

Serial-Attached SCSI RAID Enablement
in E1-700, E1-705, E1-715, E3-700,
E3-705 or E3-715



ESCALA Models Reference

The ESCALA Power7 publications concern the following models:

Bull Escala E1-700 / E3-700	(31E/2B ,8231-E2B)
Bull Escala E1-705	(31E/1C, 8231-E1C)
Bull Escala E1-715	(31E/1D, 8231-E1D)
Bull Escala E3-705	(31E/2C, 8231-E2C)
Bull Escala E3-715	(31E/2D, 8231-E2D)
Bull Escala E2-700 / E2-700T	(02E/4B, 8202-E4B)
Bull Escala E2-705 / E2-705T	(02E/4C, 8202-E4C)
Bull Escala E2-715 / E2-715T	(02E/4D, 8202-E4D)
Bull Escala E4-700 / E4-700T	(05F/6B, 8205-E6B)
Bull Escala E4-705	(05E/6C, 8205-E6C)
Bull Escala E4-715	(05E/6D, 8205-E6D)
Bull Escala E5-700	(33E/8B, 8233-E8B)
Bull Escala E5-715	(08E/8D, 8408-E8D)
Bull Escala M5-715	(09R/MD, 9109-RMD)
Bull Escala M6-700	(17M/MB, 9117-MMB)
Bull Escala M6-705	(17M/MC, 9117-MMC)
Bull Escala M6-715	(17M/MD, 9117-MMD)
Bull Escala M7-700	(79M/HB, 9179-MHB)
Bull Escala M7-705	(79M/HC, 9179-MHC)
Bull Escala M7-715	(79M/HD, 9179-MHD)
Bull Escala H9-700	(19F/HB, 9119-FHB)

References to 8236-E8C models are irrelevant.

Hardware

February 2013

BULL CEDOC
357 AVENUE PATTON
B.P.20845
49008 ANGERS CEDEX 01
FRANCE

The following copyright notice protects this book under Copyright laws which prohibit such actions as, but not limited to, copying, distributing, modifying, and making derivative works.

Copyright © Bull SAS 2013

Printed in France

Trademarks and Acknowledgements

We acknowledge the rights of the proprietors of the trademarks mentioned in this manual.

All brand names and software and hardware product names are subject to trademark and/or patent protection.

Quoting of brand and product names is for information purposes only and does not represent trademark misuse.

The information in this document is subject to change without notice. Bull will not be liable for errors contained herein, or for incidental or consequential damages in connection with the use of this material.

Contents

Safety notices	v
SAS RAID enablement and cache battery pack for the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D	1
Installing the Storage Backplane - 6 SFF Drives/SATA DVD (FC 5267 and FC EJ0D)	3
Installing the Storage Backplane - 3 SFF Drives/SATA DVD/HH Tape (FC 5263 and FC EJ0E)	7
Installing the Storage Backplane - 6 SFF Drives/SATA DVD/175MB RAID/Dual IOA/External SAS Port (FC 5268 and FC EJ0F)	11
Removing and replacing SAS RAID adapters and batteries	21
Removing the 31E/2B RAID/cache enablement card	21
Replacing the 31E/2B RAID/cache enablement card.	22
Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller	23
Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller	27
Removing and installing the cache battery card	29
Removing and replacing the cache battery pack	35
Removing and replacing the disk drive backplane	37
Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane	38
Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane	43
Removing and replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane.	48
Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane	48
Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane.	59
31E/2B SAS subsystem service considerations	75
Service considerations for the cache battery pack	75
Common procedures for installable features	77
Before you begin	77
Identifying a part	79
Control panel LEDs.	79
Identifying a failing part in an AIX system or logical partition	81
Locating a failing part in an AIX system or logical partition	81
Activating the indicator light for the failing part	81
Deactivating the failing-part indicator light.	81
Identifying a failing part in a Linux system or logical partition	82
Locating a failing part in a Linux system or logical partition	82
Finding the location code of a failing part in a Linux system or logical partition	82
Activating the indicator light for the failing part	82
Deactivating the failing-part indicator light.	83
Locating a failing part in a Virtual I/O Server system or logical partition.	83
Identifying a part by using the Virtual I/O Server	83
Starting the system or logical partition	84
Starting a system that is not managed by an HMC or an SDMC.	84
Starting a system or logical partition by using the HMC	85
Starting a system or virtual server by using the SDMC	86
Stopping a system or logical partition	86
Stopping a system that is not managed by an HMC or an SDMC	86
Stopping a system by using the HMC	87
Stopping a system by using the SDMC	88
Removing and replacing covers for the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D	89

Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.	89
Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.	90
Placing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system into the service or operating position	90
Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position	90
Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position	91
Disconnecting the power cords from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D	93
Connecting the power cords to the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.	94
Installing a part by using the HMC	95
Removing a part by using the HMC	96
Replacing a part by using the HMC	96
Verifying the installed part	97
Verifying an installed feature or replaced part in an AIX system or logical partition	97
Verifying the installed part in a Linux system or logical partition	99
Verifying an installed part by using stand-alone diagnostics	99
Verifying the installed part by using the HMC	101
Activating and deactivating LEDs by using the HMC	102
Deactivating a system attention LED or partition LED by using the HMC	102
Activating or deactivating an identify LED by using the HMC	102
Viewing serviceable events by using the HMC	103
Verifying the installed part by using the SDMC	103
Activating and deactivating LEDs by using the SDMC	104
Deactivating a system attention LED or partition LED by using the SDMC.	104
Activating or deactivating an identify LED by using the SDMC	104
Viewing serviceable events by using the SDMC	105
Verifying an installed part or replaced part on a system or logical partition by using Virtual I/O Server tools	105
Verifying the installed part by using VIOS.	105
Verify the replacement part by using VIOS	106
Installing a part by using the SDMC.	108
Replacing a part by using the SDMC	108
Removing a part by using the SDMC	109
Notices	111
Trademarks	112
Electronic emission notices	112
Class A Notices.	112
Class B Notices.	116
Terms and conditions.	118

Safety notices

Safety notices may be printed throughout this guide.

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

World Trade safety information

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

Laser safety information

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

Laser compliance

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

DANGER

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

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

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

To Disconnect:

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

To Connect:

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

(D005a)

DANGER

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

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



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

CAUTION

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

(R001)

CAUTION:

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

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

(R002)

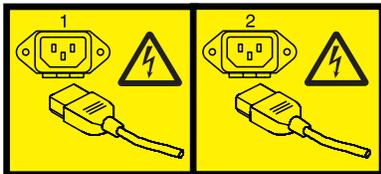
(L001)



(L002)



(L003)



or



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

CAUTION:

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

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

(C026)

CAUTION:

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

CAUTION:

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

CAUTION:

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

CAUTION:

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

Do Not:

- ___ Throw or immerse into water
- ___ Heat to more than 100°C (212°F)
- ___ Repair or disassemble

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

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

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

The equipment is suitable for installation in the following:

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

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

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

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

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

SAS RAID enablement and cache battery pack for the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D

You might need to configure a redundant array of independent disks (RAID) on your serial-attached SCSI (SAS) disk drives in your system enclosure. Use these instructions to install features to enable RAID on your 7/10 (31E/2B, 31E/1C, or 31E/1D) and the 7/30 (31E/2B, 31E/2C, or 31E/2D) systems.

The following instructions will enable you to install SAS RAID enablement cards to prepare your system, to use SAS disk drives in a RAID configuration.

Installing the Storage Backplane - 6 SFF Drives/SATA DVD (FC 5267 and FC EJ0D)

Use this procedure to install the parts included with feature Storage Backplane - 6 SFF Drives/SATA DVD. This procedure is intended for installing new features.

Before you begin

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see “Control panel LEDs” on page 79 and Enabling enclosure indicators.

Note: The FC 5267 is for the 31E/2B and FC EJ0D is for the 31E/2C.

Attention: To maintain system availability and to prevent possible data loss, it is important to understand that these features have implications on the serial-attached SCSI (SAS) configuration and data accessibility of the system. Review the SAS subsystem topic to understand the various SAS configuration and service considerations.

Before servicing or installing any features, review the I/O configurations for each logical partition on your system. It is important to understand the differences between the various configurations and the resulting service considerations. In addition, consider possible impacts to the following areas:

- Logical partitions and their I/O adapter assignments
- RAID array configurations
- Physical disk locations
- Path to your boot device

About this task

Before installing or replacing a feature, ensure that the software required to support the feature is installed on your system. If your system is managed by the Hardware Management Console (HMC), use the HMC to install a feature in the server. For instructions, see “Installing a part by using the HMC” on page 95.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to install a feature in the server. For instructions, see “Installing a part by using the SDMC” on page 108.

Procedure

Do the following steps to install the parts included with feature Storage Backplane - 6 SFF Drives/SATA DVD.

1. Perform the prerequisite tasks, as described in “Before you begin” on page 77.

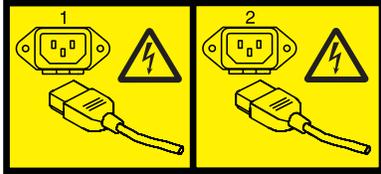
Important: Do not disconnect power to the system.

2. Stop the system. For instructions, see “Stopping a system or logical partition” on page 86.
3. Place the system into the service position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position” on page 90.
4. Remove the service access cover. For instructions, see “Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 89.
5. Use the service indicator light-emitting diodes (LEDs) to help identify the part. For instructions, see “Identifying a part” on page 79.

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

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

(L003)



or



7. Attach the wrist strap.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
8. Install the system interposer card. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D storage interposer card with the power off.
 9. Install the disk drive backplane. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane.
 10. Install the disk drives or solid-state drives. For instructions, see Installing a disk drive or solid-state drive.
 11. Install the SATA DVD drive. For instructions, see Installing a Slimline media device in the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.
 12. Replace the service access cover. For instructions, see “Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 90.

13. For a rack-mounted system, put the system into the operating position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position” on page 91.
14. Reconnect the power source.
15. Start the system as described in “Starting the system or logical partition” on page 84.
16. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part as described in Verifying the installed part.

Installing the Storage Backplane - 3 SFF Drives/SATA DVD/HH Tape (FC 5263 and FC EJ0E)

Use this procedure to install the parts included with feature Storage Backplane - 3 SFF Drives/SATA DVD/HH Tape. This procedure is intended for installing new features.

Before you begin

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see “Control panel LEDs” on page 79 and Enabling enclosure indicators.

Attention: To maintain system availability and to prevent possible data loss, it is important to understand that these features have implications on the serial-attached SCSI (SAS) configuration and data accessibility of the system. Review the SAS subsystem topic to understand the various SAS configuration and service considerations.

Before servicing or installing any features, review the I/O configurations for each logical partition on your system. It is important to understand the differences between the various configurations and the resulting service considerations. In addition, consider possible impacts to the following areas:

- Logical partitions and their I/O adapter assignments
- RAID array configurations
- Physical disk locations
- Path to your boot device

About this task

Before installing or replacing a feature, ensure that the software required to support the feature is installed on your system.

If your system is managed by the Hardware Management Console (HMC), use the HMC to install a feature in the server. For instructions, see “Installing a part by using the HMC” on page 95.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to install a feature in the server. For instructions, see “Installing a part by using the SDMC” on page 108.

Procedure

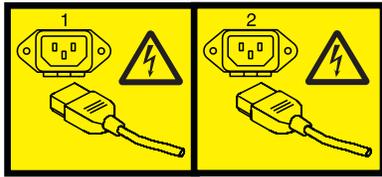
1. Perform the prerequisite tasks, as described in “Before you begin” on page 77.

Important: Do not disconnect power to the system.

2. Stop the system. For instructions, see “Stopping a system or logical partition” on page 86.
3. Place the system into the service position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position” on page 90.
4. Remove the service access cover. For instructions, see “Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 89.
5. Use the service indicator light-emitting diodes (LEDs) to help identify the part. For instructions, see “Identifying a part” on page 79.
6. Disconnect the power source from the system by unplugging the system.

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

(L003)



or



7. Attach the wrist strap.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
8. Install the system interposer card. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D storage interposer card with the power off.
 9. Install the disk drive backplane. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane.
 10. Install the disk drive or solid-state drive. For instructions, see Installing a disk drive or solid-state drive.
 11. Install the SATA DVD drive. For instructions, see Installing a Slimline media device in the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.
 12. Install the SAS tape drive. For instructions, see Installing a SAS tape drive in the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.
 13. Replace the service access cover. For instructions, see “Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 90.

14. For a rack-mounted system, put the system into the operating position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position” on page 91.
15. Reconnect the power source.
16. Start the system as described in “Starting the system or logical partition” on page 84.
17. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part as described in Verifying the installed part.

Installing the Storage Backplane - 6 SFF Drives/SATA DVD/175MB RAID/Dual IOA/External SAS Port (FC 5268 and FC EJ0F)

Use this procedure to install the parts included with feature Storage Backplane - 6 SFF Drives/SATA DVD/175MB RAID/Dual IOA/External SAS Port (FC 5268 and FC EJ0F). This procedure is intended for installing new features.

Before you begin

Note:

The FC 5268 is for the 31E/2B and FC EJ0F is for the 31E/1C or 31E/2C. The FC EJ0F does not have RAID enablement card.

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see “Control panel LEDs” on page 79 and Enabling enclosure indicators.

Attention: To maintain system availability and to prevent possible data loss, it is important to understand that these features have implications on the serial-attached SCSI (SAS) configuration and data accessibility of the system. Review the SAS subsystem topic to understand the various SAS configuration and service considerations.

Before servicing or installing any features, review the I/O configurations for each logical partition on your system. It is important to understand the differences between the various configurations and the resulting service considerations. In addition, consider possible impacts to the following areas:

- Logical partitions and their I/O adapter assignments
- RAID array configurations
- Physical disk locations
- Path to your boot device

Attention: If you are servicing a failing part, see the following service procedures:

- For the RAID enablement card, see Removing the 31E/2B RAID/cache enablement card.
- For the RAID/cache storage controller, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller and Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller.

About this task

Before installing or replacing a feature, ensure that the software required to support the feature is installed on your system.

If your system is managed by the Hardware Management Console (HMC), use the HMC to install a feature in the server. For instructions, see “Installing a part by using the HMC” on page 95.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to install a feature in the server. For instructions, see “Installing a part by using the SDMC” on page 108.

If you do not have an HMC or an SDMC, complete the following steps:

Procedure

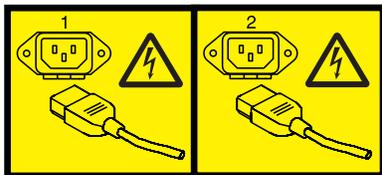
1. Perform the prerequisite tasks, as described in “Before you begin” on page 77.

Important: Do not disconnect power to the system.

2. Stop the system. For instructions, see “Stopping a system or logical partition” on page 86.
3. Place the system into the service position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position” on page 90.
4. Remove the service access cover. For instructions, see “Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 89.
5. Use the service indicator light-emitting diodes (LEDs) to help identify the part. For instructions, see “Identifying a part” on page 79.
6. Disconnect the power source from the system by unplugging the system.

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

(L003)



or



7. Attach the wrist strap.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
8. For the 31E/2B, locate the slots for the RAID enablement card (P1-C12), RAID/cache storage controller (P1-C18), and cache battery card (P1-C13).

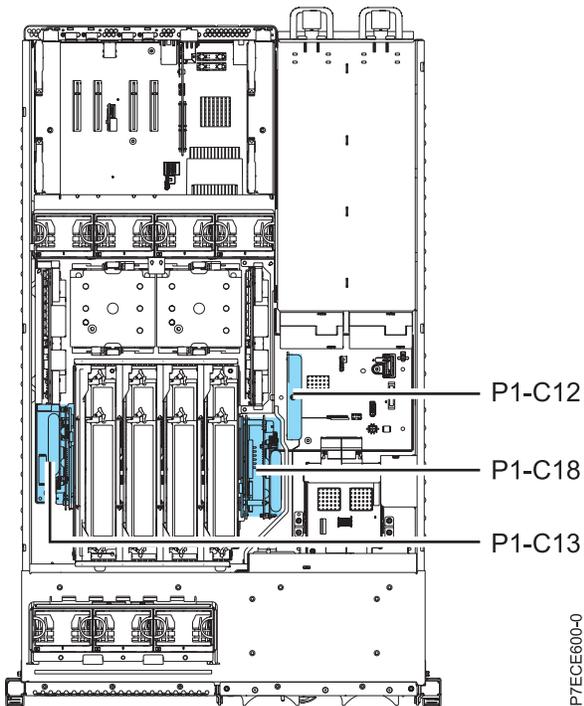


Figure 1. Slot location for RAID enablement, storage controller, and cache battery card installation for 31E/2B

9. Locate the slots for the RAID/cache storage controller (P1-C18), and cache battery card (P1-C13).

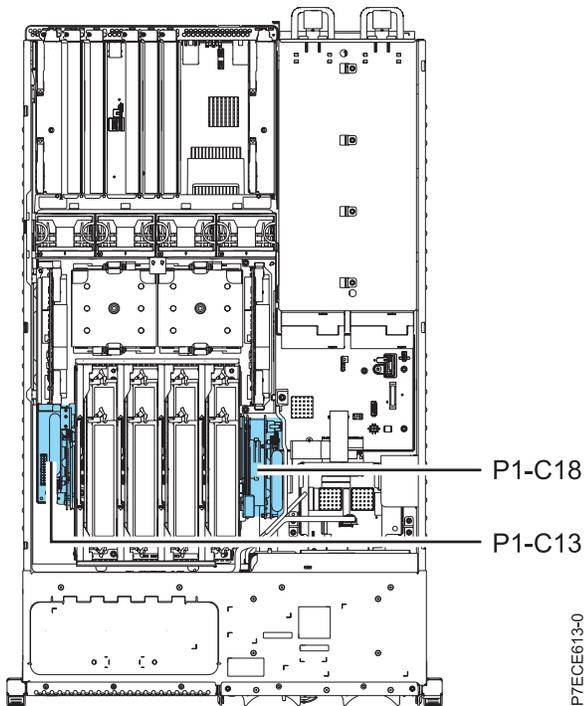


Figure 2. Slot location for storage controller and cache battery card installation for 31E/1C, 31E/1D, 31E/2C, or 31E/2D

10. For 31E/2B, install the RAID enablement card as follows:

Note: For 31E/1C, 31E/1D, 31E/2C, or 31E/2D, go to step 11 on page 15.

- a. Align the RAID enablement card (A) with the slot in the system. The RAID enablement card has a metal plate attached to it as shown in the following figure.
- b. Slide the RAID enablement card into the system until the tab locks into place as shown in the following figure.

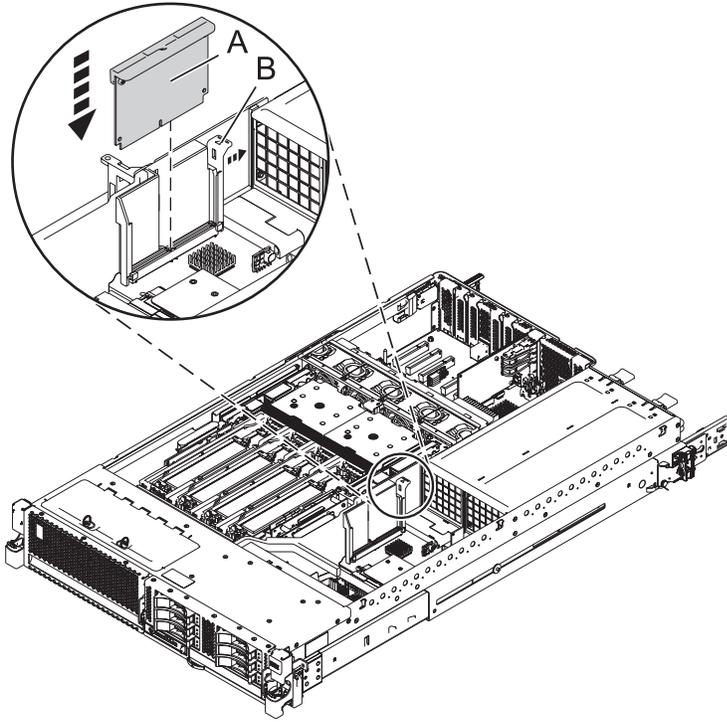


Figure 3. Rack-mounted model RAID enablement card replacement

11. Install the RAID/cache storage controller as follows:
 - a. Align the RAID/cache storage controller with the slot in the system.
 - b. Slide the RAID/cache storage controller into the system until the tabs **(B)** align with the slots in the metal guide, and the latch **(A)** locks into place as shown in the following figure.

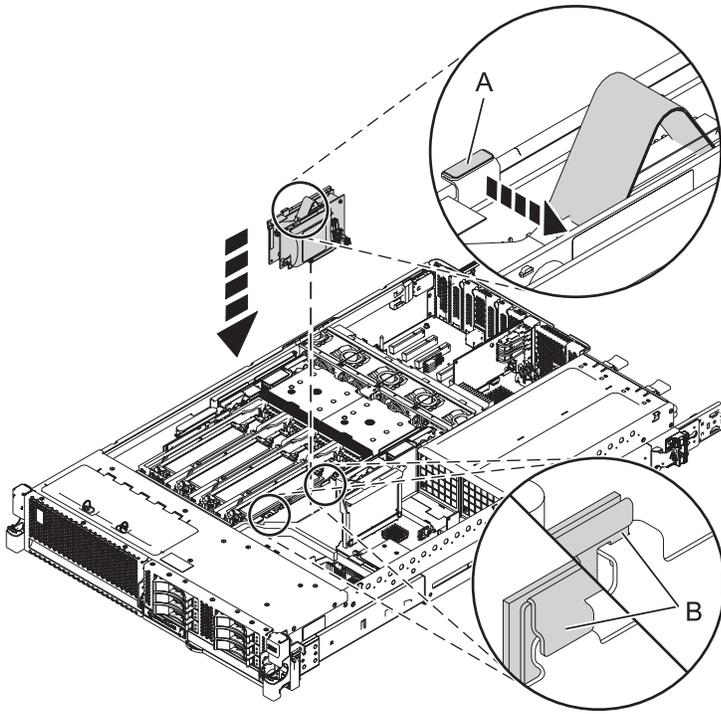


Figure 4. Replacing a RAID/cache storage controller in a rack-mounted 31E/2B

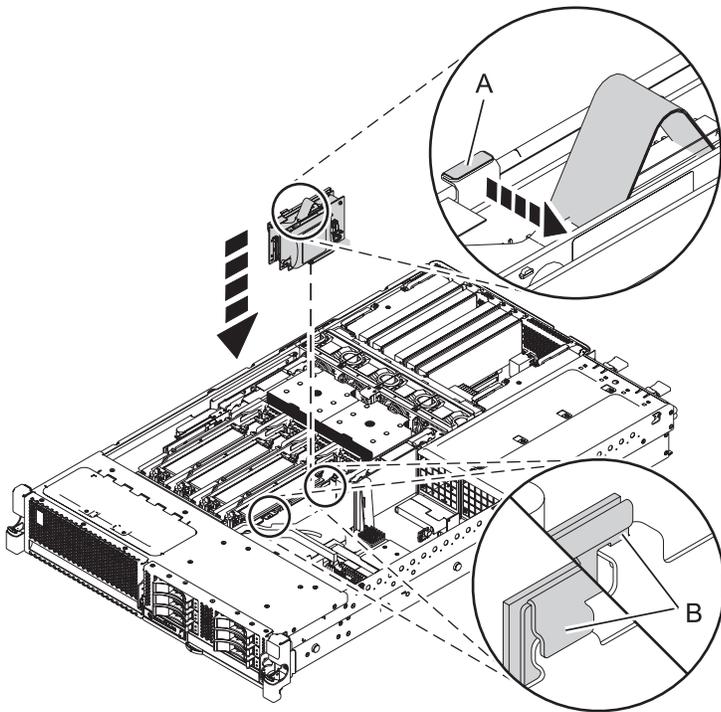


Figure 5. Replacing a RAID/cache storage controller in a rack-mounted 31E/1C, 31E/1D, 31E/2C, or 31E/2D

12. Install the cache battery card as follows:

Attention: Ensure that the cache battery card is disconnected for at least 60 seconds before you connect the new battery card.

- a. Align the cache battery card with the slot in the system.
- b. Slide the cache battery card into the system until the tabs (**B**) align with the slots in the metal guide, and the latch (**A**) locks into place as shown in the following figure.

