware resource information
  - Resource name, type-model, serial number, and logical address
4. Legend
  - Descriptions of the indicators
  - Logical address format information

132-character width printouts consist of the following:

- Description
- Type-module
- Serial number
- Location data
  - Frame ID
  - Device position
  - Card position
- Logical resource name
- Part number
- Logical address

You can sort the printout by location or by logical address data.

## Printing the system configuration list

To print the system configuration list, perform the following procedure:

1. On the Start a Service Tool display, select the Hardware service manager option.
2. Press F6 (Print) on the Hardware Service Manager display to request a printout. The Print Format Options display is shown. You can sort the information by location or logical address.

**Note:** The logical address sort and location sort are available only in 132-character width.

3. Look for the system configuration list printout.

### Notes:

- a. If you press F6 (Print) from a display other than the Hardware Service Manager display, only the information that appears on the display will print.
- b. Use the last page of the printout (the legend) to assist in interpreting the information.
- c. The logical and packaging hardware resources have unique resource names.
- d. You can also view logical address information from the product activity log.

**This ends the procedure.**

To collect more details on the information that is listed on the system configuration list, press F6 (Print) from a display other than the Hardware Service Manager display.

**Note:** The entire system configuration list will not print. Only the information that appears on the display will print.

## Printing the details of the system bus, main storage, or processor

For details (that include descriptions) of the system bus, main storage, or processor, perform the following procedure:

1. Select the Logical hardware resources option on the Hardware Service Manager display.
2. On the Logical Hardware Resources display, select one of the following options to display details:
  - System bus resources
  - Processor resources
  - Main storage resources
  - High-speed link resources
3. Press F6 (Print) to print the information.

This ends the procedure.

---

## Hardware service manager

Use the hardware service manager (HSM) to display and work with system hardware.

You can select the hardware service manager option from the Start a Service Tool display. With HSM you can display and work with system hardware (logical or packaging) and debug input/output processors (IOP) and devices.

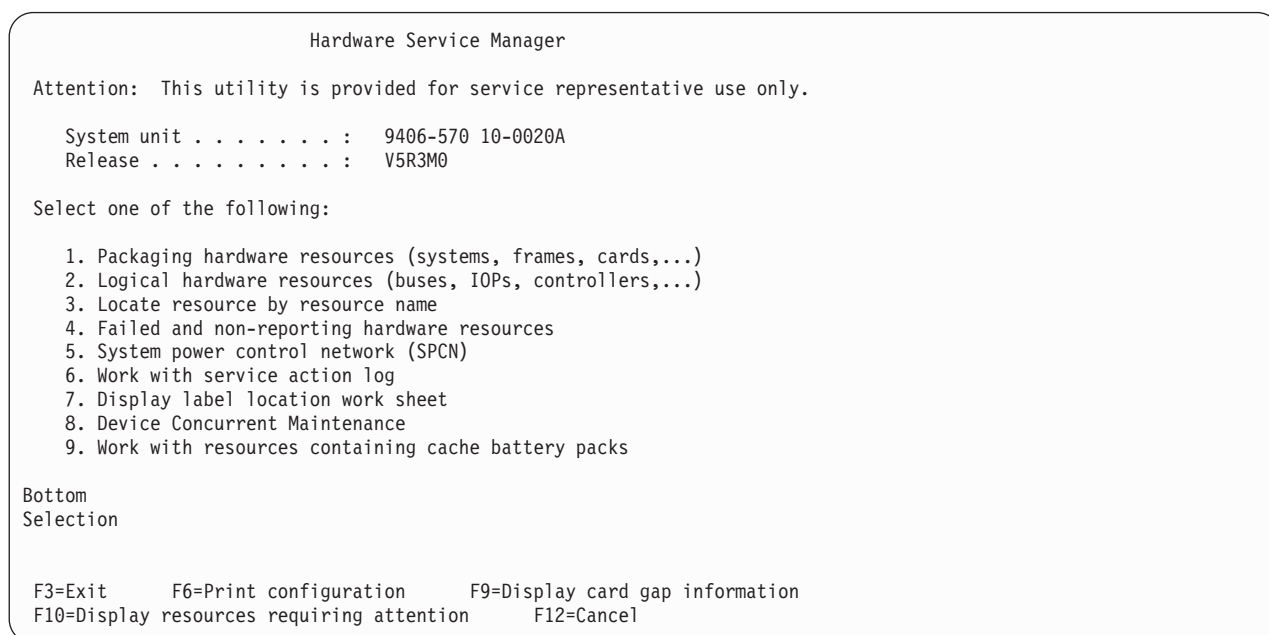


Figure 24. Example of Hardware Service Manager display (in the full and limited paging environments)

**Note:** The system power control network (SPCN) option appears only on systems with SPCN.

The Hardware Service Manager display provides the following information:

- System type, model, and serial number
- Licensed Internal Code and operating system release information
- A list of the hardware service manager options

The options vary depending on the system type and paging environment.

- Function keys

The function keys vary depending on the display that is shown.

---

## Managing the Advanced System Management Interface

This information describes how to manage the Advanced System Management Interface (ASMI).

The ASMI is the interface to the service processor that is required to perform general and administrator-level service tasks, such as reading service processor error logs, reading vital product data, setting up the service processor, and controlling the system power.

The ASMI is sometimes referred to as the service processor menus.

Use the following information to help you manage the ASMI:

## Accessing the Advanced System Management Interface

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

### Accessing the Advanced System Management Interface using a Web browser

You can connect a PC or notebook computer to the server to access the Advanced System Management Interface (ASMI). The Web interface to the ASMI is available during all phases of system operation including the initial program load (IPL) and run time.

The Web interface to the ASMI is accessible through Microsoft Internet Explorer 6.0, Netscape 7.1, Opera 7.23, or Mozilla Firefox running on a PC or notebook computer that is connected to the service processor. The Web interface is available during all phases of system operation including the IPL and run time. However, some of the menu options in the Web interface are unavailable during IPL or run time to prevent usage or ownership conflicts if the system resources are in use during that phase.

**Note:** To perform general and administrator-level service tasks, such as reading service processor error logs, reading vital product data, setting up the service processor, and controlling the system power, you must set up the ASMI.

The following instructions apply to systems that are not connected to an HMC. If you are managing the server using an HMC, see “Accessing the Advanced System Management Console using the HMC” on page 60.

To set up the Web browser for direct or remote access to the ASMI, complete the following tasks.

1. Connect the power cord from the server to a power source, and wait for the control panel to display 01.
2. Select a PC or notebook computer that has Microsoft Internet Explorer 6.0, Netscape 7.1, or Opera 7.23 for connection to your server.

If you do not plan to connect your server to your network, this PC or notebook computer will be your ASMI console.

If you plan to connect your server to your network, this PC or notebook computer will be temporarily connected directly to the server only for setup purposes. After setup, you can use any PC or notebook computer on your network that is running Internet Explorer 6.0, Netscape 7.1, or Opera 7.23 as your ASMI console.

3. Connect an Ethernet cable from the PC or notebook computer to the Ethernet port labeled HMC1 on the back of the managed system. If HMC1 is occupied, connect an Ethernet cable from the PC or notebook computer to the Ethernet port labeled HMC2 on the back of the managed system.
4. Configure the Ethernet interface on the PC or notebook computer to an IP address and subnet mask within the same subnet as the server so that your PC or notebook computer can communicate with the server. Use the following table to help you determine these values:

*Table 19. PC or notebook computer network configuration information*

Server connector	Subnet mask	IP address
HMC1	255.255.255.0	169.254.2.147
HMC2	255.255.255.0	169.254.3.147

For example, if you connected your PC or notebook computer to HMC1, the IP address for your PC or notebook computer could be 169.254.2.1 and the subnet mask would be 255.255.255.0. Set the gateway IP address to the same IP address as the PC or notebook computer.

5. Use Table 19 to determine the IP address of the Ethernet port that your PC or notebook computer is connected to, and type the IP address in the **Address** field of your PC's or notebook computer's Web browser. For example, if you connected your PC or notebook computer to HMC1, type `https://169.254.2.147` in your PC's or notebook computer's Web browser.

6. When the login display appears, enter one of the following default user IDs and passwords.

Table 20. Default user IDs and passwords for the Web interface

User ID	Password
general	general
admin	admin

7. Change the default password when prompted.
8. If you plan to connect your PC or notebook computer to your network, complete the following steps:
- From the navigation area, expand **Network Services**.
  - Click **Network Configuration**. Do one of the following:
    - If your PC or notebook computer is connected to HMC1, fill in the section labeled Network interface eth0.
    - If your PC or notebook computer is connected to HMC2, fill in the section labeled Network interface eth1.
  - Ensure that the following fields are filled in correctly.

Table 21. Fields and values for network configuration

Field	Value
Configure this interface?	Selected
Type of IP address	Static
IP address	This is the same address that you used in step 5 on page 58.
Subnet mask	255.255.255.0

- Click **Save Settings**.
  - Disconnect your PC or notebook computer from the server.
  - Connect the server to your company network.
  - Go to any PC or notebook computer on your company network that is running Internet Explorer 6.0, Netscape 7.1, or Opera 7.23, and type the following in the Address field of your browser:  
`https://host name.domain name`  
  
where *host name* and *domain name* are the host name and domain name you entered when completing step 8c.
  - Log in to the ASMI.
9. Set the time of day on the server.

## Accessing the Advanced System Management Interface using an ASCII terminal

You can connect the ASCII console to the server to access the Advanced System Management Interface (ASMI).

The ASCII interface to the ASMI provides a subset of the Web interface functions. The ASCII console is available only when the system is in platform-standby state. It is not available during the initial program load (IPL) or run time. The ASMI on an ASCII console is not available during some phases of system operation, such as the initial program load (IPL) and run time.

To set up the ASCII console for direct or remote access to the ASMI, complete the following tasks:

- Complete the following steps to cable an ASCII console, or equivalent, to the server:  
Using a cable equipped with a null modem, connect the ASCII console to system connector S1 1 on the back of the server or to system port FS1 on the control panel using an RJ-45 connector.

**Note:** Both system port 1 connections are not available simultaneously; when one is connected, the other is deactivated.

2. Connect the power cord from the server to a power source.
3. Wait for the control panel to display 01.
4. Ensure that your ASCII console is set to the following general attributes.

These attributes are the default settings for the diagnostic programs. Be sure your terminal is set to these attributes before proceeding to the next step.

General setup attributes	3151 /11/31/41 settings	3151 /51/61 settings	3161 /64 settings	Description
Line speed	19,200	19,200	19,200	Uses the 19,200 (bits per second) line speed to communicate with the system unit.
Word length (bits)	8	8	8	Selects 8 bits as a data word length (byte).
Parity	No	No	No	Does not add a parity bit and is used together with the word length attribute to form the 8-bit data word (byte).
Stop bit	1	1	1	Places a bit after a data word (byte).

5. Press a key on the ASCII console to allow the service processor to confirm the presence of the ASCII console.
6. When the login display is shown, enter one of the following default user IDs and passwords.

*Table 22. Default user IDs and passwords for the Web interface*

User ID	Password
general	general
admin	admin

7. Change the default password when you are prompted.
8. Set the time of day on the server.

## Accessing the Advanced System Management Console using the HMC

You can access the Advanced System Management Console (ASMI) through the Hardware Management Console (HMC) interface.

To access the ASMI using the HMC, complete the following steps:

1. Ensure that the HMC is set up and configured.
2. In the navigation area, select the server.
3. Expand and click **Operations**.
4. In the content area, click **Advanced System Management (ASMI)**.
5. Log on to the ASMI using the administrator user ID and password.

## Displaying error and event logs

You can view error and event logs that are generated by various service processor firmware components. The content of these logs can be useful in solving hardware or server firmware problems.

To perform the display operation, your authority level must be one of the following values:

- General
- Administrator
- Authorized service provider

Informational and error logs can be viewed by all authority levels. Hidden error logs can be viewed by authorized service providers.

The following table shows error log types that might be displayed, the conditions that make an error log specific to that error log type, and the user authority level that you need to view specific types of error logs.

Error log type	Conditions		User availability
	Severity	Action	
Informational logs	Informational	Report to operating system (OS) but not hidden	Available to all users
Error logs	Not informational	Report to OS but not hidden	Available to all users
Hidden logs	Not informational and informational	Report to OS, hidden, or both	Available only to the authorized service provider and users with higher authority.

To view error and event logs in summary or full detailed format, 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 Service Aids** and click **Error/Event Logs**. If log entries exist, a list of error and event log entries is displayed in a summary view.
3. To view the full detail format of any of the logs listed, select the log's corresponding check box and click **Show details**. When multiple logs are selected, any action applies to each selected log. The full detail information might span several pages. The contents and layout of the full detail output is defined by the event or error logging component.
4. Click **Mark as reported** to mark platform error entries whose underlying causes have been resolved. By doing so, these entries are not reported to the operating system again when the system reboots. After they are marked, these errors can be overwritten by other errors logged in the service processor history log.

**Note:** The **Mark as reported** button is available only when your authority level is an authorized service provider.

## Setting the system enclosure type

Use this procedure to set values that uniquely identify the type of enclosures attached to the system.

When setting the system enclosure type, ensure that the **Enclosure serial number** field matches the original value, which can be found on a label affixed to the unit. Updating the **Enclosure serial number** field keeps the configuration and error information synchronized, and this information is used by the system when creating the location codes. This task must be done using the ASMI, not with the control panel. However, if you do not have access to the ASMI, the system will still operate without updating this information.

For example, when replacing the I/O backplane, you must re-enter the original enclosure serial number into the **Enclosure serial number field** to overwrite the serial number that is recorded for the new I/O backplane. Failure to enter the correct enclosure serial number will result in logical partition mappings being incorrect.

**Note:** You cannot boot the system until valid values are entered for all fields in the enclosure-type information.



To perform this operation, your authority level must be one of the following values:

- Administrator
- Authorized service provider

To change the system enclosure type, complete 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** → **Program Vital Product Data**.
3. Click **System Enclosures**. In the right pane, the current system enclosures are displayed.
4. Enter the desired settings for the **Enclosure location**, **Feature Code/Sequence Number**, and **Enclosure serial number** fields using the naming convention described in the ASMI help.

The value of the **Enclosure serial number** field is different from the serial number of the system. Set the **Reserved** field to blank spaces unless directed otherwise by Level 3 technical support.

5. Click **Save settings** to update the system enclosure type information and save it to the VPD.

## Setting the system identifiers

You can set the system-unique ID, serial number, machine type, and machine model. If you do not know the system-unique ID, contact your next level of support.

To perform this operation, your authority level must be one of the following values:

- Administrator
- Authorized service provider

**Note:** You cannot boot the system until valid values are entered for all fields. You can change these entries only once.

To set the system keywords, 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** → **Program Vital Product Data**.
3. Click **System Keywords**.
4. In the right pane, enter the desired values for the system serial number, machine type, and machine model using the naming convention shown in the ASMI help. Set the **Reserved** field to blank spaces unless directed otherwise by service and support.
5. Click **Continue**. The Data Validation display is shown, which includes your entered settings.
6. Click **Save settings** to update the system keywords and save them to the VPD.

## Displaying vital product data

You can view all or selected manufacturer's vital product data (VPD), such as serial numbers and part numbers.

You can view manufacturer's VPD stored from the system boot prior to the one in progress now.

To perform this operation, your authority level must be one of the following levels:

- General
- Administrator
- Authorized service provider

To display the VPD, complete 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 Information** → **Vital Product Data**. A list of field replaceable units (FRUs) that exist on the system and their descriptions are displayed.



3. Select a single FRU or multiple FRUs from this list that you would like to view.
4. Click **Display Details** to display the details for selected FRUs, or click **Display all details** to display details for all VPD entries.

## Clearing all deconfiguration errors

Use the Advanced System Management Interface (ASMI) to clear error records for all or individual system hardware resources that include the processor, memory, L2 and L3 cache, I/O hubs, service processor card, and clock card.

To clear all deconfiguration errors, your authority level must be an authorized service provider.

### Notes:

- Before performing this operation, record error messages or ensure that the error record data is no longer needed; otherwise, you will lose all error data from the hardware resources.
- After completion of this procedure, the system must be powered off, and in standby mode, for the deconfiguration errors to be cleared.

To clear all deconfiguration errors, do the following steps:

1. If the server is not powered off and in standby state, ask the customer to power off the server. When the server is in standby state (the power on LED on the control panel is blinking slowly), continue with the next step.
2. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
3. In the navigation area, expand **System Configuration** and **Hardware Deconfiguration**.
4. Click **Clear All Deconfiguration Errors**.
5. In the right pane, select the desired hardware resource from the menu. You can click **All hardware resources** or an individual resource.
6. Click **Clear errors for selected hardware resource**.
7. Power on the server after clearing the deconfiguration errors. This will cause the flexible service processor (FSP) to retest the hardware as it powers on.

---

## Service functions

Service functions provide enough detail for the service provider to gather information about hardware problems while under the direction of the next level of support.

This information provides basic information about some of the service functions that are commonly used by authorized service providers.

Before using this information, you should know how to service this particular hardware model. You must also know how to safely work with electrical components.

**Attention:** Misuse of service tools or using them with inappropriate security safeguards might result in loss of data, programs, or other objects on the system.

---

## Working with storage dumps

This information describes how to work with storage dumps.

A main storage dump (MSD) is a process of collecting data from the system's main storage. For more information on main storage dumps, including POWER5™ and POWER6® platform system dumps, see Performing a platform or main storage dump.

A main storage dump can be performed in the following ways:

- Automatically - by the service processor as the result of a system failure.
- Manually - by using control panel functions when the system waits, loops, or appears to have an operating system failure.

## Managing dumps

After you have performed a dump, or one occurs automatically, use this information to manage the dump, including copying, reporting, and deleting it.

Dumps are deleted automatically when a new dump occurs, except for log dumps.

## Performing dumps

Learn more about the types of dumps that can be performed and how to manage them, including copying, reporting, and deleting them.

Dumps can occur automatically after a failure or external reset, or after a manual request. The dump information provides valuable information about system status and should be reported to your next level of support or your hardware service provider.

- **Platform system dump:** A platform system dump is a collection of data from server hardware and firmware, either after a system failure or a manual request.
- **Service processor dump:** A service processor dump is a collection of data from a service processor either after a failure, external reset, or manual request.

In addition, other dumps, which are generated automatically, are:

- **Platform event log entry dumps** (which are generated by server firmware when a platform event log entry is truncated)
- **Resource dumps**
- **SMP dumps**

### Performing a platform system dump or service processor dump:

A platform system dump or service processor dump is performed when your next level of support or your service provider suspects a wait or loop in the server firmware.

Only perform a platform system dump or service processor dump under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

**Note:** Before performing a platform system dump, collect any reference code information from the control panel or from the HMC.

*Performing a system dump using the Hardware Management Console:*

Your next level of support or your service provider might request that you perform a system dump if a wait or a loop in the server firmware is suspected. Hardware Management Console (HMC). You can use the HMC to perform a system dump, which is a collection of data from the server hardware and firmware.

Use this procedure only under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

To start a system dump, follow these steps:

1. Perform a controlled shut-down of all partitions.

**Note:** A system dump will abnormally end any running partitions.

2. In the navigation area, open **Systems Management**.
3. Select the server and open it.
4. Click **Serviceability** → **Manage Dumps** → **Action** > **Initiate System Dump**. The dump is automatically saved to the HMC. For details on how to copy, report, or delete a dump after you have completed a dump, refer to “Managing dumps” on page 64.

*Performing a system dump using the control panel:*

Your next level of support or your service provider might request that you perform a system dump if a wait or a loop in the server firmware is suspected. If you do not have an Hardware Management Console (HMC), you can use the control panel to perform a system dump, which is a collection of data from the server hardware and firmware.

Use this procedure only under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

If you do not have an HMC, follow these steps to perform a system dump:

1. Perform a controlled shut-down of the operating system.
  - Note:** A platform system dump will abnormally end any running partitions.
2. On the control panel, select manual mode.
3. Use the increment or decrement buttons to select function 42 ( system dump).
4. Press Enter on the control panel.
5. Is 00000000 or FF displayed on the control panel for more than 30 seconds?
  - **Yes:** The service processor or server firmware is not responding to a request from the control panel. Contact your next level of support or your hardware service provider. **This ends the procedure.**
  - **No:** An attention SRC A1xx3042 is displayed, which indicates that function 42 has been selected.
6. Perform the following steps:
  - a. Reselect function 42 and press Enter on the control panel.
  - b. Switch back to normal mode and wait for the dump to complete.
  - c. Wait for the system to perform another IPL.
7. For details on how to copy, report, or delete a dump after you have completed a dump, refer to “Managing dumps” on page 64.

*Performing a system dump using the Advanced System Management Interface:*

Your next level of support or your service provider might request that you perform a system dump if a wait or a loop in the server firmware is suspected. You can use the Advanced System Management Interface (ASMI) to perform a system dump, which is a collection of data from the server hardware and firmware.

Use this procedure only under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

To perform a system dump using the ASMI, see Using the ASMI to perform a system dump.

### **Performing a service processor dump:**

A service processor dump is a collection of data from a service processor either after a failure, external reset, or manual request.

Only perform a service processor dump under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

*Performing a service processor dump using the Hardware Management Console:*

A service processor dump is a collection of data from a service processor either after a failure, external reset, or manual request. You can use the Hardware Management Console (HMC) to perform a service processor dump.

Use this procedure only under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

To start a service processor dump, follow these steps:

1. In the navigation area, open **Systems Management**.
2. Select the server and open it.
3. Click **Serviceability** → **Manage Dumps** → **Action** > **Initiate Service Processor Dump**. The dump is automatically saved to the HMC. For details on how to copy, report, or delete a dump after you have completed a dump, refer to “Managing dumps” on page 64

*Performing a service processor dump using the control panel:*

A service processor dump is a collection of data from a service processor either after a failure, external reset, or manual request. If you do not have an Hardware Management Console (HMC), you can use the control panel to perform a service processor dump.

Use this procedure only under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

If you do not have an HMC, follow these steps to perform a service processor dump:

1. On the control panel, select manual mode.
2. Use the increment or decrement buttons to select function 43 (service processor dump).
3. Press Enter on the control panel.
4. Is 00000000 or FF displayed on the control panel for more than 30 seconds?
  - **Yes:** The service processor or server firmware is not responding to a request from the control panel. Contact your next level of support or your hardware service provider. **This ends the procedure.**
  - **No:** An attention SRC A1xx 3043 is displayed, which indicates that function 43 has been selected.
5. Perform the following steps:
  - a. Reselect function 43 and press Enter on the control panel.
  - b. Switch back to normal mode, and wait for the dump to complete.
6. For details on how to copy, report, or delete a dump after you have completed a dump, refer to “Managing dumps” on page 64.

*Performing a service processor dump using the Advanced System Management Interface:*

A service processor dump is a collection of data from a service processor either after a failure, external reset, or manual request. You can use the Advanced System Management Interface (ASMI) to perform a service processor dump.

Use this procedure only under the direction of your next level of support or your service provider, after first providing to your next level of support or service provider a dump of the operating system.

To perform a service processor dump using the ASMI, see Initiating a service processor dump.

## Copying a dump

Use this procedure to copy a current platform dump or current main storage dump when the main storage dump auto copy option is disabled. Copying the current dump allows another dump of the same type to be created.

**Note:** If you have an HMC, you must manage your platform dumps with the HMC.

### Copying a dump using a Hardware Management Console:

You can copy a dump using the Hardware Management Console (HMC).

**Note:** If you have an HMC, you must manage your platform dumps with the HMC. However, you will need to manage IBM i main storage dumps with the IBM i service tools.

1. In the navigation area, open **Systems Management**.
2. Select the server and open it.
3. Click **Serviceability** → **Manage Dumps** → **Selected** > **Copy Dump**.
4. Select the dump to copy.
5. Verify that the HMC that contains the dump is the HMC being used to copy the dump.
6. To copy the dump to DVD media, Click **Selected** > **Copy Dump File to DVD Media**.
7. Load the media and follow the instructions on the display.
8. When the copy procedure is successfully completed, remove the media and process it according to the instructions of your next level of support or your hardware service provider.
9. If you encounter a problem with the copy procedure, contact your next level of support or your hardware service provider. **This ends the procedure.**

### Copying a dump using an AIX command:

You can copy a dump using an AIX command.

Copy the dump only if you are directed to do so by your next level of support or service provider.

**Note:** If you have a Hardware Management Console (HMC), you must manage your platform dumps with the HMC. For details, see “Copying a dump using a Hardware Management Console.”

Platform dumps are saved in AIX in the following directory:

`/var/adm/platform`

**Note:** If the AIX logical partition becomes the service partition after it was installed, run the following command to create this directory:

```
platform_dump -f jfs2
```

or

```
platform_dump -f jfs
```

This command creates the `/var/adm/ras/platform` file system. This is done automatically during the installation if the AIX logical partition was marked as the service partition before it was installed.

### Copying a dump using a Linux command:

You can copy a dump using a Linux command.

Copy the dump only if you are directed to do so by your next level of support or service provider.

**Note:** If you have an Hardware Management Console (HMC), you must manage your platform dumps with the HMC. For details, see “Copying a dump using a Hardware Management Console” on page 67.

Platform dumps are saved in Linux in the following directory:

/var/log/dump/

### Copying a dump using IBM i service tools:

You can copy a dump using IBM i service tools.

Choose from the following options:

- To copy a platform system or SP dump, go to “Copying a platform system or SP dump.”
- To copy a main storage dump, go to “Copying a main storage dump” on page 69.

*Copying a platform system or SP dump:*

Use this procedure to copy a platform system or SP dump with the IBM i tools.

**Note:** If you have an Hardware Management Console (HMC), you must manage your platform dumps with the HMC. For details, see “Copying a dump using a Hardware Management Console” on page 67.

1. On any command line, enter STRSST.
2. Enter a valid service tools user ID and password.
3. Select option 1 (Start a service tool).
4. Select option 6 (Main storage dump manager). Did option 7 (Work with current platform dump) appear on the Main Storage Dump Manager display?
  - **Yes:** There is a current platform dump. Continue with the next step.
  - **No:** There is no current platform dump. A dump might have been automatically copied to the auxiliary storage pool (ASP). Go to “Reporting a dump” on page 69. **This ends the procedure.**
5. Select option 7 (Work with current platform dump).
6. Select option 1 (Display summary). The Platform Dump Summary display shows the platform dump type, date and time of the dump, and reference code.
7. Record the summary information and report it to your next level of support or your hardware service provider.
8. Press F12 (Cancel).
9. Select option 3 (Copy to ASP). The platform dump is copied to disk storage. After the dump is copied, a message is displayed indicating whether the copy completed.
10. Did a message indicate "Copy completed normally"?
  - **Yes:** There no longer is an option 7 (Work with current platform dump) listed. **This ends the procedure.**
  - **No:** Continue with the next step.
11. Has your next level of support or your hardware service provider requested a media copy of the platform dump?
  - **Yes:** Continue to the next step.
  - **No:** Work with your next level of support or your hardware service provider on the problem. **This ends the procedure.**
12. If the copy to disk failed, copy a current platform dump to removable media by performing the following steps:
  - a. Select option 2 (Copy to media).
  - b. Load the media and follow the instructions on the display.

- c. When the copy procedure is successfully completed, remove the media and process it according to the instructions of your next level of support or your hardware service provider.
13. If you encounter a problem with the copy procedure, contact your next level of support or your hardware service provider. **This ends the procedure.**

#### *Copying a main storage dump:*

Use this procedure to copy an IBM i main storage dump using IBM i tools.

1. On any command line, enter STRSST.
  2. Enter a valid service tools user ID and password.
  3. Select option 1 (Start a service tool).
  4. Select option 6 (Main storage dump manager).
  5. From the Main Storage Dump Manager display, press Enter.
- Note:** Copying a main storage dump (MSD) to disk storage on the system prevents the MSD from being overwritten in the event that another MSD occurs.
6. Select option 1 (Display/Print).
  7. Select option 1 (MSD summary). The Main Storage Dump Summary display shows the system reference code, date and time of the MSD, and Licensed Internal Code level.
  8. Record the summary information and report it to your next level of support or your hardware service provider.
  9. Press F12 (Cancel) twice to return to the Work with Current Main Storage Dump display.
  10. Select option 3 (Copy to ASP).
  11. Type a dump description and then press Enter to start copying the dump. After the dump is copied, a message is displayed indicating whether the MSD copy completed.
  12. Did a message indicate "Copy completed normally"?
    - **Yes: This ends the procedure.**
    - **No:** Continue with the next step.
  13. Has your service provider requested a media copy of the MSD?
    - **Yes:** Continue to the next step.
    - **No:** Work with your next level of support or your hardware service provider on the problem. **This ends the procedure.**
  14. To copy a current MSD to a removable media, perform the following steps:
    - a. Select option 2 (Copy to media).
    - b. Load the media and follow the instructions on the display.
    - c. When the copy procedure completes successfully, remove the media and process it according to your service provider's instructions.
    - d. If you encounter a problem with the copy procedure, contact your next level of support or your hardware service provider. **This ends the procedure.**

## **Reporting a dump**

Find out how to report a dump using the Hardware Management Console (HMC), the IBM i service tools, an AIX command, or a Linux command.