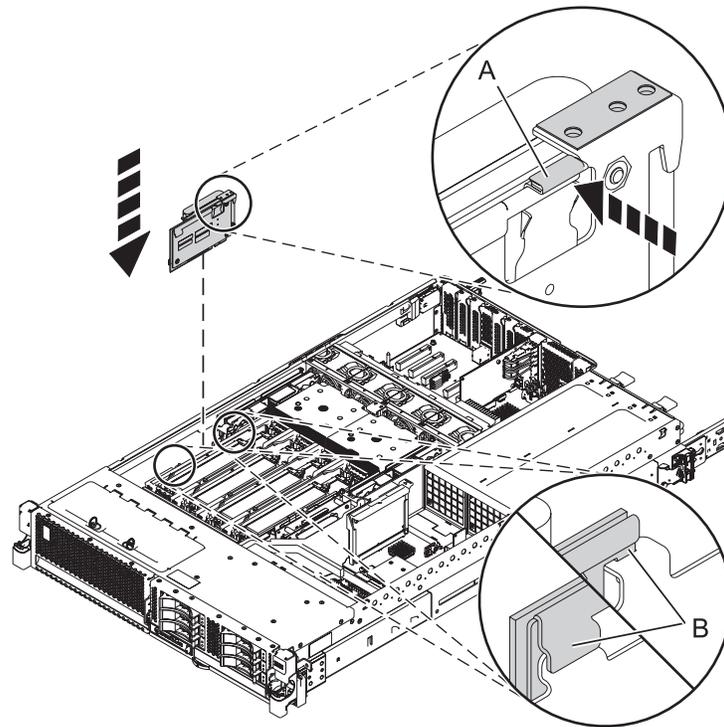


Figure 6. Cache battery card replacement for 31E/2B

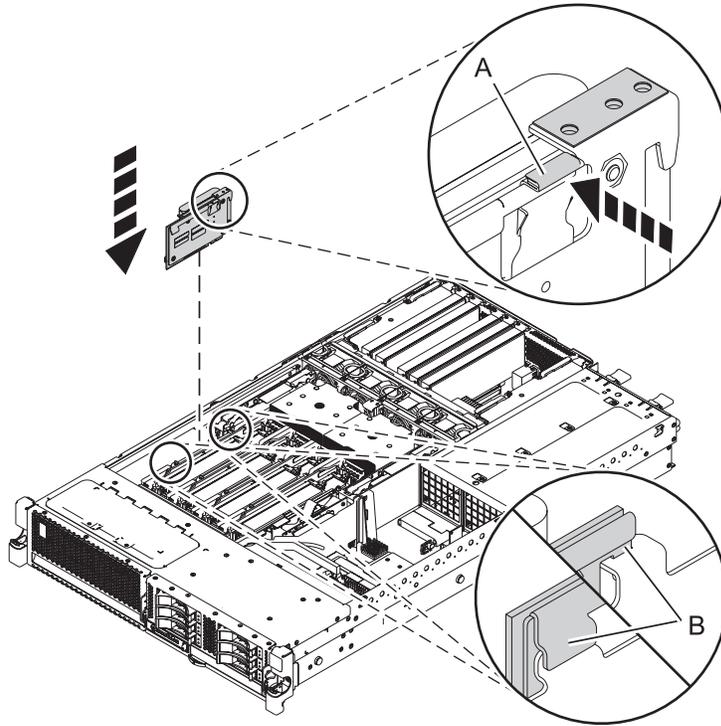
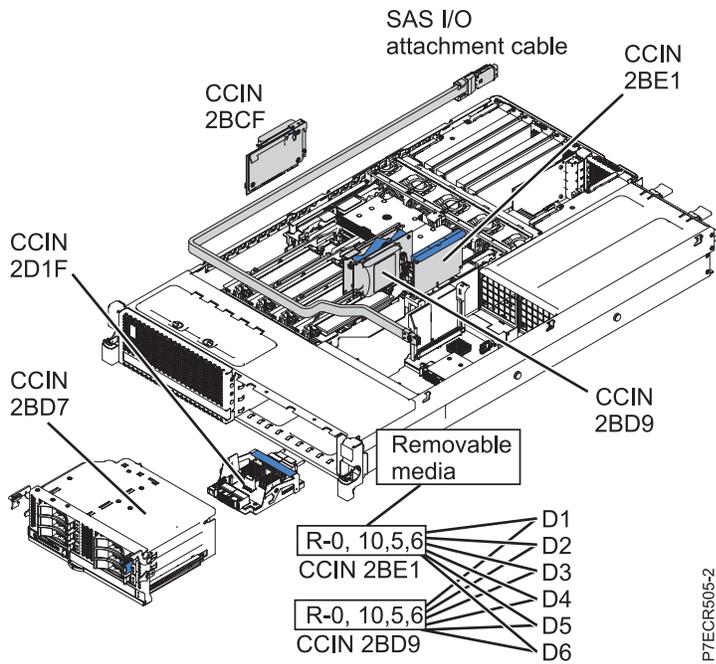


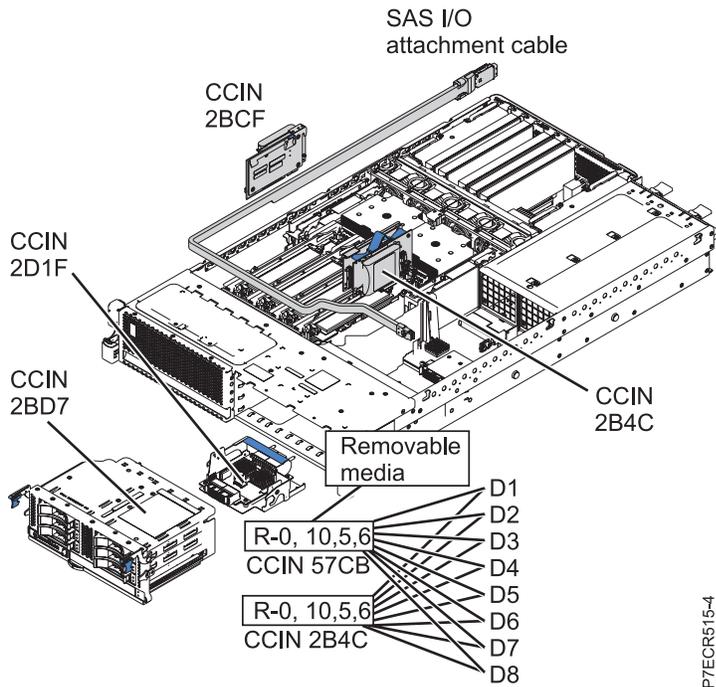
Figure 7. Cache battery card replacement for 31E/1C, 31E/1D, 31E/2C, or 31E/2D

13. Replace the system interposer card with the high-function system interposer card. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D storage interposer card with the power off.
14. Install the disk drive backplane. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane.
15. Install the disk drives or solid-state drives. For instructions, see Installing a disk drive or solid-state drive.
16. Install the SATA DVD drive. For instructions, see Installing a Slimline media device in the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.
17. Install the SAS I/O attachment cable.
 - a. Connect the mini-SAS connector of the SAS cable to the internal SAS connection port (C) on the storage interposer until it snaps in place.
 - b. Route the cable (A) in front of the memory riser cage, and along the channel in the side wall until the SAS port connector is near the opening on the rear of the chassis.
 - c. Align and guide the slot in the bracket of the SAS port connector (B) over the guide pin in the chassis, then slide the SAS port connector into the opening on the rear of the chassis until the tab on the bracket snaps in place.



P7ECR505-2

Figure 8. SAS I/O attachment cable for 31E/2B



P7ECR515-4

Figure 9. SAS I/O attachment cable for 31E/1C or 31E/2C

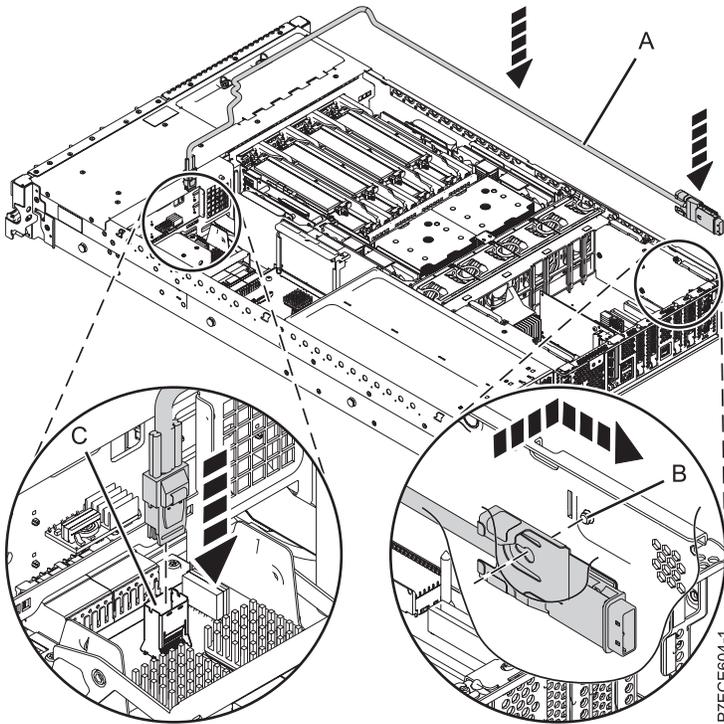


Figure 10. Installing the SAS I/O cable

18. Replace the service access cover. For instructions, see “Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 90.
19. For a rack-mounted system, put the system into the operating position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position” on page 91.
20. Reconnect the power source.
21. Start the system as described in “Starting the system or logical partition” on page 84.
22. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part as described in Verifying the installed part.

Removing and replacing SAS RAID adapters and batteries

You might need to remove or replace the SAS RAID adapters and batteries. This section includes procedures so that you can perform these tasks.

Note: Replacing this feature is a customer task. You can perform this task yourself, or contact an authorized service provider to perform the task for you. You might be charged a fee by the authorized service provider for this service.

Removing the 31E/2B RAID/cache enablement card

Use this procedure to remove a Redundant Array of Independent Disks (RAID)/cache enablement card before installing a new or upgraded RAID/cache enablement card.

About this task

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see “Control panel LEDs” on page 79 and Enabling enclosure indicators.

If your system is managed by the Hardware Management Console (HMC), use the HMC to remove the enablement card from the server. For instructions, see “Removing a part by using the HMC” on page 96.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to remove the enablement card from the server. For instructions, see “Removing a part by using the SDMC” on page 109.

If you do not have an HMC or an SDMC, complete the following steps to remove the enablement card:

Procedure

1. Complete the prerequisite tasks. For instructions, see “Before you begin” on page 77.
2. Stop the system. For instructions, see “Stopping a system or logical partition” on page 86.
3. Place the system into the service position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position” on page 90.
4. Remove the service access cover. For instructions, see “Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 89.
5. Use the service indicator light-emitting diodes (LEDs) to help identify the part. For instructions, see “Identifying a part” on page 79.
6. Disconnect the power source from the system by unplugging the system.
7. Attach the wrist strap.

Attention:

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

Note: If an optional tape drive is installed, it must be moved to access the RAID enablement card.

9. Check the cache data valid LED on the cache battery card on the other side of the system.

Note: The battery card powers the cache data that is on the RAID card. If the LED is blinking, you might lose cache data by removing this card.

10. Press the tab and slide the card out of the system, as shown in the following figures.

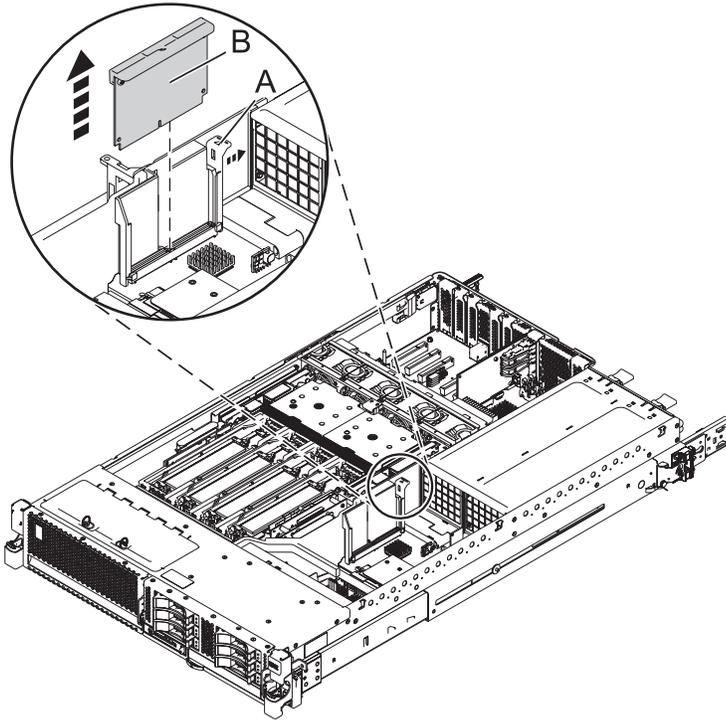


Figure 11. RAID/cache enablement card removal from a rack-mounted system unit

What to do next

Replace the RAID/cache enablement card. For instructions, see “Replacing the 31E/2B RAID/cache enablement card.”

Replacing the 31E/2B RAID/cache enablement card

Use this procedure to replace an existing Redundant Array of Independent Disks (RAID)/cache enablement card.

About this task

You must have already completed the procedure “Removing the 31E/2B RAID/cache enablement card” on page 21.

To replace a RAID/cache enablement card, complete the following steps:

Procedure

1. Locate the slot for the RAID/cache enablement card.
2. Align the RAID/cache enablement card with the slot in the system.

- Slide the RAID/cache enablement card fully into the system until the tab (A) locks into place.

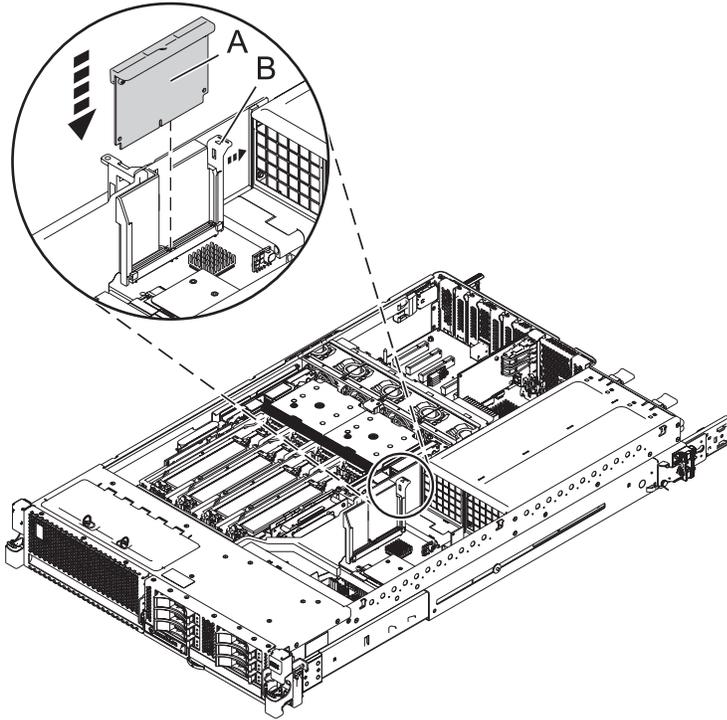


Figure 12. RAID/cache enablement card replacement in a rack-mounted system unit

- Replace the service access cover. For instructions, see “Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 90.
- For a rack-mounted system, put the system into the operating position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position” on page 91.
- Reconnect the power source.
- Start the system as described in “Starting the system or logical partition” on page 84.
- Verify the installed part or repair.
 - If you installed the part for any other reason, verify the installed part as described in Verifying the installed part.

Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller

Use this procedure to remove a Redundant Array of Independent Disks (RAID)/cache storage controller before installing a new or upgraded RAID/cache storage controller. You can also use this procedure to remove a RAID 10 storage controller.

About this task

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see “Control panel LEDs” on page 79 and Enabling enclosure indicators.

If your system is managed by the Hardware Management Console (HMC), use the HMC to remove the RAID/cache storage controller from the server. For instructions, see “Removing a part by using the HMC” on page 96.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to remove the RAID/cache storage controller from the server. For instructions, see “Removing a part by using the SDMC” on page 109.

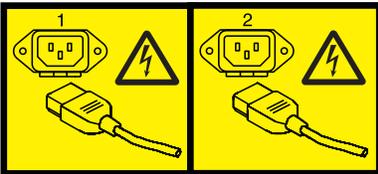
If you do not have an HMC or an SDMC, complete the following steps to remove the RAID/cache storage controller:

Procedure

1. Complete the prerequisite tasks. For instructions, see “Before you begin” on page 77.
2. Stop the system. For instructions, see “Stopping a system or logical partition” on page 86.
3. Place the system into the service position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position” on page 90.
4. Remove the service access cover. For instructions, see “Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 89.
5. Use the service indicator light-emitting diodes (LEDs) to help identify the part. For instructions, see “Identifying a part” on page 79.
6. Disconnect the power source from the system.

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

(L003)



or



7. Attach the wrist strap.

Attention:

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

Attention: Do not attempt to remove any parts related to the SAS subsystem on your system if the LED on the card in either P1-C18 or P1-C13 is flashing. This LED indicates that cache data has been written. To prevent data loss, see *Displaying rechargeable battery information*. You can safely replace the cache battery pack when Yes is displayed next to Battery pack can be safely replaced on the Battery Information panel (for Linux and IBM® i systems) or the COMMAND STATUS panel (for AIX® systems).

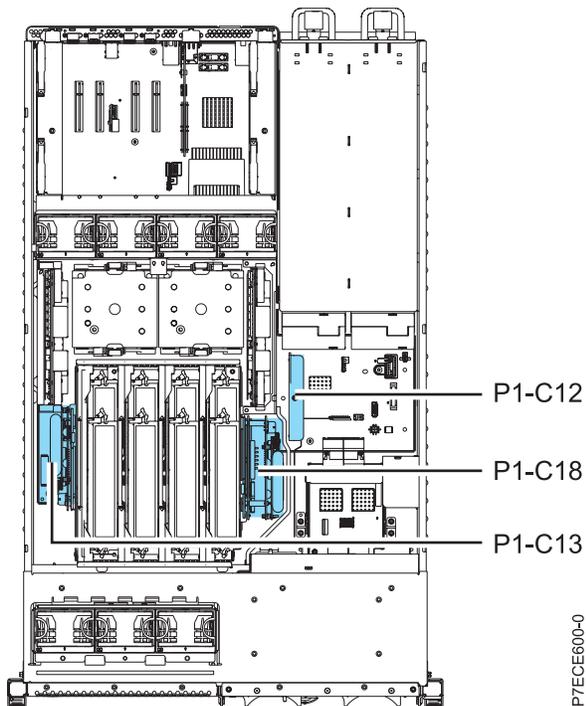


Figure 13. Slot location for RAID enablement (P1-C12), storage controller (P1-C18), and cache battery card (P1-C13) installation for 31E/2B

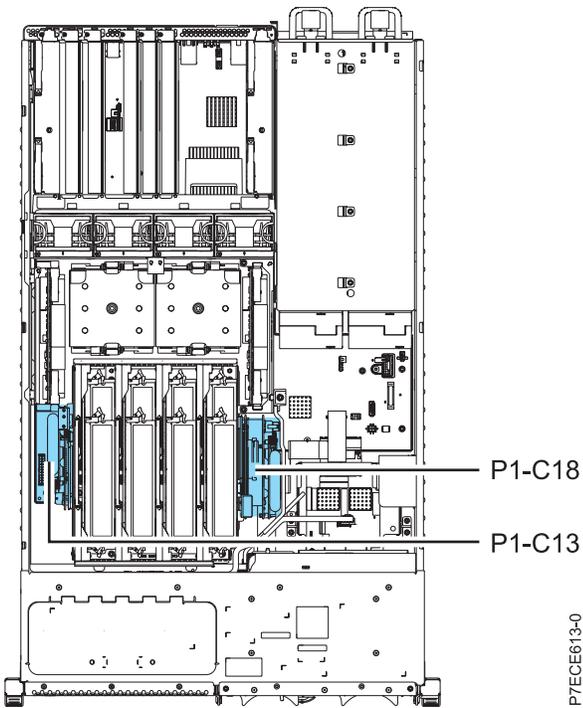


Figure 14. Slot location for storage controller (P1-C18) and cache battery card (P1-C13) installation for the 31E/1C, 31E/1D, 31E/2C, or 31E/2D

9. Push the latch (A) and pull up the handle (B) in the directions shown, and then slide the card out of the system as shown in the following figure.

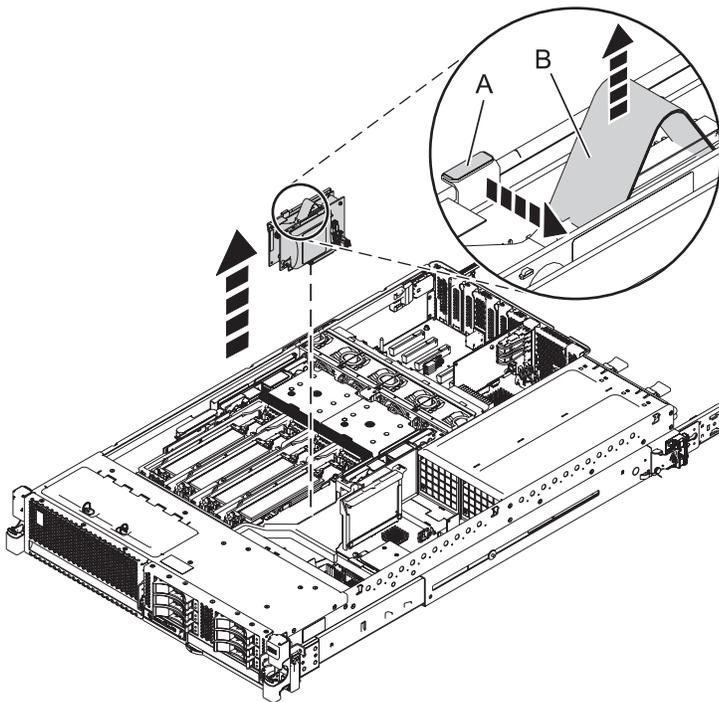


Figure 15. Removing a RAID/cache storage controller from a rack-mounted 31E/2B

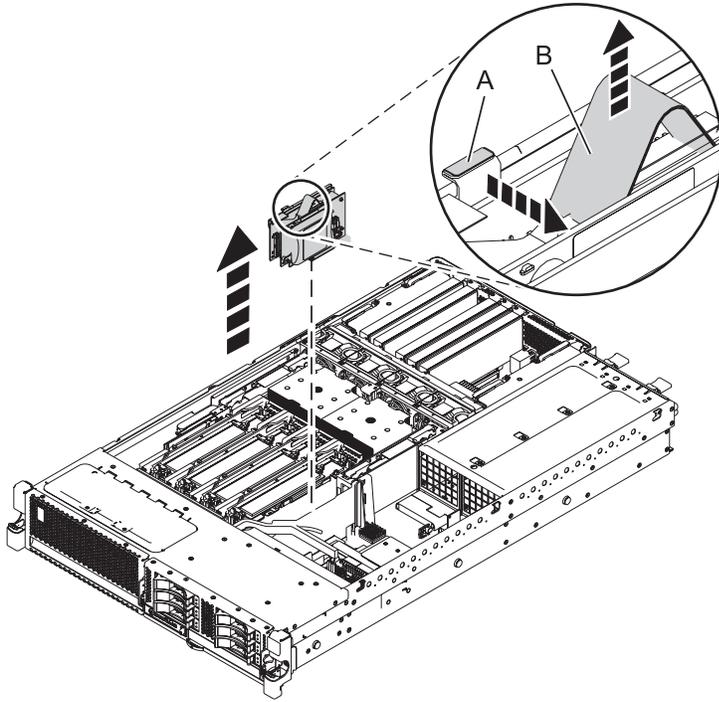


Figure 16. Removing a RAID/cache storage controller from a rack-mounted 31E/1C, 31E/1D, 31E/2C, or 31E/2D

What to do next

To replace the RAID/cache storage controller, see “Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller.”

Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller

Use this procedure to replace an existing RAID/cache storage controller. You can also use this procedure to replace a RAID 10 storage controller.

About this task

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see “Control panel LEDs” on page 79 and Enabling enclosure indicators.

You must have already completed the procedure “Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller” on page 23.

To replace a RAID/cache storage controller, complete the following steps:

Procedure

1. Locate the slot for the RAID/cache storage controller.
2. Align the RAID/cache storage controller with the slot in the system.
3. Slide the RAID/cache storage controller fully into the system until the tab (A) locks into place.

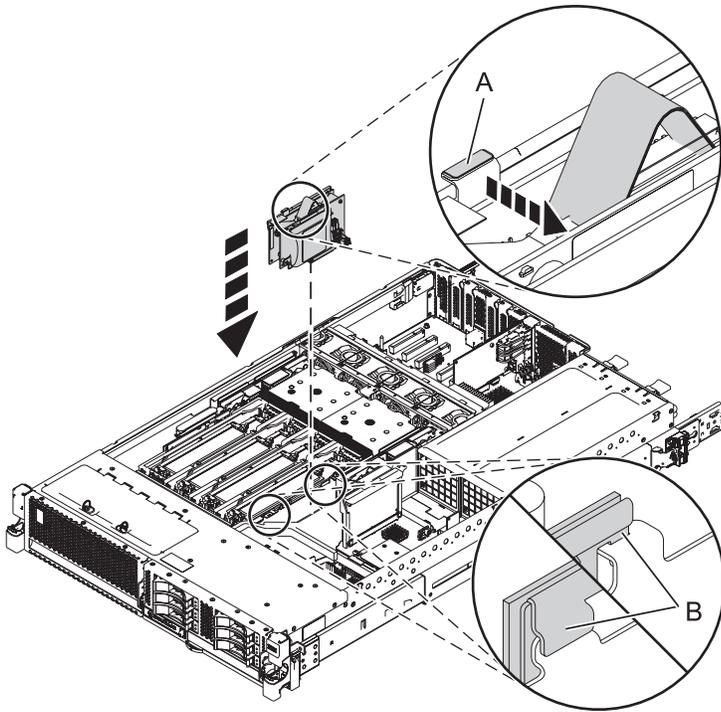


Figure 17. Replacing a RAID/cache storage controller in an 31E/2B

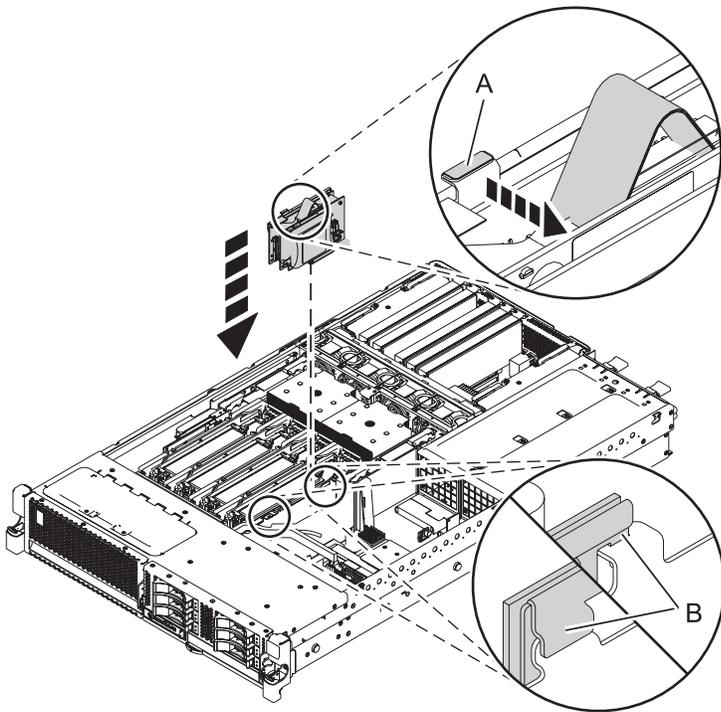


Figure 18. Replacing a RAID/cache storage controller in an 31E/1C, 31E/1D, 31E/2C, or 31E/2D

4. Replace the service access cover. For instructions, see “Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 90.

5. For a rack-mounted system, put the system into the operating position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position” on page 91.
6. Reconnect the power source.
7. Start the system as described in “Starting the system or logical partition” on page 84.
8. Verify the installed part:
 - If you installed the part for any other reason, verify the installed part as described in Verifying the installed part.

Removing and installing the cache battery card

To service the cache battery card, complete the following procedure:

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see “Control panel LEDs” on page 79 and Enabling enclosure indicators.

1. Begin with power on.

To prevent data loss, the cache battery card must be in an error state before it is removed from the system.

If you have powered off the system, ensure the power cords are connected and the system is in standby mode before you continue.

2. Select your operating system:

- AIX: Go to step 3.
- Linux: Go to step 5.
- IBM i: Go to step 7.

3. Force the cache battery card into an error state on AIX (to prevent possible data loss), as follows:

- a. Navigate to the IBM SAS Disk Array Manager by using the following steps:

- 1) At the command prompt, type `smit`, and press Enter.
- 2) Select **Devices**.
- 3) Select **Disk Array**.
- 4) Select **IBM SAS Disk Array**.
- 5) Select **IBM SAS Disk Array Manager** from the menu with the options for configuring and managing the IBM SAS RAID Controller.

- b. Select **Diagnostics and Recovery Options**.

- c. Select **Controller Rechargeable Battery Maintenance**.

- d. Select **Force Controller Rechargeable Battery Error**.

- e. Select the **IBM SAS RAID Controller** whose battery you want to replace.

This option places the battery into the error state, which requires it to be replaced.

- f. Determine that it is safe to replace the cache battery card. See the following Displaying rechargeable battery information procedure. It is safe to replace the cache battery card when **Yes** is displayed next to **Battery pack can be safely replaced**. You might need to reselect the option **Display Controller Rechargeable Battery Information** multiple times as it might take several minutes before it is safe to replace the cache battery card.

Displaying the rechargeable battery information:

- a. Navigate to the **IBM SAS Disk Array Manager** by using the previous procedure.
- b. Select **Diagnostics and Recovery Options**.
- c. Select **Controller Rechargeable Battery Maintenance**.
- d. Select **Display Controller Rechargeable Battery Information**.

- e. Select **IBM SAS RAID Controller**.
4. Go to step 8.
 5. Force the cache battery card into an error state on Linux (to prevent possible data loss), as follows:
 - a. Run the iprconfig utility by typing iprconfig.
 - b. Select **Work with disk unit recovery**.
 - c. Select **Work with resources containing cache battery packs**.
 - d. Select your adapter and type 2. Then press Enter to force the battery error.

Note: This option places the battery into the error state, which requires it to be replaced.

- e. If you are sure you want to force a battery error, type c to confirm. If you do not want to force a battery error, type q to cancel.
 - f. Determine that it is safe to replace the cache battery card. See Displaying rechargeable battery information.
 - g. It is safe to replace the cache battery card when **Yes** is displayed next to **Battery pack can be safely replaced**. You might need to reselect the option **Display Controller Rechargeable Battery Information** multiple times as it might take several minutes before it is safe to replace the cache battery card.
6. Go to step 8.
 7. Force the cache battery card into an error state on (to prevent possible data loss), on the system or partition that contains the adapter as follows:
 - a. Be sure that you are signed on to the system with at least service level authority.
 - b. Type strsst on the command line and press Enter.
 - c. Type your service tools user ID and service tools password on the System Service Tools (SST) Sign On display. Press Enter.
 - d. Select **Start a Service Tool** from the System Service Tools (SST) display and press Enter.
 - e. Select **Hardware Service Manager** from the Start a Service Tool display and press Enter.
 - f. Select **Work with resources containing cache battery packs** from the Hardware Service Manager display and press Enter.
 - g. Select **Force battery pack into error state** for the I/O card that you are working with from the **Work with Resources containing cache battery packs** display and press Enter.
 - h. On the **Force Battery Packs Into Error State** display, verify that the correct I/O adapter has been selected and press the function key that confirms your choice.
 - i. Return to the Work with Resources containing cache battery packs display and select **Display battery information**. Ensure that the field **Safe to replace cache battery** is set to **Yes**. This might take several minutes and you might need to press the Refresh key to see the field update.
 8. Place the system into the service position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position” on page 90.
 9. Remove the service access cover. For instructions, see “Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 89.
 10. Check the cache battery LED by examining the LED on the cache battery card.
 - If the LED is flashing, go to the next step.
 - If the LED is not flashing, go to step 8.

Note: Do not attempt to remove any parts related to the SAS subsystem on your system if the LED on the card in either P1-C18 or P1-C13 is flashing. This LED indicates that cache data has been written. Also, verify that the cache present LED is not flashing.

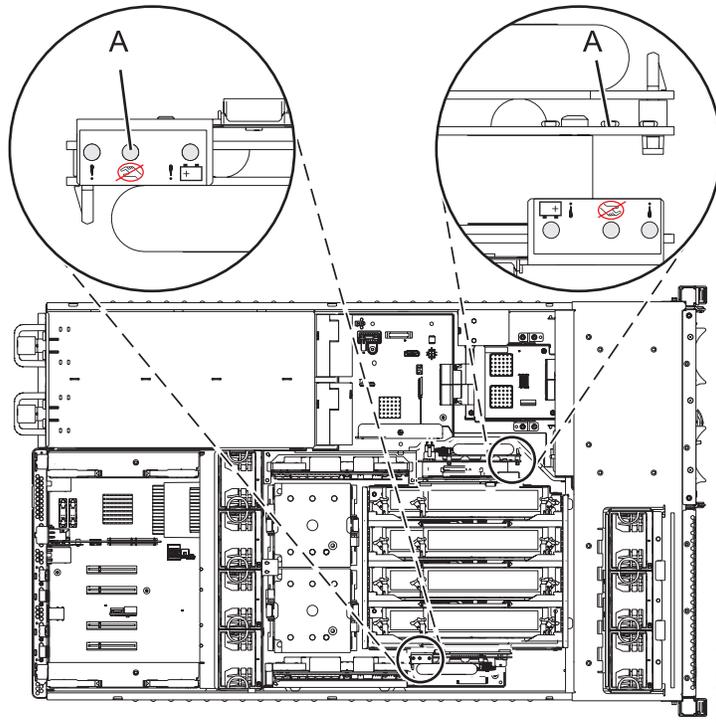


Figure 19. Cache data present LED

11. Stop removing the cache battery card.

The flashing LED indicates that the battery is preserving cache data for the RAID/cache enablement card. This data will be lost if the battery is removed at this time. Complete this service procedure without replacing the battery, and then retry it to ensure that all cache data is saved before the battery is replaced.

Go to step 18.

12. Remove the cache battery card as follows:

Attention: Do not remove the cache battery if the LED (**B**) is flashing because this indicates cache data exists.

- a. Push on the sheet-metal catch (**A**) to pull up the card.
- b. Slide the cache battery card out of the mounting guides and remove it from the controller.

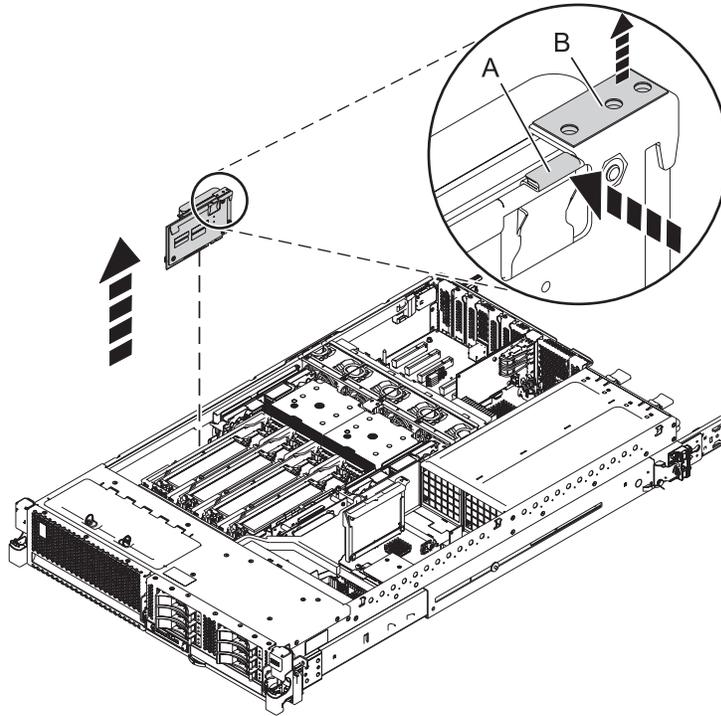


Figure 20. Removing the cache battery card for the 31E/2B

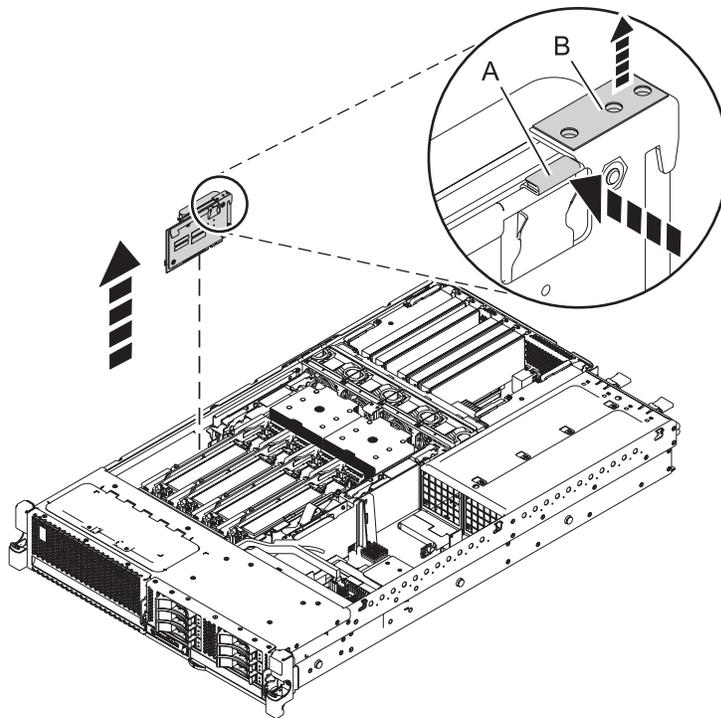


Figure 21. Removing the cache battery card for the 31E/1C, 31E/1D, 31E/2C, or 31E/2D

13. Install the cache battery card as follows:

Attention: Ensure that the cache battery card is disconnected for at least 60 seconds before you connect the new battery. This is the minimum amount of time needed for the adapter to recognize that the battery has been replaced.

- a. Align the cache battery card with the slot in the system.
- b. Slide the cache battery card into the system until the tabs **(B)** align with the slots in the metal guide, and the latch **(A)** locks into place as shown in the following figure.

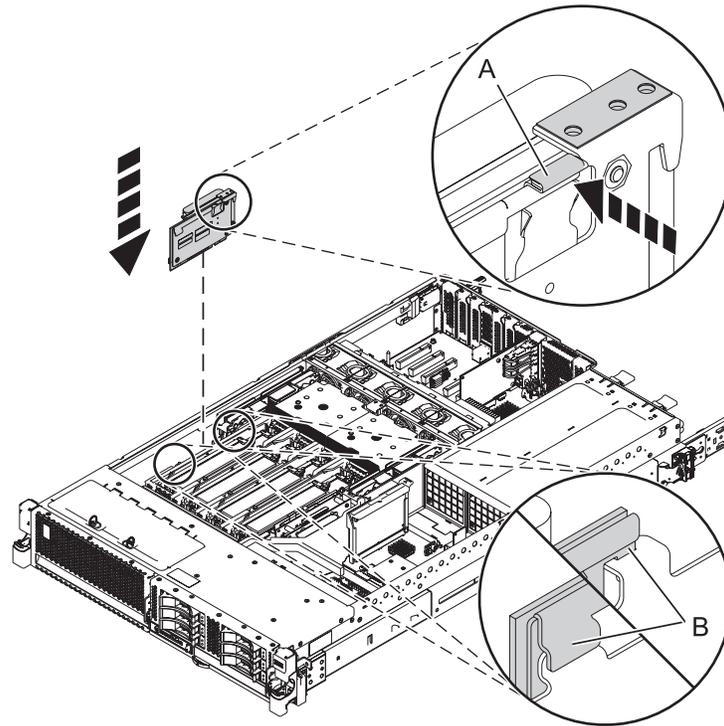


Figure 22. Installing the cache battery card for the 31E/2B

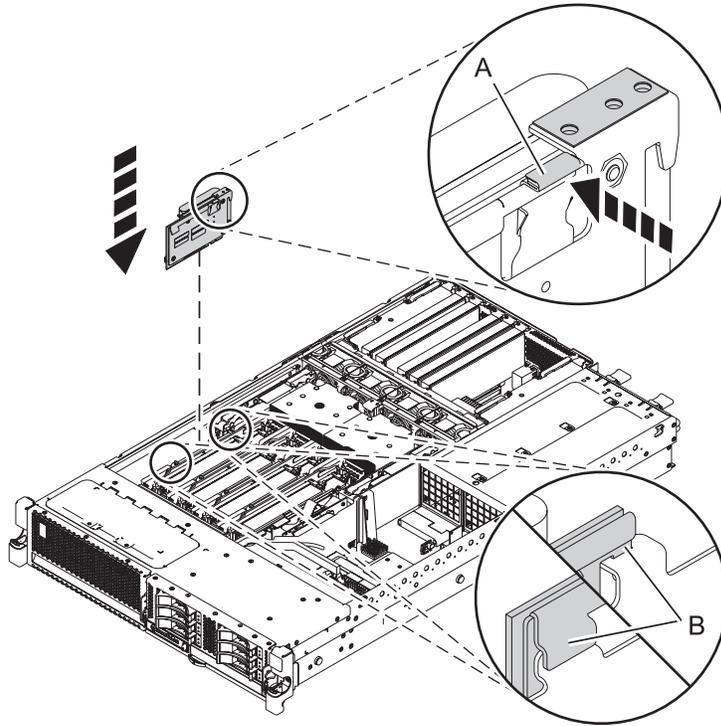


Figure 23. Installing the cache battery card for the 31E/1C, 31E/1D, 31E/2C, or 31E/2D

14. Restart the adapter's write cache by doing the following steps:

Select your operating system:

 - AIX: Go to step 15.
 - Linux: Go to step 16.
 - IBM i: Go to step 17.
15. Perform the following steps:
 - a. Navigate to the IBM SAS Disk Array Manager by using the information in step 3a.
 - b. Select **Diagnostics and Recovery Options**.
 - c. Select **Controller Rechargeable Battery Maintenance**.
 - d. Select **Start Adapter Cache**.
 - e. Select the controller that has the battery you just replaced and press Enter.
 - f. Go to step 18.
16. Perform the following steps:
 - a. Run the iprconfig utility by typing iprconfig.
 - b. Select **Work with disk unit recovery**.
 - c. Select **Work with resources containing cache battery packs**.
 - d. Start the I/O adapter cache on the adapter for the battery that you just replaced by typing 3 and press Enter.
 - e. Go to step 18.
17. Perform the following steps:
 - a. Return to the Work with Resources containing Cache Battery Packs display using the information in step 7a - 7f and select the **Start IOA Cache**. Press Enter.
 - b. Ensure that you get the message Cache was started.
 - c. Go to step 18.

18. Replace the service access cover. For instructions, see “Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D” on page 90.
19. For a rack-mounted system, put the system into the operating position. For instructions, see “Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position” on page 91.
20. Close the back door on the unit you are servicing.
21. Verify that the new resource is working correctly, as described in “Verifying the installed part” on page 97.

Removing and replacing the cache battery pack

Use this procedure to replace the cache battery pack on a battery card.

Before you begin

Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see Control panel LEDs and Enabling enclosure indicators.

Attention: Before continuing with this procedures, determine that it is safe to replace the cache battery pack. See Displaying rechargeable battery information. It is safe to replace the cache battery pack when **Yes** is displayed next to **Battery pack can be safely replaced**.

Attention: To maintain system availability and prevent possible data loss, it is important to understand that these features have implications on the serial-attached SCSI (SAS) configuration and data accessibility of the system. Review the SAS subsystem topic to understand the various SAS configuration and service considerations.

Before servicing or installing any features, review the I/O configurations for each logical partition on your system. It is important to understand the differences between the various configurations and the resulting service considerations. In addition, consider possible impacts to the following areas:

- Logical partitions and their I/O adapter assignments
- RAID array configurations
- Physical disk locations
- Path to your boot device

About this task

Complete the following steps to replace a nonconcurrent maintainable battery pack:

Procedure

1. Remove the controller from the system. For more information, see the following procedures:
 - “Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller” on page 23.
 - “Removing and installing the cache battery card” on page 29.
2. Place the controller on a surface that is electrostatic-discharge protected.
3. Unplug the battery connector (**A**) from its connector on the adapter, squeezing the retaining latch while gently pulling on the plug. The plug connects to the board in only one way; therefore, it cannot be inserted incorrectly during the replacement procedure.

Note: Ensure that the cache battery pack is disconnected for at least 60 seconds before connecting the new battery. This is the minimum amount of time needed for the adapter to recognize that the battery

has been replaced.

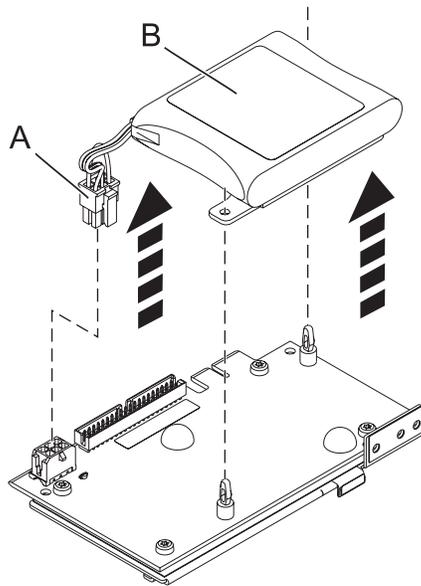


Figure 24. Removing the cache battery

(A) Battery connector

(B) Cache battery pack

4. The battery is mounted on a black plastic plate with two tabs, secured by standoffs with retaining pins. To remove the battery assembly, squeeze the retaining pins on one standoff and pull the tab of the black mounting plate up off of the standoff. Repeat this for the second tab.
5. Install the replacement battery onto the standoffs and push until the latches click into place.

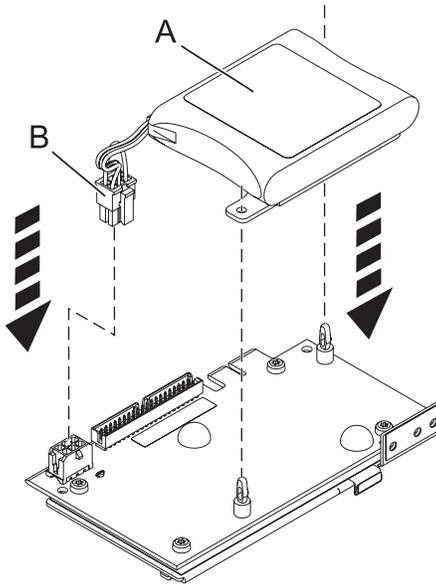


Figure 25. Replacing the cache battery

6. Reinstall the adapter and restart the cache. For more information, see the following procedures:
 - “Removing and installing the cache battery card” on page 29
 - “Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D RAID/cache storage controller” on page 23
7. Connect the cache battery pack connector (A) to the adapter. The plug connects to the adapter in only one way; therefore it cannot be inserted incorrectly.

Removing and replacing the disk drive backplane

Use this procedure to remove, replace, or install the disk drive backplane in the 7/10 (31E/2B, 31E/1C, or 31E/1D) and the 7/30 (31E/2B, 31E/2C, or 31E/2D) servers.

The following figures show the disk drive backplane in the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.

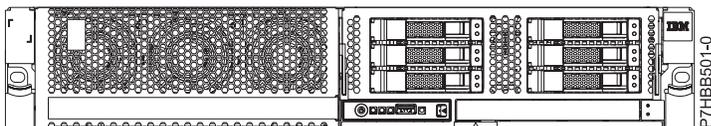


Figure 26. Disk drive backplane

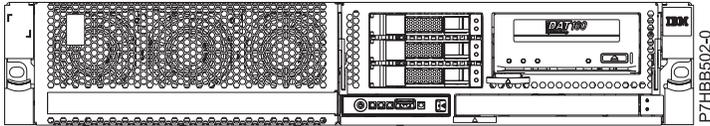


Figure 27. Disk drive backplane with tape

Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane

Use this procedure to remove the disk drive backplane from the server.

About this task

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for removing the disk drive backplane from the server. For information about using the HMC to remove the disk drive backplane, see *Removing a part using the Hardware Management Console*.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to complete the steps for removing the disk drive backplane from the server. For instructions, see *Removing a part using the Systems Director Management Console*.

If you do not have an HMC or SDMC, complete the following steps to remove the disk drive backplane:

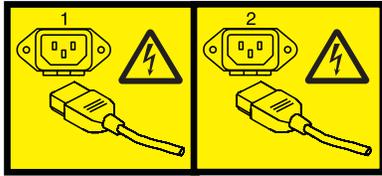
Attention: Ensure that you remove the control panel before you remove the disk drive backplane to prevent damage to the control panel cables.

Procedure

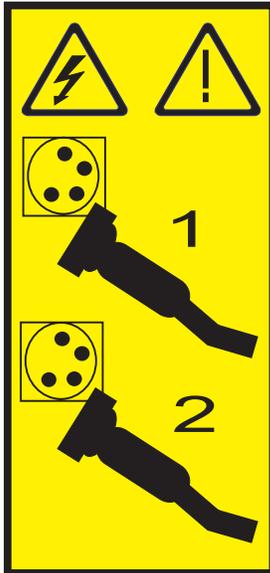
1. Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see *Enabling enclosure indicators and Control panel LEDs*.
2. Complete the prerequisite tasks. For instructions, see *Before you begin*.
3. Do one of the following steps, as applicable:
 - a. If you are removing the disk drive backplane for a system upgrade or as part of another procedure, continue to step 4.
 - b. If you are removing the disk drive backplane because of a system failure, use the service action log to help identify the failing part. See *Identifying a failing part*.
4. Stop the system, as described in *Stopping a system or logical partition*.
5. Place the system into the service position, as described in *Placing a rack-mounted model into the service position*.
6. Disconnect the power source from the system by unplugging the system. For instructions, see *Disconnecting the power cords*.

Note: If the system is equipped with a second power supply, ensure that the power source to the system has been completely disconnected.

(L003)



or



7. Remove the service access cover, as described in Removing the service access cover from a rack-mounted model.
8. Use the service indicator light-emitting diodes (LEDs) to help identify the part, as described in Identifying a part.
9. Attach the wrist strap.
 - Attention:**
 - Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
10. If you need to replace the backplane because of an upgrade or system failure, complete the following steps to remove the disk drives, depending on your backplane:

Note: If you remove a backplane that is populated with disk drives, the backplane will be heavy. Ensure that you can safely complete the procedure.

- a. To remove the disk drive from the backplane, perform the following steps:

Note: Record the location of each disk drive you remove so that the disk drive can be replaced in the same location again.

- 1) Unlock the disk drive handle (A) and pull it toward you to unseat the disk drive.
- 2) Place one hand under the disk drive and carefully pull the drive out of the system as shown in Figure 28 on page 40.

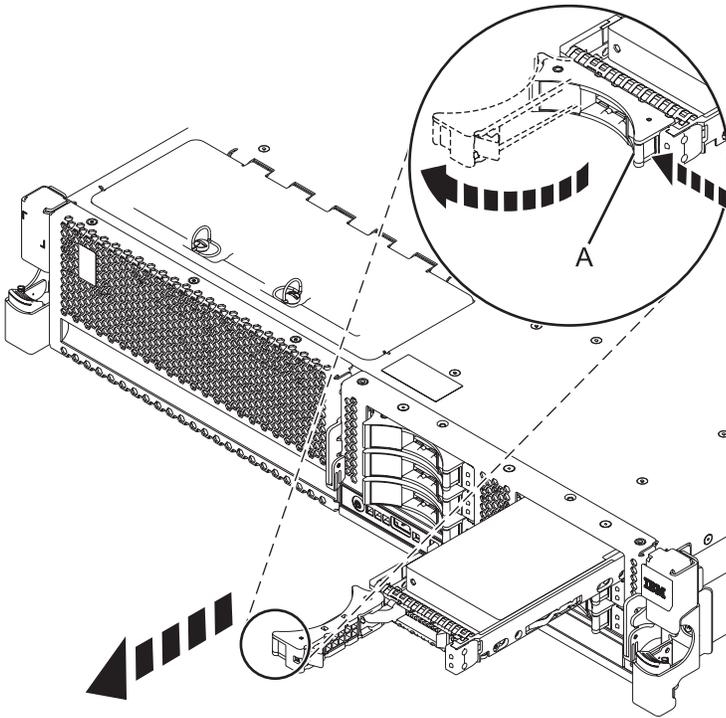


Figure 28. Removing the disk drive from the backplane

11. Remove the media device by pressing up and then pulling the latch (A) to slide the media device out of the system. See Figure 2 or 3 based on the configuration of your system.