### **Reporting a dump using a Hardware Management Console:**

You can report a dump using a Hardware Management Console (HMC).

1. In the navigation area, open **Systems Management**.
2. Select the server and open it.
3. Click **Serviceability** → **Manage Dumps** → **Selected** > **Call Home Dump**.



4. Verify that the **HMC** that contains the dump is the HMC being used to report the dump.
5. Click **Selected** → **Call Home Dump**. The dump summary display shows the date, time and size of the dump. Report the summary information to your next level of support or your hardware service provider.
6. Has your next level of support or your hardware service provider requested a copy of the dump?
  - **Yes:** Continue to the next step.
  - **No:** Contact your next level of support or your hardware service provider on the problem.
7. To copy a dump to removable media, perform the following steps:
  - a. Click **Copy Dump File to DVD Media**.
  - b. Load the media and follow the instructions on the display.
  - c. When the copy procedure is successfully completed, remove the media and process it according to the instructions of your next level of support or your hardware service provider. If you encounter a problem with the copy procedure, contact your next level of support or your hardware service provider.
8. To copy a dump to another system, perform the following steps:
  - a. Click **Selected** → **Copy Dump File to Other System**.
  - b. Follow the instructions on the display.
  - c. When the copy procedure is complete, contact your next level of support or your hardware service provider.

#### **Reporting a dump using an AIX command:**

You can report a dump using an AIX command.

Report the dump only if you are directed to do so by your next level of support or service provider.

Platform dumps are saved in AIX in the following directory:

`/var/adm/platform`

**Note:** If the AIX logical partition becomes the service partition after it was installed, run the following command to create this directory:

```
platform_dump -f jfs2
```

or

```
platform_dump -f jfs
```

This command creates the `/var/adm/ras/platform` file system. This is done automatically during the installation if the AIX logical partition was marked as the service partition before it was installed.

#### **Reporting a dump using a Linux command:**

You can report a dump using a Linux command.

Platform dumps are saved in AIX in the following directory: `/var/log/dump/`

Report the dump only if you are directed to do so by your next level of support or service provider.

#### **Reporting a main storage dump, a platform system dump, or an SP dump using the IBM i service tools:**

You can report a dump using the IBM i service tools.



If your system has the main storage dump enabled for auto copy, your system might have automatically copied the current MSD to the auxiliary storage pool (ASP) using the dump description Automatic copy. Then it might have performed another IPL of the system dump, or automatically copied a current platform system or service processor dump to ASP using the dump type as part of the dump description.

1. On any command line, enter STRSST.
2. Enter a valid service tools user ID and password.
3. Select option 1 (Start a service tool).
4. Select option 6 (Main storage dump manager).
5. Select option 2 (Work with copies of main storage dumps).
6. Find a new dump near the bottom of the list, type 5 (Display/Print) next to it, and press Enter.
7. Is the Display Main Storage Dump display shown?
  - **Yes:** This is a main storage dump. Select option 1 (MSD Summary). Continue with the next step.
  - **No:** This is a platform dump. Continue with the next step.
8. Record the summary information so that you can report it to your next level of support or your hardware service provider. The Dump Summary display shows the date and time of the dump, system reference code (SRC) data, and Licensed Internal Code level.
9. Press F3 (Exit).
10. If the dump has a description of Automatic copy, rename it so that another auto copy and IPL can occur if necessary.
  - a. Select option 7 (Rename).
  - b. Type a new dump description, and press Enter.
11. Has your next level of support or your hardware service provider requested a media copy of the dump?
  - **Yes:** Continue with the next step.
  - **No:** Contact your next level of support or your hardware service provider on the problem. Continue with "Deleting a dump."
12. To copy an MSD or a platform dump to removable media, perform the following steps:
  - a. Select option 8 (Copy to media).
  - b. Load the media and follow the instructions on the display.
  - c. When the copy procedure completes successfully, remove the media and process it according to the instructions from your next level of support or your hardware service provider. If you encounter a problem with the copy procedure, contact your next level of support or your hardware service provider.
13. Continue with "Deleting a dump."

## Deleting a dump

Use this procedure to delete a dump when dump copies are no longer needed by your next level of support or by your hardware service provider.

### Deleting a dump using a Hardware Management Console:

You can delete a dump using the Hardware Management Console (HMC).

Dumps are stored in the HMC's Manage Serviceable Events tool and are automatically deleted when room is required for new dumps.

To manually delete a dump, complete the following steps:

1. In the navigation area, open **Systems Management**.
2. Select the server and open it.
3. Click **Serviceability** → **Manage Dumps** → **Selected** > **Delete Dump**.

4. Select the dump to be deleted.
5. Verify that HMC containing the dump is the HMC being used to delete the dump.
6. Click **Selected** → **Delete Dump**.

#### **Deleting a dump using an AIX command:**

You can use an AIX command to delete a dump.

Platform dumps are saved in AIX in the following directory:

`/var/adm/platform`

Only delete the dump if directed to do so by your next level of support or service provider.

**Note:** If the AIX logical partition becomes the service partition after it was installed, run the following command to create this directory:

```
platform_dump -f jfs2
```

or

```
platform_dump -f jfs
```

to create the `/var/adm/ras/platform` file system.

During an installation, this directory is created automatically if the AIX logical partition was marked as the service partition before it was installed.

#### **Deleting a dump using a Linux command:**

You can delete a dump using a Linux command.

Platform dumps are saved in Linux under the following directory: `/var/log/dump/`

Only delete the dump if directed to do so by your next level of support or service provider.

#### **Deleting a dump using the IBM i service tools:**

You can delete a dump using the IBM i service tools.

To delete a dump using IBM i service tools, complete the following steps:

1. On any command line, enter STRSST.
2. Enter a valid service tools user ID and password.
3. Select option 1 (Start a service tool).
4. Select option 6 (Main storage dump manager).
5. Select option 2 (Work with copies of main storage dumps).
6. If you want to delete any dump copies, type 4 next to the dump copies, and press Enter twice.
7. To exit SST, press F3 (Exit) three times, and then press Enter.

## **Performing an IBM i main storage dump**

A main storage dump is a collection of data from the IBM i main storage. It can be manually initiated when the system administrator suspects a system wait or loop, or automatically by the server firmware as the result of a system failure.

**Note:** Before performing a main storage dump, collect any reference code information from the control panel or the Hardware Management Console.

## Performing an IBM i main storage dump using the Hardware Management Console

You can perform a main storage dump using a Hardware Management Console (HMC) and IBM i.

**Note:** Before performing a or main storage dump, collect any reference code information from the control panel or the HMC.

To perform a main storage dump from an HMC, complete the following steps:

**Note:** If a main storage dump occurred automatically, go to Managing dumps for information on how to copy, report, or delete a dump.

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, expand **Partitions**.
4. Right-click the logical partition and click **Restart Partition**.
5. Click **Dump**.
6. Click **OK**.
7. For details on how to copy, report, or delete a dump after you have completed a dump, refer to Managing dumps.

## Performing an IBM i main storage dump using the control panel

You can perform a main storage dump using a control panel and IBM i.

**Note:** Before performing a or main storage dump, collect any reference code information from the control panel or the HMC.

If you do not have an Hardware Management Console (HMC), follow these steps to perform a platform system dump:

1. Verify that no interactive jobs are running.
2. On the control panel, select manual mode.
3. Use the increment or decrement buttons to select function 22 (main storage dump).
4. Press Enter on the control panel.
5. Is 00000000 or FF displayed on the control panel for more than 30 seconds?
  - **Yes:** The service processor or server firmware is not responding to a request from the control panel. Contact your next level of support or your hardware service provider. **This ends the procedure.**
  - **No:** An attention system reference code (SRC) A1xx 3022 is displayed, which indicates that function 22 has been selected. Continue with the next step.
6. Perform the following steps on the control panel:
  - a. Reselect function 22.
  - b. Press Enter.
  - c. Switch back to normal mode and wait for the dump to complete. If function 22 was selected, SRC A2D0 3000 on the console indicates that the main storage dump initiated by the user was successful. (SRC B6xx xxxx indicates that a main storage dump initiated by the IBM i operating system was successful.)
7. For details on how to copy, report, or delete a dump after you have completed a dump, refer to Managing dumps.

---

## Performing a slow boot

Use this procedure to perform a slow boot using the Hardware Management Console (HMC), control panel, or Advanced System Management Interface (ASMI) menus depending on your configuration.

In some cases, you need to perform a slow-mode boot to perform extended diagnostic testing.

**Note:** A slow-mode boot might produce a new reference code on the control panel or new errors in the service processor error log. When the server reports a new error code, record it for use in subsequent steps.

## Performing a slow boot using the Hardware Management Console

You can perform a slow boot using the Hardware Management Console (HMC).

In some cases, you need to perform a slow-mode boot to perform extended diagnostic testing.

**Note:** A slow-mode boot might produce a new reference code on the control panel or new errors in the service processor error log. When the server reports a new error code, record it for use in subsequent steps.

To perform a slow boot, complete the following steps:

1. Record any reference codes appearing on the control panel or HMC.
2. Shut down all logical partitions and the server.
3. In the navigation area, open **Systems Management**.
4. Open **Servers**.
5. Select the server on which you want to perform a slow boot.
6. In the **Tasks** area, click **Properties**.
7. Click the **Power-On Parameters** tab.
8. Click **Slow** from the list in the Power-on speed override field in the Next column.

**Note:** These settings apply only to the current boot. After you complete the service action, the settings revert back to the original setting.

9. Click **OK**.
10. After you are done, return to the step in the procedure that caused you to perform a slow boot. **This ends the procedure.**

## Performing a slow boot using the control panel

You can perform a slow boot using the control panel.

In some cases, you need to perform a slow-mode boot to perform extended diagnostic testing.

**Note:** A slow-mode boot might produce a new reference code on the control panel, or new errors in the service processor error log. When the server reports a new error code, record it for use in subsequent steps.

To perform a slow boot using the control panel, complete the following steps:

1. Record any reference codes that appear on the control panel.
2. Stop the operating system by performing the following steps:
  - a. Log in to the system as a user with the authority to run the shutdown or pwrdownsys (Power Down System) command.
  - b. At the command line, enter one of the following commands:

**Note:** These commands stop the operating system. The system power turns off, the power-on light begins to slowly blink, and the system goes into a standby state.

- If your system is running AIX, type `shutdown`
  - If your system is running IBM i, type `pwrwnsys *immed`
  - If your system is running Linux, type `shutdown -h now`
3. On the control panel, use the increment or decrement buttons to scroll to function 02.
  4. Press Enter to start function 02. The current IPL type (with pointer) and speed is displayed.
  5. Use the increment or decrement buttons to scroll through the IPL types and speeds.
  6. When manual is shown, press Enter to select the IPL type of manual. The current IPL type and speed (with pointer) is displayed.
  7. Use the increment or decrement buttons to scroll through the IPL speeds.
  8. When S is shown, press Enter to select the IPL speed of slow.
  9. To exit function 02, press Enter multiple times until only 02 is displayed.
  10. Power on the server by pressing the white power button. Then return to the procedure that caused you to perform a slow boot. **This ends the procedure.**

## Performing a slow boot using the Advanced System Management Interface menus

You can perform a slow boot using the Advanced System Management Interface (ASMI) menus.

In some cases, you need to perform a slow-mode boot to perform extended diagnostic testing.

**Note:** A slow-mode boot might produce a new reference code on the control panel or new errors in the service processor error log. When the server reports a new error code, record it for use in subsequent steps.

To perform a slow boot using the ASMI, complete the following steps:

1. Record any reference codes that appear on the control panel or HMC.
2. Shut down all logical partitions and the server.
3. In the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
4. Expand **Power/Restart Control** and click **Power On/Off System**.
5. Record the settings so that you can reenter them after you complete the service actions.
6. On the Power on/off system menu, select the following options:
  - Click **Slow** in the **Set System Boot Speed** field.
  - Click **Running** in the **Boot to system server firmware** field.
7. Select **Save Settings**.

**Note:** These settings will apply to all future boots. After you complete the service action, change the settings back to what you recorded in step 5.

8. After you are done, return to the step in the procedure that caused you to perform a slow boot. **This ends the procedure.**

---

## Determining the primary or alternate console

Use this procedure to determine the primary or alternate console.

If the Hardware Management Console (HMC) has been configured as the primary console, the system will open a console on the HMC.

If the Operations Console has been configured as the primary console, the system will start the Operations Console. If the Operations Console has not been configured, the primary console is a workstation that is attached to the first input/output processor (IOP) that is capable of supporting workstations.

In addition to the primary console, the system can assign up to two alternative consoles. The first alternative console can only be a twinaxial workstation that is attached to the same IOP as the primary console. The second alternative console is a workstation that is attached to the next IOP or input/output adapter (IOA) that is capable of supporting workstations.

The IOP that supports the console must be on the first system bus (bus 1).

If a workstation is not correctly attached to the first IOP that is capable of attaching workstations, then the system will not assign a primary console. The system displays a reference code on the operator's panel. In addition, if the IPL (initial program load) mode is set to manual, the system will stop.

## Primary console workstation requirements

To be the primary console, the workstation must be operational and have the correct port and address. If the workstation is a PC, it must also have an active emulation program on the workstation.

The workstation requirements follow:

- HMC
- Twinaxial workstation - Port 0 Address 0
- ASCII workstation - Port 0
- PC attached to ASCII IOP or IOA
  - Port 0
  - PC software to emulate a 316x or 3151 terminal
- PC attached to twinaxial IOP
  - Port 0 Address 0
  - 5250 emulator software active on PC
- PC attached to a LocalTalk IOA (6054)
  - SNAPS 5250 Version 1.2 (or above) application
  - Console capable selected on Macintosh (IOA converts to Port 0 Address 0)
- PC attached to a 2609, 2612, 2699, or 2721 communications IOA
  - Client Access Console cable attached to the 2609 or 2612 P2 port (part number 46G0450 or 46G0479), 2699 (part number 21H3779), or 2721 (part number 44H7504)
  - Operations Console cable attached to the 2609 or 2612 (part number 97H7555), 2699 (part number 97H7556), or 2721 (part number 97H7557) with 5250 emulation or Rumba active on PC

## Finding the primary console when the system is operational

Various methods are available to find the primary console when the system is operational.

The following methods are available to find the primary console:

- **Method 1:** Look for a sign-on display with DSP01 shown in the upper-right corner.
- **Method 2:** If the device name (DSP01) for the console has been changed, you can verify the device name for the primary console by doing the following steps:
  1. Enter DSPCTLD QCTL on a command line. The Display Controller Description display is shown.
  2. Find the Resource name parameter (such as CTL01) and record it.
  3. Enter PRTDEVADR *rrrrr* on a command line, where *rrrrr* is the resource name you recorded.

**Note:** If the printer is active, the data will print.

- **Method 3:**

1. Enter STRSST on any command line. The System Service Tools display is shown.
2. Select option 1 (Start a service tool).
3. Select option 7 (Hardware service manager).
4. Select option 2 (Logical hardware resources).
5. Select option 1 (System bus resources). On the Logical Hardware Resources on System Bus display, the less than (<) symbol indicates the IOP that the console is attached to.
6. Use option 9 (Resource associate with IOP and display detail) to find the location of the system bus, board, and card.

## Finding the primary console when the system power is off

Various methods are available to find the primary console when the system power is off.

Use one of the following methods:

- Turn on the system in manual mode and look for the IPL and Install System display.
- Turn on the system in normal mode and look for DSP01 on the Sign On display.

Note that the name might have been changed. See “Finding the primary console when the system is operational” on page 76 to determine the device name.

---

## Resetting the service processor

Use this procedure to ensure that the service processor is reset properly under the direction of your hardware service provider.

**Note:** Use this procedure only under the direction of your next level of support or your hardware service provider. During this procedure you will be powering off the system and removing and reapplying ac power.

1. Inform anyone using the server that it will be shut down.
2. Stop all applications that are running on the server.
3. Stop the operating system and server by choosing from the following options:
  - If you have a Hardware Management Console (HMC), shut down all logical partitions and the server. For instructions see Powering on and powering off a system. Then continue with step 6.
  - If you do not have an HMC, continue with the next step.
4. Log in to the system as a user with the authority to run the appropriate shutdown command.
5. At the command line, enter one of the following commands:
  - If your system is running AIX, type shutdown
  - If your system is running IBM i, type PWRDOWNSYS \*IMMED
  - If your system is running Linux, type shutdown -h now

These commands stop the operating system. The system power turns off, the power-on light begins to slowly blink, and the system goes into a standby state.

6. Unplug the ac power cord and plug it back in.
7. The service processor is reset. Start the server. **This ends the procedure.**



---

## Resetting the managed system connection from the Hardware Management Console

You can reset the managed system connection from the Hardware Management Console (HMC).

To reset the managed system connection, complete the following steps:

1. In the navigation area, open **Systems Management**.
2. Click **Servers**.
3. In the contents area, select the server on which you want to reset the connection.
4. In the **Tasks** area, open **Connections**.
5. Click **Reset or Remove Connection** → **Reset Connection** → **OK**.

---

## Checking for a duplicate IP address

Use this procedure to check for a duplicate IP address.

To check for a duplicate IP address, complete the following steps:

1. On the Hardware Management Console (HMC), right-click the desktop and select **terminal** → **rshterm**.
2. At the terminal, issue this command: `lssyscfg -r sys -F "name,ipaddr"` A list of managed systems' names and their IP addresses (or host names) is displayed.
3. Check to see if there are duplicate IP addresses.

---

## Disk drive

Use this procedure to replace the disk drive.

Your system can be powered off or powered on when you replace the disk drive. If the system is running, you can replace a disk drive with the power on. If it is not, or if the disk drive to be replaced is in the AIX or Linux root volume group (rootvg) and it is not protected with either a redundant array of independent disks (RAID) or mirroring, use the procedure for replacing the disk drive with the power off.

1.

Do you want to replace the disk drive concurrently with system operations and the unit powered on?

**Yes**

**No**

↓

Go to Replace the disk drive nonconcurrently.

---

2.

Choose the procedure for the operating system running in the partition that the disk drive resource is assigned to.

For AIX, go to Replace the disk drive using AIX .

For Linux, go to Replace the disk drive using Linux .

For IBM i, go to Replace the disk drive using IBM i.

---

## Replacing the disk drive nonconcurrently

Use this procedure to remove and replace a disk drive nonconcurrently.

1.



The component will not be serviced concurrently. If this system is powered on, power it off before continuing.

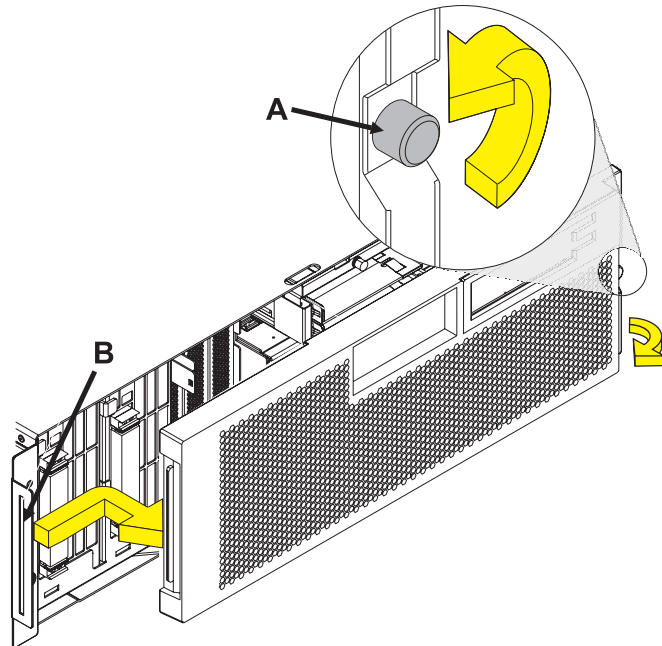
When the system is powered off, disconnect the AC input source from the enclosure being serviced. Do not apply power to the enclosure until directed to do so in this procedure.

---

2.

Access the unit by:

1. Open the front rack door.
2. Loosen the thumbscrew (A) on the right side of the cover.
3. Slide the cover to the right and remove it from the system unit slot (B).

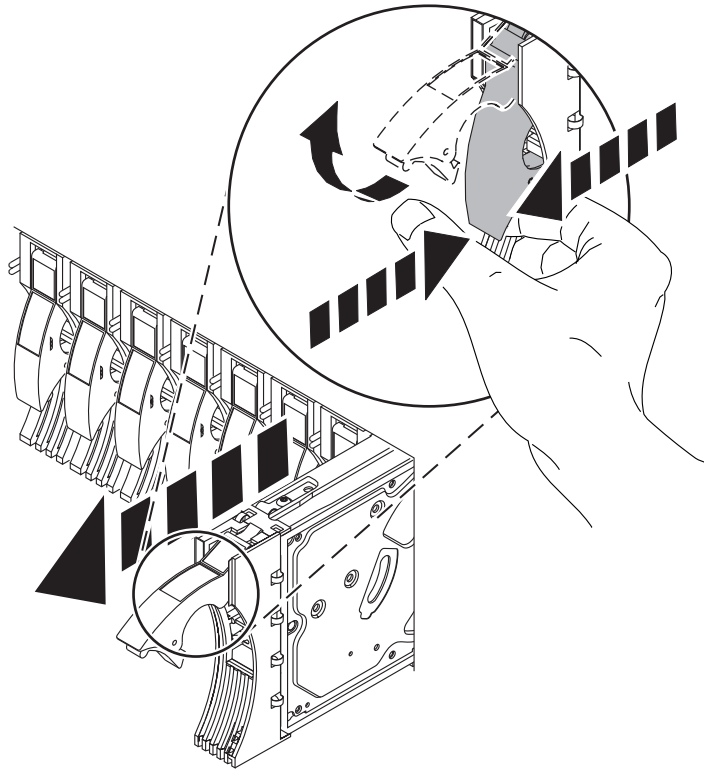


3.

Remove the disk drive by:

1. Unlock the disk drive handle by squeezing it and pulling it out toward you as shown.
2. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.

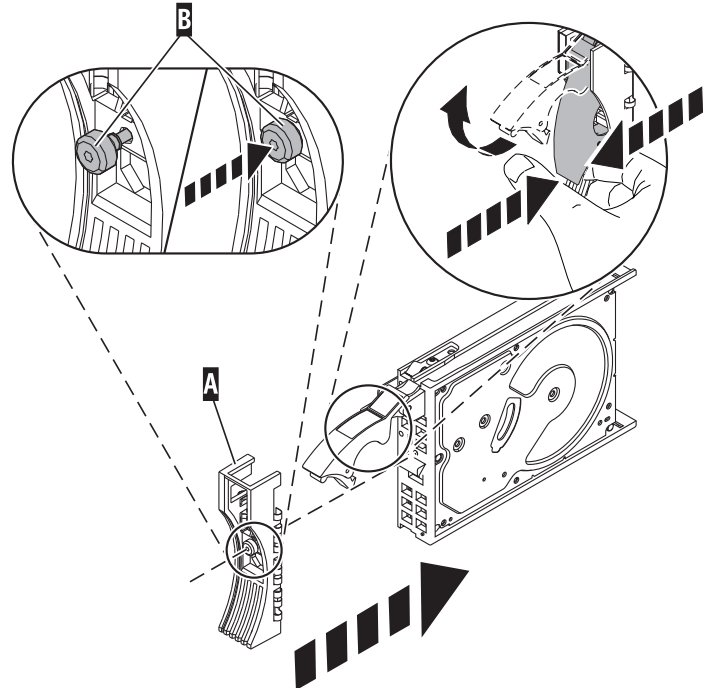
The concurrent maintenance light for the slot turns off when you remove the disk drive.



4.

Install the bezel on the new disk drive:

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



5.

Install the disk drive:

1. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
  2. Slide the disk drive into the system until it stops.
  3. Push the disk drive handle in until it locks.  
**Note:** It is important to ensure that when installing a disk drive, that the drive is fully seated and all the way into the system.
  4. Reconnect the power source.
  5. Power on the unit, and then go to Verifying a repair. **This completes this procedure.**
- 

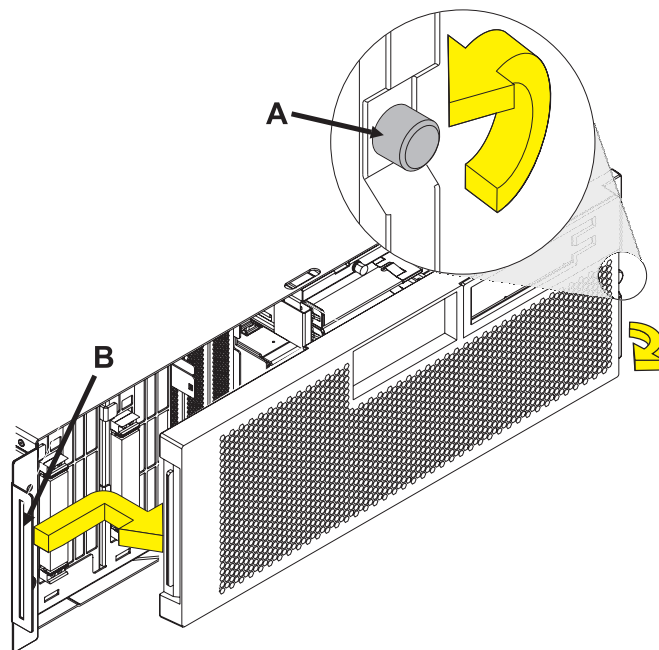
## Replacing the disk drive using AIX

Use this procedure to remove and replace a disk drive concurrently with the AIX operating system.

1.

Access the unit by:

1. Open the front rack door.
2. Loosen the thumbscrew (A) on the right side of the cover.
3. Slide the cover to the right and remove it from the system unit slot (B).



---

2.

Remove the disk drive as a resource:

1. Log in as root user or use CE Login.
2. At the command line, type **diag** and press Enter.
3. Press Enter to continue.
4. On the Function Selection display, select **Task Selection**.
5. Select **Hot Plug Task**.
6. Select **RAID Hot Plug Devices**.
7. Select the adapter that is connected to the array that contains the disk drive you want to replace and press Enter.
8. Select **Commit**.
9. On the Identify and Remove Resources display, select **Identify**.
10. Select the disk drive you want to remove and press Enter.

The disk drive slot enters the identify state. The concurrent maintenance light for the slot begins flashing. The following figures show the locations of the concurrent maintenance lights **A**. Verify that the flashing light corresponds to the location for the disk drive you want to remove, and press Enter.

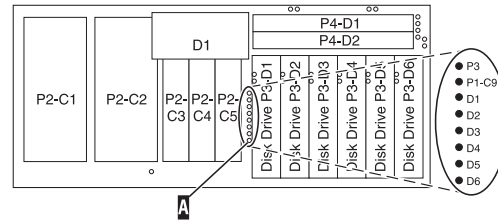
The disk drive slot exits the identify state.

11. On the Identify and Remove Resources display, select **Remove**.

A list of the disk drives that you can remove is shown. If the disk drive you want to remove does not appear on the list, ask your system administrator to put the disk drive in the failed state before continuing with this procedure. For information, see *AIX System Management Guide: Operating System and Devices*.

12. Select the disk drive you want to remove and press Enter.

The disk drive slot enters the remove state and power is removed from the slot. The concurrent maintenance light for the slot begins flashing rapidly.

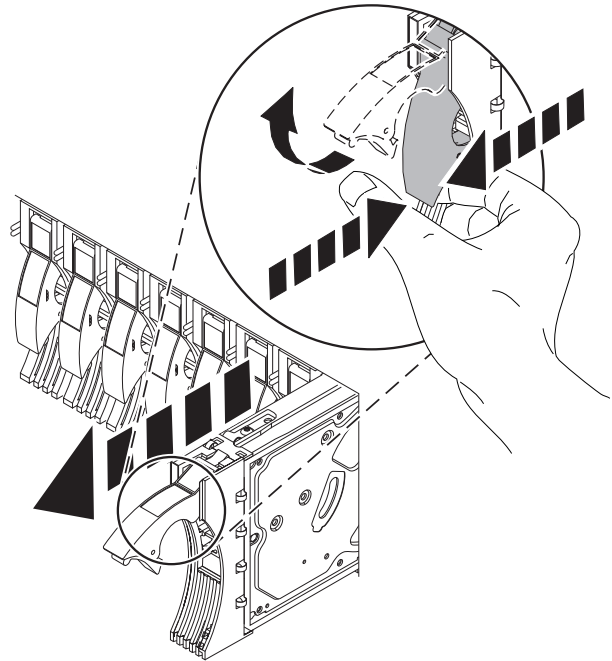


**Note:** If the disk drive slot is not in the Remove state, contact your next level of support.

Remove the disk drive by:

1. Unlock the disk drive handle by squeezing it and pulling it out toward you as shown.
2. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.

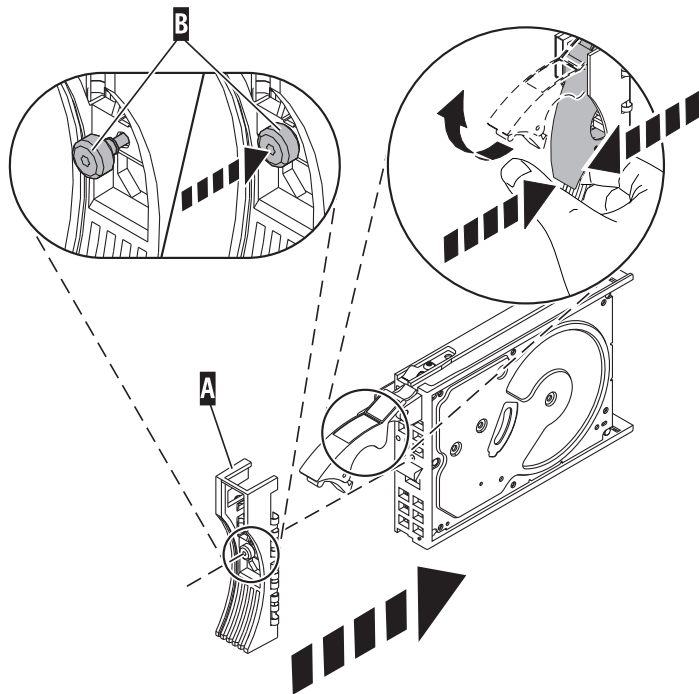
The concurrent maintenance light for the slot turns off when you remove the disk drive.



4.

Install the bezel on the new disk drive:

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



5.

Install the disk drive:

1. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
2. Slide the disk drive into the system until it stops.
3. Push the disk drive handle in until it locks.

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

---

6.

Add the new disk drive as a resource:

1. Press Enter.  
The disk drive slot exits the Remove state and enters the Normal state.
  2. Exit to the RAID Hot-Plug Devices menu. Press the F3 or ESC 3 key to return
  3. Exit to the Task selection display.
  4. Select **Log Repair Action**.
  5. Select the disk drive that you replaced and then press Enter.
  6. Select **Commit** after you have made your selection and then press Enter.
  7. Exit to the command line.
- 

7.

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

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

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

---

8. Go to Verifying a repair. **This completes this procedure.**

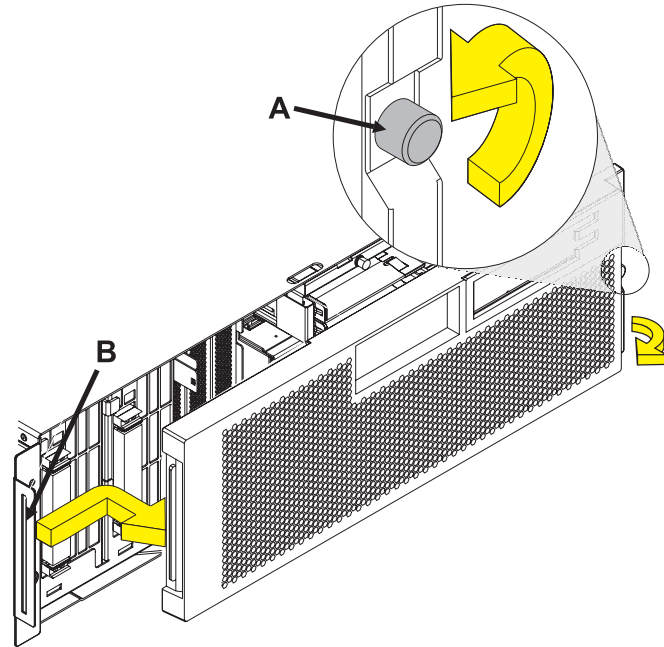
## Replacing the disk drive using IBM i

Use this procedure to remove and replace a disk drive concurrently with IBM i.

- 1.

Access the unit by:

1. Open the front rack door.
2. Loosen the thumbscrew (A) on the right side of the cover.
3. Slide the cover to the right and remove it from the system unit slot (B).



---

2.

To recover any data that might be lost when a disk drive is replaced, you must know if the disk drive has data protection.

Do you know the protection status of the disk drive to be removed?

**No:** Continue with the next step.

**Yes:** If the disk drive is mirrored, record the status of both disk drives in the mirrored pair and go to step 6 on page 86.  
If the disk drive is parity protected, go to step 4 on page 86.

---

3.

Determine the protection status of the disk drive to be removed:

1. Sign on the operator console with at least service level authority.
2. Type strsst on the command line of the IBM i session and press Enter.
3. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.
4. Select **Work with disk units** from the System Service Tools (SST) display. Press Enter.
5. Select **Display Disk Configuration** from the Work with Disk Units display. Press Enter.
6. Select **Display Disk Configuration Status** from the Display Disk Configuration display. Press Enter.

A list of each auxiliary storage pool (ASP) displays, showing the disk drives that are members of the ASPs..

7. Is the status of the failing disk drive **Mirrored**?

**No:** Continue with the next step.

**Yes:** Record the status of both disk drives in the mirrored pair and continue at step 6.

---

4.

Determine if the failing disk drive is parity protected:

Check the status of the failing disk drive for one of the following items:

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

**Note:** An ASP with a status of unprotected might contain disk drives that are device parity protected.

If the status of the failing disk drive and all other disk drives in the array is shown in the preceding list, the failing disk drive is parity protected.

Is the failing disk drive parity protected?

**Yes:** Go to step 9 on page 87.

**No:** Continue with the next step.

---

5.

Perform a backup of the data in the failing ASP.

Go to step 9 on page 87.

---

**Note:** This is a customer task. Refer to the system's operations information for instructions.

6.



Does the disk drive you are replacing have a status of suspended?

**Yes:** Go to step 9.

**No:** Check the status of the disk drive that is mirrored to the disk drive you are replacing. If it is Suspended, go to step 8. If it is Active, continue with the next step.

---

7.

Suspend the disk drive that you are replacing by performing the following steps:

1. Press F3 from the Display Disk Configuration display to return to the Work with Disk Units display.
  2. Select Work with Disk Unit Recovery from the Work with Disk Units display and press Enter.
  3. Select Suspend mirrored protection from the Work with Disk Unit Recovery display and press Enter.
  4. Select the option to suspend the disk drive that you are replacing from the Suspend Mirrored Protection display and press Enter.
  5. Go to step 9.
- 

8.

The suspended mirrored pair of the failing drive has also failed and must be replaced.

**Note:** Performing a backup is a customer task. Refer to the system's operations information for instructions.

Perform a backup of the data in the failing ASP.

Go to step 9 to replace the failing mirrored disk.

Return to the beginning of this procedure to replace the disk that you originally intended to replace.

---

9.

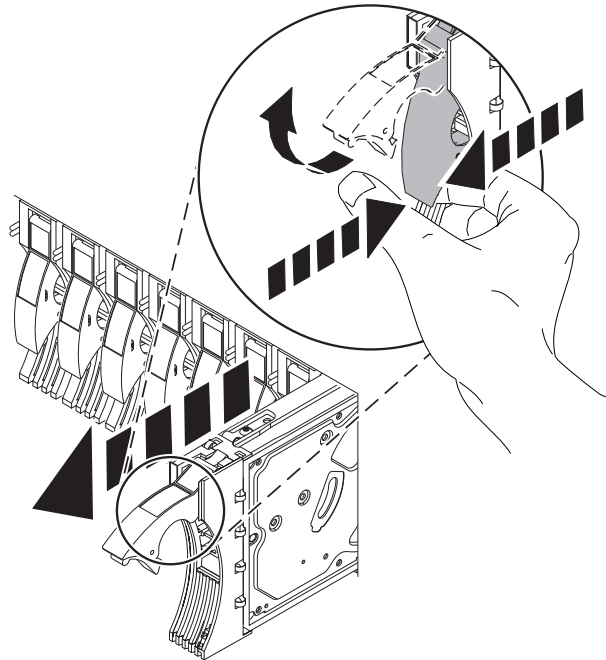
Select **Device Concurrent Maintenance** from the Hardware Service Manager display. Press Enter. The Device Concurrent Maintenance display is displayed.

1. Enter the location code of the disk drive being replaced in the form of: U787A.001.AAAXXX-P3-D4
  2. Select option 1 (Remove device) for the **Action to be performed**.
  3. Set the time delay for one minute: 01.  
**Important:** Do not press Enter at this time.
  4. Locate the concurrent maintenance light that corresponds to the position of the disk drive that you are replacing.  
**Important:** When you press Enter, after a one minute delay, this light comes on and begins to blink rapidly. You then have nine seconds to remove the disk drive.
  5. Press Enter on the console.
  6. When the light blinks rapidly, perform the next step to remove the disk drive within 9 seconds.
- 

10.

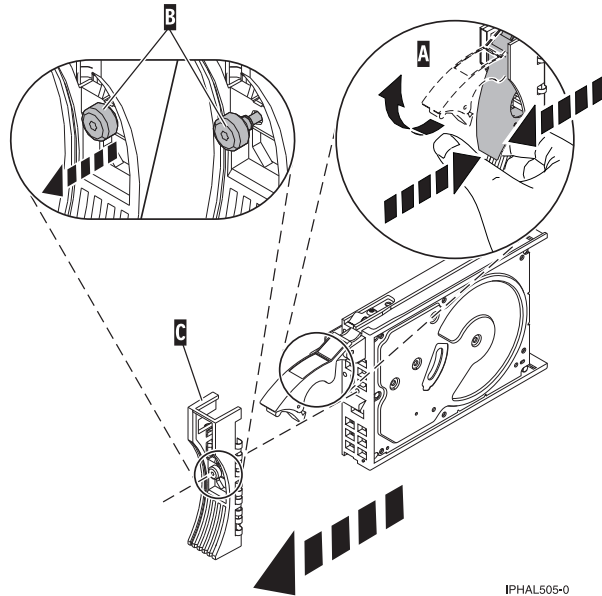
Remove the disk drive by:

1. Unlock the disk drive handle by squeezing it and pulling it out toward you as shown.
  2. Support the bottom of the disk drive as you slide it out of the system or expansion unit. Do not hold the disk drive by the handle.
- The concurrent maintenance light for the slot turns off when you remove the disk drive.



11.

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

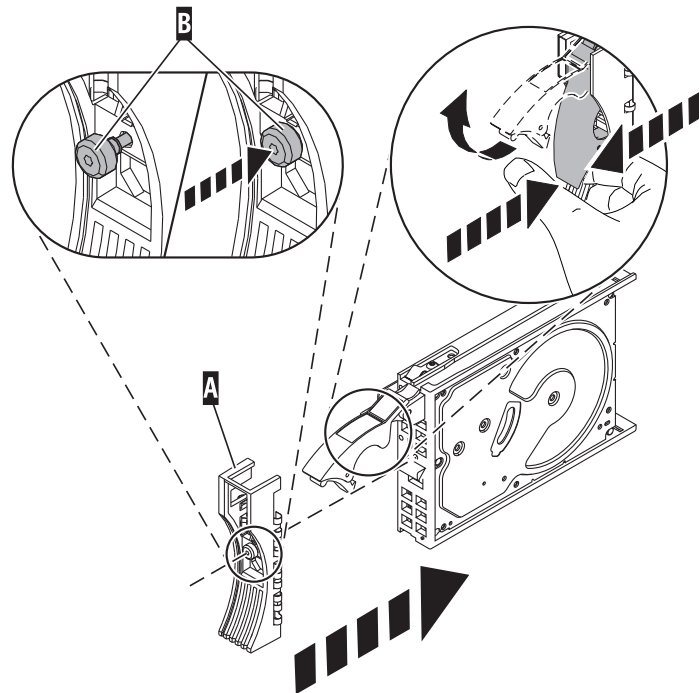


IPHAL505-0

12.

Install the bezel on the new disk drive:

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



13.

1. Return to the console and wait until the Concurrent Maintenance Results display is shown. Press F12.
  2. The physical locations you entered in step 6 of this procedure might still appear on the display. If not, retype the physical location where you will be installing the new disk drive.
  3. Select option 2 (Install device) for the **Action to be performed**.
  4. Set the time delay for one minute: 01.  
**Important:** Do not press Enter at this time.
  5. Locate the concurrent maintenance light that corresponds to the position of the disk drive that you are replacing
  6. **Important:** When you press Enter, after a one minute delay, this light comes on and begins to blink rapidly. You then have nine seconds to install the disk drive.
- 

14.

Install the disk drive:

1. Support the bottom of the disk drive as you align it with the guide rails in the system unit. Do not hold the disk drive by the handle.
  2. Slide the disk drive into the system until it stops.
  3. Press Enter on the console.
  4. When the light blinks rapidly, perform the next step to install the disk drive within 9 seconds.
  5. Push the disk drive handle in until it locks.  
**Note:** It is important to ensure that the drive is fully seated all the way into the system when installing a disk drive.
- 

15.

1. If you removed a front cover, install the front cover
  2. Install or close the system, expansion unit or rack front door.
  3. Return to the console and wait until the Concurrent Maintenance Results display is shown. Press Enter.
  4. If you return to the service action log display, exit the service action log.
  5. When the Hardware Service Manager display is shown, press F3.
- 

16.

Rebuild the data on the replacement disk drive by:

1. If necessary, start System Service Tools (SST) by typing strsst on the command line of the IBM i session and pressing Enter.
2. Type your service tools user ID and service tools password on the Start Service Tools (STRSST) Sign On display. Press Enter.  
**Note:** The service tools password is case sensitive.
3. Select **Work with disk units** from the Start System Service Tools (SST) display. Press Enter.
4. Select **Work with disk unit recovery** from the Work with Disk Units display. Press Enter.

Was the failing disk drive mirrored?

**Yes:** Go to step 20 on page 91.

**No:** Continue with the next step.

---

17.

Was the failing disk drive parity protected?

**Yes:** Go to step 19.

**No:** Continue with the next step.

---

18.

Restore the data on the replacement disk drive from the latest backup available.

**Note:** Performing a restore is a customer task. Refer to the system's operations information for instructions.

---

19.

1. Select **Rebuild disk unit data** on the Work with Disk unit recovery display. Press Enter.
  2. Select 1 to rebuild the disk drive displayed (the disk drive displayed is the disk drive that you removed) on the Rebuild Disk Unit Data display. Press Enter.
  3. Press Enter on the Confirm Rebuild Disk Unit Data display. The rebuild process might take several minutes to complete.
  4. Press F5 to refresh the display until the **Percent complete** shows 5%.
  5. When the display shows at least 5% complete, you can either continue to monitor this display to completion, or press F3 (Exit) to return to the Work with disk units display.
  6. Press F3 (Exit) to return to the System service tools display.
  7. Press F3 (Exit) to return to the Exit SST display and press Enter.
- 

20.

1. Select **Replace configured unit** on the Work with Disk unit recovery display. Press Enter.
2. Select the configured disk drive that you are exchanging (suspended drive) on the Select Configured Unit to Replace display. Press Enter.
3. Select the disk drive that you just installed on the Select Replacement Unit display. This drive has a non-configured status.  
**Note:** In some cases, it might take several minutes for a new disk drive to display. Repeat these steps until the new drive is shown.  
Press Enter.
4. Press Enter on the Confirm Replace of Configured Unit display to confirm your choice for replacement.  
The replacement process might take several minutes to complete.  
When the process is complete, the Work with Disk unit recovery display is shown.
5. Press F3 (Exit) to return to the Work with disk units display.
6. Select **Display disk configuration** on the Work with disk units display.
7. Select **Display disk configuration status** on the Display Disk Configuration display.  
Mirrored status shows Resuming. When complete, the mirrored status shows Active. This process might take several minutes to complete. You can either monitor this display to completion, or press F3 (Exit) three times, and then press Enter to return to the main menu.

Was the failing disk drive mirrored?

**Yes:** Go to step 22 on page 92.

**No:** Continue with the next step.

---

21.

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

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

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

22. Go to Verifying a repair. **This completes this procedure.**

## Replacing the disk drive using Linux

This procedure is used to replace a disk drive in a location that is controlled by a system or logical partition that is running the Linux operating system.

### Preparing to remove the disk drive

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

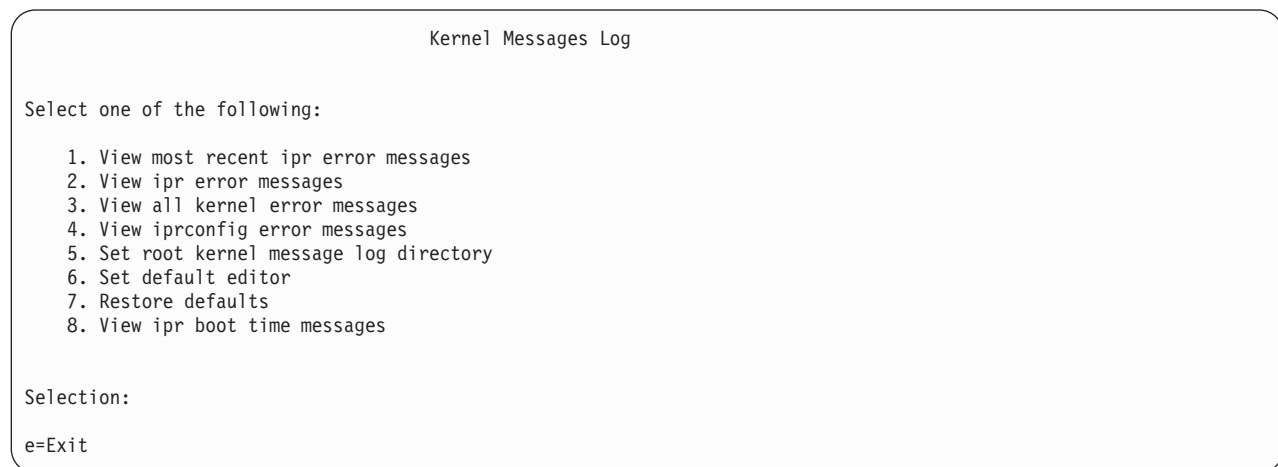


Figure 25. Kernel Messages Log

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

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

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

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

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

The IBM Power RAID Configuration Utility display is shown.

11. Select **Display hardware status** from the IBM Power RAID Configuration Utility display. Press Enter. The Display Hardware Status display is shown.

Display Hardware Status

Type option, press Enter.

1=Display hardware resource information details

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

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

Figure 26. Example Display Hardware Status

12. Look for the disk drive at the PCI location you recorded. The disk drive might have a failed status.
13. If the disk drive you want to replace is unprotected or in use, move the data from the disk drive before continuing with this procedure.  
For information, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.
14. Type option 1 (Display hardware resource information details) next to the disk drive you want to replace. Press Enter.

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

Disk Unit Hardware Resource Information Details	
Manufacturer . . . . .	: IBM
Product ID . . . . .	: ST336607LC
Firmware Version . . . . .	: 43353048 (C50H)
Serial Number. . . . .	: 00006719
Capacity . . . . .	: 36.40 GB
Resource Name. . . . .	: /dev/sdd
Physical location	
PCI Address. . . . .	: 0001:50:01.0
SCSI Host Number . . . . .	: 2
SCSI Channel . . . . .	: 0
SCSI Id. . . . .	: 4
SCSI Lun . . . . .	: 0
Extended Details	
FRU Number . . . . .	: 00P2676
Press Enter to Continue	
e=Exit q=Cancel f=PageDn b=PageUp	

Figure 27. Example Disk Hardware Resource Information Details display

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

## Removing the disk drive

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

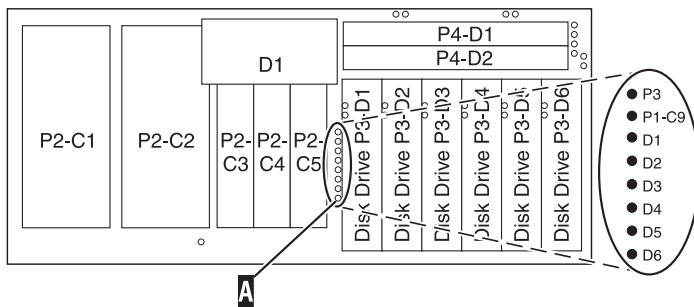
Concurrent Device Remove

Choose a single location for remove operations  
1=Select

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

Figure 28. Example Concurrent Device Remove display

3. Type option 1 (Select) next to the location for the disk drive you want to replace. Press Enter.
4. The Verify Device Concurrent Remove display is shown. The concurrent maintenance light turns on for that disk drive slot.



5. On the Verify Device Concurrent Remove display, verify that the selected disk drive is the disk drive you want to replace, then press Enter. The identify light turns on for the disk drive.

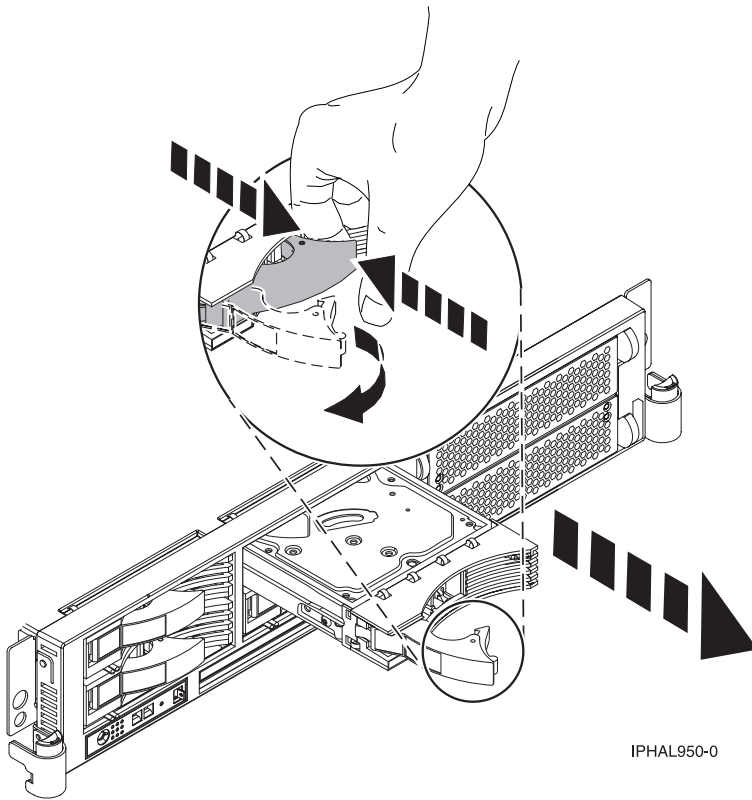
**Note:** Ensure that the disk drive is not in use to prevent loss of data.

6. The Complete Device Concurrent Remove display is shown.

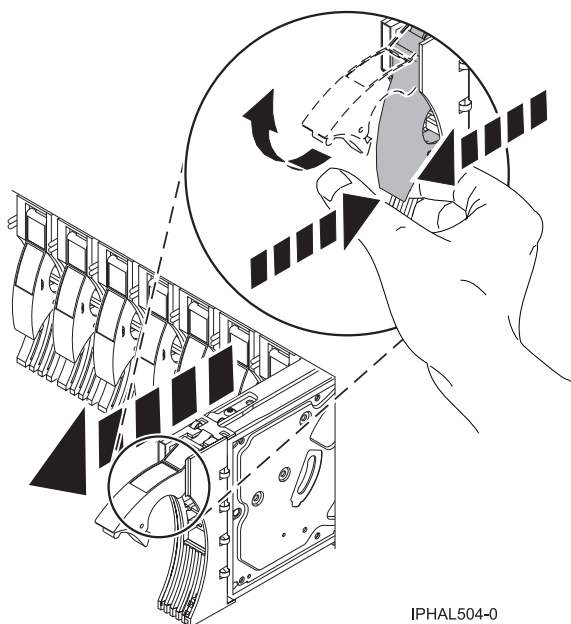


**Attention:**

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
  - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
  - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
7. Squeeze and pull the handle of the disk drive out toward you before you remove the disk drive as shown in Figure 29 or Figure 30 on page 96. If the handle is not all the way out, the disk drive will not slide out of the system or expansion unit.



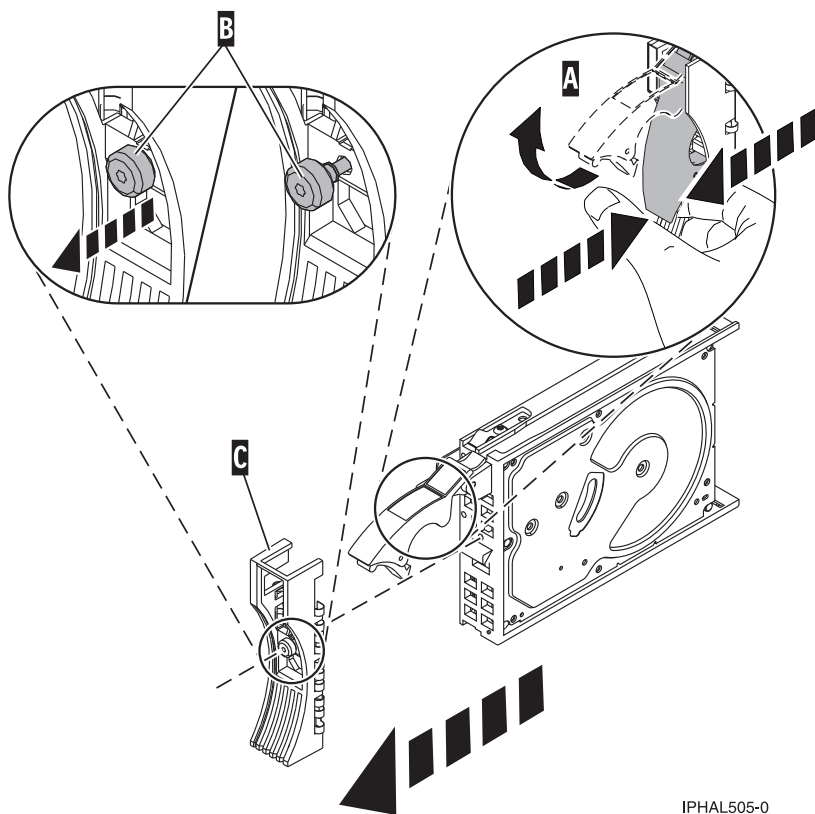
*Figure 29. Removing a disk drive from the system unit*



IPHAL504-0

Figure 30. Removing a disk drive from the system unit

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



IPHAL505-0

Figure 31. Removing a disk-drive bezel

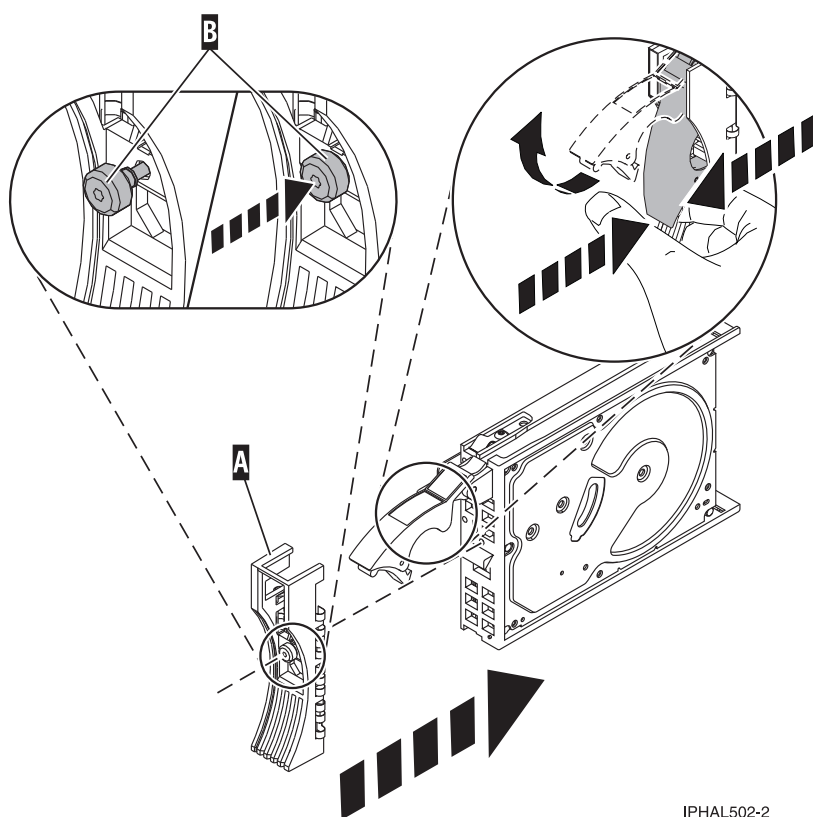
10. Press Enter on the IBM Power RAID Configuration Utility to indicate that you have removed the disk drive.