For more information about removing the different types of media devices, see Removing a SAS media device from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.

Note: The device is held in place by a friction fit clip. There are no screws or fasteners to hold it in place. Ensure that you remove the device carefully to avoid dropping the clip.

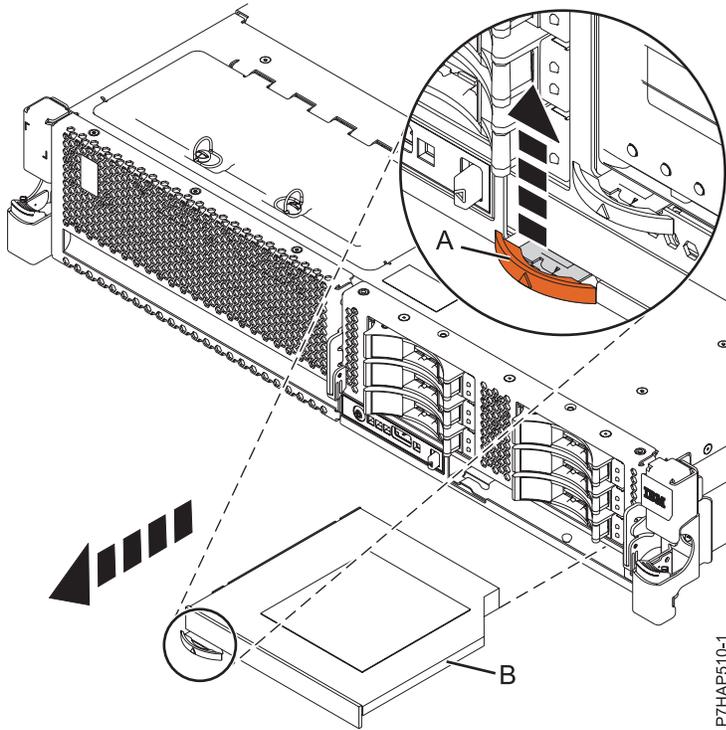


Figure 29. Removing the Slimline media device from the disk drive backplane

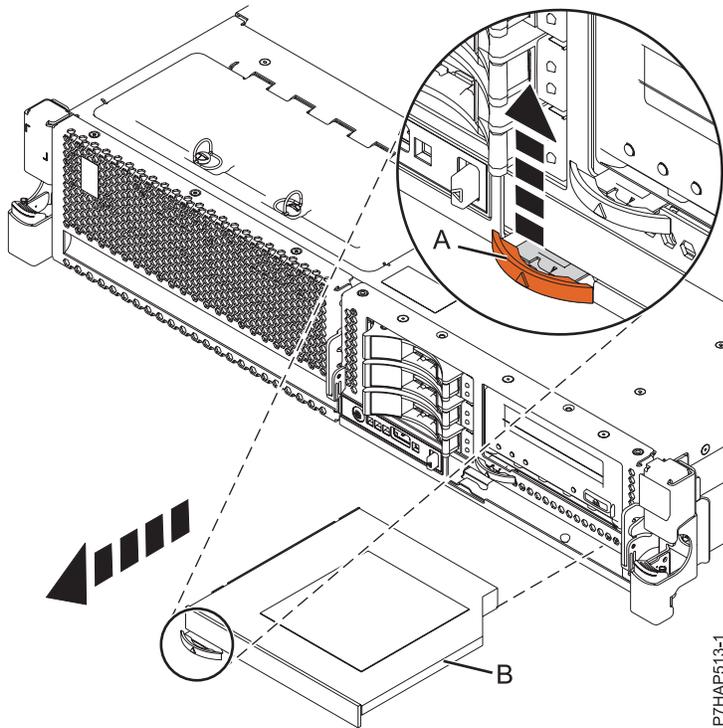


Figure 30. Removing the SAS media device from the disk drive backplane

12. Remove the control panel and signal cable from the backplane. For instructions, see Control panel and signal cables.

13. Unlock the disk drive backplane by pulling the handles (A) open from the center of the backplane as shown in Figure 31 and Figure 32.

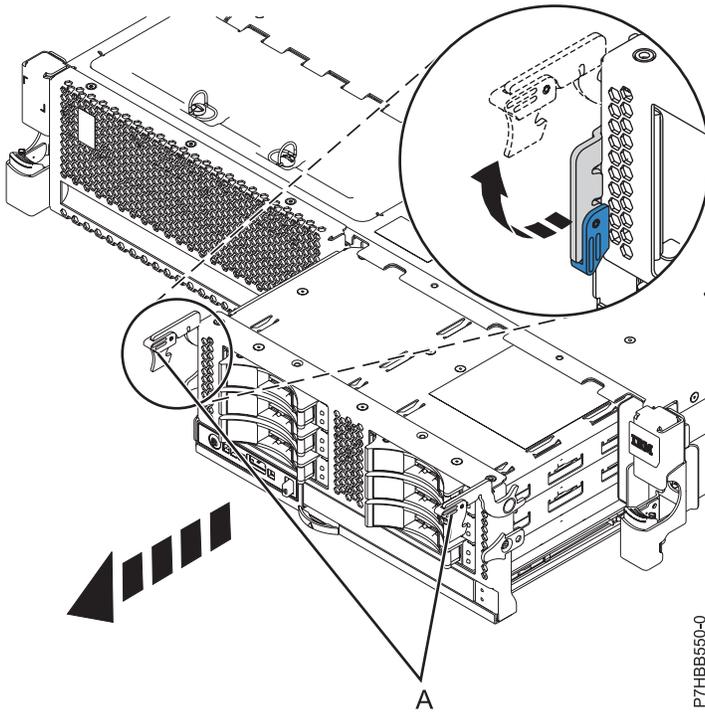


Figure 31. Removing the backplane populated with disk drives

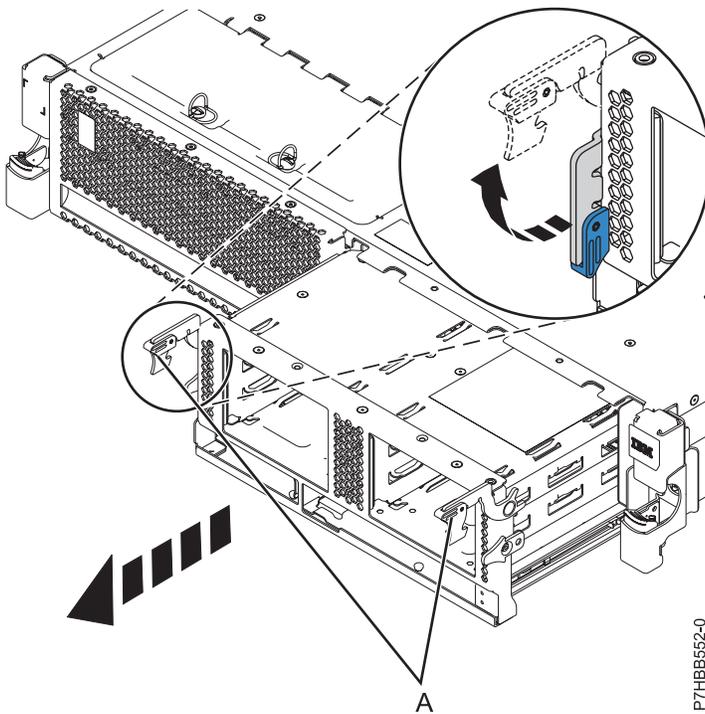


Figure 32. Removing the backplane that is not populated with disk drives

14. Pull the backplane out of the server.

15. If you removed the backplane as a part of another procedure, continue with that procedure. To replace the backplane, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane

Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D disk drive backplane

Use this procedure to replace the disk drive backplane.

About this task

If your system is managed by the Hardware Management Console (HMC), use the HMC to complete the steps for replacing the disk drive backplane in the server. For instructions, see Exchanging a part using the Hardware Management Console.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to complete the steps for replacing the disk drive backplane in the server. For instructions, see Replacing a part using the Systems Director Management Console.

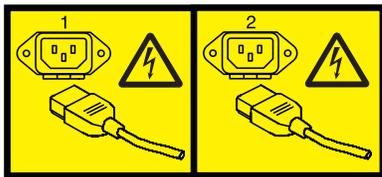
If you do not have an HMC or SDMC, complete the following steps to replace the disk drive backplane:

Procedure

1. Identify the system that you will be working on by using the identify the system process to turn on the system locate (blue) indicator. For more information, see Enabling enclosure indicators and Control panel LEDs.
2. Complete the prerequisite tasks as described in Before you begin.
3. Stop the system, as described in Stopping a system or logical partition.
4. Place the system into the service position, as described in Placing a rack-mounted model into the service position.
5. Disconnect the power source from the system by unplugging the system, as described in Disconnecting the power cords.

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

(L003)



or



6. Remove the service access cover, as described in Removing the service access cover from a rack-mounted model.
7. Use the service indicator light-emitting diodes (LEDs) to help identify the part, as described in Identifying a part.
8. Attach the wrist strap.

Attention:

- Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge (ESD) from damaging your hardware.
 - When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
 - If you do not have a wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.
9. Install the control panel and signal cable. For instructions, see Control panel and signal cables.
 10. Check for a protective cover that might be present on the lower-right connector pins. If a protective cover is present, remove the cover.
 11. Carefully lift the backplane along two sides and align it with the slot in the server.
 12. Insert the backplane firmly into the server.

Note: Ensure that the signal cables do not bind when you install the disk drive backplane.

13. Secure the backplane into the system by pressing in the locking tabs (A), as shown in the following figures.

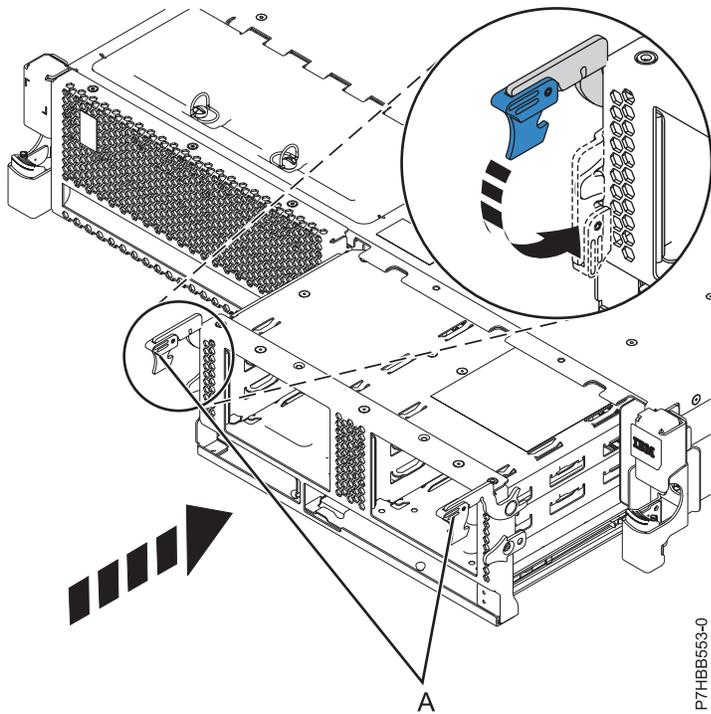


Figure 33. Installing the backplane that is not populated with disk drives in a rack-mounted model

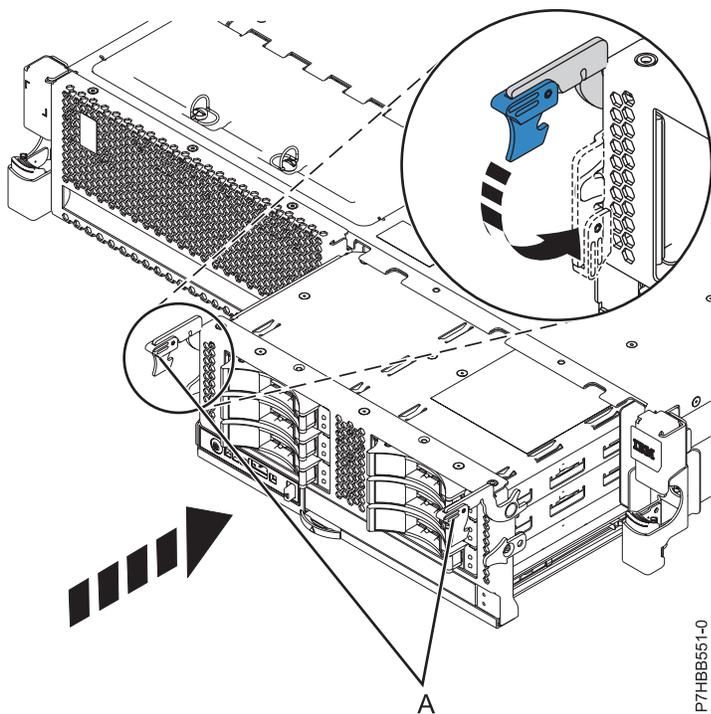


Figure 34. Installing the backplane that is populated with disk drives in a rack-mounted model

14. Replace the disk drives, if you removed them earlier. Use the location information that you recorded while removing the disk drives to install them the correct locations. To replace the disk drives, perform the following steps:

- a. Hold the disk drive by the top and bottom edges as you position the drive, and insert it into the system or expansion unit. Do not hold the disk drive by the handle.
- b. Slide the disk drive all the way into the system or expansion unit, and push the disk drive handle (A) in until it locks, as shown in the following figure.

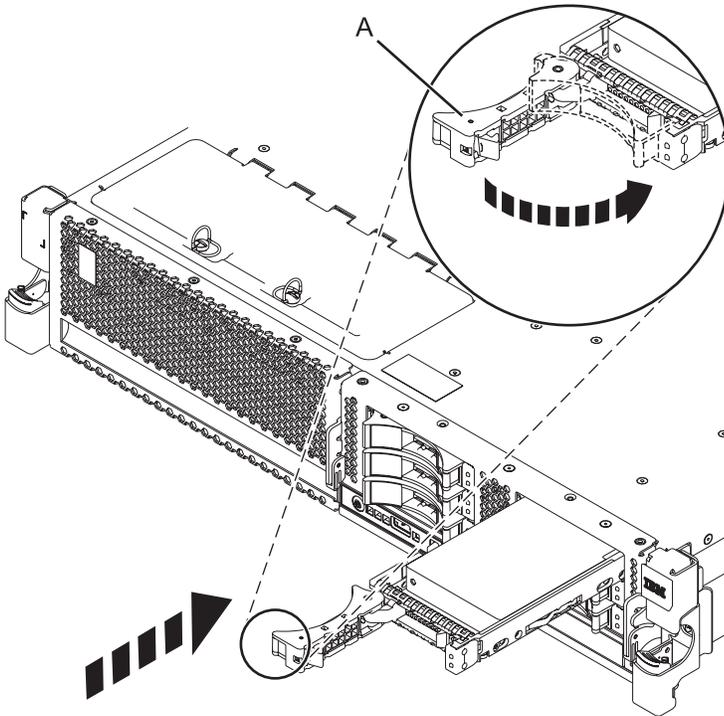


Figure 35. Installing the backplane disk drives

15. Replace the Slimline media device by performing the following steps:
 - a. Align the bracket with the tab (A) along the side of the media device. This bracket is not attached with screws, clips, or other fastening devices. It is held in place by tabs and friction.
 - b. Align the small tabs in the slots of the media device (B), and insert the device and clip at the same time. Then, push the tab (A) in until it locks into place. See figure 4 or 5 based on the configuration of your system.

For more information about replacing the different types of media devices, see Removing a SAS media device from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D.

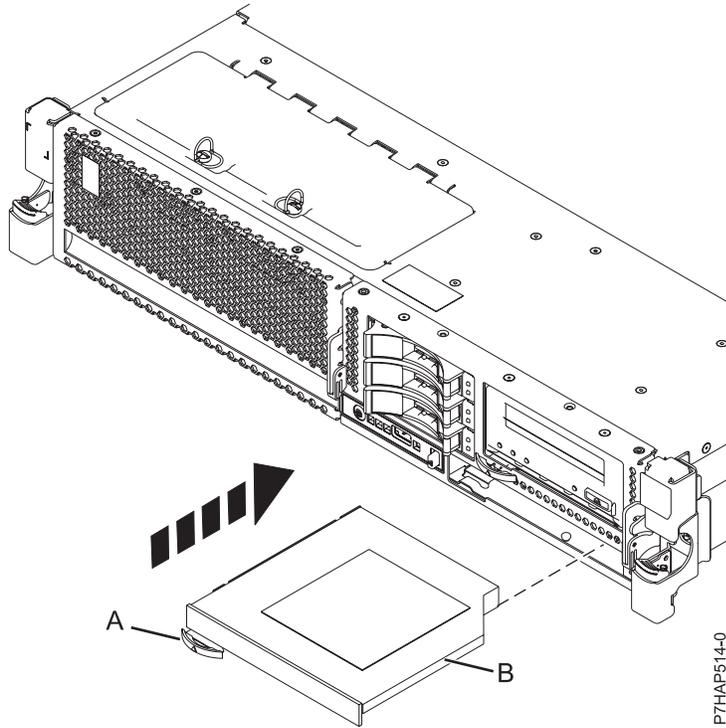


Figure 36. Installing the SAS media device

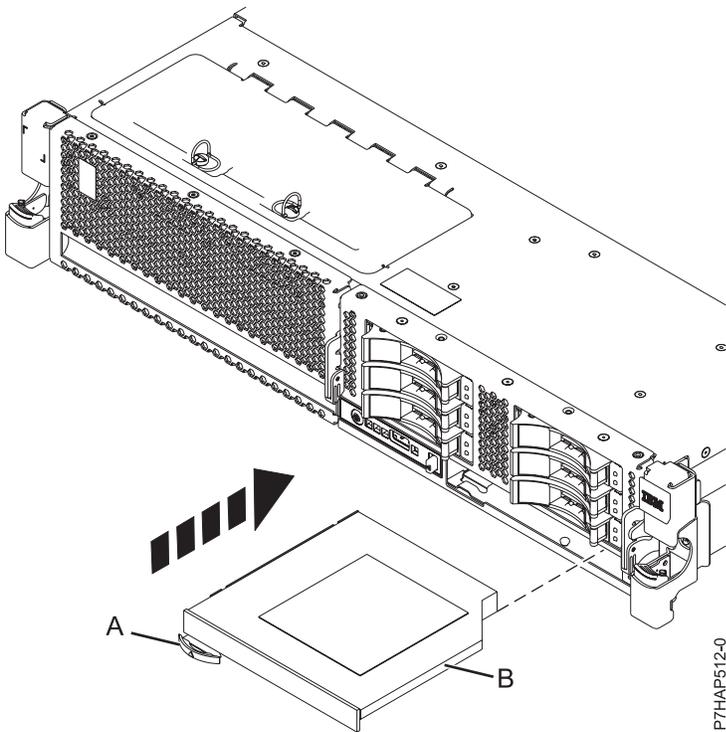


Figure 37. Installing the Slimline media device

16. Replace the service access cover, as described in Installing the service access cover on a rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system.

17. Place the system in the operating position, as described in [Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system into the operating position](#).
18. Connect the power cords to the system, as described in [Connecting the power cords](#).
19. Start the system or logical partition. See [Starting the system or logical partition](#).
20. Verify the installed part.
 - If you installed the part for any other reason, verify the installed part as described in [Verifying the installed part](#).

Removing and replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane

Learn how to remove or replace the 7/10 (31E/2B, 31E/1C, or 31E/1D) and the 7/30 (31E/2B, 31E/2C, or 31E/2D) system backplane.

About this task

Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane

Learn how to remove the system backplane from a server to replace a failing part or as part of another service procedure.

Before you begin

Notes:

- Before you begin this procedure, ensure that you have authority to log in as an authorized service provider. The authority levels are described in [ASMI authority levels](#).
- Identify the system that you will be working on by using the [identify the system](#) process to turn on the system locate (blue) indicator. For more information, see [Control panel LEDs](#).

About this task

If your system is managed by the Hardware Management Console (HMC), use the HMC to remove the system backplane. For instructions, see [Removing a part using the Hardware Management Console](#).

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to remove the system backplane. For instructions, see [Removing a part using the Systems Director Management Console](#).

If you do not have an HMC or an SDMC, complete the following steps to remove the system backplane:

Procedure

1. Access 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 might also be referred to as the service processor menus. To access the ASMI, see [Accessing the Advanced System Management Interface](#). After you have accessed the ASMI, continue with the next step.

2. Check and record the System Enclosure Type and Feature Code.

The enclosure serial number is a seven-digit number printed on a bar-coded label on the system unit.

Note: The feature code number for the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane is 78AB-001.

3. Check and record the server settings.

Prior to replacing this field-replaceable unit (FRU), check and record all server settings since you might need to update the system after you replace this FRU. This can be done through the ASMI.

- a. Check and record the server firmware level indicated on the right edge of the status frame, the area where the **Log out** button is located. You might need to update the system to the latest server firmware code level after you replace this FRU.
- b. Check and record the service processor settings you previously set using the ASMI. You will need to reset these service processor settings after you update this FRU or the default settings will be used. Settings to record include the following:
 - System Name setting
 - System Power Control settings
 - System Service Aids settings
 - System Configuration settings
 - Network Services settings
 - Performance Option settings
 - Login Profile settings settings
 - Boot List settings
 - Host Ethernet Adapter settings
- c. Record any service processor settings you might have set using the operating system commands.

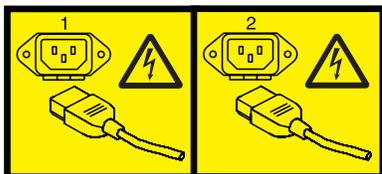
4. Shut down the partitions and power off the system.

This FRU cannot be serviced concurrently. Every partition must be shut down and the system must be powered off to continue the repair. Authorization must come from the customer to shut down all running partitions and to power off the system. If the customer does not allow the partitions to be shut down or the system to be powered off, delay the service procedure. If the customer is using a secondary to manage the system, ensure that the customer is not powering on the system at this time. For instructions, see Stopping a system or logical partition.

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

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

(L003)



or



6. Disconnect the external cables from the system. Label and disconnect the external cables that are connected to the system you are servicing.
7. Place the system into the service position. For instructions, see Placing a rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system into the service position.
8. Remove the service access cover. For instructions, see Removing the service access cover on a rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system.
9. Remove the memory modules. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D memory module.
10. Remove the GX adapters.
For instructions, see Removing GX adapters from the 31E/2B.
For instructions, see Removing GX adapters from the 31E/1D, 31E/2C, or 31E/2D.
11. Remove the PCI adapters. For instructions, see Removing a PCI adapter from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D server with the power off.
12. Remove the RAID card P1-C12 (31E/2B only), if present.
Remove the RAID card P1-C13, if present.
Remove the RAID card P1-C18, if present
13. Remove the Host Ethernet card from the 31E/2B. For instructions, see Removing the 31E/2B Host Ethernet Adapter with the power off.
14. Remove the voltage regulator module. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D voltage regulator module.
15. Remove the fans. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D fans.
16. Remove the power supplies. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D power supply with the power off.
17. Disconnect all internal cables from the system backplane. Examples of the cables to disconnect follow:
 - a. Disconnect the operator panel cable (A).

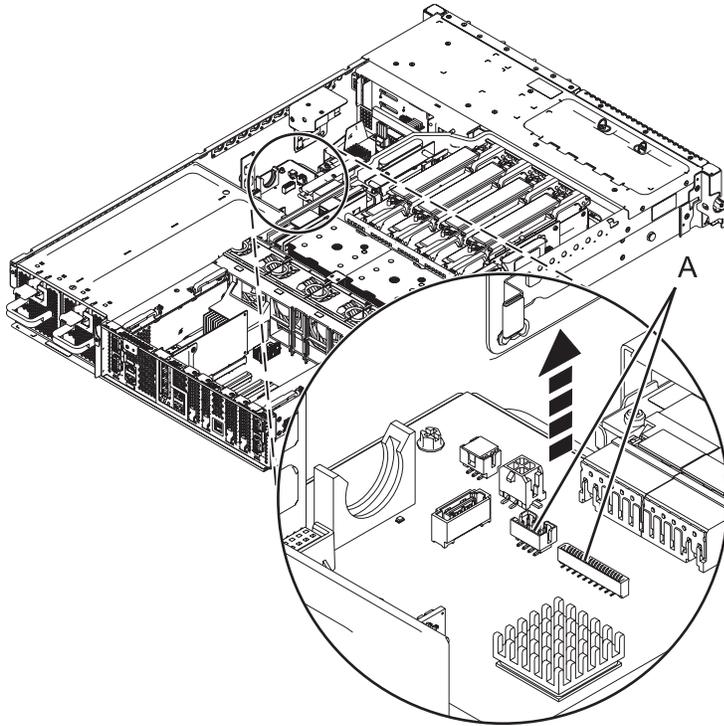


Figure 38. Disconnecting the operator panel cable

b. Disconnect the SAS cable:

- 1) Press the side tab **(B)** and pull out the SAS shroud from the external SAS connection port on the disk drive backplane. See Figure 39 on page 52.
- 2) Pull out the SAS cable **(C)** from the system.
- 3) Press the latch for the SAS connection port **(A)** and then dislodge the SAS cable **(C)** out of the system backplane.

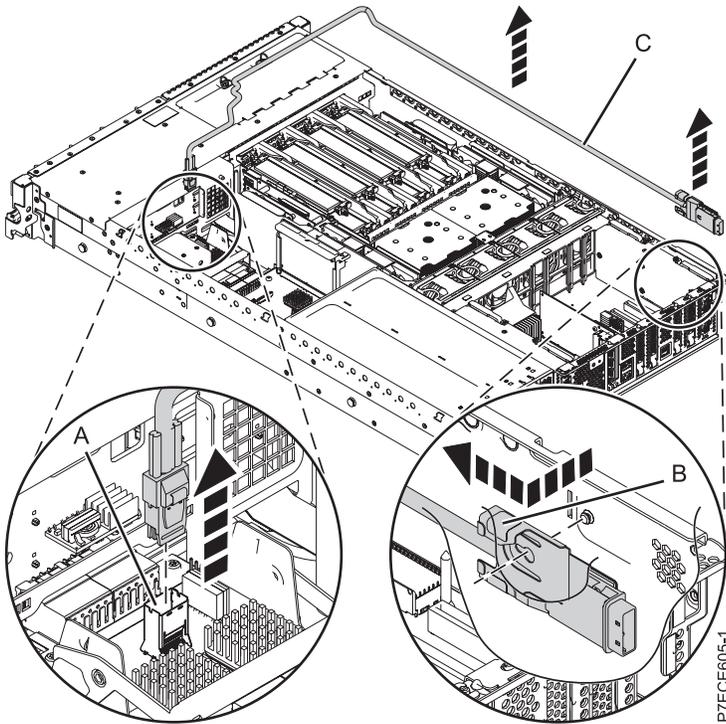


Figure 39. Removing the external SAS port

c. Disconnect the media device cables (A).

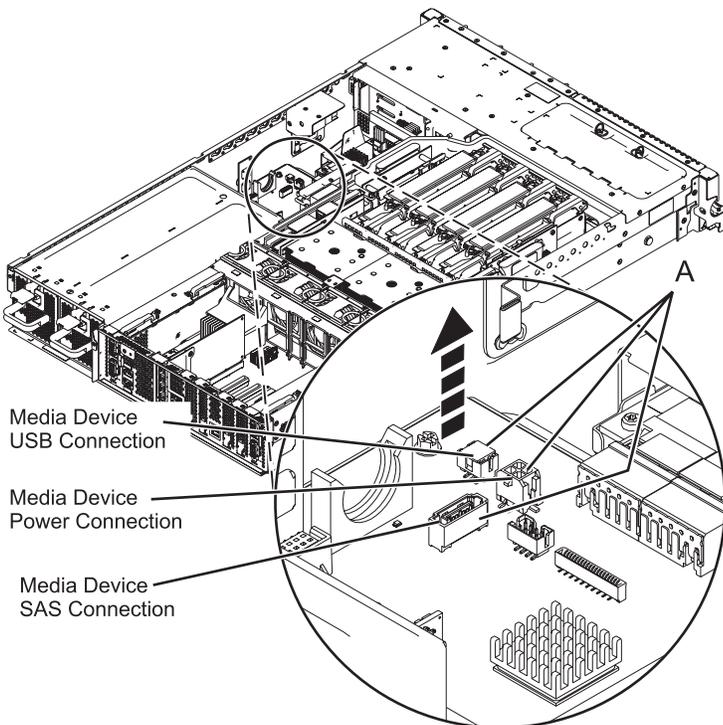


Figure 40. Disconnecting the media device cables

18. Remove the disk drive cage:

- a. Grasp the disk drive latches and pull it upward to unlock the disk drive cage.
- b. Grasp the handles and pull the disk drive cage toward you.

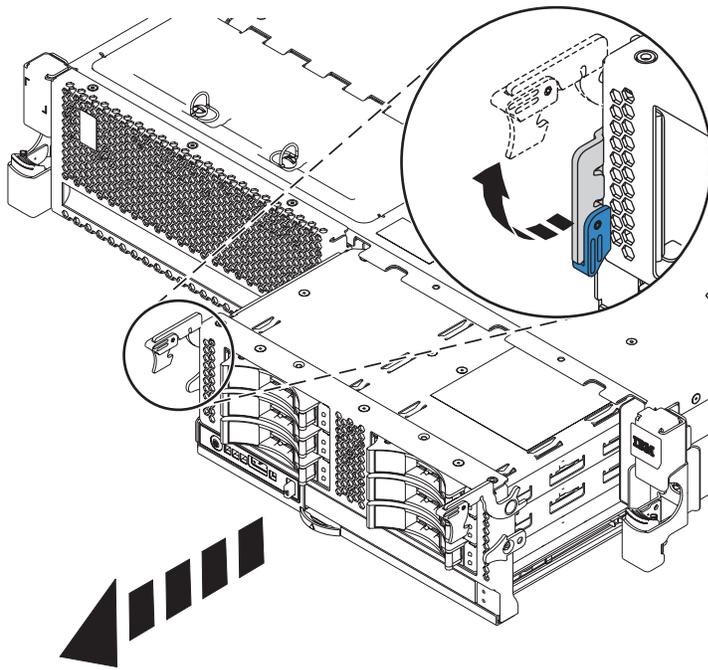


Figure 41. Removing the disk drive cage

19. Remove the voltage regulator guide and air divider.

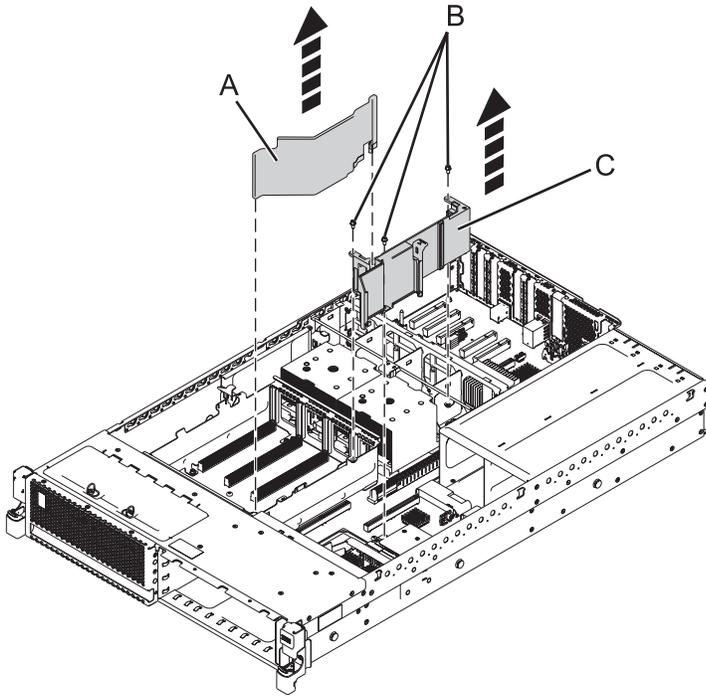


Figure 42. Removing the voltage regulator guide and air divider from the 31E/2B

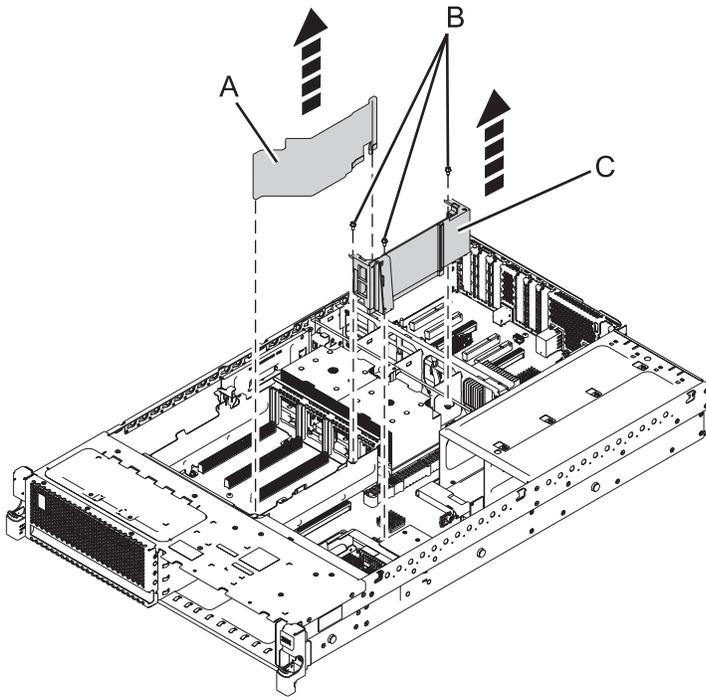


Figure 43. Removing the voltage regulator guide and air divider from the 31E/1C, 31E/1D, 31E/2C, or 31E/2D

20. Remove the dual inline memory module (DIMM) cage:
 - a. Remove the six screws that secure the DIMM cage (A).

b. Remove the DIMM cage by lifting upward.

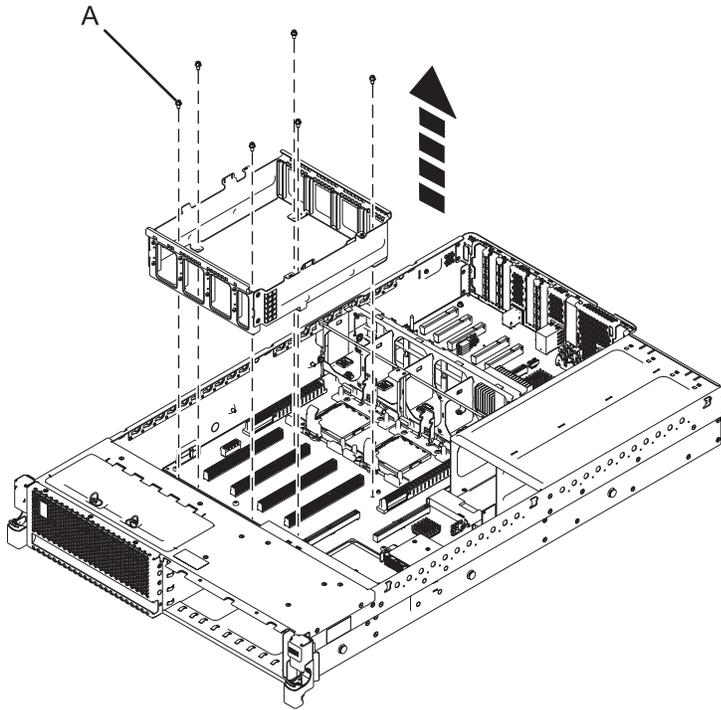


Figure 44. Removing the DIMM cage

21. Remove the front fan cable.

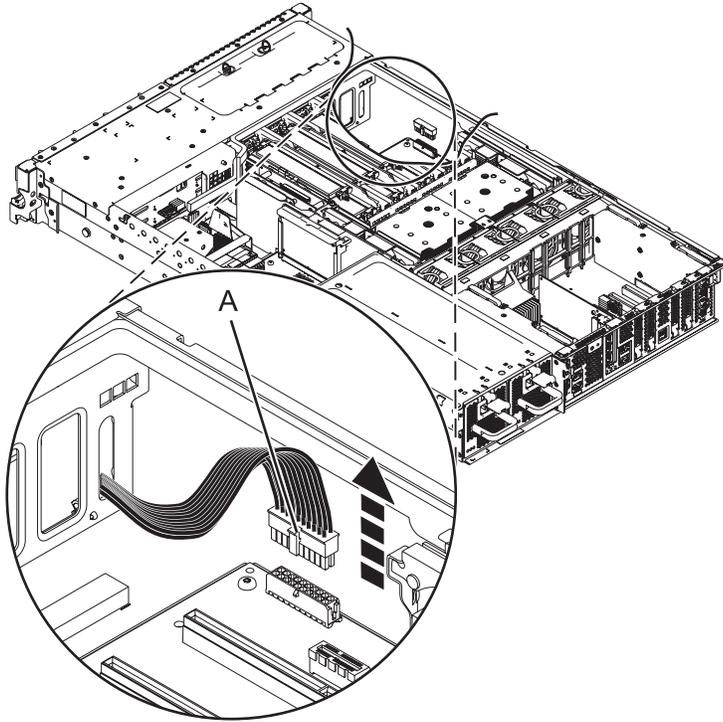


Figure 45. Removing the front fan cable

22. Remove the power interlock switch. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D power interlock switch with the power off.
23. Remove the vital product data card. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D vital product data card.
24. Remove the storage interposer card. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D storage interposer card with the power off.
25. Remove the second voltage regulator module, if present. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D voltage regulator module.
26. Remove the metal guide bracket for the second voltage regulator module:
 - a. Remove the two screws securing the bracket to the chassis.
 - b. Lift the bracket from the chassis.
27. Remove the middle fan cage. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D middle fan cage.
28. Remove the system processor modules. For instructions, see Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system processor module.
29. Remove the system backplane.

Note: Use care when removing the system backplane. Do not lift the system backplane by any of the attached modules.

- a. Remove the screws (A).

Note: Do not remove any of the Torx screws. Remove only the five hex and slot combination screws.

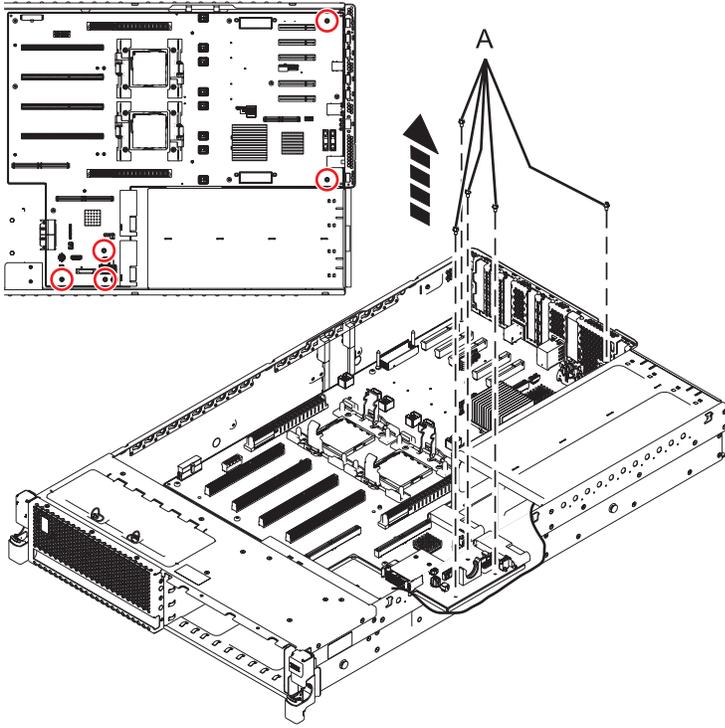


Figure 46. Removing the system backplane (five screws for 31E/2B)

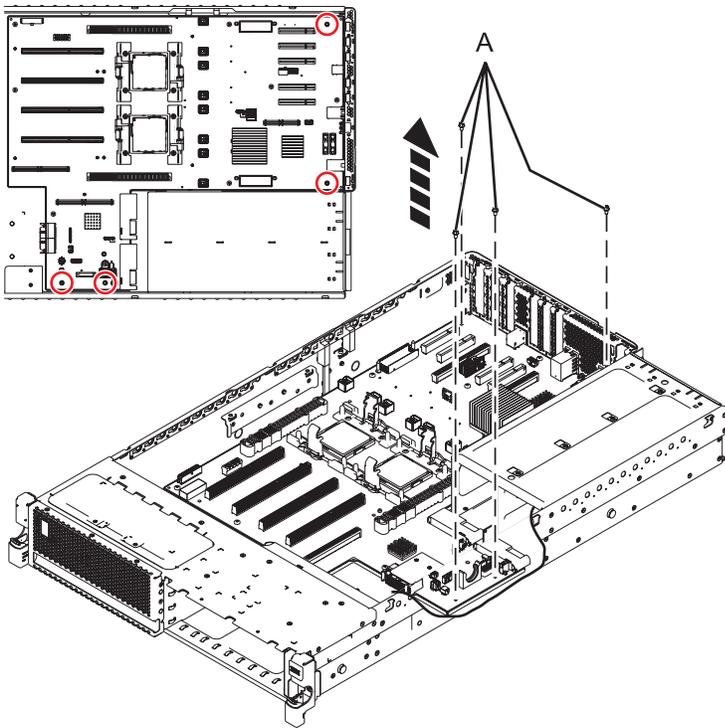


Figure 47. Removing the system backplane (four screws for 31E/1C, 31E/1D, 31E/2C, or 31E/2D)

- b. Grip the system backplane by both heat sink load arms **(B)**.

- c. Lift the front of the system backplane up to clear the front alignment pins (approximately 6.35 mm (1/4 in.)).
- d. Slide the system backplane slightly toward the front of the system so that the connectors on the system backplane clear the rear chassis.
- e. After the connectors are clear of the chassis, lift the rear of the system backplane and remove the system backplane at an angle.

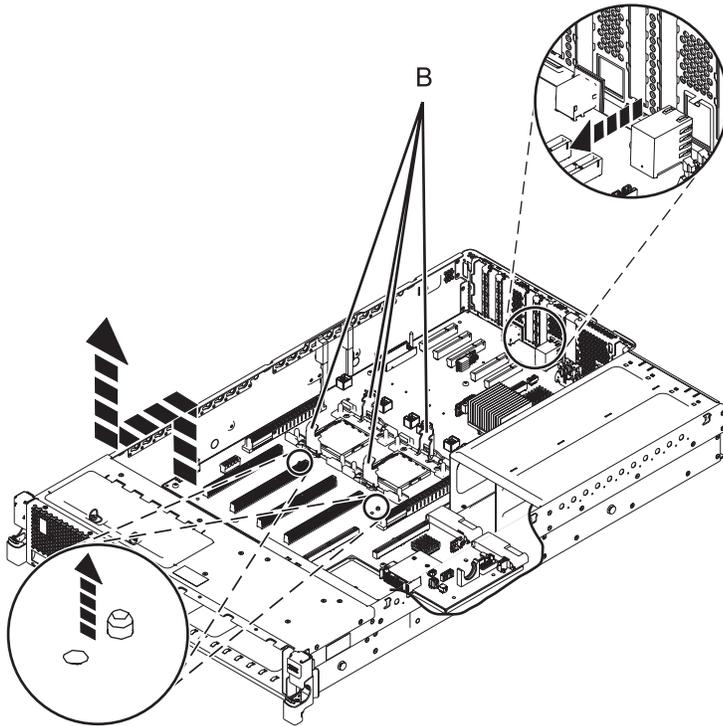


Figure 48. Removing the system backplane from the 31E/2B

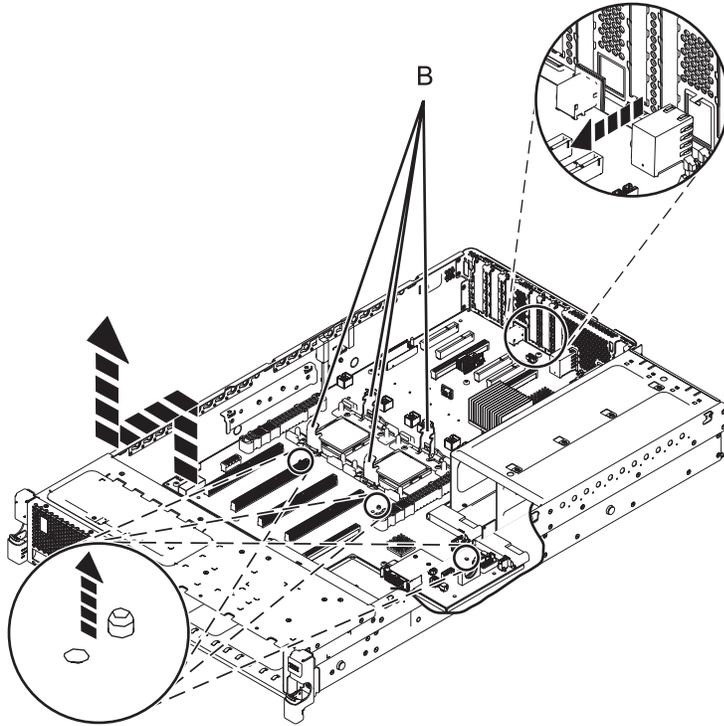


Figure 49. Removing the system backplane from the 31E/1C, 31E/1D, 31E/2C, or 31E/2D

Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane

Learn how to replace the system backplane that is part of a service action.

About this task

To complete this procedure, you must have already completed the removal procedure. For the removal procedure instructions, see *Removing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane*.

If your system is managed by the Hardware Management Console (HMC), use the HMC to replace the system backplane. For instructions, see *Exchanging a part using the Hardware Management Console*.

If your system is managed by the Systems Director Management Console (SDMC), use the SDMC to replace the system backplane. For instructions, see *Exchanging a part using the Systems Director Management Console*.

If you do not have an HMC or an SDMC, complete the following steps to replace the system backplane:

Attention:

Attach a wrist strap to an unpainted metal surface of your hardware to prevent electrostatic discharge from damaging your hardware.

When using a wrist strap, follow all electrical safety procedures. A wrist strap is for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.

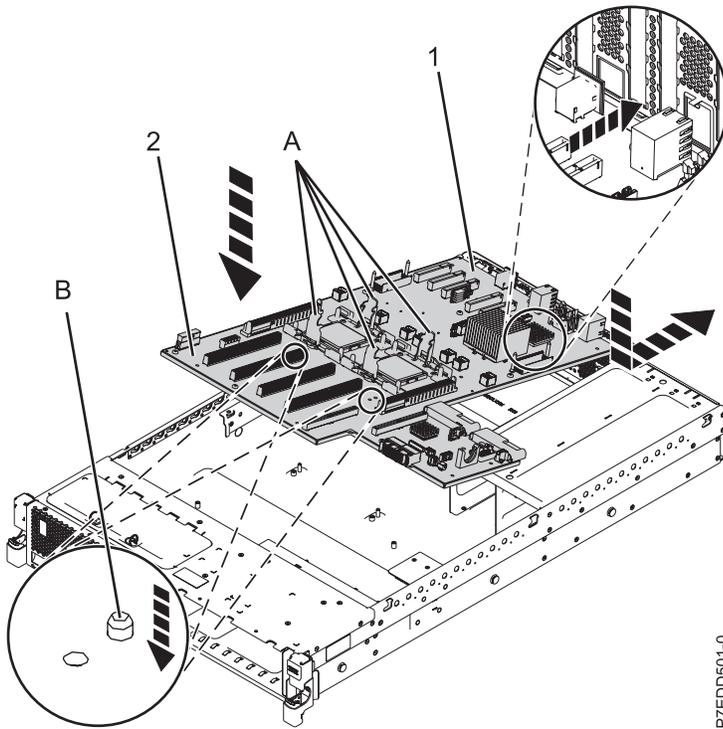
If you do not have a wrist strap, prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds.

Procedure

1. Replace the system backplane.

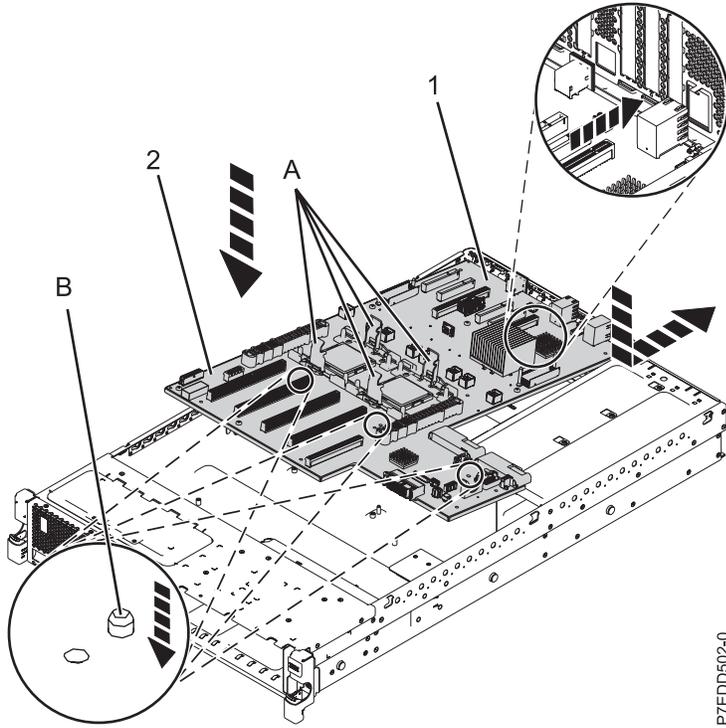
Note: Use care when you replace the system backplane.

- a. Carefully grasp the replacement system backplane by both of the heat sink load arms (A).
- b. Lower the system backplane at an angle, biased toward the front of the system chassis.
- c. Lower the rear of the system backplane (1), and then slide it toward the rear of the system until the connectors clear the openings in the chassis.
- d. Lower the front of the system backplane (2) onto the alignment pins (B).



P7EDD501-0

Figure 50. Replacing the system backplane in the 31E/2B



P7EDDS02-0

Figure 51. Replacing the system backplane in the 31E/1C, 31E/1D, 31E/2C, or 31E/2D

- e. Tighten the screws (C) that secure the system backplane to the system chassis.