## Replacing the disk drive

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

**Attention:** Disk drives are fragile. Handle them with care.

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



IPHAL502-2

Figure 32. Attaching a bezel to the disk drive

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

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

Figure 33. Example Concurrent Device Add display

7. Type option 1 (Select) next to the location from which you removed the disk drive.  
The Verify Device Concurrent Add display is shown.
8. Press Enter on the Verify Device Concurrent Add display. The Complete Device Concurrent Add display is shown.
9. Support the bottom of the disk drive as you align it with the guide rails in the system or expansion unit. Do not hold the disk drive by the handle.
10. Slide the disk drive all the way into the system or expansion unit and then lock it in place by pushing in the disk drive handle, as shown in Figure 34 or Figure 35 on page 99.

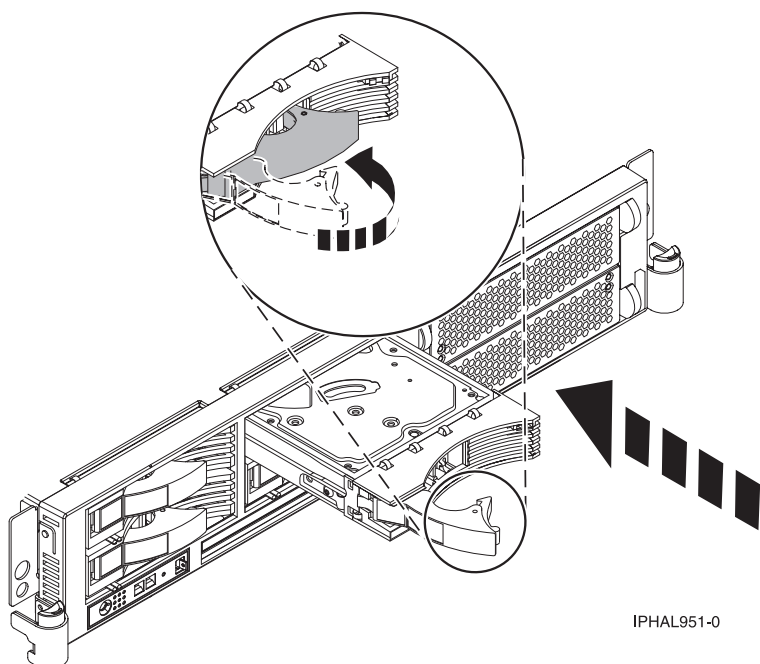


Figure 34. Installing a disk drive in the system unit

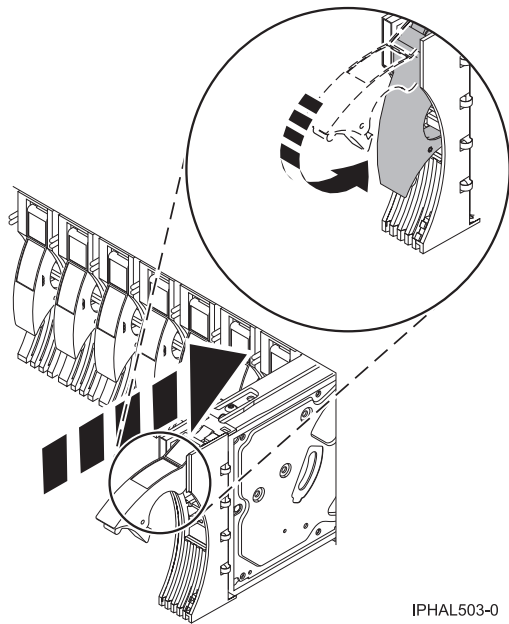


Figure 35. Installing a disk drive in the system unit

11. Press Enter on the Complete Device Concurrent Add display to indicate that the disk drive is installed.
12. Rebuild the data on the replacement disk drive. For instructions, go to “Rebuilding data on a replacement disk drive using Linux.”
13. Go to Verifying a repair. **This completes this procedure.**

## Rebuilding data on a replacement disk drive using Linux

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

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

### For an unprotected disk drive

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

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

For information on these tasks, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*, SA23-1327.

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## PCI adapter

Use this procedure to service a PCI adapter.

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing and replacing a PCI adapter. For instructions, see Removing a part using the Hardware Management Console.

The PCI adapter is serviced concurrently. Select the procedure below based on your operating system.

If you are doing a concurrent repair using the AIX operating system, go to Removing and replacing a PCI adapter contained in a cassette in an AIX partition that is powered on.

If you are doing a concurrent repair using the IBM i operating system, go to Removing and replacing a PCI adapter contained in a cassette in an IBM i partition that is powered on.

If you are doing a concurrent repair using the Linux operating system, go to Removing and replacing a PCI adapter contained in a cassette in a Linux partition that is powered on.

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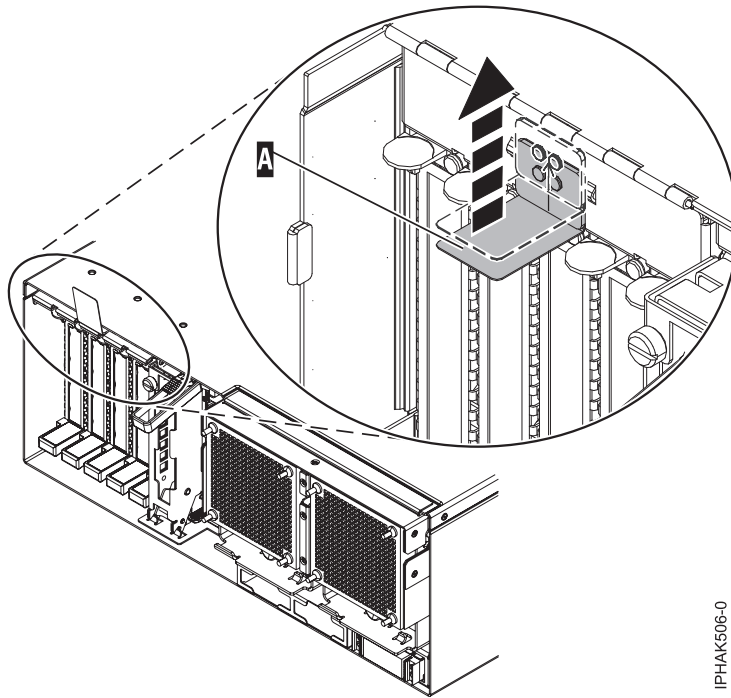
## Removing and replacing a PCI adapter contained in a cassette in an AIX partition that is powered on

Use this procedure to remove and replace a PCI adapter contained in a cassette with the power on.

Procedures performed on a PCI adapter in an AIX partition that is powered on, 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.

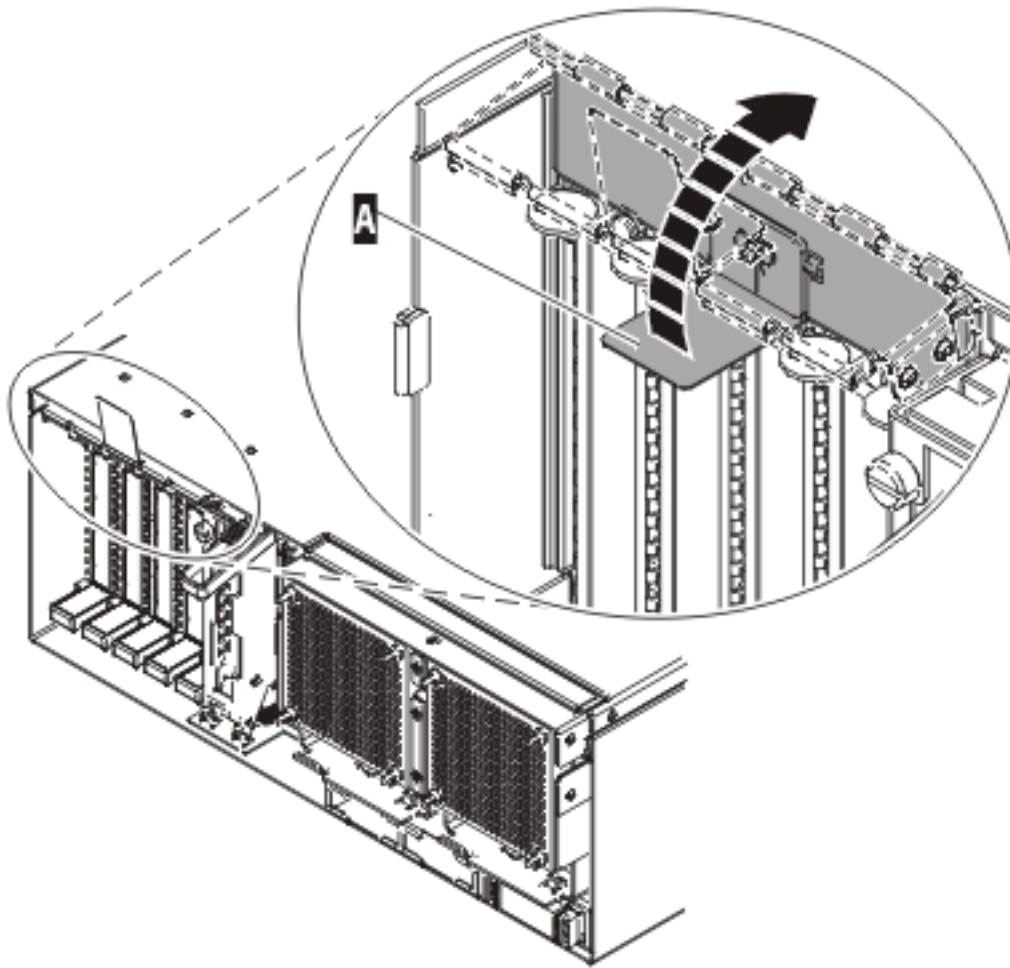
To remove and replace an adapter, do the following steps:

1. Determine the location of the PCI adapter in the system.
2. Record the slot number and location of each adapter being removed. 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. Enter the system diagnostics by logging in as root user or as the CE login user, then type `diag` at AIX command line.
5. When the DIAGNOSTIC OPERATING INSTRUCTIONS menu is displayed, press Enter.
6. At the FUNCTION SELECTION menu, select **Task Selection**, and then press enter.
7. At the Task Selection list, select **Hot Plug Manager**, and then select **PCI Hot Plug Manager**.
8. Select **Unconfigure a Device**, and then press Enter.
9. Press F4 (or Esc+4) to display the **Device Names** menu.
10. Select the adapter you are removing in the **Device Names** menu.
11. 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.
12. The **ARE YOU SURE** screen is displayed. 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.
13. Press F3 (or Esc +3) twice to return to the **Hot Plug Manager** menu.
14. Select **replace/remove PCI Hot Plug adapter**.
15. Select the slot that has the device to be removed from the system.
16. Select **Replace**. Or, if you need to remove an adapter without replacing it, select **Remove**. A fast-blinking amber LED located at the back of the machine near the adapter indicates that the slot has been identified.
17. Press Enter. This places the adapter in the action state, meaning it is ready to be removed from the system.
18. Label, and then disconnect all cables attached to the adapter you plan to remove.
19. Lift up on the PCI adapter EMC shield (**A**) as shown in Figure 36 on page 101 and then rotate it up and away from the cassette as shown in Figure 37 on page 102.



IPHA506-0

Figure 36. Lift up on the EMC shield



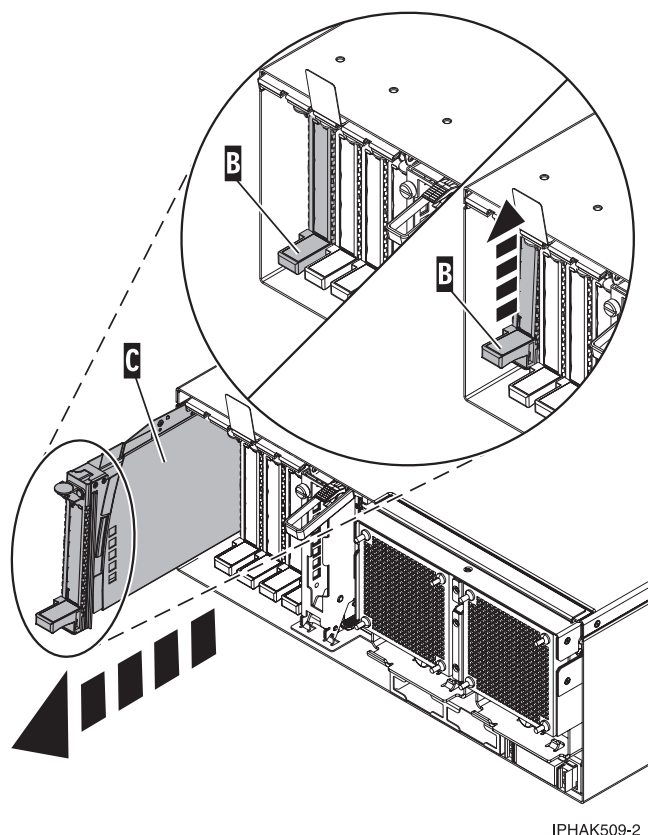
IPHAK507-0

Figure 37. Rotate the EMC shield into the open position

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

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

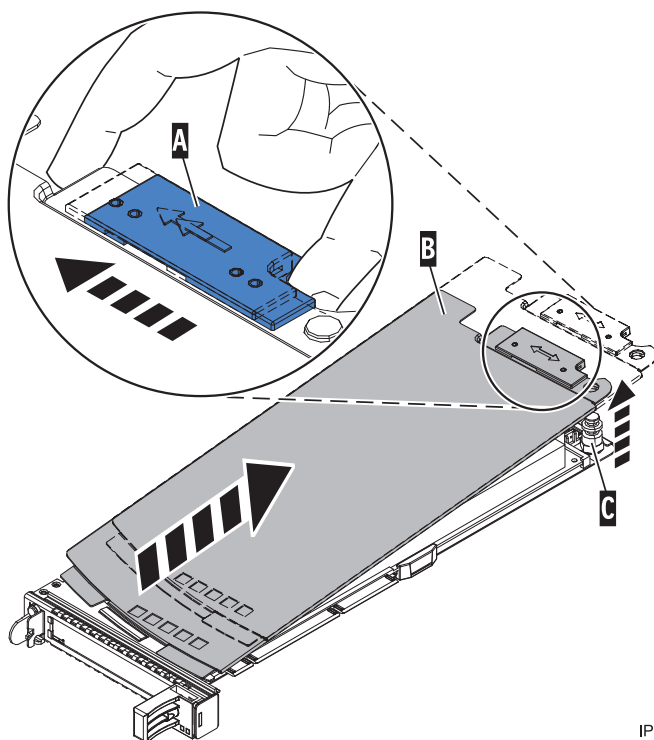




IPHAK509-2

Figure 38. PCI adapter cassette removed from the system unit

21. Place the cassette with the cover facing up on an approved ESD surface. The cover will have a label on it.
22. Install the replacement adapter into the PCI adapter cassette using the following instructions. If the cassette is not going to contain a replacement adapter, use this same procedure to place an adapter filler panel in the cassette. Follow these steps:
  - a. Remove the cassette cover by doing the following steps:
    - 1) Slide the cover latch (A) to disengage it from the pivot pin (C) as shown in the following figure.
    - 2) Lift the cover (B) off of the pivot pin.
    - 3) Slide the cover off of the cassette.



IPHA520-0

Figure 39. PCI adapter cassette cover removed

b. Remove the adapter from the cassette by doing the following steps:

- 1) Unlock the adapter retainers by rotating the retainer clip (A) into the horizontal position. See Figure 40 on page 105.

**Notes:**

- The edge of the adapter located at the end of the cassette that contains the cassette handles is called the adapter **tailstock**.
  - 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.
  - When the retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide away from the card.
  - If the corner support retainer is used, unlock it, and then slide the corner support retainer away from the card.
- 2) Push the adapter retainers (B) away from the adapter.
  - 3) Unlock the adapter tailstock clamp (C).
  - 4) 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.
  - 5) Lift the adapter out of the tailstock retaining channel.

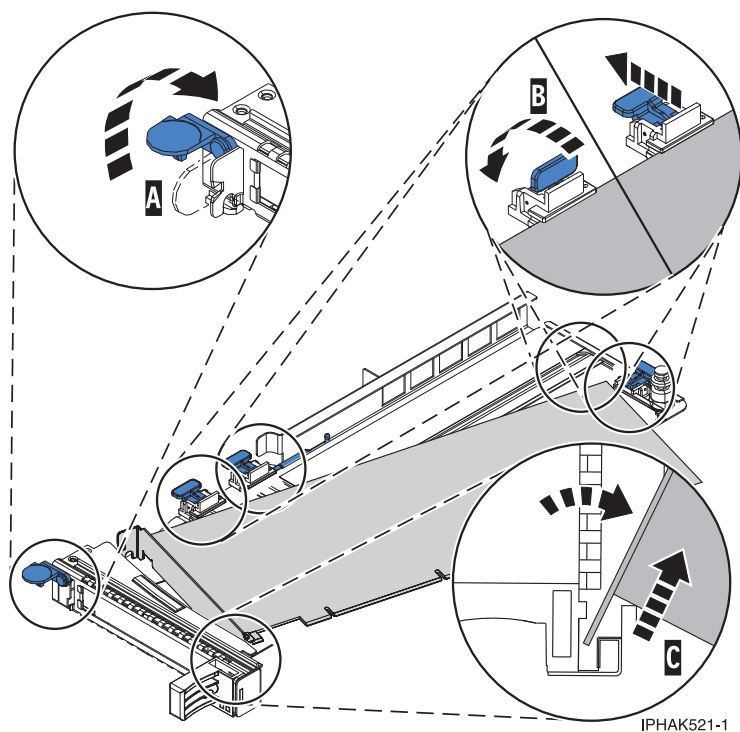
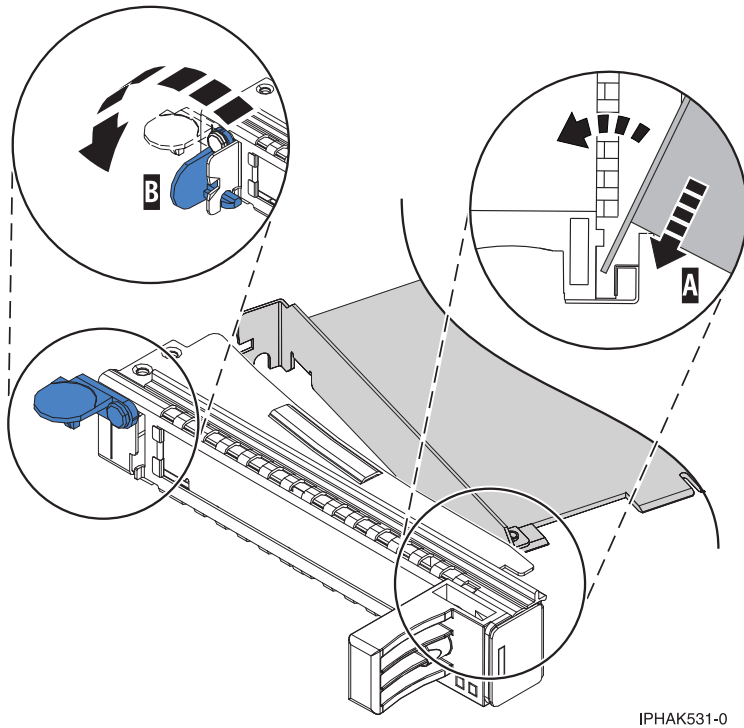


Figure 40. Adapter removed from the PCI adapter cassette

- c. Place the new adapter in the cassette.

**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. If the cassette is not going to contain a PCI adapter, use this same procedure to place an adapter filler panel in the cassette.

- 1) Remove any shipping handles or brackets attached to the adapter.
- 2) With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel (A). See Figure 41 on page 106.
- 3) Rotate the adapter toward the top of the cassette and into place.
- 4) Close the tailstock clamp.



IPHA531-0

Figure 41. Adapter removed from the PCI adapter single-width cassette

- 5) Position the adapter retainers to support the adapter, and then rotate the retainer clip **(B)** into the closed position. See Figure 41.

**Note:** 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. When the adapter retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide toward the adapter. 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
- Adapter-cassette retainer placement for mid-sized adapters
- Adapter-cassette retainer placement for small adapters

#### Adapter-cassette retainer placement for long adapters

- Place and lock the retainers **(B)**. See Figure 42 on page 107.

**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.

- 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.

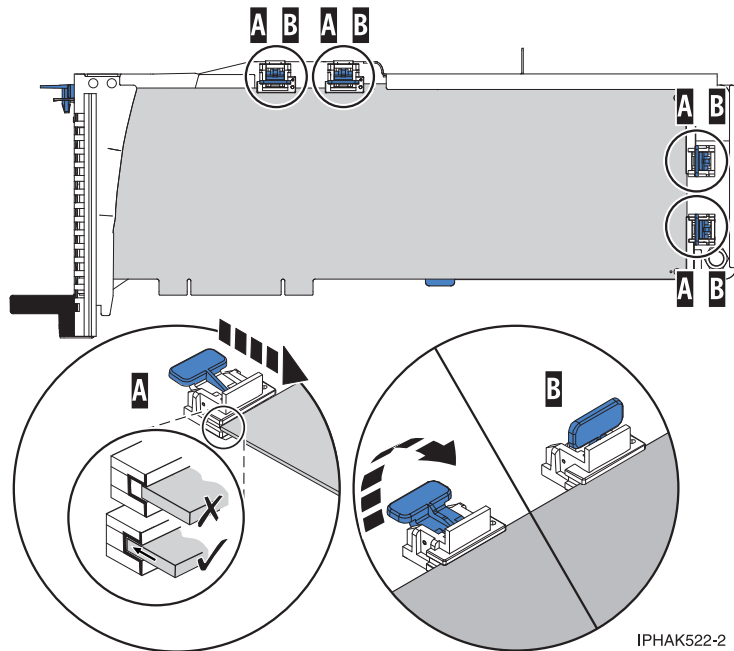
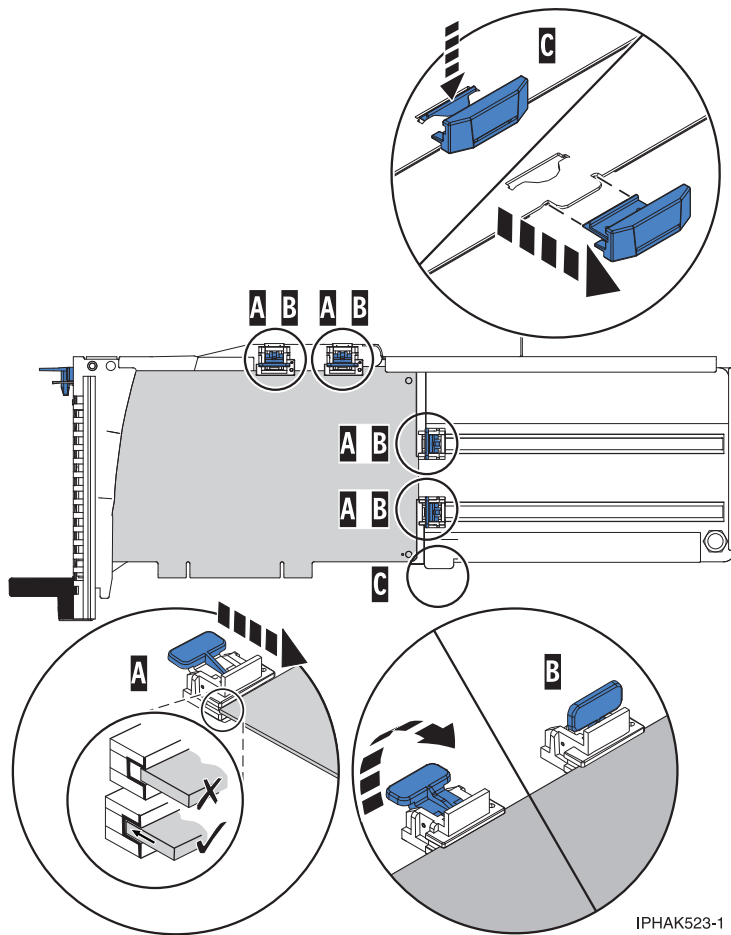


Figure 42. Long adapter in the PCI adapter cassette with the supports and stabilizer in place

#### Adapter-cassette retainer placement for medium-length adapters

- Remove the adapter stabilizer (C). See Figure 43 on page 108.
- Place and lock the retainers (B).
- Ensure the adapter edge is seated in each retainer groove (A). If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.



IPHAK523-1

Figure 43. Medium-length adapter in the PCI adapter cassette with the supports in place

#### Adapter-cassette retainer placement for short adapters

- Remove the adapter stabilizer (C). See Figure 44 on page 109.
- Place the hookarm (D) into the hole in the corner of the adapter. This supports the card when it is undocked from the connector on the system backplane.
- Place and lock the retainers (B).
- Ensure the adapter edge is seated in each retainer groove (A). If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.

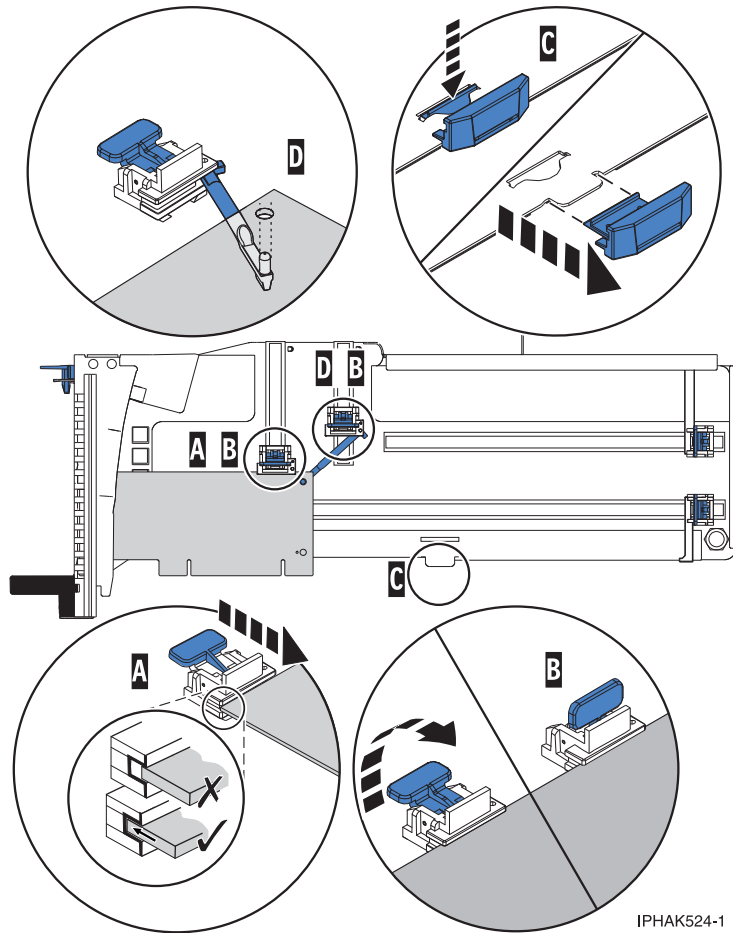
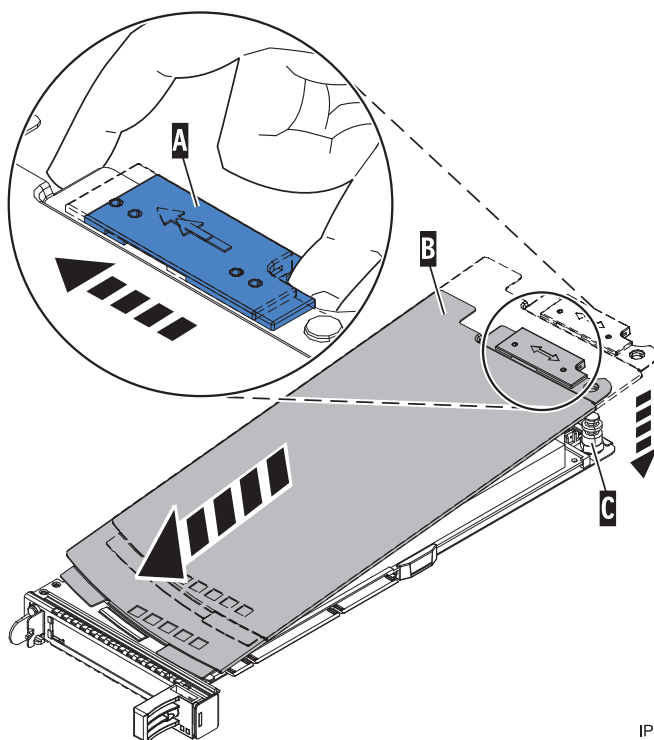


Figure 44. Short adapter in the PCI adapter cassette with the supports and the hookarm in place

- d. 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.