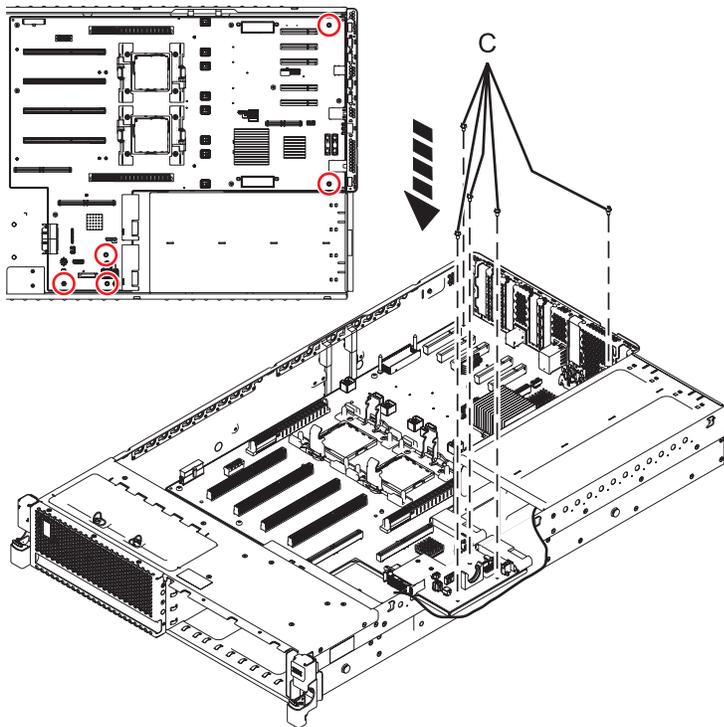


Figure 52. Replacing the system backplane (five screws for 31E/2B)

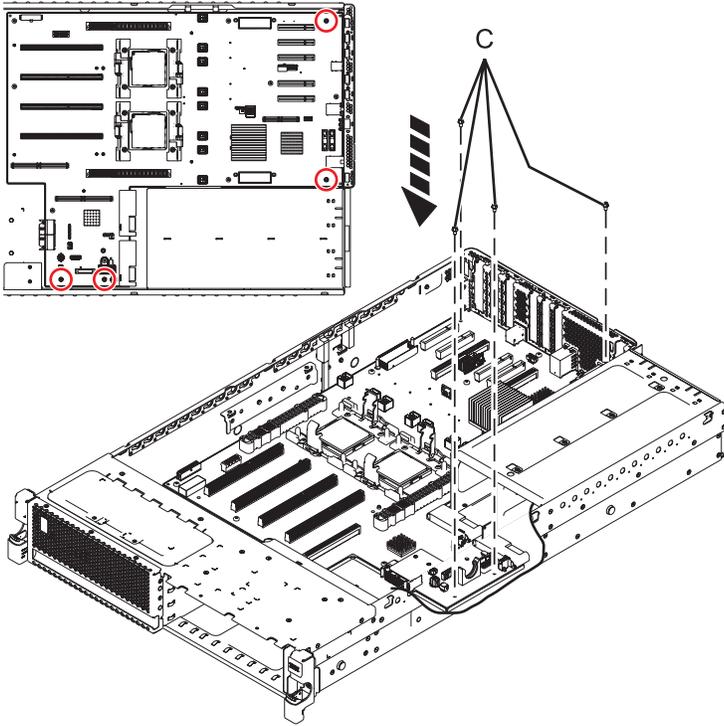


Figure 53. Replacing the system backplane (four screws for 31E/1C, 31E/1D, 31E/2C, or 31E/2D)

2. Replace the system processor modules. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system processor module.
3. Replace the middle fan cage. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D middle fan cage.
4. Replace the metal guide bracket for the second voltage regulator module:
 - a. Align the bracket to the pins in the chassis
 - b. Replace the two screws to secure the bracket to the chassis.
5. Replace the second voltage regulator module, if present. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D voltage regulator module.
6. Replace the power interlock switch. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D power interlock switch with the power off.
7. Replace the storage interposer card. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D storage interposer card with the power off.
8. Replace the vital product data card. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D vital product data card.
9. Replace the system unit fans. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system unit fans.
10. Connect the fan cable by pressing the fan cable (A) into the fan cable connector.

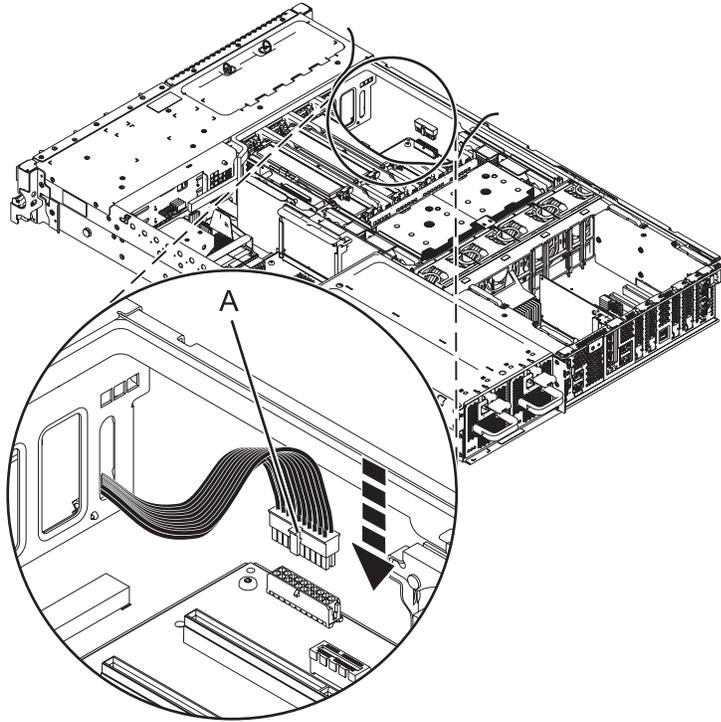


Figure 54. Connecting the fan cable

11. Replace the dual inline memory module (DIMM) cage:
 - a. Lower the DIMM cage into position ensuring that the DIMM cage alignment mark (A) and the alignment guide (B) are aligned.
 - b. Insert and tighten the six screws (C) that secure the DIMM cage.

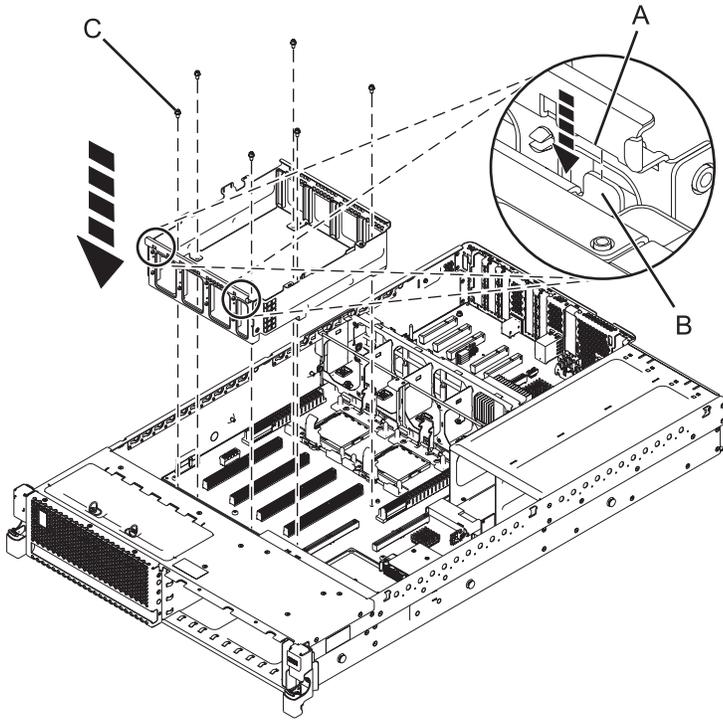


Figure 55. Replacing the DIMM cage

12. Replace the voltage regulator guide and air divider:
 - a. Lower the voltage regulator guide (A) into place and tighten the three screws (B) that secure it in place.
 - b. Lower the air divider (C) into place.

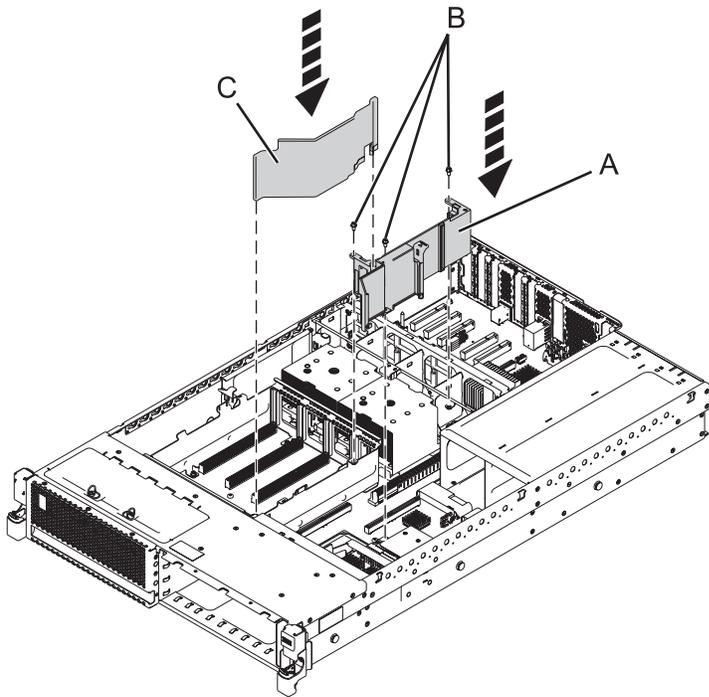


Figure 56. Replacing the voltage regulator guide air divider in the 31E/2B

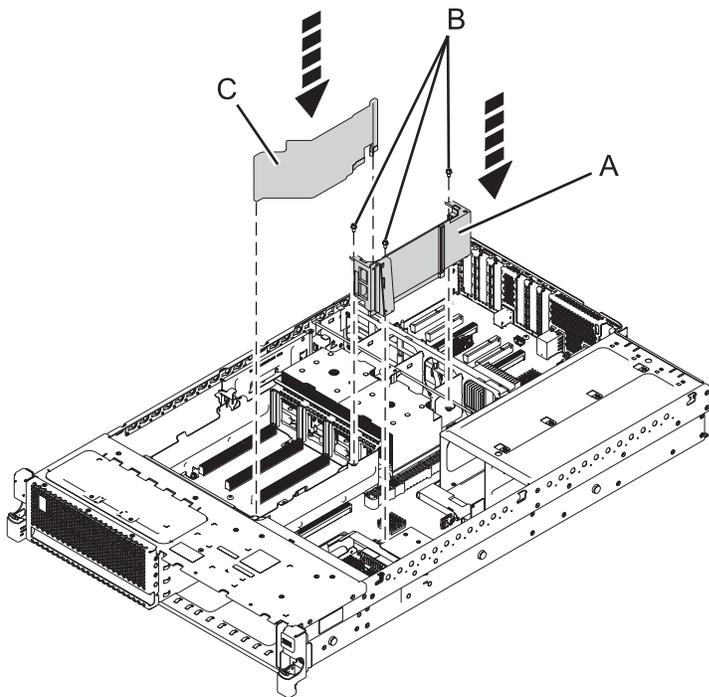


Figure 57. Replacing the voltage regulator guide air divider in the 31E/1C, 31E/1D, 31E/2C, or 31E/2D

13. Replace the disk drive cage:
 - a. With the disk drive latches extended, push the disk drive cage into the system.

- b. Push the disk drive latches toward the system until they lock.

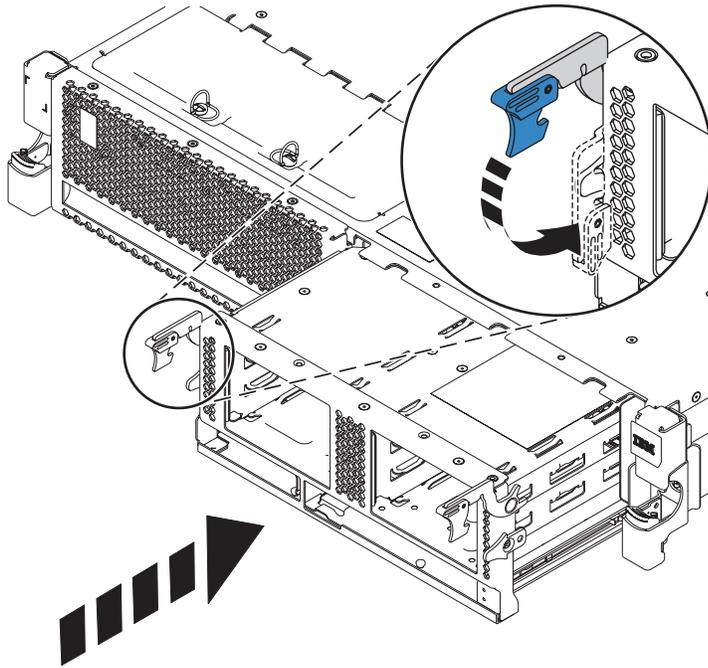


Figure 58. Replacing the disk drive cage

14. Connect the internal cables to backplane:
 - a. Connect the media device cables. Connect the media device cables, if present, by firmly pressing the cable connectors into the cable receptacles (A).

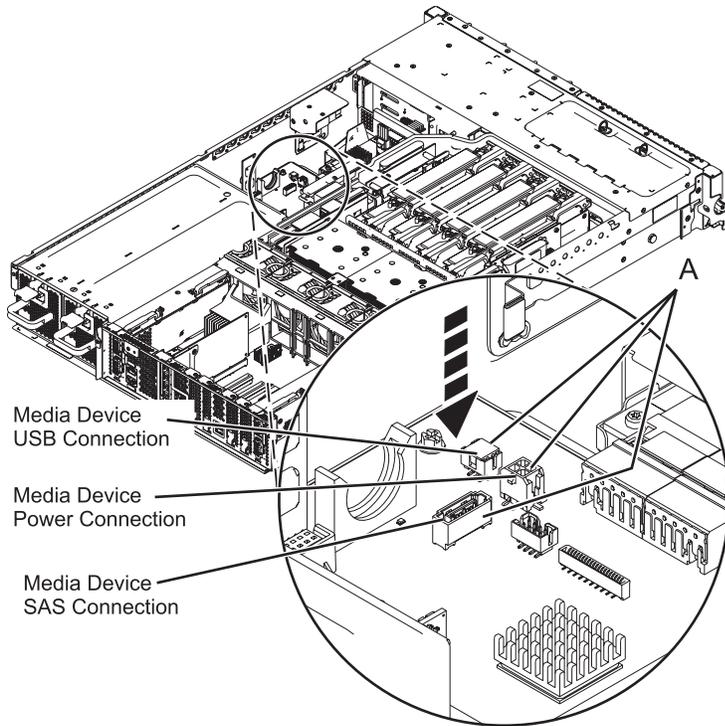


Figure 59. Connecting the media device cables

b. Connect the SAS cable:

- 1) Connect the mini-SAS connector of the SAS cable to the internal SAS connection port (C) on the storage interposer until it snaps in place. See Figure 60 on page 68.
- 2) Route the cable (A) in front of the memory riser cage, and along the channel in the side wall until the SAS port connector is near the opening on the rear of the chassis.
- 3) Align and guide the slot in the bracket of the SAS port connector (B) over the guide pin in the chassis, then slide the SAS port connector into the opening on the rear of the chassis until the tab on the bracket snaps in place.

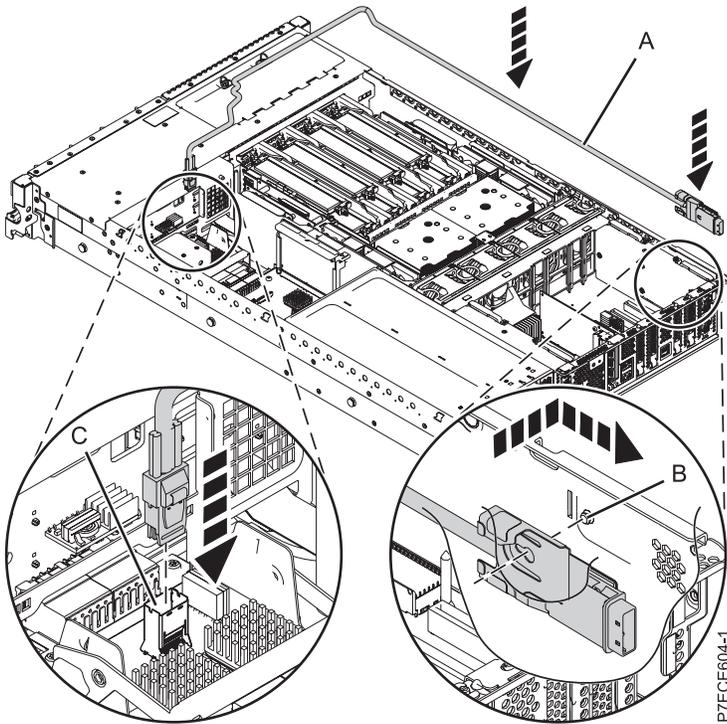


Figure 60. Replacing the SAS cable

- c. Connect the operator panel cable by firmly pressing the cable connectors into the cable receptacles (A).

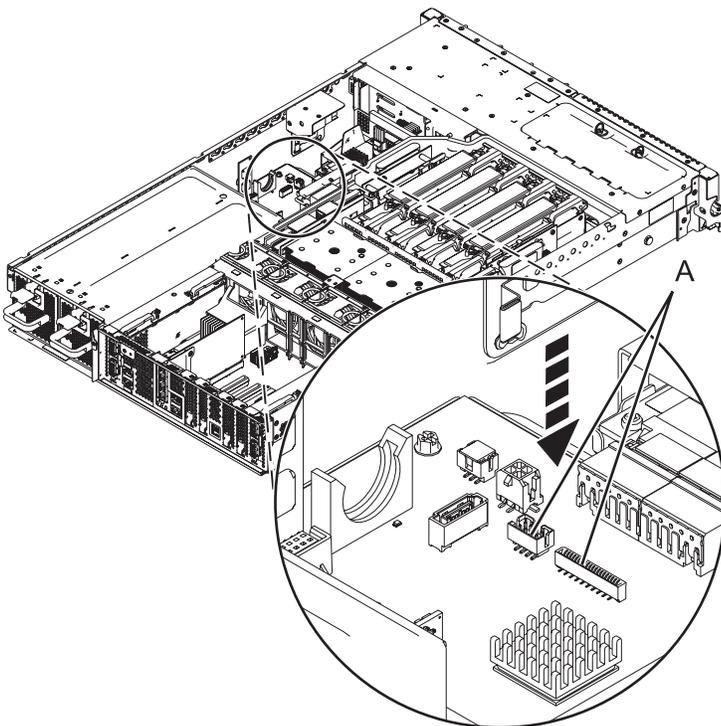


Figure 61. Connecting the operator panel cable

15. Replace the power supplies. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D power supply with the power off or Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D power supply with the power on.
16. Replace the memory modules. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D memory module.
17. Replace the voltage regulator module. For instructions, see Replacing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D voltage regulator module.
18. Replace the Host Ethernet Adapter (31E/2B). For instructions, see Replacing the 31E/2B Host Ethernet Adapter with the power off.
19. Replace the GX adapters.
For instructions, see Replacing GX adapters for the 31E/2B.
For instructions, see Replacing GX adapters for the 31E/1D, 31E/2C, or 31E/2D.
20. Replace the RAID card P1-C12 (31E/2B only), if present.
Replace the RAID card P1-C13, if present.
Replace the RAID card P1-C18, if present
21. Replace the PCI adapters. For instructions, see Replacing a PCI adapter in the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D server with the power off.
22. Replace the service access cover. For instructions, see Installing the service access cover on a rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system.
23. Place the system in the operating position. For instructions, see Placing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system into the operating position.
24. Reconnect all power cords and signal cables.
25. Start the system or logical partition. See Starting the system or logical partition.
26. Restore network connectivity.

The service processor must connect to the network to be accessible from the management console.

How will the IP address of the service processor be managed?

- If the IP address will be automatically obtained from a Dynamic Host Configuration Protocol (DHCP) server, go to the next step.
- If the IP address will be manually configured as a static IP address, go to step 28.

27. Restore service processor settings.

Enable network access to the service processor. If the network connection uses the DHCP to establish an IP address, and uses the Management consoles as the DHCP server, no additional configuration is necessary to enable network access to the service processor. Perform the following steps:

- a. Ensure that the service processor is connected to the existing service network by verifying that the management console cable is connected to the management console port on the system backplane.
- b. If not already connected, connect all system power cables by plugging them into power outlets.

Note: Do not start the system at this time.

Can you access the service network?

- **Yes:** Go to step 30 on page 70.
- **No:** Go to step 33 on page 71.

28. Restore service processor settings.

The Advanced System Management Interface (ASMI) is the interface to the service processor that is required to perform general and administrator-level service tasks, such as reading service processor error logs, reading vital product data, setting up the service processor, controlling the system power, and setting service processor network ports. The ASMI may also be referred to as the service processor menus. The ASMI can be accessed through https. Perform the following steps:

- a. The control panel can be used in manual mode to display the service processor's IP addresses. Refer to service functions to get control panel documentation in that case.
- b. Connect a client with a web browser directly to the service processor network ports you previously noted. It could be something like the following URLs:
 - <https://169.254.2.147>
 - <https://169.254.3.147>

Note: In some cases, the IP addresses might be different. For more information, see Function 30.

- c. If not already connected, connect all system power cables by plugging them into power outlets.

Note: Do not start the system at this time.
- d. Log on to the ASMI with the admin **User ID** and admin default **Password**.
- e. Change the admin user ID **Password** and the general user ID **Password** when prompted.
- f. To configure network access perform the following steps:
 - 1) Click **Network Configuration** under the **Network Services** node.
 - 2) On the right pane, configure **eth0** and **eth1** network interfaces, select **Static** for the **Type of IP Address** field, and set and a **Host name**, an **IP address**, a **Subnet mask**.

29. Restore system processor settings.

With the network connection now configured to use static IP address assignments, try to access the service processor network ports.

Can you access the service network?

- **Yes:** Go to the next step.
- **No:** Go to step 34 on page 71.

30. Access the 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 might also be referred to as the service processor menus. To access the ASMI, see Accessing the Advanced System Management Interface. After you have accessed the ASMI, continue with the next step.

31. Set System Enclosure Type and Feature Code.

The enclosure serial number is a seven-digit number printed on a bar-coded label on the system unit. When the system backplane is replaced, the seven-digit enclosure serial number and feature code number needs to be manually inputted and stored in the new system backplane by using the ASMI.

Note: The feature code number for 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system backplane is 78AB-001.

Note: To perform this operation, your authority level must be Authorized Service Provider (ID: celogin).

To input the enclosure serial number and feature code, complete the following steps:

- a. On the ASMI Welcome pane, specify your user ID and password, and click **Log in**.
- b. In the navigation area, expand **System Configuration > Program Vital Product Data**.
- c. Select **System Enclosures**. In the right pane, the current system enclosures are displayed.
- d. On the system being serviced, record the enclosure serial number and feature code printed on the bar-coded label on the system unit.
- e. Enter the last 7 characters of the enclosure serial number in the **Enclosure serial number** field.
- f. Enter the feature code number, including the dash (-), in the **Feature Code/Sequence Number** field.
- g. Click **Save settings** to update and save the enclosure serial number and the feature code.

32. Go to step 36 on page 72

33. Restore service processor settings.

If the network connection uses DHCP to establish an IP address, but does not use a as the DHCP server, complete the following steps:

- a. Complete any network configuration necessary to allow the DHCP server to recognize and assign an IP address to the service processor.
- b. Ensure that the service processor is connected to the existing service network by verifying that the network cable is connected to the network port.
- c. If not already connected, connect all system power cables by plugging them into power outlets.

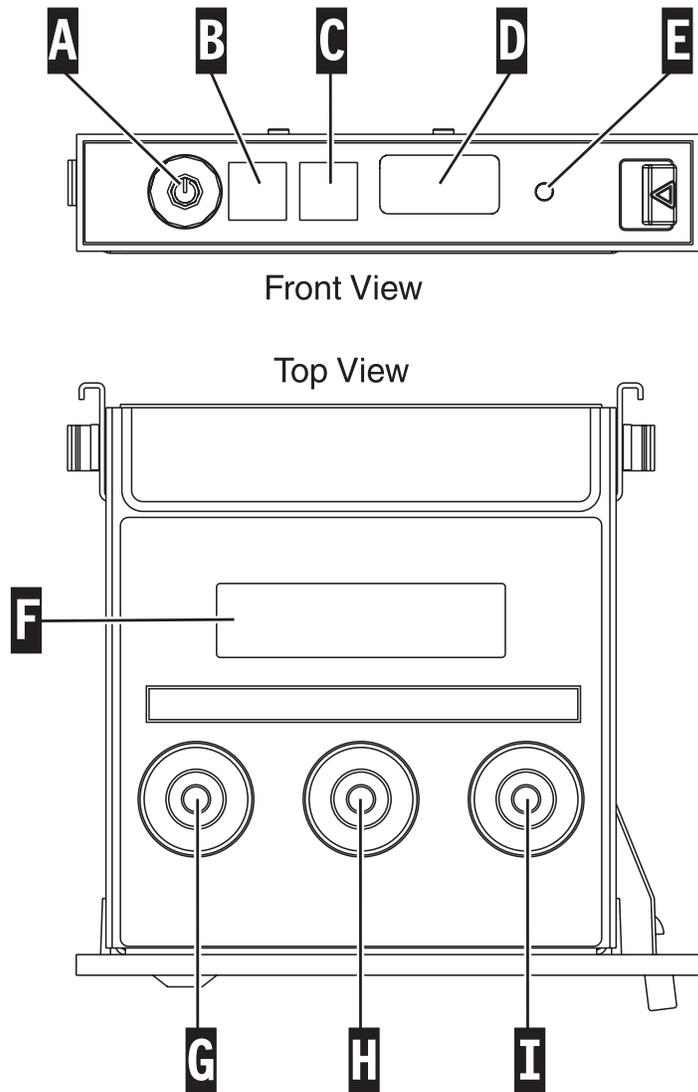
Note: Do not start the system at this time.

Can you access the service network?

- **Yes:** Go to step 30 on page 70.
- **No:** Go to the next step.

34. Restore service processor settings.

If you are still not able to access the service network, reset the service processor by pressing the pin-hole switch (E) on the operator panel.



IPHAJ941-0

Figure 62. Pin-hole switch on the operator information panel

35. Go to step 26 on page 69.
36. Restore service processor settings.
 - Change the password of the admin user ID when prompted by performing the following steps:
 - a. In the navigation area of the ASMI, expand **Login Profile**.
 - b. Select **Change Password** under **Login Profile**.
 - c. Specify the required information, and click **Continue**.

As a security measure, you are required to enter your current user password in the **Current password for current user ID** field.

Note: Passwords can be any combination of up to 64 alphanumeric characters. The default password for the admin **User ID** is admin. After your initial login to the ASMI, the admin password must be changed.

As a security measure, you are required to enter the password for your user ID in the **Current password for current user** field.

37. Restore service processor settings.

Set the system name. The system name can be changed to any valid ASCII string. It does not have to follow the *machine type_model_serial number* format. To change the system name, complete the following steps:

- a. In the navigation area of the ASMI, expand **System Configuration**.
- b. Select **System Name** under **System Configuration**.
- c. Enter the desired system name.
- d. Click **Save settings** to update the system name to the new value.

The new system name is displayed in the status frame, the area where the **Log out** button is located. If another method, such as the a management console, is used to change the system name, the status frame does not reflect the change.

38. Restore service processor settings.

To set the time-of-day, complete the following steps:

- a. In the navigation area of the ASMI, expand **System Configuration**.
- b. Select **Time of Day** under **System Configuration**.
- c. If the system is powered off, the right pane displays a form that shows the current date (month, day, and year) and time (hours, minutes, and seconds).
- d. Change the date, the time, or both, and click **Save settings**.

39. Restore service processor settings.

Verify that the server firmware level is the same as the level recorded prior to replacing the system backplane. If the level is different, the firmware may have to be reinstalled. For information on installing firmware, see Getting firmware fixes.

40. Restore service processor settings.

Reenter any of the following settings that were previously changed through the ASMI, unless you want to use the default settings.

- System name setting
- System Power Control settings
- System Service Aids settings
- System Configuration settings
- Network Services settings
- Performance Options settings
- Login Profile settings
- Boot List settings
- Host Ethernet Adapter settings

41. Restore service processor settings.

- a. Reset any service processor settings that you may have set using operating system commands. You recorded these settings at the beginning of this procedure.

- b. If you choose to reset the **Management consoles Access password**, perform the following:

To change the **HMC** access password, select one of the following methods:

- 1) From the HMC GUI (preferred method):

- a) Expand the **Systems Management** folder in the navigation tree pane.
- b) Double-click the **Servers** folder.
- c) Select a server in the central panel.
- d) Under the **Operations** folder, select **Change Password**.
- e) Provide the desired information and click **OK**.

- 2) From the HMC command line, type:

```
/usr/hmcrcbin/chsyspwd -m managedsystem -t access --passwd --newpasswd newpassword  
where:
```

- The value for managedsystem is the new service processor's managed system name.
- No value for --passwd is entered thereby allowing authentication.
- The value for newpasswd is the newpassword value.

To change the SDMC access password, complete the following steps:

- 1) Click the **Resources** tab, and then click **Hosts**.
- 2) Select a server in the right pane.
- 3) From the **Actions** menu, click **Operations > Change Password**.
- 4) Provide the desired information and click **OK**.

42. Recover partition data on the service processor.

Profile data stored in the managed server has been cleared or corrupted.

To recover profile data, using the HMC, complete the following steps:

- a. Expand the **Systems Management** folder in the navigation tree pane.
- b. Double-click the **Servers** folder.
- c. Use the check box to select a server, in the central panel.
- d. In the **Configuration** folder if you have the **Manage Partition Data** folder, select **Restore**.

To recover profile data, using the SDMC, complete the following steps:

- a. Click the **Resources** tab, and then click **Hosts**.
- b. Select a server in the right pane.
- c. From the **Actions** menu, click **System Configuration > Manage Partition Data > Restore**.
- d. Select the desired restore option and click **OK**.

43. Update vital product data.

If your system is running and is not managed by the management consoles, you must update the load source after replacing the system backplane. To update the load source without using the management consoles, do the following steps:

- a. Load the I_BASE_01 Licensed Internal Code optical media into the device that is defined for the system and access it to perform an initial program load (IPL).

Note: This IPL can take several minutes.

- b. After the Select a Language Group display is shown, press Enter to select the default language feature 2924 (English).

Note: To change the language feature, type the language feature that appears on the media that contains the operating system, and then press Enter.

Confirm the language feature by pressing Enter.

- c. From the Install Licensed Internal Code display, select option 2 (Work with Dedicated Service Tools (DST)) and press Enter.

Use the Dedicated Service Tools to make sure the disk units, including the load source, are reporting correctly and that there are no errors that might prevent the IPL from disk. When all errors have been resolved and the load source disk is reporting correctly, continue with the next step.

- d. From the Work with dedicated service tools (DST) display, select option 2 (Work with disk units) and press Enter.
- e. Select option 8 (Update system vital product data) to identify the location of the load source disk unit. Press Enter. The Update System Vital Product Data display is shown.
- f. Press Enter to confirm that you want the vital product data to be written.
- g. Press F12 (Previous) twice.
- h. Type 1 and press Enter to exit DST. Use the system control panel to delay turning off the system. Change the IPL mode to B, and power on the system to perform an IPL from disk.

44. Restore the boot list and Host Ethernet Adapter settings.

The boot list is not present on a new system backplane; therefore, it is necessary to create the boot devices by booting into the system management services (SMS) menus. See *Selecting boot options* for information on setting the boot device list.

After the operating system is booted, the bootlist command can be used to verify, or make additional changes to, the list of boot devices for a system or partition.

To restore the Host Ethernet Adapter settings, see *Configuring physical ports on a Host Ethernet Adapter*.

45. Verify the repair. For more information, see *Verifying a repair*.

31E/2B SAS subsystem service considerations

There are several considerations to review before servicing features within the SAS subsystem for the 31E/2B system.

Attention: Do not attempt to remove any parts related to the SAS subsystem if the cache data present LED on the card in either P1-C18 or P1-C13 is flashing. To see this LED, you must shut down the system and remove the service cover. The LED shows a no-touch icon (a hand with a slash through it), and indicates that there is possible data in cache on the adapter. To prevent data loss, first make sure that the system has been shut down correctly. If either cache data present LED is flashing, refer to one of the following topics before removing any SAS subsystem parts. You can safely replace the cache battery pack when Yes is displayed next to Battery pack can be safely replaced on the Battery Information panel (for Linux and IBM i systems) or the COMMAND STATUS panel (for AIX systems).

Before servicing any features, review the I/O configurations for each logical partition on your system. It is important to understand the differences between the various configurations and the resulting service considerations. In addition, consider possible impacts to the following areas:

- Logical partitions and their I/O adapter assignments
- RAID array configurations
- Physical disk locations
- Path to your boot device

Service considerations for the cache battery pack

To prevent data loss, follow proper procedures before replacing the cache battery pack on the Cache RAID cards.

Note: Concurrent maintenance of adapter battery is not supported. Even with failed or missing batteries, the card associated with the battery must first be removed.

Attention: To maintain system availability and prevent possible data loss, it is important to understand that these features have implications on the SAS configuration and data accessibility of the system.

Attention: Do not attempt to remove any parts related to the SAS subsystem if the cache data present LED on the card in either P1-C18 or P1-C13 is flashing. To see this LED, you must shut down the system and remove the service cover. The LED shows a no-touch icon (a hand with a slash through it), and indicates that there is possible data in cache on the adapter. To prevent data loss, first make sure that the system has been shut down correctly. If either cache data present LED is flashing, refer to one of the following topics before removing any SAS subsystem parts. You can safely replace the cache battery pack when Yes is displayed next to Battery pack can be safely replaced on the Battery Information panel (for Linux and IBM i systems) or COMMAND STATUS panel (for AIX systems).

The following figure shows the location of the cache data present LED in the 31E/2B SAS subsystem.

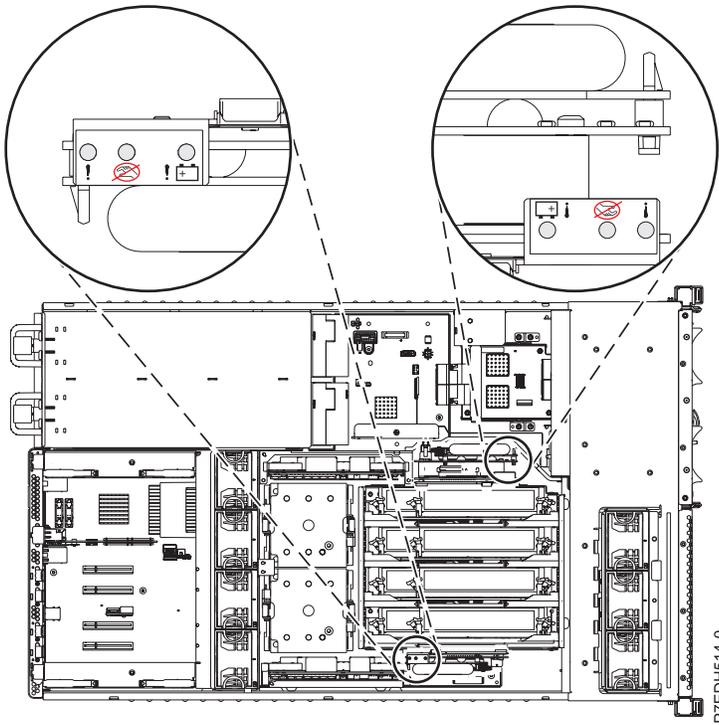


Figure 63. Cache data present LED

The following table describes the states of the cache data present LED and what to consider before attempting a service action.

Table 1. LED indications and actions

Cache battery card (Un-P1-C13)	RAID/Cache storage controller (Un-P1-C18)	Indication	Action
 Off	 Off	Cache is not active.	Service actions can proceed.
 Off	 Flashing	Cache is active on C18. Cache might have been flushed on C13 if C18 is failed.	Attempt to power on and perform a proper shutdown prior to any service action.
 Flashing	 Off	Cache is active on C13. Cache might have been flushed on C18 if C13 is failed.	Attempt to power on and perform a proper shutdown prior to any service action.
 Flashing	 Flashing	Cache is active on the dual controllers.	Attempt to power on and perform a proper shutdown prior to any service action. If this is unsuccessful in clearing the cache active LEDs, contact support. See Contacting IBM service and support.

Common procedures for installable features

This section contains all the common procedures that are related to installing, removing, and replacing features.

Before you begin

Observe these precautions when you are installing, removing, or replacing features and parts.

About this task

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

DANGER

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

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

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

To Disconnect:

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

To Connect:

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

(D005a)

DANGER

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

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



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

CAUTION

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

(R001)

Before you begin a replacement or installation procedure, perform these tasks:

Procedure

1. If you are installing a new feature, ensure that you have the software required to support the new feature. See IBM Prerequisite.
2. If you are performing an installation or replacement procedure that might put your data at risk, ensure, wherever possible, that you have a current backup of your system or logical partition (including operating systems, licensed programs, and data).
3. Review the installation or replacement procedure for the feature or part.
4. Note the significance of color on your system.

Blue or terra-cotta on a part of the hardware indicates a touch point where you can grip the hardware to remove it from or install it in the system, open or close a latch, and so on. Terra-cotta might also indicate that the part can be removed and replaced with the system or logical partition power on.

5. Ensure that you have access to a medium flat-blade screwdriver, a Phillips screwdriver, and a pair of scissors.
6. If parts are incorrect, missing, or visibly damaged, do the following:
 - If you are replacing a part, contact the provider of your parts or next level of support.
 - If you are installing a feature, contact one of the following service organizations:
 - The provider of your parts or next level of support.
7. If you encounter difficulties during the installation, contact your service provider, or your next level of support.
8. If you are installing new hardware in a logical partition, you need to understand and plan for the implications of partitioning your system. For information, see Logical Partitioning.

Identifying a part

Use these instructions to learn how to identify the location of a failed part, the location of a part to be removed, or the location to install a new part on your system or expansion unit using the appropriate method for your system.

About this task

For systems servers that contain the POWER7[®] processor, the light-emitting diodes (LEDs) can be used to identify or verify the location of a part that you are removing, servicing, or installing.

The combination identify and fault LED (amber color) shows the location of a field replaceable unit (FRU). When removing a FRU, first verify whether you are working on the correct FRU by using the identify function in the management console or other user interface. When removing a FRU by using the hardware management console, the identify function is activated and deactivated automatically at the correct times.

The identify function causes the amber LED to flash. When you turn off the identify function, the LED returns to the state it was previously. For parts that have a blue service button, the identify function sets LED information for the service button so that when the button is pressed, the correct LEDs on that part flash.

If you need to use the identify function, use the following procedures.

Control panel LEDs

Use this information as a guide to the control panel LEDs and buttons.

The control panel has LEDs that indicate various system status.

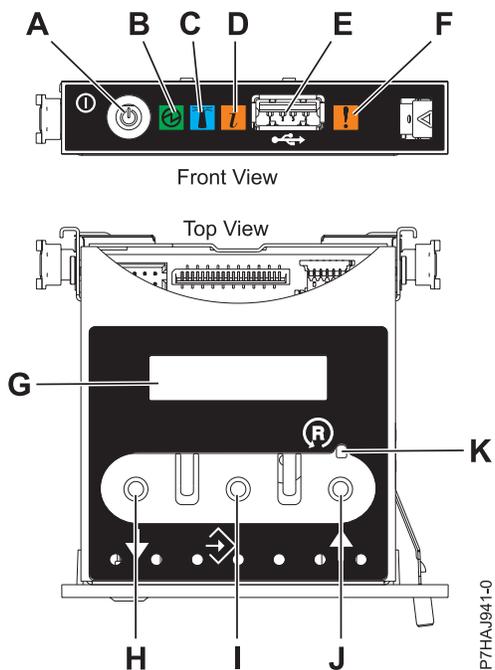


Figure 64. Control panel

- **A:** Power-on button
- **B:** Power LED
 - A constant light indicates full system power to the unit.
 - A flashing light indicates standby power to the unit.
- Note:** There is approximately a 30-second transition period from the time the power-on button is pressed to when the power LED goes from flashing to solid. During the transition period, the LED might flash faster.
- **C:** Enclosure identify light
 - A constant light indicates the identify state, which is used to identify a part.
 - No light indicates that the system is operating normally.
- **D:** System information light
 - No light indicates that the system is operating normally.
 - Light on indicates that the system requires attention.
- **E:** USB port
- **F:** Enclosure fault roll-up light
 - A constant light indicates a fault in the system unit.
 - No light indicates that the system is operating normally.
- **G:** Function/Data display
- **H:** Decrement button
- **I:** Enter button
- **J:** Increment button
- **K:** Pinhole reset button

Related concepts:

Identifying a failing part

Use these instructions to learn how to locate and identify a failing part on your system or expansion unit using the appropriate method for your system.

Identifying a failing part in an AIX system or logical partition

Use these instructions to learn how to locate a failing part, and then activate the indicator light for that part on a system or logical partition running the AIX operating system.

Locating a failing part in an AIX system or logical partition

You might need to use AIX tools, before activating the indicator light, to locate a part that is failing.

Procedure

1. Log in as root user or `ce login-`.
2. At the command line, type `diag` and press Enter.
3. From the Function Selection menu, select **Task Selection** and press Enter.
4. Select **Display Previous Diagnostic Results** and press Enter.
5. From the Display Previous Diagnostic Results display, select **Display Diagnostic Log Summary**. The Display Diagnostic Log display shows a chronological list of events.
6. Look in the **T** column for the most recent **S** entry. Select this row in the table and press Enter.
7. Select **Commit**. The details of this log entry are shown.
8. Record the location information and the SRN value shown near the end of the entry.
9. Exit to the command line.

What to do next

Use the location information for the failing part to activate the indicator light that identifies the failing part. See “Activating the indicator light for the failing part.”

Activating the indicator light for the failing part

Use these instructions to help physically identify the location of a part you are servicing.

About this task

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

Procedure

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. From the **Task Selection** menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter.
6. Select **Commit**. This turns on the system attention and indicator light for the failing part.
7. Exit to the command line.

Deactivating the failing-part indicator light

Use this procedure to turn off any indicator light that you turned on as a part of a service action.

About this task

To deactivate the indicator light, complete the following steps:

Procedure

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. From the **Task Selection** menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter. When a light is activated for a failing part, an I character precedes the location code.
6. Select **Commit**. This turns off the system attention and indicator light for the failing part.
7. Exit to the command line.

Identifying a failing part in a Linux system or logical partition

If the service aids have been installed on a system or logical partition, you can activate or deactivate the indicator lights to locate a part or complete a service action.

Locating a failing part in a Linux system or logical partition

If the service aids have been installed on a system or logical partition, you need to activate the indicator lights to locate a part.

About this task

To activate the indicator light, follow these steps:

Procedure

1. Log in as root user.
2. At the command line, type `/usr/sbin/usysident -s identify -l location_code` and press Enter.
3. Look for the system attention light to identify the enclosure that contains the failing part.

Finding the location code of a failing part in a Linux system or logical partition

To retrieve the location code of the failing part, if you do not know the location code, use the procedure in this topic.

About this task

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

Procedure

1. Log in as root user.
2. At the command line, type `grep diagela /var/log/platform` and press Enter.
3. Look for the most recent entry that contains a system reference code (SRC).
4. Record the location information.

Activating the indicator light for the failing part

If you know the location code of the failing part, activate the indicator light to help you locate which part to replace.

About this task

To activate the indicator light, follow these steps:

Procedure

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

3. Look for the system attention light to identify the enclosure that contains the failing part.

Deactivating the failing-part indicator light

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

About this task

To deactivate the indicator light, follow these steps:

Procedure

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

Locating a failing part in a Virtual I/O Server system or logical partition

You can use Virtual I/O Server (VIOS) tools, before activating the indicator light, to locate a part that is failing.

About this task

To locate the failing part, follow these steps:

Procedure

1. Log in as root user or `celogin-`.
2. At the command line, type `diagmenu` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. Select **Display Previous Diagnostic Results** and press Enter.
5. From the **Display Previous Diagnostic Results** display, select **Display Diagnostic Log Summary**. A **Display Diagnostic Log** display appears. This display contains a chronological list of events.
6. Look in the **T** column for the most recent **S** entry. Select this row in the table and press Enter.
7. Choose **Commit**. The details of this log entry are shown.
8. Record the location information and the SRN value shown near the end of the entry.
9. Exit to the command line.

Results

Use the location information for the failing part to activate the indicator light that identifies the failing part. For instructions, see “Identifying a part by using the Virtual I/O Server.”

Identifying a part by using the Virtual I/O Server

You can use Virtual I/O Server (VIOS) tools to physically locate a part.

About this task

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

Procedure

1. Log in as root user.
2. At the command line, type `diagmenu` and press Enter.
3. From the **Function Selection** menu, select **Task Selection** and press Enter.
4. From the **Task Selection** menu, select **Identify and Attention Indicators** and press Enter.
5. From the list of lights, select the location code for the failing part and press Enter.

6. Select **Commit**. This turns on the system attention and indicator light for the failing part.
7. Exit to the command line.

Starting the system or logical partition

Learn how to start a system or logical partition after performing a service action or system upgrade.

Starting a system that is not managed by an HMC or an SDMC

You can use the power button or the Advanced System Management Interface (ASMI) to start a system that is not managed by a Hardware Management Console (HMC) or an Systems Director Management Console (SDMC).

About this task

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

Procedure

1. Open the front rack door, if necessary.
2. Before you press the power button on the control panel, ensure that power is connected to the system unit as follows:
 - All system power cables are connected to a power source.
 - The power LED, as shown in the following figure, is slowly flashing.
 - The top of the display, as shown in the following figure, shows 01 V=F.
3. Press the power button (**A**), as shown in the following figure, on the control panel.

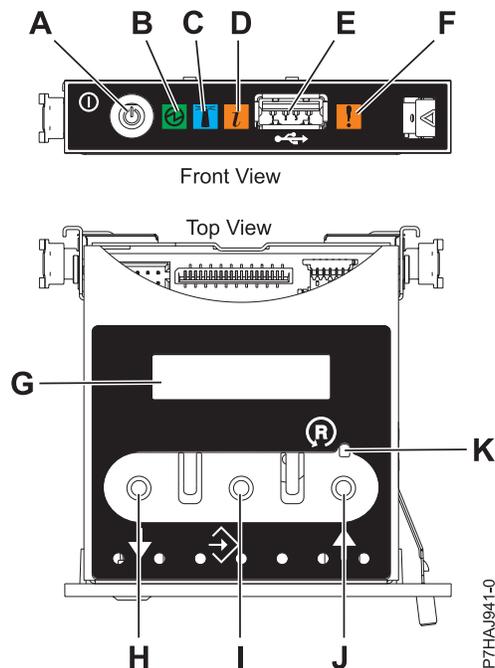


Figure 65. Control panel

- **A:** Power-on button
- **B:** Power LED
 - A constant light indicates full system power to the unit.
 - A flashing light indicates standby power to the unit.

Note: There is approximately a 30-second transition period from the time the power-on button is pressed to when the power LED goes from flashing to solid. During the transition period, the LED might flash faster.

- **C:** Enclosure identify light
 - A constant light indicates the identify state for the enclosure or for a resource within the enclosure.
 - No light indicates that no resources in the enclosure are being identified.
 - **D:** Attention light
 - No light indicates that the system is operating normally.
 - A solid light indicates that the system requires attention.
 - **E:** USB port
 - **F:** Enclosure fault roll-up light
 - A constant light indicates a fault indicator active in the system.
 - No light indicates that the system is operating normally.
 - **G:** Function/Data display
 - **H:** Decrement button
 - **I:** Enter button
 - **J:** Increment button
 - **K:** Pinhole reset button
4. Observe the following aspects after pressing the power button:
- The power-on light begins to flash faster.
 - The system cooling fans are activated after approximately 30 seconds and begin to accelerate to operating speed.
 - Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. The power-on light on the control panel stops flashing and remains on, indicating that the system power is on.

What to do next

Tip: If pressing the power button does not start the system, do the following steps to start the system by using the Advanced System Management Interface (ASMI):

1. Access the ASMI. For instructions, see [Accessing the ASMI without an HMC](#).
2. Start the system by using the ASMI. For instructions, see [Powering the system on and off](#).

Starting a system or logical partition by using the HMC

You can use the Hardware Management Console (HMC) to start the system or logical partition after the required cables are installed and the power cables are connected to a power source.

About this task

For instructions on working with the HMC, see [Managing the Hardware Management Console](#). For instructions on starting a logical partition, see [Logical partitioning](#). For instructions on starting the system, see [Powering on the managed system](#).

Progress indicators, also referred to as checkpoints, appear on the control panel display while the system is being started. When the power-on light on the control panel stops blinking and remains on, the system power is on.

Starting a system or virtual server by using the SDMC

You can use the Systems Director Management Console (SDMC) to start the system or virtual server after the required cables are installed and the power cables are connected to a power source.

About this task

For instructions on working with the SDMC, see *Managing and configuring the SDMC*. For instructions on starting a virtual server, see *Managing virtual servers*. For instructions on shutting down and restarting virtual servers, see *Shutting down and restarting virtual servers*.

Progress indicators, also known as checkpoints, display on the control panel while the system is being started. When the power-on light on the control panel stops flashing and remains on, the system power is on.

Stopping a system or logical partition

Learn how to stop a system or logical partition as a part of a system upgrade or service action.

About this task

Attention: Using either the power-on button on the control panel or entering commands at the Hardware Management Console (HMC) to stop the system can cause unpredictable results in the data files. Also, the next time you start the system, it might take longer if all applications are not ended before stopping the system.

To stop the system or logical partition, select the appropriate procedure.

Stopping a system that is not managed by an HMC or an SDMC

You might need to stop the system to perform another task. If your system is not managed by the Hardware Management Console (HMC) or the Systems Director Management Console (SDMC), use these instructions to stop the system by using the power button or the Advanced System Management Interface (ASMI).

Before you begin

Before you stop the system, follow these steps:

1. Ensure that all jobs are completed and end all applications.
2. Ensure that the operating system is stopped.
Attention: Failure to do so can result in the loss of data.
3. If a Virtual I/O Server (VIOS) logical partition is running, ensure that all clients are shut down or that the clients have access to their devices by using an alternate method.

About this task

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

Procedure

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

- If your system is running the operating system, type PWRDWNSYS. If your system is partitioned, use the PWRDWNSYS command to power down each of the secondary partitions. Then, use the PWRDWNSYS command to power down the primary partition.

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

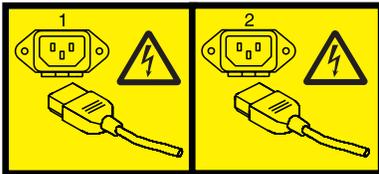
3. At the Linux command line, type `shutdown -h now`.

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

4. Record the IPL type and the IPL mode from the control panel display to help you return the system to this state when the installation or replacement procedure is completed.
5. Set the power switches of any devices connected to the system to off.
6. Unplug any power cables that are attached to the unit from electrical outlets. Ensure that you unplug power cables from peripheral devices, such as printers and expansion units.