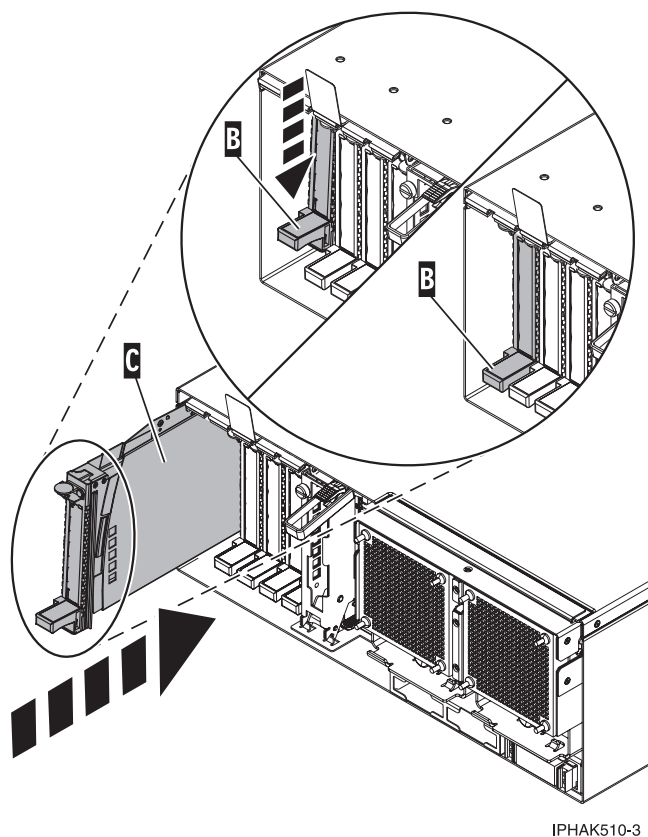


IPHAK530-0

*Figure 45. PCI adapter cassette cover replaced*

23. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.
24. 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.
25. Lift and hold the PCI adapter EMC shield in the open position. See Figure 36 on page 101 and Figure 37 on page 102.
26. Slide the cassette (C) into the cassette slot as shown in the following figure.
27. When the cassette is fully inserted into the system, firmly press downward on the lower cassette handle (B) to lock the adapter in its connector.

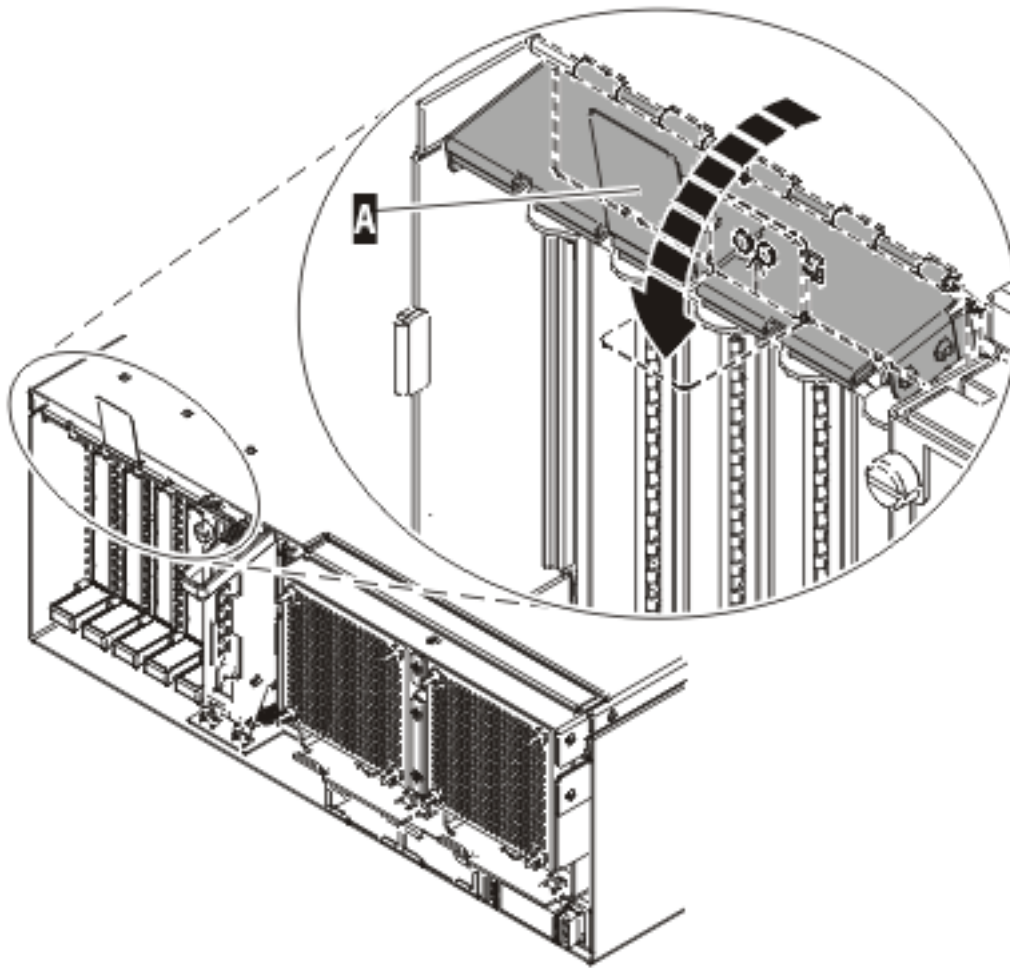




IPHAK510-3

*Figure 46. PCI adapter cassette removed from the system unit*

28. Connect the adapter cables.
29. Lower the PCI adapter EMC shield (A) into the closed position, close the shield latch, and then close the rear rack door.



IPHAK508-0

Figure 47. PCI adapter EMC shield in the closed position

30. Return to the AIX screen. Choose one of the following options:
  - If you are replacing an adapter, go to step 31.
  - If you removing an adapter without replacing it, follow these steps:
    - a. Press enter and continue to follow the screen instructions until you receive a message that the removal is successful. Successful removal is indicated by the OK message displayed next to the **Command** field at the top of the screen.
    - b. Press F10 to exit the Hot-Plug Manager.
    - c. Run the **diag -a** command. If the system responds with a menu or prompt, follow the instructions to complete the configuration.
    - d. Continue at step 41 on page 113.
31. Press enter and continue to follow the screen instructions 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 screen.
32. Press the F3 or Esc+3 key to return to the **PCI Hot-Plug Manager** menu.
33. Press the F3 or Esc+3 key to return to the **Hot-Plug Manager** menu.
34. Press the F3 or Esc+3 key to return to the **TASK** selection list.
35. Select **Log Repair Action**.
36. Select the resource just replaced, press Enter, press Commit (F7 or ESC 7), and then press Enter.

37. Press F3 or Esc+3 to return to **TASK Selection List**.
38. Select **Hot Plug Task**, and then press enter.
39. Select **PCI Hot Plug Manager**, then select **Configure a defined device**, and then press Enter.
40. Select the device just replaced from the list, and then press Enter. The device is now configured.
41. Press the F10 key to exit the diagnostic program.

## Removing and replacing a PCI adapter contained in a cassette in a Linux partition that is powered on

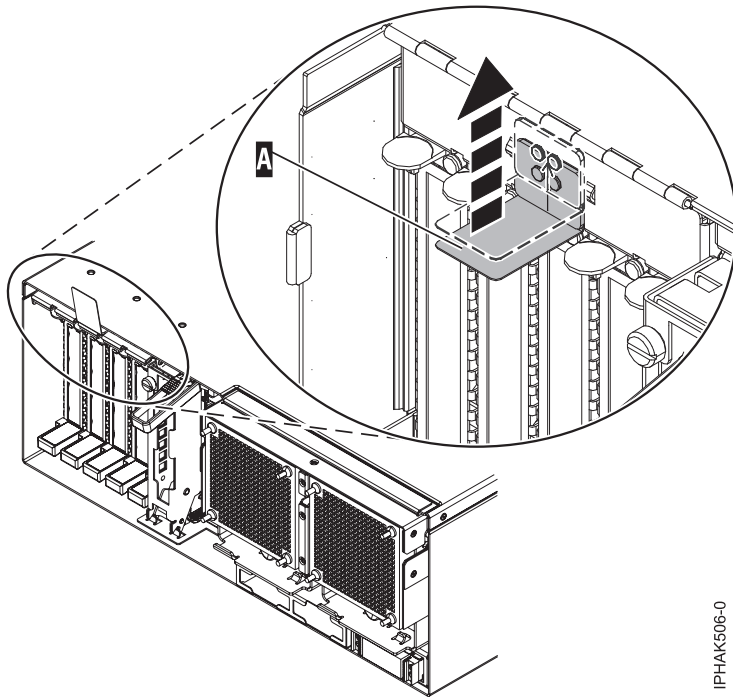
Procedures performed on a PCI adapter in a Linux partition that is powered on, also known as hot-plug procedures, require the system administrator to take the PCI adapter offline prior to performing the operation. Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

Before performing this procedure, do the following steps:

- Ensure that the system meets the “Prerequisites for hot-plugging PCI adapters in a Linux partition” on page 125
- “Verifying that the hot-plug PCI tools are installed on the Linux partition” on page 126.

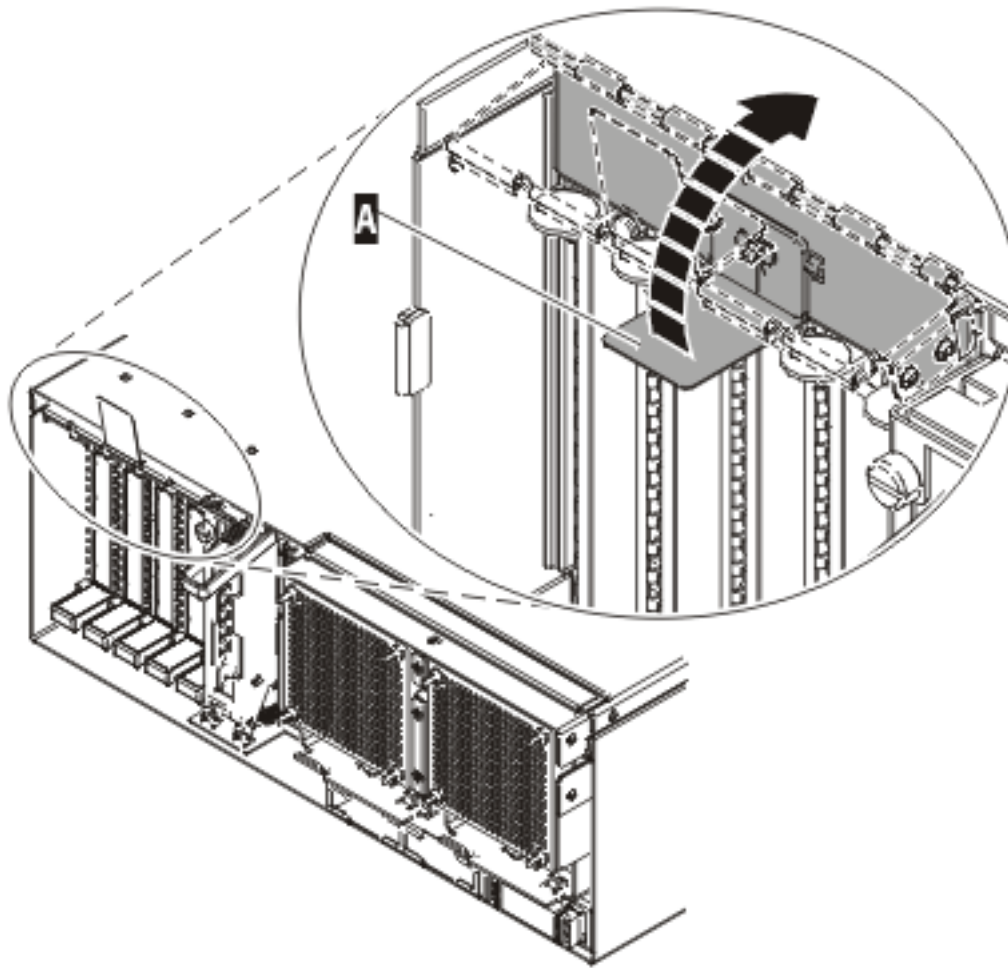
To remove and replace an adapter, do the following steps:

1. Determine the location of the PCI adapter in the system.
2. Record the slot number and location of each adapter being removed. 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. Run the `drslot_chrp_pci` 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:  
`drslot_chrp_pci -R -s U7879.001.DQD014E-P1-C3`  
Follow the instructions on the display to complete the task.
5. Label, and then disconnect all cables attached to the adapter you plan to remove.
6. Lift up on the PCI adapter EMC shield (**A**) as shown in Figure 48 on page 114 and then rotate it up and away from the cassette as shown in Figure 49 on page 115.



IPHAK506-0

Figure 48. Lift up on the EMC shield

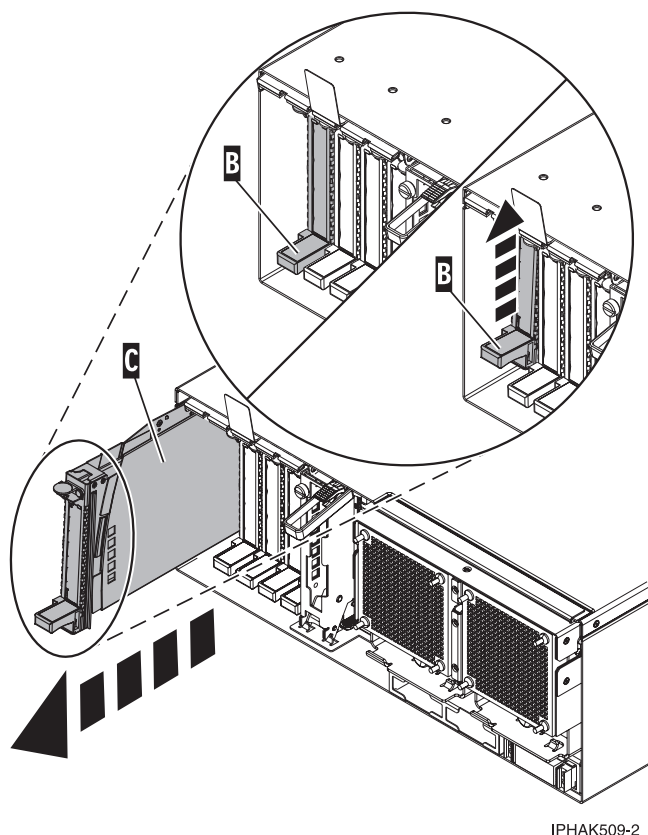


IPHAK907-0

Figure 49. Rotate the EMC shield into the open position

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

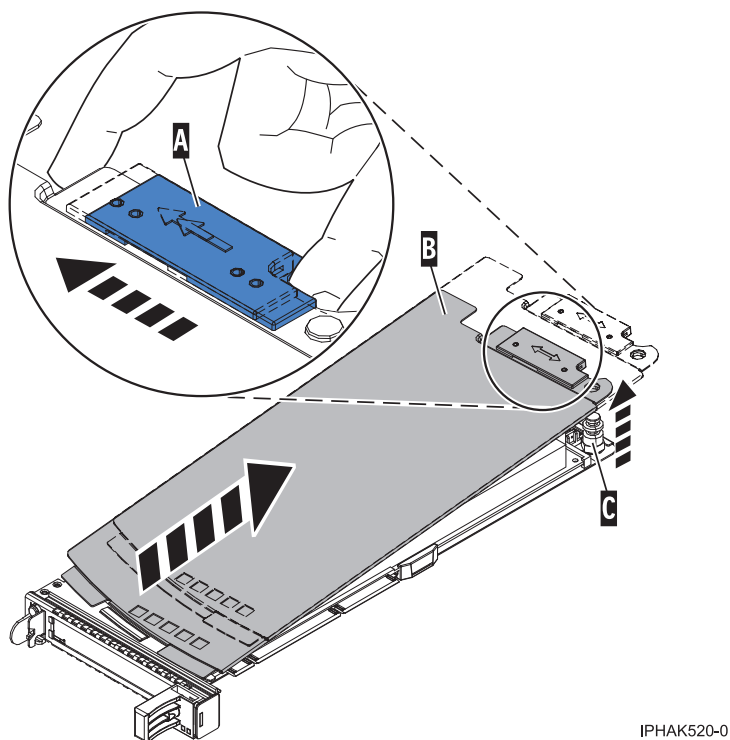
**Attention:** A cassette containing either a PCI adapter or filler panel must be placed in the PCI adapter slot of the system unit for proper air flow and cooling.



IPHAK509-2

Figure 50. PCI adapter cassette removed from the system unit

8. Place the cassette with the cover facing up on an approved ESD surface. The cover will have a label on it.
9. Install the replacement adapter into the PCI adapter cassette using the following instructions. If the cassette is not going to contain a replacement adapter, use this same procedure to place an adapter filler panel in the cassette. Follow these steps:
  - a. Remove the cassette cover by doing the following steps:
    - 1) Slide the cover latch (A) to disengage it from the pivot pin (C) as shown in the following figure.
    - 2) Lift the cover (B) off of the pivot pin.
    - 3) Slide the cover off of the cassette.



IPHA520-0

Figure 51. PCI adapter cassette cover removed

b. Remove the adapter from the cassette by doing the following steps:

- 1) Unlock the adapter retainers by rotating the retainer clip (A) into the horizontal position. See Figure 52 on page 118.

**Notes:**

- The edge of the adapter located at the end of the cassette that contains the cassette handles is called the adapter **tailstock**.
  - 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.
  - When the retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide away from the card.
  - If the corner support retainer is used, unlock it, and then slide the corner support retainer away from the card.
- 2) Push the adapter retainers (B) away from the adapter.
  - 3) Unlock the adapter tailstock clamp (C).
  - 4) 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.
  - 5) Lift the adapter out of the tailstock retaining channel.

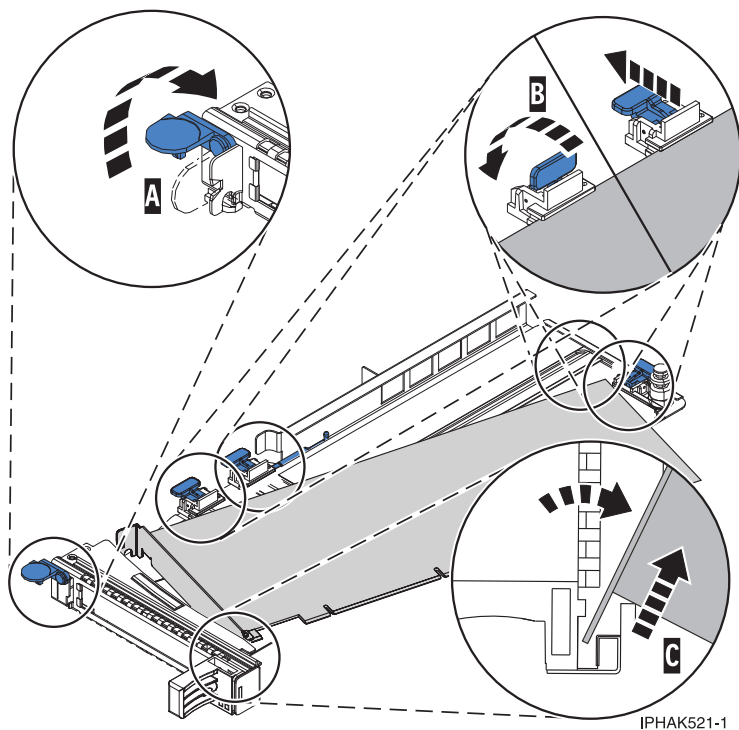


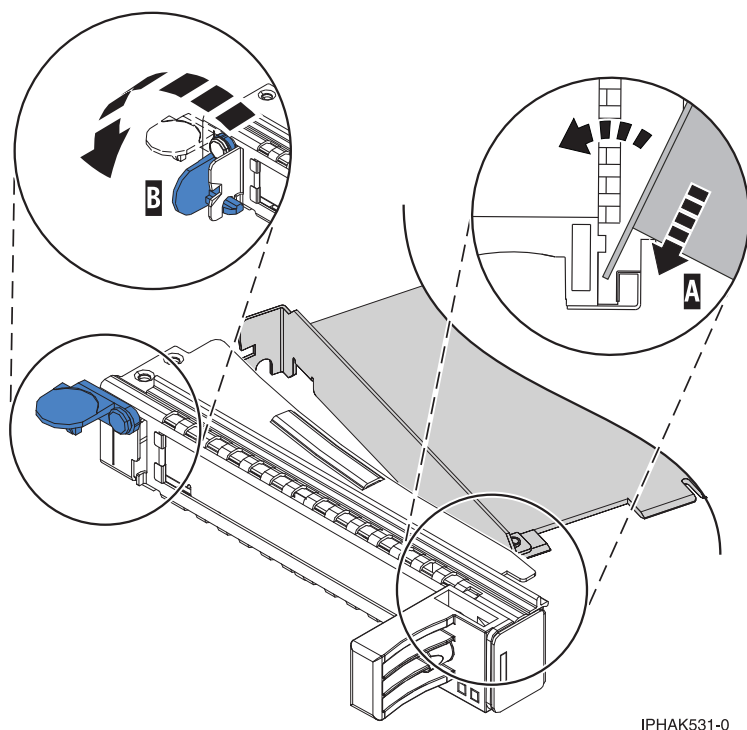
Figure 52. Adapter removed from the PCI adapter cassette

- c. Place the new adapter in the cassette.

**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. If the cassette is not going to contain a PCI adapter, use this same procedure to place an adapter filler panel in the cassette.

- 1) Remove any shipping handles or brackets attached to the adapter.
- 2) With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel (A). See Figure 53 on page 119.
- 3) Rotate the adapter toward the top of the cassette and into place.
- 4) Close the tailstock clamp.





IPHA531-0

Figure 53. Adapter removed from the PCI adapter single-width cassette

- 5) Position the adapter retainers to support the adapter, and then rotate the retainer clip (B) into the closed position. See Figure 53.

**Note:** 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. When the adapter retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide toward the adapter. 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
- Adapter-cassette retainer placement for mid-sized adapters
- Adapter-cassette retainer placement for small adapters

#### Adapter-cassette retainer placement for long adapters

- Place and lock the retainers (B). See Figure 54 on page 120.

**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.

- 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.

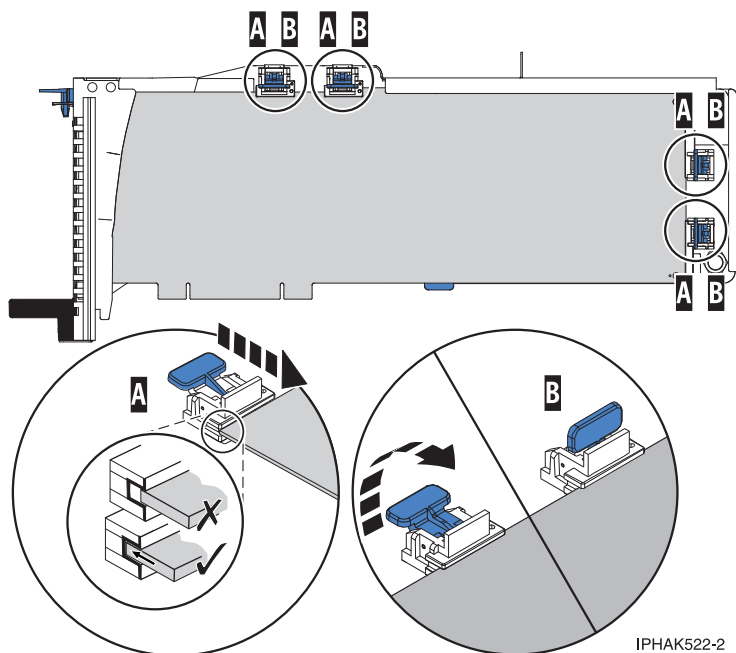


Figure 54. Long adapter in the PCI adapter cassette with the supports and stabilizer in place

#### Adapter-cassette retainer placement for medium-length adapters

- Remove the adapter stabilizer (C). See Figure 55 on page 121.
- Place and lock the retainers (B).
- Ensure the adapter edge is seated in each retainer groove (A). If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.

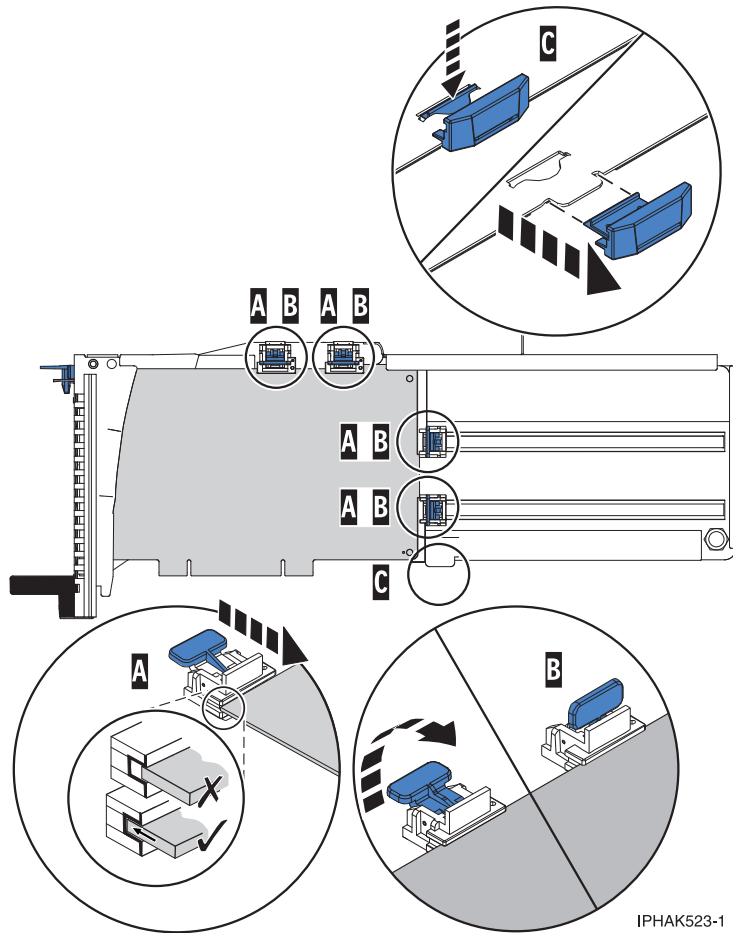


Figure 55. Medium-length adapter in the PCI adapter cassette with the supports in place

#### Adapter-cassette retainer placement for short adapters

- Remove the adapter stabilizer (C). See Figure 56 on page 122.
- Place the hookarm (D) into the hole in the corner of the adapter. This supports the card when it is undocked from the connector on the system backplane.
- Place and lock the retainers (B).
- Ensure the adapter edge is seated in each retainer groove (A). If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.

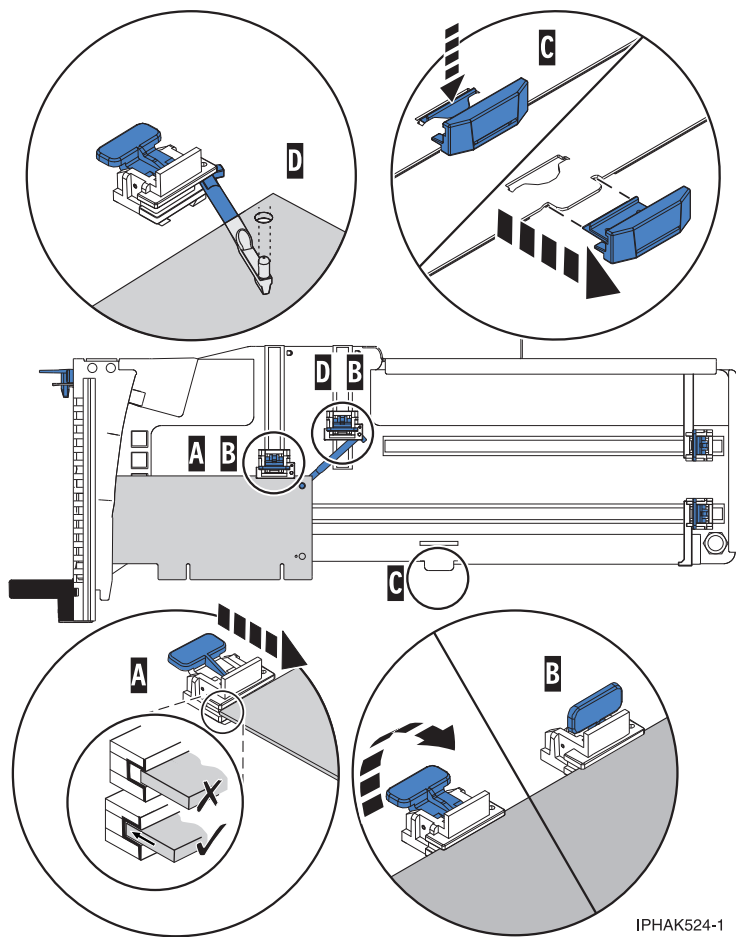
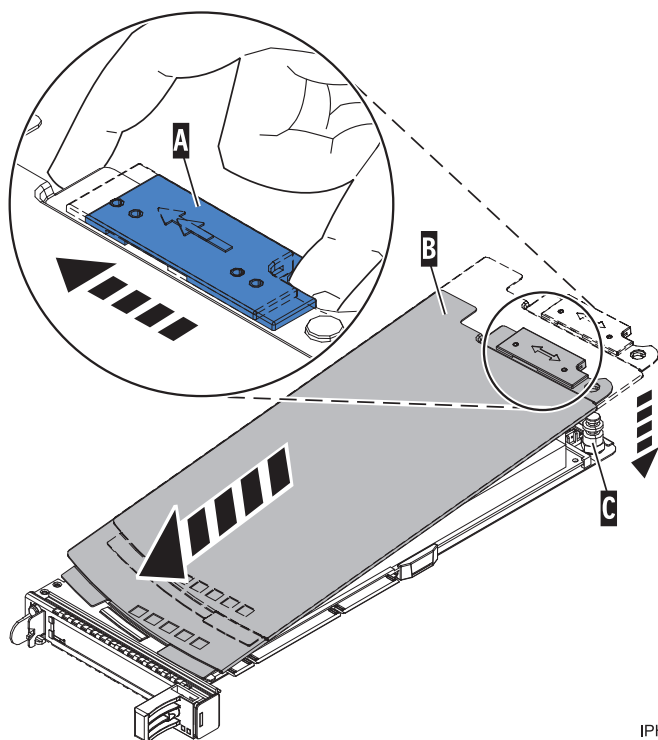


Figure 56. Short adapter in the PCI adapter cassette with the supports and the hookarm in place

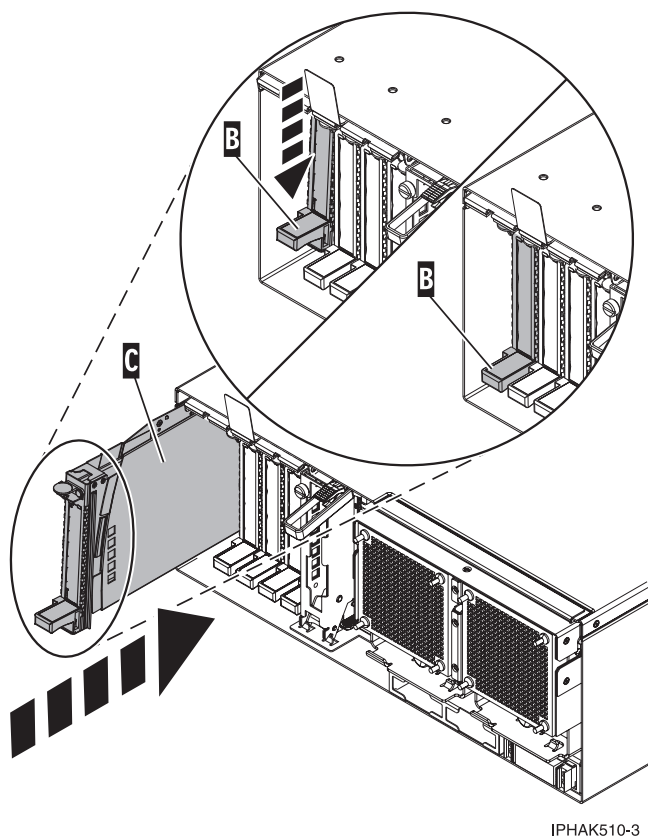
- d. Replace the cassette cover by doing the following steps:
  - 1) Slide the cover **(B)** into position on the cassette.
  - 2) While holding the cover latch **(A)** in the open position, place the cover over the pivot pin **(C)**.
  - 3) Release the cover latch to lock the cover into place.



IPHA530-0

*Figure 57. PCI adapter cassette cover replaced*

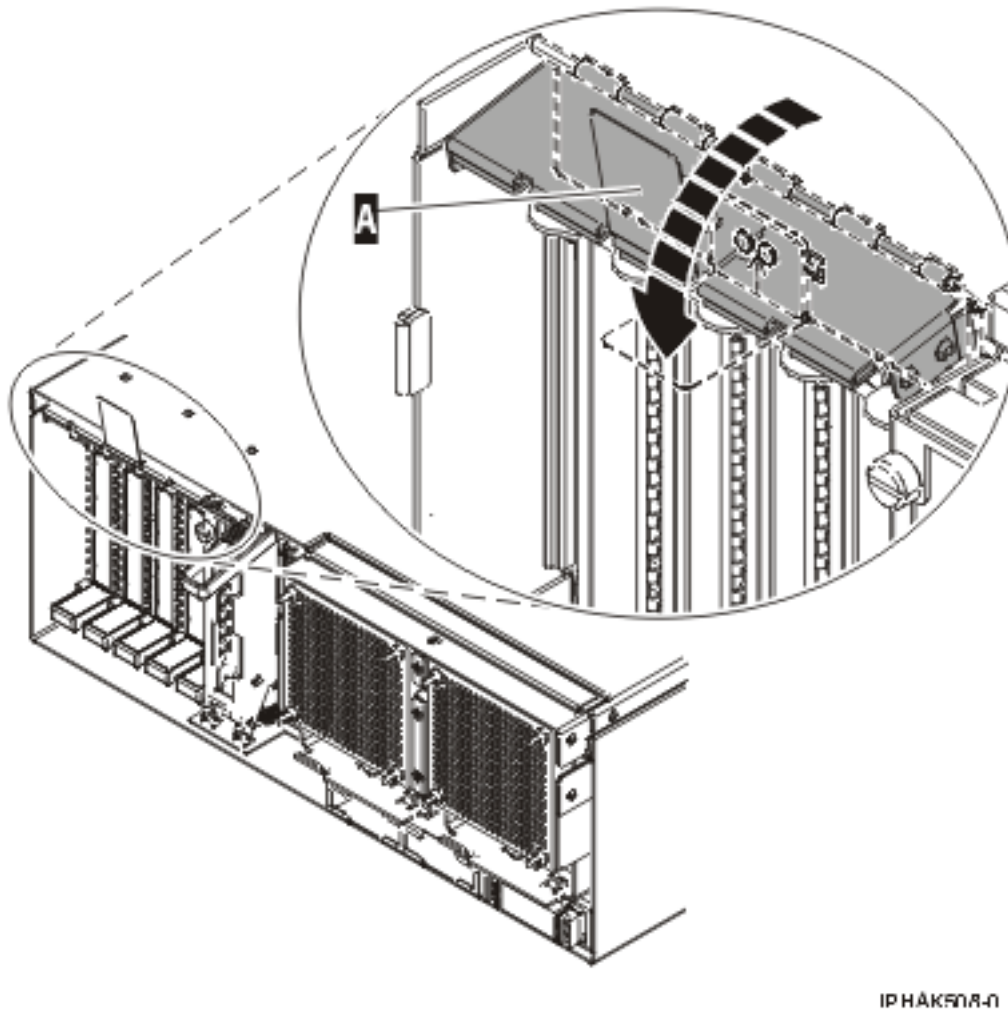
10. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.
11. Ensure the lower cassette handle is pressed up toward the retainer clip. This places the adapter in the correct position to be docked in the system.
12. Lift and hold the PCI adapter EMC shield in the open position. See Figure 48 on page 114 and Figure 49 on page 115.
13. Slide the cassette (C) into the cassette slot as shown in the following figure.
14. When the cassette is fully inserted into the system, firmly press downward on the lower cassette handle (B) to lock the adapter in its connector.



IPHAK510-3

*Figure 58. PCI adapter cassette removed from the system unit*

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



IP HAK508-0

Figure 59. PCI adapter EMC shield in the closed position

17. 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
```

### Prerequisites for hot-plugging PCI adapters in a Linux partition

When you install, remove, or replace a PCI adapter in a Linux partition that is powered on, you might need to complete some prerequisite tasks.

The Linux system administrator needs to take the PCI adapter offline prior to removing, replacing, or installing a PCI adapter with the system power on (hot-plugging). Before taking an adapter offline, the devices attached to the adapter must be taken offline as well. This action prevents a service representative or user from causing an unexpected outage for system users.

Before hot-plugging adapters for storage devices, ensure file systems on those devices are unmounted. After hot-plugging adapters for storage devices, ensure the file systems on those devices are remounted.

Before hot-plugging an adapter, ensure that the server or partition is at the correct level of the Linux operating system (Linux operating system 2.6 or later).

Install the Linux Service Aids. These service aids enable system serviceability, as well to improve system management.

If you are using a Linux distribution with Linux kernel version 2.6 or greater, you can install the Service Aids that gives you access to more capabilities, which can help you diagnose problems on your system.

This software is available at the Service and productivity tools for Linux Web site. (<http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags>)

## Verifying that the hot-plug PCI tools are installed on the Linux partition

When you install, remove, or replace a PCI adapter in a Linux partition that is powered on, you might need to use the hot-plug PCI tools. Use this procedure to verify that you have the hot-plug PCI tools installed.

1. Enter the following command to verify that the hot-plug PCI tools are installed:

```
rpm -aq | grep rpa-pci-hotplug
```

If the command does not list any rpa-pci-hotplug packages, the PCI Hot Plug tools are not installed.

2. Enter the following command to ensure that the rpaphp driver is loaded:

```
ls -l /sys/bus/pci/slots/
```

The directory should contain data. If the directory is empty, the driver is not loaded or the system does not contain hot-plug PCI slots. The following is an example of the information displayed by this command:

```
drwxr-xr-x 15 root root 0 Feb 16 23:31 .
drwxr-xr-x  5 root root 0 Feb 16 23:31 ..
drwxr-xr-x  2 root root 0 Feb 16 23:31 0000:00:02.0
drwxr-xr-x  2 root root 0 Feb 16 23:31 0000:00:02.2
drwxr-xr-x  2 root root 0 Feb 16 23:31 0000:00:02.4
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.0
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.2
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.4
drwxr-xr-x  2 root root 0 Feb 16 23:31 0001:00:02.6
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.0
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.2
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.4
drwxr-xr-x  2 root root 0 Feb 16 23:31 0002:00:02.6
```

If the directory does not exist, run the following command to mount the filesystem:

```
mount -t sysfs sysfs /sys
```

3. Ensure the following tools are available in the /usr/sbin directory.

- lsslot
- drslot\_chrp\_pci

4. Return to the procedure that sent you here.

## Removing and replacing a PCI adapter contained in a cassette in an IBM i partition that is powered on

Procedures performed on a PCI adapter in an IBM i partition that is powered on, 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 and replace an adapter, do the following steps:

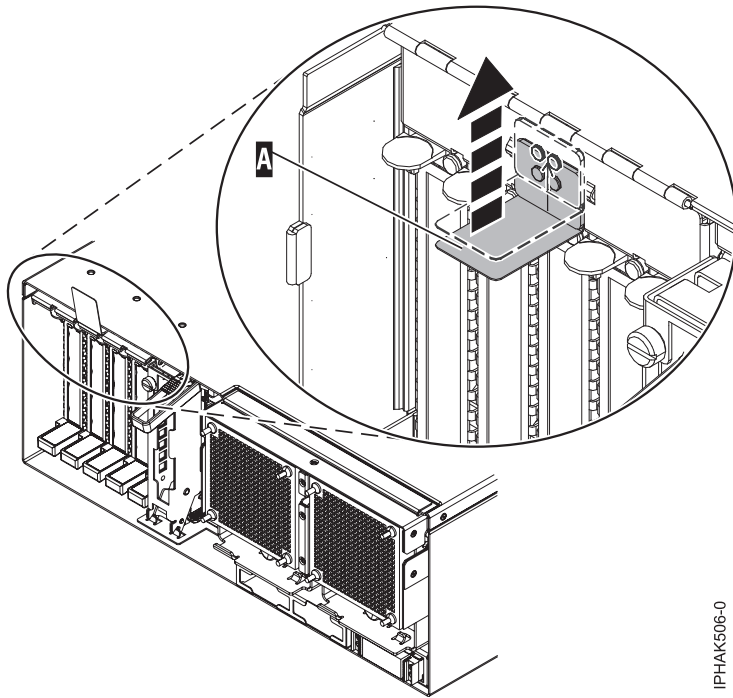
1. Determine the location of the PCI adapter in the system.



2. Record the slot number and location of each adapter being removed. Adapter slots are numbered either below or along the side of each adapter slot.
3. Ensure that any processes or applications that might use the adapter are stopped.
4. Go to your terminal and type **strsst** on the command line of the Main Menu and press Enter.
5. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
6. Select **Start a service tool** from the System Service Tools (SST) display. Press Enter.
7. Select **Hardware service manager** from the Start a Service Tool display and press Enter.
8. Select **Packaging hardware resources (system, frames, cards)** from the Hardware Service Manager display. Press Enter.
9. Type 9 (Hardware contained within package) in the System Unit or Expansion Unit field of the unit where you are removing the card, then press Enter.
10. Select the option to **Include empty positions**.
11. Select **Concurrent Maintenance** on the card position where you want to remove the card and then press Enter.
12. Select the option to **Toggle LED blink off/on**. A light-emitting diode (LED) located on your system or I/O enclosure blinks identifying the PCI adapter position you chose. Physically verify that this is the slot where you want to remove the adapter.
13. Select the option to **Toggle LED blink off/on** to stop the blinking LED.
14. Select the option to **Power off domain** on the Hardware Resource Concurrent Maintenance display and press Enter.
15. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message: Power off complete
16. Label, and then disconnect all cables attached to the adapter you plan to remove.
17. Record the slot number and location of each adapter being removed.

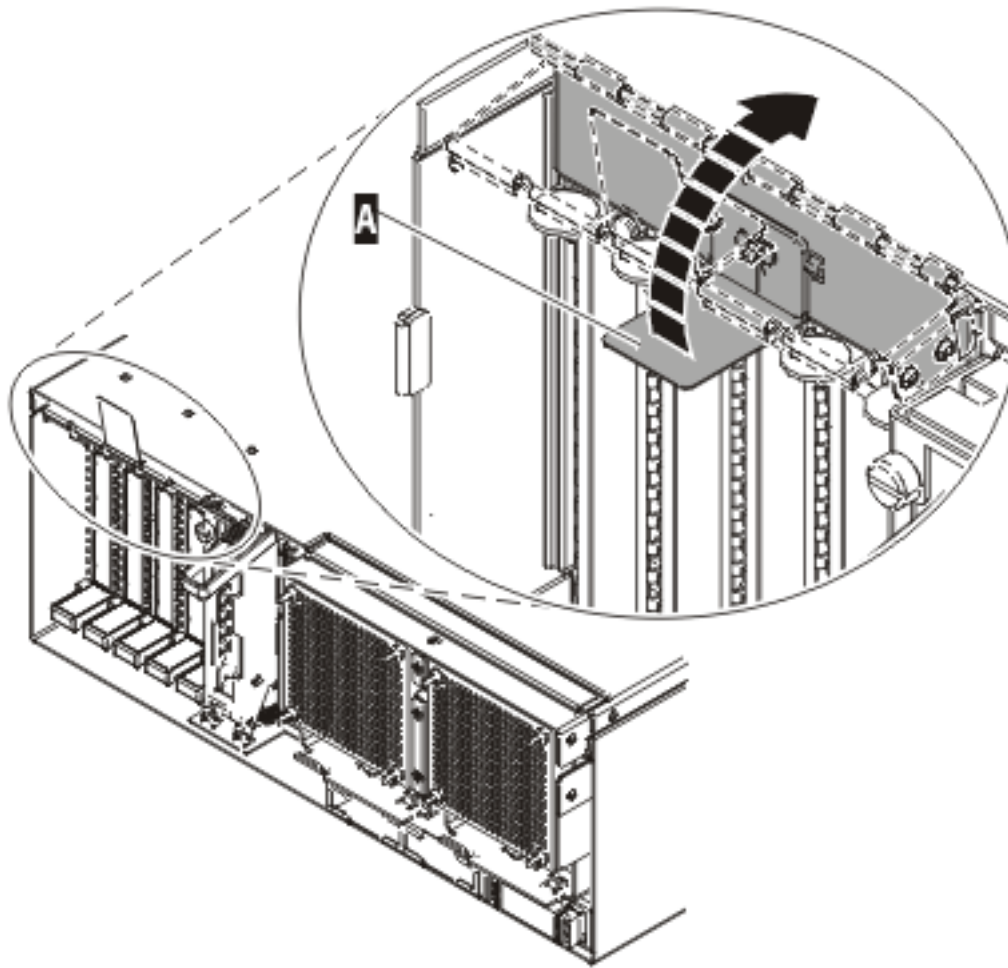
**Note:** Adapter slots are numbered below or along side of each PCI adapter slot.

18. Lift up on the PCI adapter EMC shield (**A**) as shown in Figure 60 on page 128, and then rotate it up and away from the cassette as shown in Figure 61 on page 129.



IPHAK506-0

Figure 60. Lift up on the EMC shield

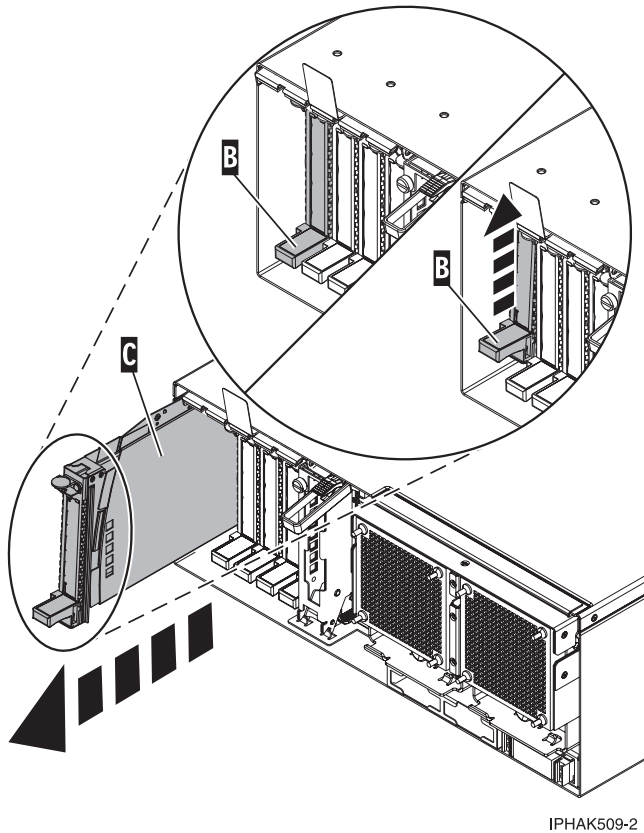


IPHAK507-0

Figure 61. Rotate the EMC shield into the open position

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

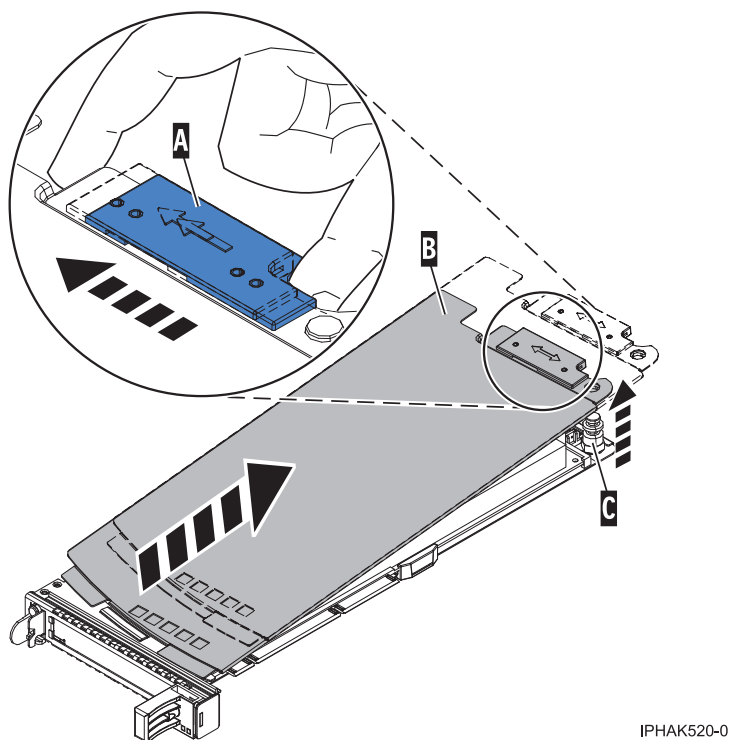
**Attention:** A cassette containing either a PCI adapter or filler panel must be placed in the PCI adapter slot of the system unit for proper air flow and cooling.



IPHAK509-2

Figure 62. PCI adapter cassette removed from the system unit

20. Place the cassette with the cover facing up on an approved ESD surface. The cover will have a label on it.
21. Install the replacement adapter into the PCI adapter cassette using the following instructions. If the cassette is not going to contain a replacement adapter, use this same procedure to place an adapter filler panel in the cassette. Follow these steps:
  - a. Remove the cassette cover by doing the following steps:
    - 1) Slide the cover latch (A) to disengage it from the pivot pin (C) as shown in the following figure.
    - 2) Lift the cover (B) off of the pivot pin.
    - 3) Slide the cover off of the cassette.



IPHA520-0

Figure 63. PCI adapter cassette cover removed

b. Remove the adapter from the cassette by doing the following steps:

- 1) Unlock the adapter retainers by rotating the retainer clip (A) into the horizontal position. See Figure 64 on page 132.

**Notes:**

- The edge of the adapter located at the end of the cassette that contains the cassette handles is called the adapter **tailstock**.
  - 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.
  - When the retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide away from the card.
  - If the corner support retainer is used, unlock it, and then slide the corner support retainer away from the card.
- 2) Push the adapter retainers (B) away from the adapter.
  - 3) Unlock the adapter tailstock clamp (C).
  - 4) 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.
  - 5) Lift the adapter out of the tailstock retaining channel.

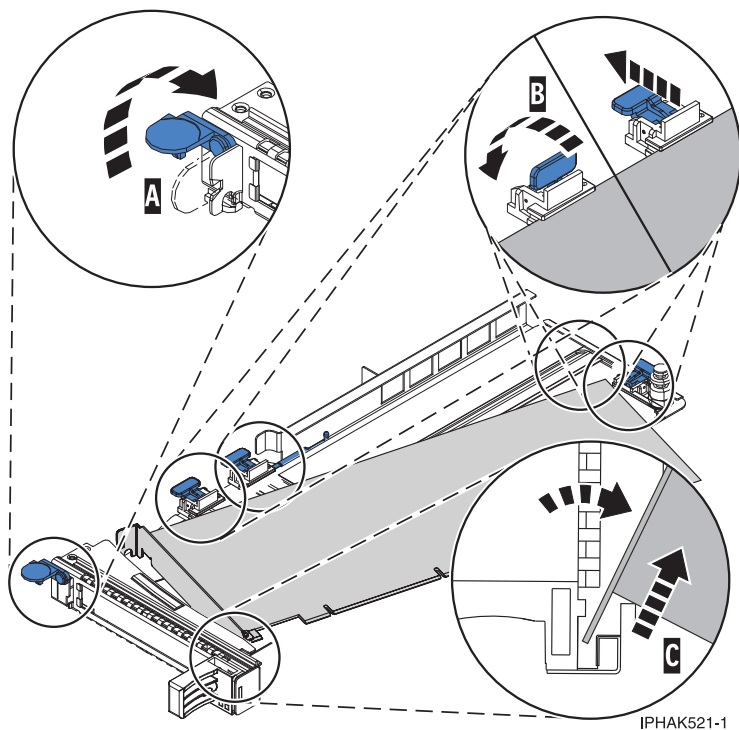
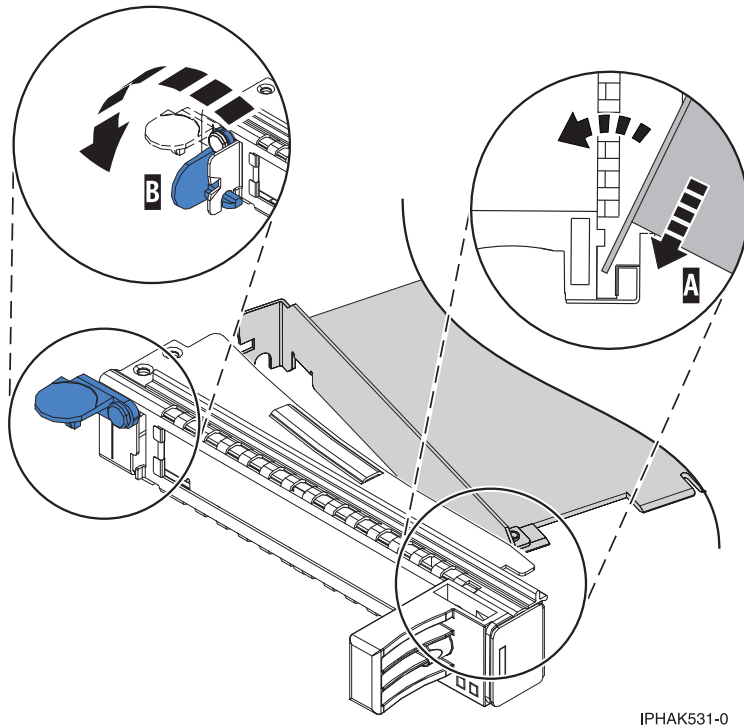


Figure 64. Adapter removed from the PCI adapter cassette

- c. Place the new adapter in the cassette.

**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. If the cassette is not going to contain a PCI adapter, use this same procedure to place an adapter filler panel in the cassette.

- 1) Remove any shipping handles or brackets attached to the adapter.
- 2) With the tailstock clamp in the open position, insert the adapter firmly into the tailstock retaining channel (A). See Figure 65 on page 133.
- 3) Rotate the adapter toward the top of the cassette and into place.
- 4) Close the tailstock clamp.



IPHA531-0

Figure 65. Adapter removed from the PCI adapter single-width cassette

- 5) Position the adapter retainers to support the adapter, and then rotate the retainer clip **(B)** into the closed position. See Figure 65

**Note:** 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. When the adapter retainer clip is in the horizontal position, the adapter retainers are unlocked and can slide toward the adapter. 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
- Adapter-cassette retainer placement for mid-sized adapters
- Adapter-cassette retainer placement for small adapters

#### Adapter-cassette retainer placement for long adapters

- Place and lock the retainers **(B)**. See Figure 66 on page 134.

**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.

- 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.

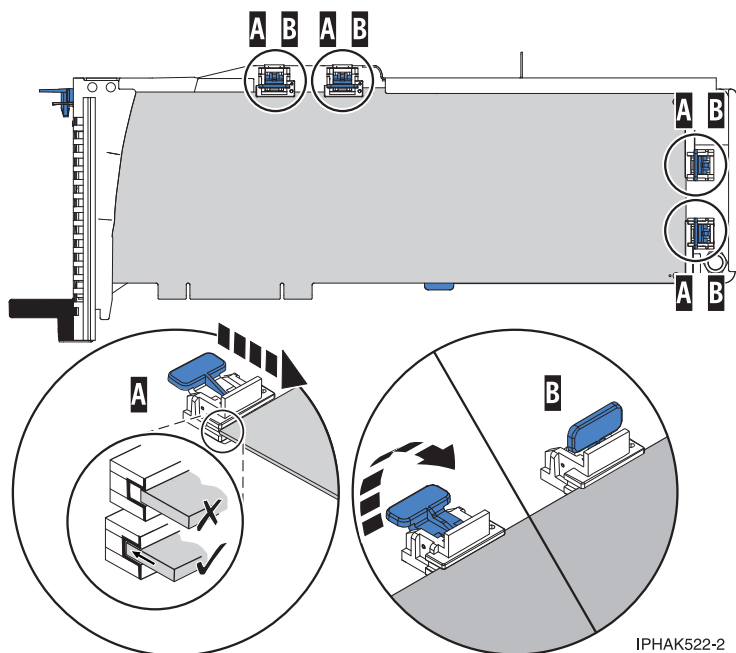
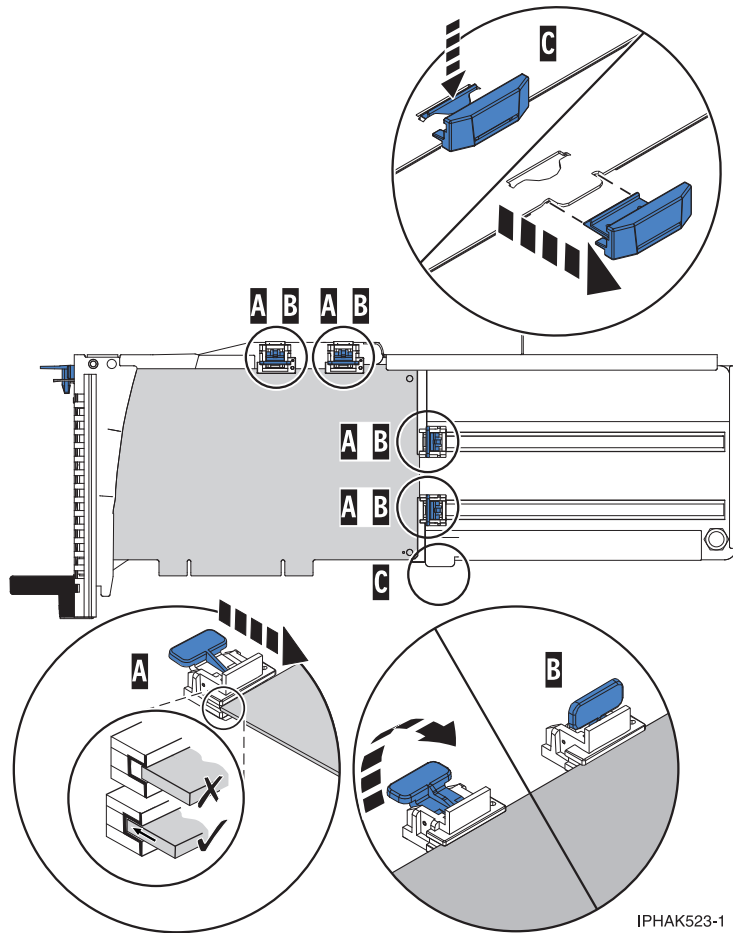


Figure 66. Long adapter in the PCI adapter cassette with the supports and stabilizer in place

#### Adapter-cassette retainer placement for medium-length adapters

- Remove the adapter stabilizer (C). See Figure 67 on page 135.
- Place and lock the retainers (B).
- Ensure the adapter edge is seated in each retainer groove (A). If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.





IPHAK523-1

Figure 67. Medium-length adapter in the PCI adapter cassette with the supports in place

#### Adapter-cassette retainer placement for short adapters

- Remove the adapter stabilizer (C). See Figure 68 on page 136.
- Place the hook arm (D) into the hole in the corner of the adapter. This supports the card when it is undocked from the connector on the system backplane.
- Place and lock the retainers (B).
- Ensure the adapter edge is seated in each retainer groove (A). If the shape of the adapter or the presence of a connector will not allow the adapter edge to be seated into the retainer groove, ensure the retainer is still locked firmly against that edge or connector.

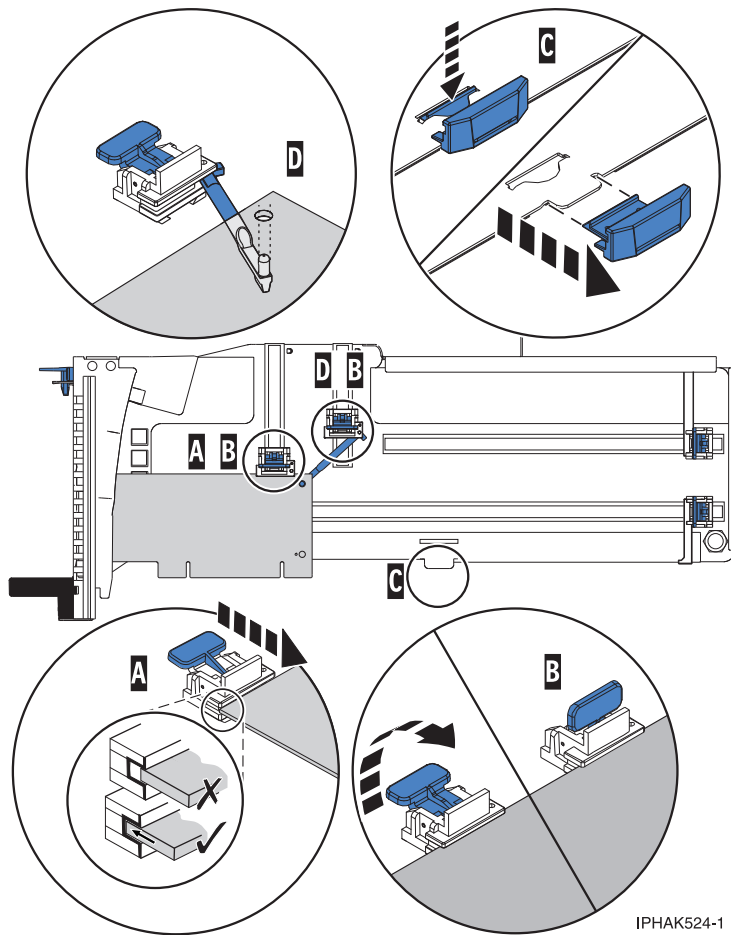
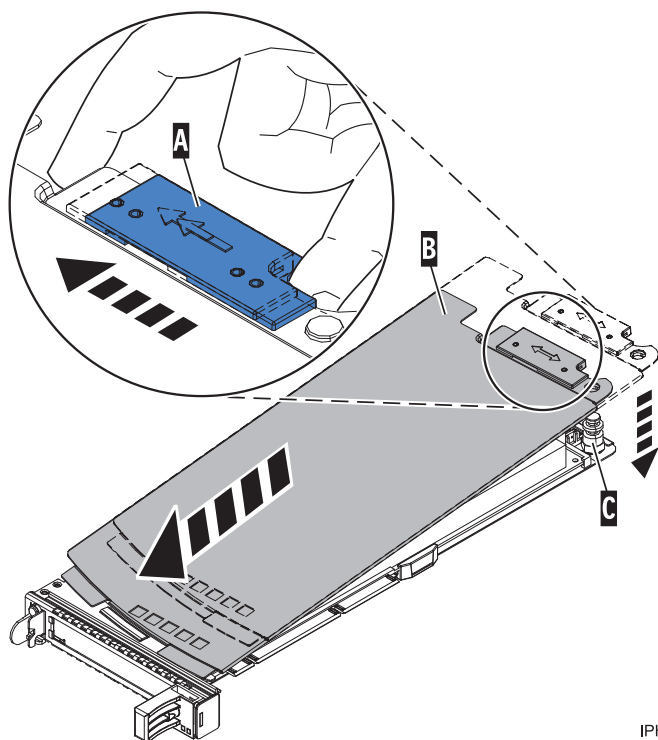


Figure 68. Short adapter in the PCI adapter cassette with the supports and the hook arm in place

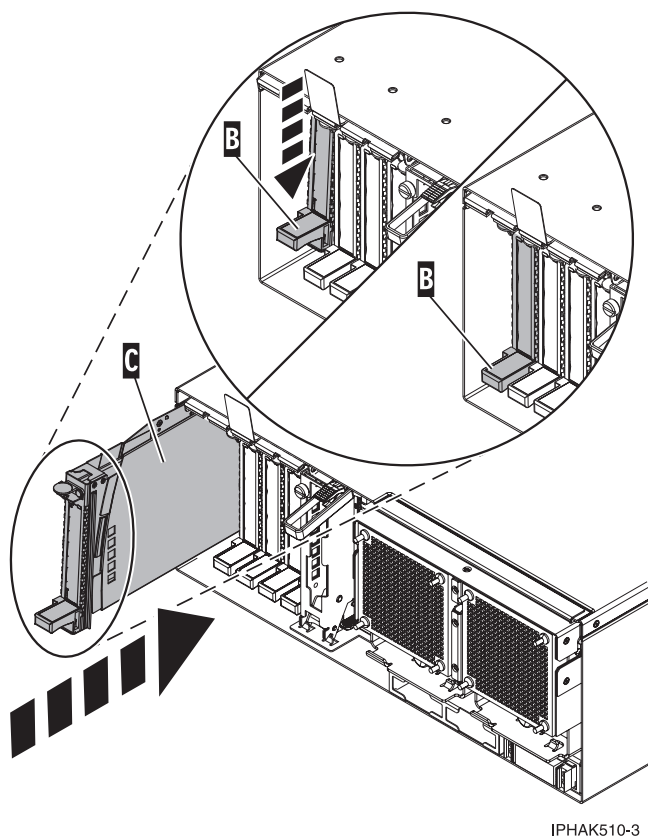
- d. Replace the cassette cover by doing the following steps:
  - 1) Slide the cover (**B**) into position on the cassette.
  - 2) While holding the cover latch (**A**) in the open position, place the cover over the pivot pin (**C**).
  - 3) Release the cover latch to lock the cover into place.



IPHA530-0

Figure 69. PCI adapter cassette cover replaced

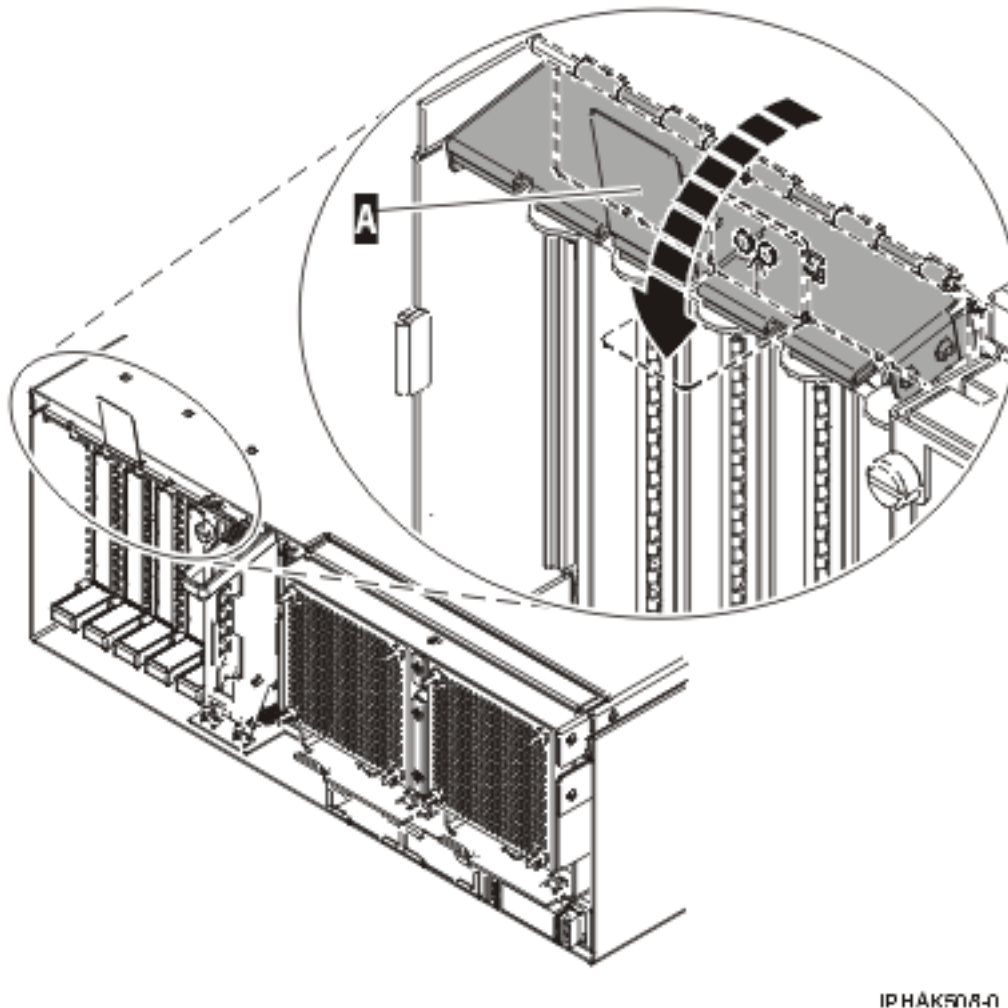
22. At the back of the system, lift the cassette cover flap and identify the cassette slot you want to use.
23. Ensure the lower cassette handle is pressed up toward the retainer clip. This places the adapter in the correct position to be docked in the system.
24. Lift and hold the PCI adapter EMC shield in the open position. See Figure 60 on page 128 and Figure 61 on page 129.
25. Slide the cassette (C) into the cassette slot as shown in the following figure.
26. When the cassette is fully inserted into the system, firmly press downward on the lower cassette handle (B) to lock the adapter in its connector.



IPHAK510-3

Figure 70. PCI adapter cassette removed from the system unit

27. Connect the adapter cables.
28. Lower the PCI adapter EMC shield (**A**) into the closed position, close the shield latch, then close the rear rack door.



IPHAK50A-0

Figure 71. PCI adapter EMC shield in the closed position

29. Return to your terminal and the IBM i sign on screen.
30. Select **Power on domain** on the Hardware Resource Concurrent Maintenance display and press Enter.
31. Select **Assign** to on the resource that has an asterisk (\*) on the Work with Controlling Resource display. Press Enter.
32. Wait for the Hardware Resource Concurrent Maintenance display to appear with this message: Power on complete  
The device is now configured. **This ends this procedure.**

## Rebuilding data on a replacement disk drive using Linux

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

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

### For an unprotected disk drive

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

1. Re-create the disk array.

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

For information on these tasks, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*, SA23-1327.

---

## Preparing for hot-plug SCSI device or cable deconfiguration

Use this procedure when you are preparing to unconfigure a hot-plug Small Computer System Interface (SCSI) device or cable. This procedure will help determine if a SCSI device or SCSI device cable is causing your system problem.

Disconnect all cables attached to the adapter, (except for the cable to the device from which you boot to run diagnostics; temporarily move these device cables to another SCSI port while you are trying to find the problem).

1. Go to Running the online and stand-alone diagnostics and perform the prerequisite tasks described in the Before you begin topic.
2. Determine which SCSI adapter you plan to remove the cables or devices from.
3. Adapter slots are numbered on the rear of the system unit, record the slot number and location of each adapter being removed.
4. Ensure that any processes or applications that might use the adapter are stopped.
5. Enter the system diagnostics by logging in as root user or as the CE login user. Type the diag command on the AIX command line.
6. When the DIAGNOSTIC OPERATING INSTRUCTIONS menu displays, and press Enter. The FUNCTION SELECTION menu appears.
7. From the FUNCTION SELECTION menu, select Task Selection, and then press Enter.
8. From the Task Selection list, select Hot Plug Manager, and select PCI Hot Plug Manager.
9. From the PCI Hot Plug Manager menu, select Unconfigure a Device, and then press Enter.
10. Press F4 or ESC+4 to display the Device Names menu.
11. Select the adapter from which you are removing the cables or devices in the Device Names menu.
12. In the Keep Definition field, use the tab key to answer Yes.
13. In the Unconfigure Child Devices field, use the Tab key to answer Yes, then press Enter. The ARE YOU SURE screen is displayed.
14. Press Enter to verify the information. A successful deconfiguration is indicated by the OK message displayed next to the **Command** field at the top of the screen.
15. Press F4 or ESC+4 twice to return to the Hot Plug Manager menu.
16. Select replace/remove PCI Hot Plug adapter.
17. Select the slot that has the adapter you want to remove the cables or devices from in the system.
18. Select **Remove**.

**Note:** A fast blinking amber LED located at the back of the machine indicates the slot that you selected.

19. Press Enter. This places the adapter in the action state, meaning it is ready to be removed from the system. (You do not need to remove the adapter, unless it makes removing the cables attached to it easier).

---

## Powering off an expansion unit

This procedure provides detailed instructions for powering off an expansion unit.

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

**Attention:** If the server is not HMC-managed and there is no IBM i service partition, the expansion unit power cannot be turned off with the server power turned on.

**Attention:** Do *not* use this procedure to replace disk units that are supported under device concurrent maintenance. Use the device concurrent maintenance procedure instead.

**Attention:** Do *not* use this procedure on the system unit or the system unit's integrated expansion unit. For systems and system integrated expansion units see Powering on and powering off a system.

**Notes:**

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

Perform the following with the assistance of the customer:

1. If you have not already done so, record the expansion unit's location code and machine type-model-serial numbers (MTMS).
2. Can the expansion unit be powered off with the server powered on (the server is HMC-managed or has an IBM i service partition), and does the customer want to perform the procedure with the server powered on?

**No:** The expansion unit must be powered off by powering off the server. See Powering on and powering off a system for instructions on powering off the server, then return to the procedure that sent you here.

**Yes:** Go to step 3.

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

If it is desirable to replace the I/O backplane with the server powered off, but configuration changes cannot be tolerated, powering off the server and then powering it on to firmware standby state before performing the procedure might be a satisfactory alternative.

The activated firmware level of the server is displayed in the upper right corner of the ASMI welcome page.

3. Verify that the expansion unit being powered off is the correct one. If the expansion unit has an alphanumeric display on the control panel, you can verify that the type, model, and serial number of the expansion unit displayed on the user interface match that shown on the control panel display. Otherwise, you can activate the identify indicator on the expansion unit. To activate the Identify indicator on the expansion unit, do the following steps for your particular interface:

- From the HMC V7 and later, use *Select managed system* → **Operations** → **LED Status** → **Identify LED**. Select the desired expansion unit and use **Activate LED** to turn on the LED and thus verify that the tower is the correct one. Then, use **Deactivate LED** to turn off the LED.
- From the HMC V6R1.3 or earlier, use **Service Focal Point** → **Service Utilities** → **Identify LED processing**.
- From IBM i use **System (or Dedicated) Service Tools** → **Start a service tool** → **Hardware service manager** → **Packaging hardware resources** → **Concurrent maintenance** → **Toggle LED blink off/on**.
- Are you powering off the correct expansion unit?

**No:** Choose the correct expansion unit. Then perform this procedure again.

**Yes:** Go to step 4.

4. The system will prevent the expansion unit from being powered off if there are failed or inactive links in the HSL loop that the expansion unit is on, other than the links adjacent to the expansion unit. If an attempt is made to power off the expansion unit under these circumstances, a descriptive error message will be presented. Determine if there are failed or inactive links. .

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

**No:** Go to step 5.

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

5. Verify that the SPCN loop is complete. A 10009135 reference code in the error log indicates an incomplete SPCN loop. A complete SPCN loop is not required, but is highly recommended. Powering off an expansion unit with an incomplete SPCN loop could cause lost contact with other expansion units on the SPCN loop. The expansion units that the system lost contact with will continue to function; however, the system may log additional errors and will not be able to monitor those units. Work with the customer to determine whether the SPCN loop is complete, whether correction is necessary, and then go to step 6.
6. If the system has only partitions running AIX or Linux, skip to step 10, if not go to step 7.
7. The system will prevent the expansion unit from being powered off if the expansion unit is configured as switchable and the system that owns the HSL I/O bridge (the logical owner of the expansion unit) is not the system that provides power to the expansion unit (the system whose SPCN the expansion unit resides in, or SPCN system). If an attempt is made to power off the expansion unit under these circumstances, a descriptive error message will be presented. Determine if the expansion unit is configured as a switchable unit, either by asking the customer or referring to Determining if an expansion unit is configured as switchable under OptiConnect.

**Note:** Switchable expansion units will exist only if the server makes use of Switchable Independent Disk Pools.

Is the expansion unit configured as switchable?

**No:** The expansion unit is configured as private to this system. Go to step 10.

**Yes:** Go to step 8.

8. Determine if the logical owner of the expansion unit is the SPCN system by asking the customer or referring to Determining if a expansion unit is configured as switchable under OptiConnect.

Is the logical owner of the expansion unit also the SPCN system?

**No:** Work with the customer to switch logical ownership of the HSL I/O bridge in the expansion unit to the SPCN system. This should be done using the OptiConnect user interface, a feature of IBM i. If that is not successful due to problems with the OptiConnect user interface, it may be attempted as described in . Switching ownership of an expansion units switchable resources, However, this should be used only as a last resort since it may result in Cluster Resource Group (CRG) problems. If the switch cannot be performed, contact your service provider for assistance. Otherwise, continue with step 9 from the SPCN system.

**Yes:** Go to step 9.



9. The system will prevent the expansion unit from being powered off if it contains resources included in an active Cluster Resource Group (CRG). If an attempt is made to power off the expansion unit under these circumstances, a descriptive error message will be presented. Determine if the expansion unit contains resources included in an active CRG by asking the customer.

Does the expansion unit contain resources included in an active CRG?

**No:** Go to step 10.

**Yes:** Work with the customer to end each active CRG that contains resources in the expansion unit.

10. Determine if any of the I/O resources in the expansion unit are owned by partitions running Linux. Are any of the I/O resources in the expansion unit owned by partitions running Linux?

**No:** Go to step 11.

**Yes:** Power off the partitions running Linux and go to step 11.

11. Determine if any of the I/O resources in the expansion unit are owned by partitions running AIX. Are any of the I/O resources in the expansion unit owned by partitions running AIX?

- **No:** Go to step 12.

- **Yes:** Do the partitions have a code level that supports the powering off and on of an expansion unit with the partition running? The required level for AIX 5.2 is 5.2.0.61 or later and the required level for AIX 5.3 is 5.3.0.22 or later. You can determine the level of AIX by entering the command **lspp -l devices.chrp.base.rte** from the AIX command line.

- **Yes:** Does the HMC have a code level that supports power off and on of an expansion unit with I/O resources assigned to active partitions running AIX? The required HMC code level is version 4, release 5.0 or later. You can view the HMC code level by accessing: **Licensed Internal Code Maintenance** → **HMC Code Update**. The code level appears in the content area.

**Yes:** Go to step 12.

**No:** Power off the partitions that are running AIX and that own I/O resources in the expansion unit, then go to step 12.

- **No:** Power off the partitions that are running AIX and that own I/O resources in the expansion unit, then go to step 12.

12. Work with the customer to end I/O activity to the expansion unit by performing the following steps. If all partitions that own I/O resources in the expansion unit have been powered off, skip this step and go to step 13.

- In IBM i partitions:

- Work with the customer to vary off all configuration descriptions (for example, ctl, device, line, network server, etc.) that use resources in the expansion unit. This can be done using the **vrycfg** command. The system will prevent the expansion unit from being powered off unless all configuration descriptions that use resources in the expansion unit are varied off. If an attempt is made to power off the expansion unit when there are configuration descriptions that use resources in the expansion unit that are varied on, a descriptive error message will be presented.

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

- If the expansion unit contains disk unit IOPs, IOAs, or both, and the disk units are not mirrored to disk units in other expansion units, work with the customer to end all communications activities to these disk units by ending all subsystems.

**Note:** The system allows you to power off the expansion unit even if this is not done, however, doing so may result in a disk unit attention SRC and a partial or complete hang of the partition until the expansion unit is powered on.

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

Reporting partition type: RPA

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

Message:

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

The partition command is:

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

The partition standard output is:

drslot\_chrp\_slot: slot\_type=1 all slots=0x20042d68

The partition standard error is:

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

pci11

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

```

Reporting partition type: RPA

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

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

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

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

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

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

```

- The following AIX commands are helpful in determining which logical device resources use an expansion unit. In the following examples, U0595.001.435DF30 is the location code of the expansion unit being powered off.

Displays information about logical device resource pci5:

```
lscfg -l pci5
```

Displays all logical resources in U0595.001.435DF30:

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

Displays the rootvg hdisk(s):

```
lsvg -o
```

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

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

13. Power off all external DVD-RAM storage devices (containing their own power supplies) connected to resources in the expansion unit, and then go to step 14.
14. Use one of the following procedures to power off the expansion unit. Carefully follow the instructions provided by the utility to complete the power off.

**Attention:** If the server is not HMC-managed and there is no IBM i service partition, the expansion unit power cannot be turned off with the server power turned on.

To turn off the power in an expansion unit with the server power on, do one of the following procedures:

- If the server is HMC-managed, the power off and power on functions must be performed using the Power On/Off Unit utility on the HMC.
  - For HMC V6R1.3 and earlier, do the following steps:
    - a. In the navigation area, open the Service Applications folder.

- b. Select **Service Focal Point**.
- c. In the contents area, select **Service Utilities**.
- d. In the Service Utilities window, select the system on which you are working.
- e. Select **Selected** → **Power On/Off Unit**
- For HMC V7 and later, do the following steps:
  - a. Select the managed system, then select **Serviceability** -> **Hardware** -> **Power on/off IO Unit**.
  - b. In the Power on/off IO Unit window, expand the Managed system I/O and select the appropriate unit.
  - c. Click the **Power off** button.
- If the server is not HMC-managed, the power off and power on functions must be performed using the Packaging Hardware Resources utility from the IBM i service partition, do the following steps:
  - a. Access the system service tools or the dedicated service tools on the IBM i service partition.
  - b. Select **Start a service tool**.
  - c. Select **Hardware service manager**.
  - d. Select **Packaging hardware resources**.
  - e. Select **Concurrent maintenance**.

**Notes:**

- a. If the procedure is being done from an IBM i partition, the system prevents the procedure from being done from a console or terminal session connected through the expansion unit being powered off. A different console or terminal session not connected through the expansion unit being powered off must be found, or the server must be powered off. See Powering on and powering off a system for instruction on powering off the server, then return to the procedure that sent you here.
  - b. If I/O activity to resources in the expansion unit was not ended as described in step 12, the power off will not continue and messages will be presented indicating which partition resources need to be varied off or unconfigured. Similarly for other conditions described previously in this page that prevent the power off.
  - c. Carefully follow all instructions given by the utility. For instance, you may be informed that critical disk resources exist in the expansion unit and that panel function 69 must be used to power the expansion unit back on.
  - d. Wait for the expansion unit to power off. This might take up to 15 minutes depending on the configuration.
  - e. When the utility gives notification that the power off has completed, ensure that the expansion unit is actually powered off by verifying that one of the two air moving devices (AMDs) in the expansion unit has stopped and that the power LED/indicator on the expansion unit control panel is off.
  - f. If the expansion unit does not power off after more than 15 minutes, the system may be hung. If this occurs, contact your service provider for assistance.
15. Were you directed here to power off the expansion unit to set the expansion unit configuration ID or the machine type-model-serial numbers (MTMS)?
- No:** Go to step 16.
- Yes:** Return to the procedure that sent you here.
16. Does the procedure that sent you here instruct you to remove the ac power from the expansion unit?
- No:** Return to the procedure that sent you here.
- Yes:** Go to step 17.

17. Is this an expansion unit with ac power cords connected from this unit's ac input/charger to an SPCN-controlled expansion unit (for example, a 5088 expansion I/O unit)?
- No:** This expansion unit can be serviced without affecting an SPCN controlled expansion unit. Return to the procedure that sent you here.
- Yes:** Servicing this expansion unit may affect an SPCN-controlled expansion unit that is receiving ac power from this expansion unit. Go to step 18.
18. You may be able to maintain ac power to the expansion unit that is receiving ac power from this expansion unit and remove power from this expansion unit so that you can service it. The following steps will help you to determine what you can do. Were you directed to this procedure as part of a procedure to exchange the ac input/charger, any of the device boards, or the power board?
- No:** You can maintain ac power to the expansion unit receiving ac power from this expansion unit while you are servicing this expansion unit. When the expansion unit is powered off, open the rear cover and trace the ac jumper cords from the three power supplies to the ac input charger. Then disconnect them at the ac charger. Power is now removed from the components that you will be working with or near. Return to the procedure that sent you here.
- Yes:** You must search for an alternate ac power source for the expansion unit receiving ac power from this expansion unit. Go to step 19.
19. Can you find an alternate ac power source for the expansion unit that is receiving ac power from this expansion unit?
- No:** You must power off the system to service this expansion unit. See Powering on and powering off a system for instructions on powering off the system, then return to the procedure that sent you here.
- Yes:** Move each of the expansion unit's ac power cords one at a time to the alternate ac power source to prevent the expansion unit from losing ac power. Return to the procedure that sent you here.

---

## Powering on an expansion unit

Use these procedures to power on an expansion unit that is either managed by a Hardware Management Console (HMC) or not managed by an HMC.

### Attention:

- Before beginning, read this entire procedure. If there are procedural steps that cannot be performed at this time, the entire procedure must be delayed until a later time.
- If the server is managed by an HMC, the power off and power on functions must be performed using the Power On/Off Unit utility on the HMC. To use the Power On/Off Unit utility from the HMC display, do the following steps:
  1. Expand the Systems Management topic.
  2. Select **Servers**.
  3. From the Select column, select the server you are working on.
  4. In the Tasks area select the following options:
    - a. Select **Serviceability**.
    - b. Select **Hardware**.
    - c. Select **Power on/off I/O unit**.
    - d. Select **Power on**.

**Attention:**

If the server is not managed by an HMC, the power off and power on functions must be performed using the Packaging Hardware Resources utility from the IBM i service partition. To use the Packaging Hardware Resources, go to the system service tools or the dedicated service tools and do the following when instructed to in the procedure below:

1. Select **Start a service tool**.
2. Select **Hardware service manager**.
3. Select **Packaging hardware resources**.
4. Select **Concurrent maintenance**.

If the server is not managed by an HMC and there is no IBM i service partition, the enclosure cannot be powered off and on with the server powered on.

**Attention:** Do not use this procedure in either of the following situations:

- To replace disk units that are supported under device concurrent maintenance. Use the device concurrent maintenance procedure instead.
- On the system unit or the system unit's integrated I/O enclosure. For system units and system units integrated I/O enclosures, see the "Powering on or off a system". This procedure is located in your host system's service information.

**Notes:**

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

Perform the following with the assistance of the customer.

1. If the ac power cords were disconnected when the enclosure was powered off and have not been reconnected, reconnect them now. If they are already connected, go to step 2.
  - The enclosure will automatically power on when the ac power cords are connected.
  - If this is a System i<sup>®</sup> server that is not managed by an HMC, go to step 2.
  - If this is a server managed by an HMC, power off the enclosure again. See "Powering off an expansion unit" on page 140. Then go to step 3.
2. Were you instructed to perform a function 69 to power on the enclosure?
  - No:** Go to step 3.
  - Yes:** Perform function 69 (with the control panel set to manual mode) from the system unit control panel. See Control panel functions. Then go to step 4.
3. Power on the enclosure using either the Power On/Off Unit utility from the HMC, or the Packaging Hardware Resources utility from the IBM i service partition, as described at the top of this page. Follow the instructions provided by the utility. Go to step 4.

**Note:** If you are required to do this step using the Packaging Hardware Resources utility from the IBM i service partition, but the Packaging Hardware Resources utility cannot be accessed, you might be able power on the enclosure using the system control panel as follows:

- a. With the control panel set to manual mode, select function **07** and press Enter.
- b. Increment to A1 and press Enter. This will send out a **Rack Power On** command is issued on the SPCN, which will restore power any enclosure that is powered off.

- c. For further information about control panel functions and how to use them, see Control panel functions.
4. Wait for I/O resources in the enclosure to be brought back online to a functional state, and then go to step 5.
- It may take between five and ten minutes after the enclosure is powered on for IBM i resources in the enclosure to return to a operating state. Using the Packaging Hardware Resources and Logical Hardware Resources utilities in the hardware service manager, you can determine when resources in the enclosure return to a operating state by observing the transition of the resources from non-reporting (designated by a "?" next to the resources) to reporting (designated by the absence of a "?" next to the resources) or Unknown, Not Connected, Failed, or Disabled status to Operational status. If there is a disk unit attention SRC in the partition operator panel and the hardware service manager is not available, the transition to functional/operational has occurred when the disk unit attention SRC disappears and the partition resumes normal operation.
5. Work with the customer to restart all I/O bus activity that was ended when the enclosure was powered off, then go to step 6
- In IBM i partitions:
    - Work with the customer to vary on all configuration descriptions (ctl, device, line, network server, etc.) that were varied off when the enclosure was powered off. Use the **vrycfg** command.
    - Start all subsystems that were ended when the enclosure was powered off.
  - In AIX partitions:
    - Work with the customer to configure all logical resources that were unconfigured when the enclosure was powered off. Use the **cfgmgr** command.
6. If you moved the ac power cords of an enclosure from this enclosure to an alternate ac power source when this enclosure was powered off, move them back to this enclosure. To prevent the enclosure from losing ac power, move only one of the enclosure's ac power cords at a time. Then go to the next step.
7. If the enclosure was configured as switchable when you powered off the enclosure, and you changed the mode to private, work with the customer to restore the mode of the enclosure to switchable using Switching the mode of a I/O enclosure's switchable resources. Then go to step 8.
8. If you ended Cluster Resource Groups (CRGs) when you powered off the enclosure, work with the customer to start the CRGs, then go to step 9.
9. If ownership of the enclosure's HSL I/O bridge was changed when the enclosure was powered off, work with the customer to restore the desired ownership.
10. Return to the procedure that sent you here.

---

## 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 on page 150.
  - 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 150.
1. Power on the server and all attached I/O enclosures.

### Did all the enclosures power on?

**Yes:** Go to step 3 on page 150.↓ Go to step 3 on page 150.

**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 155
- “Verifying a repair using an IBM i system or logical partition” on page 154

## 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 on page 151.

**Yes**      Continue with the next step.

---

2. Run stand-alone diagnostics either from a CD or from a Network Installation Management (NIM) server.



**Did you encounter any problems?**

**No** Reinstall the operating system and continue with step 5.

**Yes** If the original problem still exists, replace the field-replaceable unit (FRU) or perform the isolation procedure that is next in the FRU list. If you have reached the end of the FRU list, contact your next level of support.

If a new problem has occurred, go to Beginning problem analysis.

---

**3. Did you replace a FRU with the power turned on and concurrently with system operations?**

**No** Go to step 5.

**Yes** Continue with the next step.

---

**4. Did you use an AIX diagnostics service aid hot-swap operation to change the FRU?**

**Yes** Go to step 6.

**No** Go to step 7.

**Note:** The AIX diagnostic service aid was used if a resource was removed using the **Hot Plug** task.

---

**5.**

**Note:** If any FRUs have been removed that should be reinstalled, reinstall them now.

Perform the following steps:

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 displays or until system activity on the operator panel or display apparently 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 has occurred, go to Beginning problem analysis.

---

**6. If the Resource Repair Action menu is already displayed, go to step 9 on page 152; 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 the `diag -a` command and check for missing resources. Follow any instructions that display. If an SRN displays, suspect a loose card or connection. If no instructions display, 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 displays, select **System verification**.
5. When the Diagnostic Selection menu displays, select the **All Resources** option or test the FRUs you exchanged, and any devices that are attached to the FRU(s) you exchanged, by selecting the diagnostics for the individual FRU.

Did the Resource Repair Action menu (801015) display?

**No** Continue with the next step.

**Yes** Go to step 9.

---

8. Did the Testing Complete, no trouble was found menu (801010) display?

**Yes** Use the **Log Repair Action** option, if not previously logged, in the TASK SELECTION menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action.

If the resource associated with your action is not displayed on the resource list, select **sysplanar0**.

**Note:** If the system attention indicator is on, this action will set it back to the normal state.

Go to step 11 on page 153.

**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 has occurred, 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 displays.

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 on page 153.

**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 displays, 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 involving changing 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 close of call procedure.
-

## Verifying a repair using an IBM i system or logical partition

Use this procedure to verify a repair 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 Start of call procedure. **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 Using 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 non-reporting 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 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 occurred, go to Beginning problem analysis and repair the new problem.
-

## Verifying the repair from the HMC

Perform these procedures to close problem numbers, clear hardware messages, and prepare the server to return to the customer using the hardware management console (HMC).

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 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.
- Server verification has been performed and there are no problems that require additional service actions.
- If the repair was done using the HMC online repair procedures, ensure that the original serviceable event is now closed.

1. Is an HMC used to manage the server that you are servicing?

- **Yes:** Continue with the next step.
  - **No:** Return to the “Verifying a repair” on page 149. **This ends the procedure.**
- 

2. Are you closing a service event that was a repair on the HMC personal computer?

- **Yes:** Continue with the next step.
  - **No:** Go to step 4.
- 

3. Power on the HMC. Did the power-on process complete without errors?

- **Yes:** Ensure that the HMC can be used to perform server management tasks, and return the HMC to normal operations. Go to “Closing a service call” on page 159. **This ends the procedure.**
  - **No:** Go to the *HMC isolation procedures*. **This ends the procedure.**
- 

4. Log into the HMC as the service representative. If invalid user or invalid password displays, get the correct login information from the system administrator.

1. If logged on the System Manager, select Exit from the Console, located on the System Manager window.
  2. Login to the System Manager with the following: User identification service Password service mode
- 

5. View Serviceable Event Details.

1. In the navigation area, select the Service Applications icon.
  2. In the navigation area, select the Service Focal Point™ icon.
  3. In the Contents area, select 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, on the Service Event Overview window.
  2. Select the menu Selected, 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 159. **This ends the procedure.**
    - **No:** Go to *Detecting problems*. **This ends the procedure.**
- 

## Activating and deactivating LEDs

You can use these procedures to activate or deactivate LEDs using the Hardware Management Console (HMC) or the Advanced System Management Interface (ASMI).

Choose from the following tasks:

- “Deactivating a system attention LED or partition LED using the HMC”
- “Activating or deactivating an identify LED using the HMC” on page 158
- “Deactivating a system attention LED or logical partition LED using the Advanced System Management Interface” on page 158
- “Activating or deactivating an identify LED using the Advanced System Management Interface” on page 159

## Deactivating a system attention LED or partition LED using the HMC

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.

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 using the HMC, complete the following steps:

1. In the navigation area, open **Systems management**.
2. Select the server you are working on by checking the box next to its name.
3. Open **Operations**.
4. Open **LED Status**.
5. 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.
6. Select **Deactivate System Attention LED** from the Action menu. A confirmation window is displayed that provides the following information:
  - A verification that the system attention LED was deactivated.
  - An indication that there still might be open problems within the system.
  - An indication that you cannot activate the system attention LED.
7. Select one of the logical partitions in the lower table, and select **Deactivate partition LED** from the Partition Operations menu. A confirmation window is displayed that provides the following information:
  - A verification that the logical partition LED was deactivated.



- An indication that there still might be open problems within the logical partition.
- An indication that you cannot activate the logical partition LED.

## Activating or deactivating an identify LED using the HMC

You can activate or deactivate an identify LED for components attached to the system.

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 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.

## Deactivating a system attention LED or logical partition LED using the Advanced System Management Interface

You can deactivate a system attention LED or a logical partition LED 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 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. 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** → **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 using the Advanced System Management Interface

You can activate or deactivate an identify LED 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**.

---

## Closing a service call

Perform these procedures to close problem numbers, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedures:

- 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 Hardware Management Console (HMC) 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 an HMC?

- **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 using Integrated Virtualization Manager” on page 168.
    - If the server is not partitioned and is running the AIX or Linux operating system, go to “Closing a service call using AIX or Linux” on page 164.
- 

2. On the HMC, open **Manage Serviceable Events** and examine the service action event log for any open service action 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 157. 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, perform the following step 6 through step 32 on page 163 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 159?

- **Yes:** Go to step 11 on page 161.
  - **No:** Continue with the next step.
- 

8. Examine the FRU list of the service action event. Are any FRUs listed for the service action event?

- **Yes:** Continue with the next step.
  - **No:** Go to step 11 on page 161.
- 

9. Is the FRU list identical (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 159?

- **Yes:** Go to step 11 on page 161.
  - **No:** Continue with the next step.
- 

10. The FRU list is different. Is the FRU you replaced and recorded in step 1 on page 159 in the list of FRUs for this service action event?

- **Yes:** Continue with the next step.
  - **No:** Go to step 32 on page 163.  
**Note:** There are service action events that will remain open when you leave this MAP. Further service actions might be required to complete the repair.
- 

11. Examine the details of this service action event, and record the partitions involved in this service action event for use in a later step.

---

12. Is the error code associated with this service action event of the form A11-xxx or A01-xxx?

- **Yes:** Continue with the next step.
  - **No:** Go to step 17.
- 

13. Have you begun a list of Axx 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 Axx 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 Axx 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. If you are referred to the list of partitions obtained in step 11 in future steps, the list is empty. Go to step 17.

---

17. Select and highlight the service action event from the Error Associated With This Serviceable Event window.

---

18. Click **Close Event**.

---

19. Add comments for the serviceable event. Include any unique additional information. Click **OK**. The following steps will add or update FRU information.

---

20. Did you replace, add, or modify a FRU of the open service action event?

- **Yes:** Continue with the next step.
  - **No:** Go to step 22 on page 162.
-

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 161 empty?

- **Yes:** Go to step 32 on page 163.
  - **No:** Continue with the next step.
- 

25. Does the list of all partitions you recorded in step 11 on page 161 contain more than one entry?

- **Yes:** Continue with the next step.
  - **No:** Go to step 32 on page 163.
- 

26. Is the error class recorded in step 25 AIX?

- **Yes:** Continue with the next step.
  - **No:** Go to step 32 on page 163.
- 

27. Perform the following steps for each entry in the list of all partitions you recorded in step 11 on page 161, except the partition you were using to debug the original problem.

---

28. From the HMC virtual terminal window of a partition in the list of all partitions, type `diag` at the AIX command prompt.

---

29. When the diagnostic operating instructions are displayed, do 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 have made 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 prompt.

---

31. Have all the partitions in the list of all the partitions you recorded in step 11 on page 161 been processed?

- **Yes:** Continue with the next step.
  - **No:** Go to step 24 on page 162 to process the next partition in the list you recorded in step 11 on page 161.
- 

32. Have all the serviceable events recorded in step 4 on page 160 been processed?

- **Yes:** Continue with the next step.
  - **No:** Go to step 5 on page 160 and process the next service action event in the list of serviceable events recorded in step 4 on page 160.
- 

33. While processing all service action events, were you directed to step 14 on page 161?

- **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 157. 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 the following steps for each entry in the list of Axx partitions you began recording in step 14 on page 161, except the partition you were using to debug the original problem.

---

35. From the HMC virtual terminal window of a partition in the list of Axx partitions, type diag at the AIX command prompt.

---

36. When the diagnostic operating instructions are displayed, do 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 have made your selection.
- 

37. Exit from diagnostics in this partition and return to the AIX prompt.

---

38. Have all the partitions in the list of Axx partitions you began recording in step 14 on page 161 been processed?

- **Yes:** Continue with the next step.
  - **No:** Go to step 34 to process the next partition in the list you recorded in step 14 on page 161.
-

39. If the system attention LED is still on, turn off the LED as described in “Activating and deactivating LEDs” on page 157. 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 using AIX or Linux

If the server is not connected to an Hardware Management Console (HMC) and not using Integrated Virtualization Manager (IVM), perform these procedures to close problem numbers, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedures:

- 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 using the IVM online repair procedures, ensure that the original serviceable event is now closed.
  1. Did you use an AIX diagnostics service aid hot-swap operation to change the FRU?

- **Yes:** Go to step 4
  - **No:** Continue with the next step.
- 

2. Do you have any field-replaceable units (FRUs) (for example cards, adapters, cables, or devices) that were removed during problem analysis that you want to put back into the system?

**Note:** If the system planar 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. The system time and date information should also be set when the repair is completed.

- **Yes:** Reinstall all of the FRUs that were removed during problem analysis. Go to step 3
  - **No:** Continue with the next step.
- 

3. Is the system or logical partition that you are performing a repair action on running the AIX operating system?

- **Yes:** Continue with the next step.
  - **No:** Go to step 5 on page 165.
- 

4. Does the system or logical partition you are performing a repair action on have AIX installed?

**Note:** Answer no to this question if you have just replaced a hard disk in the root volume group.

- **Yes:** Go to step 7.
  - **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 on running stand-alone diagnostics from a CD and not using an HMC, go to Running the stand-alone diagnostics from CD on a server without an HMC attached.

For instructions on 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 157.

**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 slow boot (see Performing a slow boot), do a slow boot on the system. If the system does not support slow boot, do a normal boot.
2. Power on the system.
3. Wait until the AIX operating system login prompt displays or until system activity on the operator panel or display apparently 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 166; otherwise, do 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 display. If an system request number (SRN) displays, suspect a loose card or connection. If no instructions display, no resources were detected as missing. Continue with 9.
- 

9. Complete 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 displays, select **Problem determination**.
5. When the Advanced Diagnostic Selection menu displays, 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?

- **Yes:** Go to step 13 on page 167.
  - **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. 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 will set it back to the normal state. Go to step 14 on page 167.

---

12. 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 displays.

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.

Do 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?



- **Yes:** Continue with the next step.
  - **No:** If the No Trouble Found menu displays, go to step 14.
- 

13. 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, and 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.

Do 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.

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 involving changing of the PCI RAID adapter cache card or changing the configuration?

**Note:** This does not refer to the PCI-X RAID adapter or cache.

- **Yes:** Continue with the next step.
  - **No:** Go to step 16 on page 168.
- 

15. Use the **Recover Options** selection to resolve the RAID configuration. To do this, do the following steps:

1. On the PCI SCSI Disk Array Manager dialog, 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 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.
  8. You should see an OK status message when the recover is complete. If you get a Failed status message, verify that you selected the correct adapter, and then repeat this procedure. When recover is complete, exit the operating system.
  9. Go to 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 using Integrated Virtualization Manager

Perform these procedures to close problem numbers, clear hardware messages, and prepare the server to return to the customer.

Follow this checklist before performing the procedures:

- 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 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 157. 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 on page 168, perform step 6 through step 30 on page 171 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 associated with this service action event the same as recorded in step 1 on page 168?

- **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 (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 168?

- **Yes:** Go to step 11.
  - **No:** Continue with the next step.
- 

10. Is the FRU you replaced and recorded in step 1 on page 168 in the list of FRUs for this service action event?

- **Yes:** Continue with the next step.
  - **No:** Go to step 30 on page 171.  
**Note:** There are service action events that 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 170.
- 

13. Have you begun a list of Axx partitions from prior service action events that you processed in this maintenance analysis procedure (MAP)?

- **Yes:** Go to step 15 on page 170.
  - **No:** Continue with the next step.
-

14. Begin a new list of Axx partitions by copying the list of partitions obtained in step 11 on page 169. Go to step 16.

---

15. Add the partition list obtained in step 11 on page 169 to the existing list of Axx 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 169. If you are referred to the list of partitions obtained in step 11 on page 169 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 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 169 empty?

- **Yes:** Go to step 30 on page 171.
  - **No:** Continue with the next step.
- 

23. Does the list of all partitions you recorded in step 11 on page 169 contain more than one entry?

- **Yes:** Continue with the next step.
  - **No:** Go to step 30 on page 171.
- 

24. Is the error class recorded in step 23?

- **Yes:** Continue with the next step.
  - **No:** Go to step 30 on page 171.
-

25. Perform the following steps for each entry in the list of all partitions you recorded in step 11 on page 169, except the partition you were using to debug the original problem.

---

26. From the IVM virtual terminal window of a partition in the list of all partitions, type diag at the AIX command prompt.

---

27. When the diagnostic operating instructions are displayed, do 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 have made your selection.
- 

**Note:** If the terminal type is not defined, you are prompted to define it before you can proceed.

28. Exit from diagnostics in this partition and return to the AIX prompt.

---

29. Have all the partitions in the list of all partitions you recorded in step 11 on page 169 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 169.
- 

30. Have all the serviceable events recorded in step 4 on page 168 been processed?

- **Yes:** Continue with the next step.
  - **No:** Go to step 5 on page 169 and process the next service action event in the list of serviceable events recorded in step 4 on page 168.
- 

31. While processing all service action events, were you directed to step 14 on page 170?

- **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 157. 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. Perform the following steps for each entry in the list of Axx partitions you began recording in step 14 on page 170, except the partition you were using to debug the original problem.

---

33. From the IVM virtual terminal window of a partition in the list of Axx partitions, type diag at the AIX command prompt.

---

34. When the diagnostic operating instructions are displayed, do 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 have made your selection.
- 

35. Exit from diagnostics in this partition and return to the AIX prompt.

---

36. Have all the partitions in the list of Axx partitions you began recording in step 14 on page 170 been processed?

- **Yes:** Continue with the next step.
  - **No:** Go to step 32 on page 171 to process the next partition in the list you recorded in step 14 on page 170.
- 

37. If the system attention LED is still on, turn off the LED as described in “Activating and deactivating LEDs” on page 157. 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.

---

## Displaying the effect of system node evacuation

You can display the effect of service procedures that require the evacuation of a system unit node. A system node is a processor book in a 9119-FHA, or a drawer in a 9117-MMA or 9406-MMA.

Only use this procedure when you are directed by an authorized service provider to prepare a system for a service procedure that requires the evacuation of resources in a system node. The Display Service Effects utility is also automatically run as a part of any service procedure requiring the evacuation of a system node.

The system must be managed by a Hardware Management Console (HMC) to use this procedure. This procedure is valid for the 9117-MMA, the 9406-MMA, and the 9119-FHA systems with firmware level 01EM340 (9117-MMA and 9406-MMA) or 01EH340 (9119-FHA), or later.

To display the service effect for a repair procedure for a system node, perform the following steps:

1. In the navigation pane, select **Systems Management** → **Servers**.
2. In the work pane, select the server name on which you are working.
3. In the tasks area, select **Serviceability** → **Hardware** → **Power On/Off Unit**.
4. Select the **Managed System in the Power On/Off Unit** utility.
5. Select the base location code that contains the field-replaceable unit (FRU) to be serviced.
6. Click **Advanced**.
7. Select the **Display Service Effect** and click **OK**.
8. Select **Yes** when prompted to continue with the Advanced Power Control command.

The Display Service Effect utility displays either a message indicating why a node evacuation of the selected node is not allowed, or displays the Node Evacuation Summary Status.

The Node Evacuation Summary Status displays a summary of any conditions that must be corrected to start the node evacuation procedure as part of a concurrent repair or upgrade. Use the four buttons across the top of the utility (**Platform**, **Memory**, **Processors**, and **Partitions**) to display details on any error or information conditions. All error conditions must be corrected prior to the evacuation of the selected node as part of a concurrent repair or upgrade procedure.

**Note:** The Proceed button on this utility is not active when the utility is launched from the Power On/Off Unit interface as described here. When an IBM service provider initiates a service procedure to repair or upgrade the system, this utility is displayed with the Proceed button active.

9. Click **Recheck** to re-evaluate the systems readiness for node evacuation without relaunching the utility.
10. Click **Cancel** to exit the Display Service Effect utility.
11. When all error conditions are corrected, and IBM service provider can proceed with the repair or upgrade procedure.

## Common messages for displaying service effect

The following are some of the common error conditions and information messages that are displayed in the Display Service Effect utility for node evacuation. Each of the errors or information messages displayed within this utility has additional details available to describe the condition. If you are unable to resolve the error messages, the system node evacuation is not allowed to continue. Contact your authorized service provider for assistance.

*Table 23. Common error conditions and information messages*

Message type	Common error condition or information message	Description
Processor message	Insufficient available processors	<p>This message indicates that the remaining nodes do not have enough processors to support the currently active logical partitions on the system. Use the <b>Processors</b> button to display information about this error condition and the amount of processing resources that must be made available to proceed with the node evacuation.</p> <p>Partitions can be deactivated or dynamic logical partitioning can be used to decrease the processor resources used by active logical partitions. See Removing processor resources dynamically using the HMC.</p> <p>Following the completion of the service procedure, the processing resources are not automatically returned to the logical partitions. You can use dynamic logical partitioning to return the processing resources to the logical partitions after the completion of the service procedure.</p>

Table 23. Common error conditions and information messages (continued)

Message type	Common error condition or information message	Description
Memory message	Insufficient available memory	<p>This message indicates that the remaining nodes do not have enough memory to support the currently active logical partitions on the system. Use the <b>Memory</b> button to display information about this error condition and the amount of memory resources that must be made available to proceed with the node evacuation.</p> <p>Partitions can be deactivated or dynamic logical partitioning can be used to decrease the memory resources used by active logical partitions. See Removing memory dynamically using the HMC.</p> <p>Following the completion of the service procedure, the memory resources are not automatically returned to the logical partitions. You can use dynamic logical partitioning to return the memory resources to the logical partitions after the completion of the service procedure.</p>
Platform messages	Unit must be varied off	<p>This message is an information message that indicates a system unit or expansion unit that will be varied off during the service procedure. Use the <b>Platform</b> button to display more details about this informational message. Information messages within the Display Service Effect utility provide additional information about how the system is affected by the node evacuation, but no specific action is required to proceed with the service procedure. Any resources in this node that are in use by logical partitions are identified as unique errors or informational messages.</p>
	IOP must be powered off	<p>This messages indicates that an I/O processor (IOP) is assigned to an active logical partition. Use the <b>Platform</b> button to display the dynamic reconfiguration connected (DRC) index and partition ID of the logical partition that owns the IOP. The IOP must be powered off, or unconfigured, or the logical partition must be powered off.</p> <p>The HMC command lshwres is used to display additional details for the DRC index. For more information, see the lshwres command.</p>



Table 23. Common error conditions and information messages (continued)

Message type	Common error condition or information message	Description
Partition messages	In-use I/O resource	<p>This message indicates that there is an I/O resource that is in use by an active IBM i logical partition that will be affected by the node evacuation procedure. Use the <b>Partitions</b> button to display information about the resources in use. This information includes details about what must be done to correct the errors.</p> <p>For IBM i resources that are in use, the system does not allow the targeted system node to be evacuated unless all configuration descriptions that use resources in the target system unit node are varied off. This operation is done by using the Vary Configuration varycfg command. If configuration descriptions that use resources in the system unit node cannot be varied off, the procedure must be delayed until they can be varied off or the logical partitions that have these configuration descriptions must be powered off. For more information, see the Vary Configuration (VRYCFG) command.</p>
	Critical disk resource	<p>The critical disk resources message is an error message that indicates disk units will be affected by the service action that is in use by an active IBM i logical partition. Use the <b>Partitions</b> button to display details about these disk units and logical partitions that are affected. The logical partitions indicated in the detailed information must be powered down so that the node evacuation can proceed.</p>
	RPA partition error (RPA Return Code of 1)	<p>This message indicates that an I/O resource is in use by an active AIX or Linux logical partition that will be affected by the node evacuation procedure. The HMC uses resource monitoring and control (RMC) flows to query the use of logical partition. RMC must be active on a logical partition for these queries to succeed. An error code of 1, in response to this query command, indicates that an I/O resource must be unconfigured before the node evacuation proceeds. Use the <b>Partitions</b> button to display information about resources in use. This information includes details about what must be done to correct the errors.</p> <p>For this return code, the targeted system node cannot be evacuated unless the resources are unconfigured. This operation is done by using the rmdev command. If logical device resources that use resources in the system node cannot be unconfigured, the procedure must be delayed until they can be unconfigured or the logical partitions that have such resources must be powered off. For more information, see the AIX Remove device (rmdev) command.</p>

Partition messages	RPA partition error (RPA Return Code of 6)	<p>This message indicates that an I/O resource that is in use by an active Linux logical partition will be impacted by the node evacuation procedure. The Hardware Management Console (HMC) uses RMC flows to query the use of logical partition resources. RMC must be active on a logical partition for these queries to succeed. An error code of 6, in response to this query command, is used to identify I/O resources in use by a Linux logical partition. Use the <b>Partitions</b> button to display information about the resources in use. This information includes details about what must be done to correct the errors.</p> <p>The HMC allows the targeted node to be evacuated even if logical device resources that use resources in the target node remain configured for a Linux logical partition. The procedure continues even if the Linux logical partition might be affected by the removal of resources from the partition as a part of the service action. This general policy of few restrictions during concurrent maintenance of resources owned by Linux logical partitions is consistent with the general Linux operating system expectations.</p>
	RPA partition error (RMC return code 1022)	<p>This error message indicates that the RMC connection cannot be established to one of the logical partitions. Use the <b>Partitions</b> button to display more details for this error. For the node evacuation to proceed, either verify the RMC configuration or power down the logical partition identified in the detailed error information. To learn more about configuring and using RMC, see Understanding RMC and resource managers in the RCST Administration Guide.</p>

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The following Class A statements apply to the IBM servers that contain the POWER6 processor.

### Federal Communications Commission (FCC) statement

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

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

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

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

### **Industry Canada Compliance Statement**

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

### **Avis de conformité à la réglementation d'Industrie Canada**

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

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

### **VCCI Statement - Japan**

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

VCCI-A

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

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

**Japanese Electronics and Information Technology Industries Association (JEITA)  
Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)**

高調波ガイドライン適合品

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

高調波ガイドライン準用品

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

**声 明**

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

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

**Electromagnetic Interference (EMI) Statement - Taiwan**

**警告使用者：**

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

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

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

**IBM Taiwan Contact Information:**

台灣IBM 產品服務聯絡方式：  
台灣國際商業機器股份有限公司  
台北市松仁路7號3樓  
電話：0800-016-888

## Electromagnetic Interference (EMI) Statement - Korea

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

## Germany Compliance Statement

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

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

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

"Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

### Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

### Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A.

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

Verantwortlich für die Konformitätserklärung nach des EMVG ist die IBM Deutschland GmbH, 70548 Stuttgart.



Generelle Informationen:

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

## Electromagnetic Interference (EMI) Statement - Russia

**ВНИМАНИЕ!** Настоящее изделие относится к классу А.  
В жилых помещениях оно может создавать  
радиопомехи, для снижения которых необходимы  
дополнительные меры

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