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

(L003)



or



Stopping a system by using the HMC

You can use the Hardware Management Console (HMC) to stop the system or a logical partition.

About this task

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

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

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

- Super administrator
- Service representative
- Operator
- Product engineer

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

Procedure

1. In the navigation area, expand the **Systems Management** folder.
2. Click the **Servers** icon.
3. In the Contents area, select the managed system.
4. Select **Tasks > Operations > Power Off**.
5. Select the appropriate power-off mode and click **OK**.

Related information:

Shutting down and restarting logical partitions

Stopping a system by using the SDMC

You can use the Systems Director Management Console (SDMC) to stop the system or a virtual server.

About this task

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

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

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

- Super administrator
- Service representative
- Operator
- Product engineer

Use the following steps to stop the system by using the SDMC.

Procedure

1. In the Power Systems™ Resource area, select the managed system you want to power off.
2. From the **Actions** menu, select **Operations > Power Off**.
3. Select the appropriate power-off mode and click **OK**.

Removing and replacing covers for the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D

Use these instructions to remove, replace, or install covers so that you can access the hardware parts or perform service.

Removing the service access cover from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D

Use this procedure to remove the service access cover.

About this task

Perform the following steps to remove the service access cover:

Procedure

1. Loosen the thumbscrew (A) located at the rear of the cover.
2. Slide the cover (B) toward the rear of the system. When the front of the service access cover has cleared the upper frame ledge, lift the cover up and off the system.

Attention: When the service access cover is removed, the system powers down.

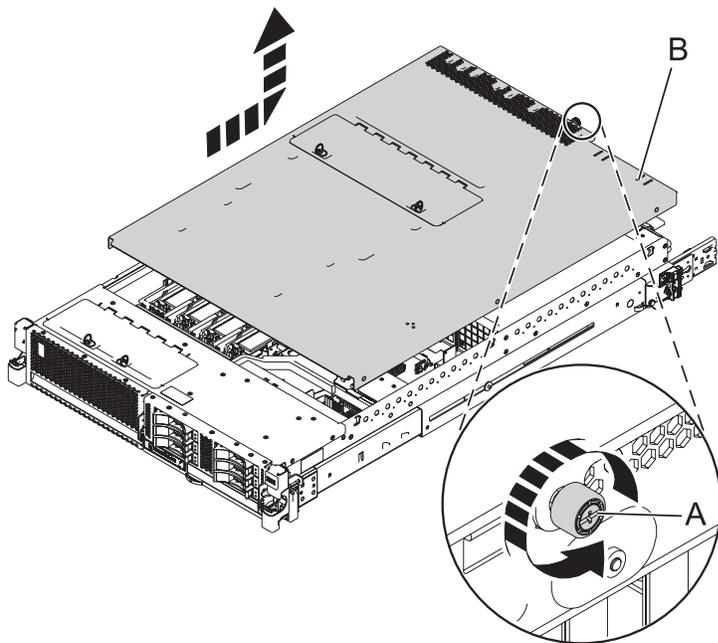


Figure 66. Removing the service access cover

Installing the service access cover on the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D

Use this procedure to install the service access cover.

About this task

Perform the following steps to install the service access cover:

Procedure

1. Place the service access cover (A) on top of the system, about 25 mm (1 in.) from the upper chassis ledge.
2. Hold the service access cover against the system unit and slide it toward the front of the system. The tabs of the service access cover slide beneath the upper chassis ledge.
3. Align the thumbscrew (B) located on the rear of the service access cover with the two holes on the rear of the system chassis.
4. Tighten the thumbscrews to secure the service access cover.

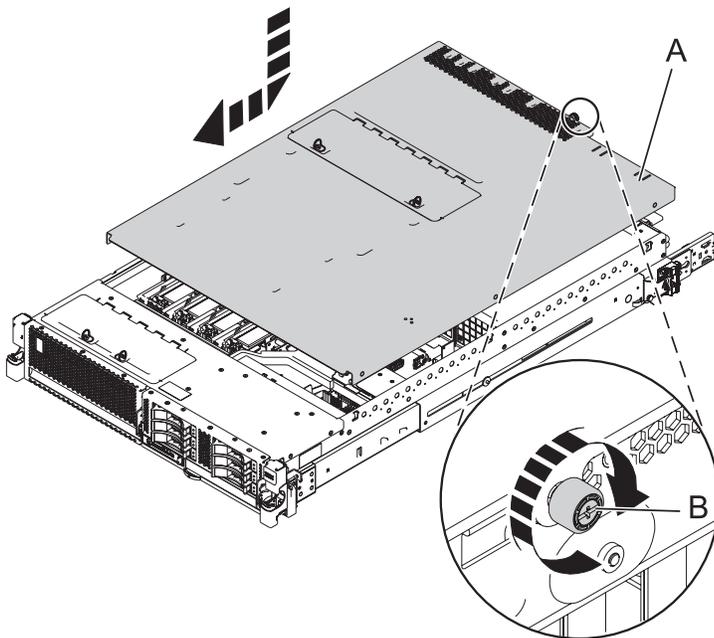


Figure 67. Installing the service access cover

Placing the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D system into the service or operating position

Use these procedures to place a system into the service position or operating position to perform service or to gain access to internal components.

Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the service position

Use this procedure to place the rack-mounted system into the service position.

Before you begin

Notes:

- When placing the system into the service position, it is essential that all stability plates are firmly in position to prevent the rack from toppling. Ensure that only one system unit is in the service position at a time.
- Ensure that the cables at the rear of the system do not catch or bind as you pull the unit forward in the rack.
- When the rails are fully extended, the rail safety latches lock into place. This action prevents the system from being pulled out too far.

Procedure

1. Open the front rack door.
2. Identify the system unit that you are servicing in the rack.
3. While holding the system unit release latches down on both the left and right sides, pull the system unit out from the rack until the rails are fully extended and locked.

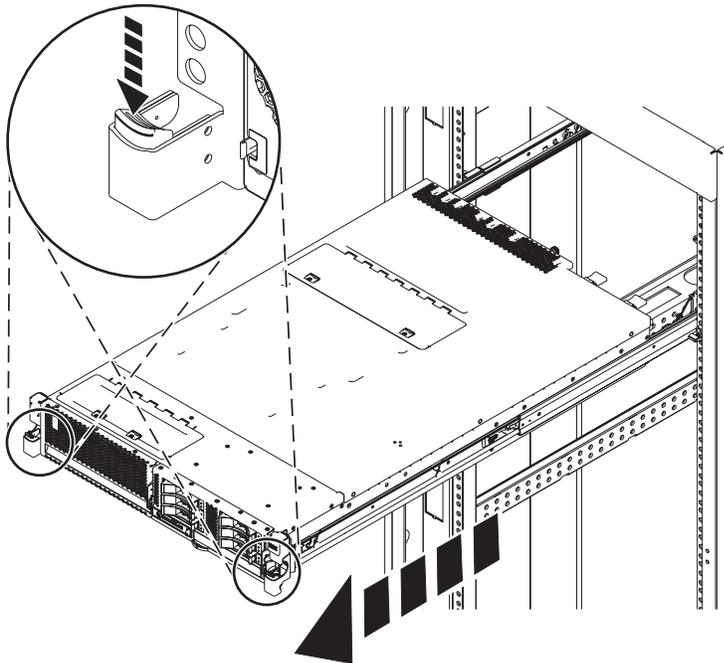


Figure 68. Placing the system in the service position

Placing the rack-mounted 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D into the operating position

Use this procedure to place the rack-mounted system into the operating position.

Before you begin

When placing the system in the operating position, ensure that the cables at the rear of the system do not catch or bind as you push the system unit back into the rack.

Procedure

1. Unlock the blue safety rail latches (A) by lifting them upward.

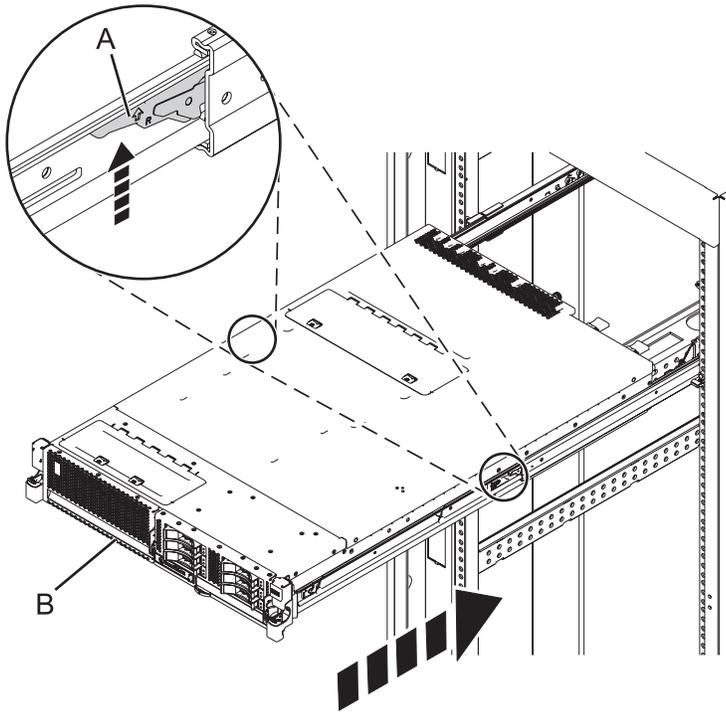


Figure 69. Unlocking the safety rail latches

2. Push the system unit back into the rack until both system-unit release latches have locked into position.

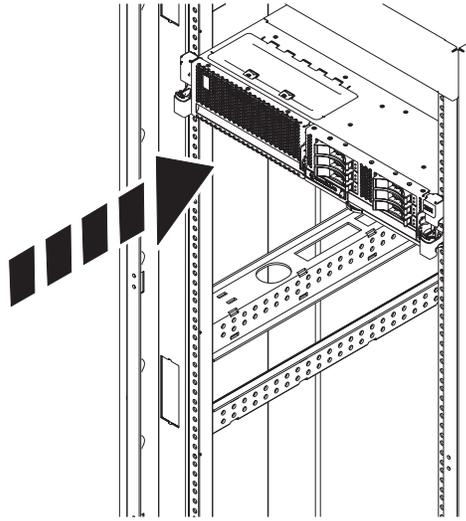


Figure 70. Placing the system in the operating position

3. Close the front rack door of the system unit that you are servicing.

Disconnecting the power cords from the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D

Use this procedure to disconnect the power cords from the system.

About this task

Perform the following steps to disconnect the power cords from the system:

Procedure

1. Open the rear rack door on the system unit that you are servicing.
2. Identify the system unit that you are servicing in the rack.
3. Disconnect all power cords from the system unit that you are servicing.

Note: This system might be equipped with two power supplies. Before continuing with any remove and replace procedures that require the power to be off, ensure that both power sources to the system have been completely disconnected.

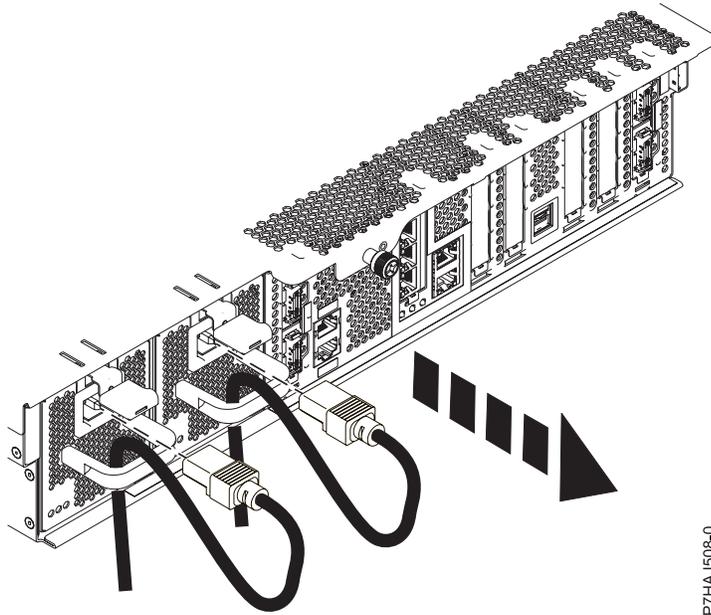


Figure 71. Removing the power cords

Connecting the power cords to the 31E/2B, 31E/1C, 31E/1D, 31E/2C, or 31E/2D

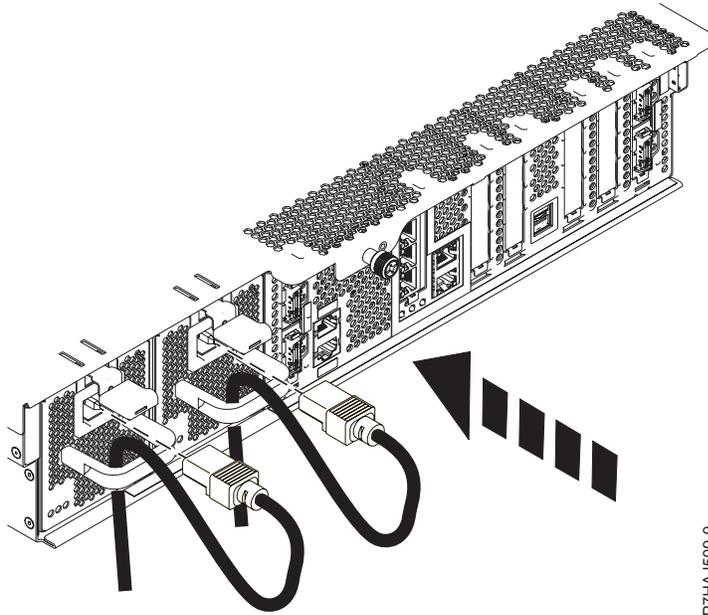
Use this procedure to connect the power cords to the system.

About this task

Perform the following steps to connect the power cords to the system:

Procedure

1. Open the rear rack door on the system unit that you are servicing.
2. Identify the system unit that you are servicing in the rack.
3. Connect all power cords to the system unit that you are servicing. Ensure that the cords are threaded through the handles.



P7HAJ509-0

Figure 72. Connecting the power cords

Installing a part by using the HMC

You can use the Hardware Management Console (HMC) to perform many service actions, including the installation of a new feature or part.

Before you begin

To install a feature or part into a system or expansion unit that is managed by HMC Version 7, or later, complete the following steps:

Procedure

1. In the navigation area, expand **Systems Management > Servers**.
2. Select the managed system on which you will install the part.

Note: If your part is in a miscellaneous equipment specification (MES), continue with step 3. If your part is contained in the install done by the system services representative (SSR) or in a ship group, go to step 8.
3. In the Tasks area, expand **Serviceability > Hardware > MES Tasks > Open MES**.
4. Click **Add MES Order Number**.
5. Enter the number, and click **OK**.
6. Click the newly created order number, and click **Next**. The details of the order number are displayed.
7. Click **Cancel** to close the window.
8. In the Tasks area, expand **Serviceability > Hardware > MES Tasks**.
9. Select **Add FRU** (field replaceable unit).
10. In the Add/Install/Remove Hardware-Add FRU, Select FRU Type window, select the system or enclosure into which you are installing the feature.

11. Select the type of feature you are installing, and click **Next**.
12. Select the location code where you will install the feature, and click **Add**.
13. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to install the feature.

Note: The HMC might open external instructions for installing the feature. If so, follow those instructions to install the feature.

Removing a part by using the HMC

You can use the Hardware Management Console (HMC) to perform many service actions, including the removal of a field replaceable unit (FRU) or part.

About this task

To remove a part in a system or expansion unit that is managed by HMC Version 7, or later, complete the following steps:

Procedure

1. In the navigation area, expand **Systems Management > Servers**.
2. Select the managed system from which you are removing a part.
3. In the **Tasks** area, expand **Serviceability > Hardware > MES Tasks > Remove FRU**
4. In the Add/Install/Remove Hardware - Remove FRU, Select FRU Type window, select the system or enclosure from which you are removing the part.
5. Select the type of part that you are removing, and click **Next**.
6. Select the location of the part that you are removing, and click **Add**.
7. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to remove the part.

Note: The HMC might open the information center instructions for removing the part. If so, follow those instructions to remove the part.

Replacing a part by using the HMC

You can use the Hardware Management Console (HMC) to perform many service actions, including exchanging a field replaceable unit (FRU) or part.

About this task

If you are exchanging a part to repair a serviceable event, follow those instructions. If you are exchanging a part as a part of any other procedure by using HMC Version 7, or later, complete the following steps:

Procedure

1. In the navigation area, expand **Systems Management > Servers**.
2. Select the managed system in which you are exchanging a part.
3. In the **Tasks** area, expand **Serviceability > Hardware > Exchange FRU**.
4. Select the system or enclosure from which you want to exchange the part.
5. In the Replace Hardware - Replace FRU, Select FRU Type window, select the type of part that you will exchange from the menu, and click **Next**.
6. Select the location code of the part that you will exchange, and click **Add**.
7. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to exchange the part.

Note: The HMC might open external instructions for replacing the part. If so, follow those instructions to replace the part.

Verifying the installed part

You can verify a newly installed or replaced part on your system, logical partition, or expansion unit by using the operating system, stand-alone diagnostics, or the Hardware Management Console (HMC).

Verifying an installed feature or replaced part in an AIX system or logical partition

If you installed feature or replaced a part, you might want to use the tools in the AIX operating system to verify that the feature or part is recognized by the system or logical partition.

About this task

To verify the operation of a newly installed feature or replacement part, select the appropriate procedure:

- Verify the installed feature using AIX
- Verifying the replaced part using AIX

Verify the installed feature by using the AIX operating system:

1. Log in as root user.
2. At the command line, type `diag` and press Enter.
3. Select **Advanced Diagnostics Routines** and press Enter.
4. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
5. When the **Advanced Diagnostic Selection** menu appears, do one of the following:
 - To test a single resource, select the resource that you just installed from the list of resources and press Enter.
 - To test all the resources available to the operating system, select **All Resources** and press Enter.
6. Select **Commit**, and wait until the diagnostic programs run to completion, responding to any prompts that appear.
7. Did the diagnostics run to completion and display the message No trouble was found?
 - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the installation procedures to ensure that the new feature is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system is running in logical partitioning (LPAR) mode, note the logical partition in which you installed the feature. Contact your service provider for assistance.
 - **Yes:** The new device is installed correctly. Exit the diagnostic programs and return the system to normal operations.

Verify the replacement part by using the AIX operating system:

To verify the operation of a newly installed feature or replacement part, follow these steps:

1. Did you use either the AIX operating system or the online diagnostics service aid concurrent (hot-swap) service to replace the part?
 - No:** Go to step 2.
 - Yes:** Go to step 5 on page 98.
2. Is the system powered off?
 - No:** Go to step 4 on page 98.
 - Yes:** Continue with the next step.

3. Start the system and wait until the AIX operating system login prompt is displayed or until apparent system activity on the operator panel or display has stopped.

Did the AIX login prompt display?

- **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the procedures for the part that you replaced to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system does not start or you have no login prompt, see: Problems with loading and starting the operating system.

If the system is partitioned, note the logical partition in which you replaced the part. Contact your service provider for assistance.

- **Yes:** Go to step 4.

4. At the command prompt, type `diag -a` and press Enter to check for missing resources. If you see a command prompt, go to step 5.

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

- a. Select the resource and press Enter.
- b. Select **Commit**.
- c. Follow any instructions that are shown.
- d. If the *Do you want to review the previously displayed error?* message is shown, select **Yes** and press Enter.
- e. If an SRN is shown, suspect a loose card or connection. If no obvious problem is shown, record the SRN and contact your service provider for assistance.
- f. If no SRN is shown, go to step 5.

5. Test the part by doing the following steps:

- a. At the command line, type `diag` and press Enter.
- b. From the **Function Selection** menu, select **Advanced Diagnostics Routines** and press Enter.
- c. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
- d. Select **All Resources**, or select the diagnostics for the individual part to test only the part you replaced and any devices that are attached to the part you replaced and press Enter.

Did the **Resource Repair Action** menu appear?

No: Go to step 6.

Yes: Go to step 7.

6. Did the *Testing Complete, No trouble was found* message appear?

- **No:** There is still a problem. Contact your service provider. **This ends the procedure.**
- **Yes:** Select **Log Repair Action**, if not previously logged, from the **Task Selection** menu to update the AIX error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the resource list, select `sysplanar0` and press Enter.

Tip: This action changes the indicator light for the part from the fault state to the normal state.

Go to step 9 on page 99.

7. Select the resource for the replaced part from the **Resource Repair Action** menu. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.

Note: On systems with an indicator light for the failing part, this action changes the indicator light to the normal state.

- a. Select the resource that has been replaced from the **Resource Repair Action** menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select **sysplanar0** and press Enter.
 - b. Select **Commit** after you make your selections. Did another **Resource Repair Action** display appear?
 - No:** If the **No Trouble Found** display appears, go to step 9
 - Yes:** Go to step 8.
8. Select the parent or child of the resource for the replaced part from the **Resource Repair Action** menu if necessary. When a test is run on a resource in system verification mode, and that resource has an entry in the AIX error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the AIX error log to indicate that a system-detectable part has been replaced.
- Note:** This action changes the indicator light for the part from the fault state to the normal state.
- a. From the **Resource Repair Action** menu, select the parent or child of the resource that has been replaced. If the repair action was to reseat a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the resource list, select **sysplanar0** and press Enter.
 - b. Select **Commit** after you make your selections.
 - c. If the **No Trouble Found** display appears, go to step 9.
9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the values they had prior to servicing the system.
10. Did you do any hot-plug procedures before doing this procedure?
 - No:** Go to step 11.
 - Yes:** Go to step 12.
11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?
 - No:** Contact your service provider. **This ends the procedure.**
 - Yes:** Go to step 12.
12. Are the indicator lights still on?
 - **No. This ends the procedure.**
 - **Yes.** Turn off the lights. See the following for instructions: Changing service indicators.

Verifying the installed part in a Linux system or logical partition

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

About this task

To verify the newly installed or replaced part, continue with “Verifying an installed part by using stand-alone diagnostics.”

Verifying an installed part by using stand-alone diagnostics

If you have installed or replaced a part, verify that the system recognizes the new part. You can use stand-alone diagnostics to verify an installed part in an AIX or Linux system, expansion unit, or logical partition.

Before you begin

- If this server is directly attached to another server or attached to a network, ensure communications with the other servers have stopped.

- The stand-alone diagnostics require use of all of the logical partition resources. No other activity can be running on the logical partition.
- The stand-alone diagnostics require access to the system console.

About this task

You access these diagnostics from a CD-ROM or from the Network Installation Management (NIM) server. This procedure describes how to use the diagnostics from a CD-ROM. For information on running diagnostics from the NIM server, see *Running stand-alone diagnostics from a Network Installation Management server*.

To use stand-alone diagnostics, follow these steps:

Procedure

1. Stop all jobs and applications and then stop the operating system on the system or logical partition.
2. Remove all tapes, diskettes, and CD-ROM.
3. Turn off the system unit power. The next step boots the server or logical partition from the stand-alone diagnostics CD-ROM. If the optical drive is not available as a boot device on the server or logical partition on which you are working, follow these steps:
 - a. Access the ASMI. For information on using the ASMI, see *Accessing the ASMI*.
 - b. On the ASMI main menu, click **Power/Restart Control**.
 - c. Click **Power On/Off System**.
 - d. Select the **Service mode boot from default boot list** option in the AIX or Linux logical partition mode boot drop-down menu.
 - e. Click **Save settings and power on**. When the optical drive is powered on, insert the stand-alone diagnostic CD-ROM.
 - f. Go to step 5.
4. Turn on the system unit power and immediately insert the diagnostics CD-ROM into the optical drive.
5. After the **keyboard** POST indicator displays on the system console and before the last POST indicator (**speaker**) displays, press the numeric 5 key on the system console to indicate that a service mode boot must be initiated by using the default-service mode boot list.
6. Enter any requested password.
7. At the **Diagnostic Operating Instructions** display, press Enter.

Tip: If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection.

Note: If you received an SRN or any other reference code when you attempted to start the system, contact your service provider for assistance.

8. If the terminal type is requested, select the **Initialize Terminal** option on the Function Selection menu to initialize the operating system.
9. From the Function Selection menu, select **Advanced Diagnostics Routines** and press Enter.
10. From the Diagnostic Mode Selection menu, select **System Verification** and press Enter.
11. When the Advanced Diagnostic Selection menu appears, select **All Resources**, or test only the part you replaced, and any devices that are attached to the part you replaced, by selecting the diagnostics for the individual part and press Enter.
12. Did the Testing Complete, No trouble was found message appear?
 - **No:** There is still a problem. Contact your service provider.
 - **Yes:** Go to step 13 on page 101.

13. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the value they had prior to servicing the system.
14. If the indicator lights are still on, follow these steps:
 - a. Select **Identify and Attention Indicators** from the Task Selection menu to turn off the system attention and indicator lights and press Enter.
 - b. Select **Set System Attention Indicator to NORMAL** and press Enter.
 - c. Select **Set All Identify Indicators to NORMAL** and press Enter.
 - d. Choose **Commit**.

Note: This changes the system attention and identify indicators from the *Fault* state to the *Normal* state.

- e. Exit to the command line.

Verifying the installed part by using the HMC

If you have installed or replaced a part, use the Hardware Management Console (HMC) to update your HMC records after you have completed a service action on your server. If you have reference codes, symptoms, or location codes that you used during the service action, locate the records for use during this procedure.

About this task

To verify the installed part, complete these steps:

Procedure

1. At the HMC, examine the service action event log for any open service action events. See “Viewing serviceable events by using the HMC” on page 103 for details.
2. Are there any service action events that are open?
 - No:** If the system attention LED is still on, use the HMC to turn off the LED. See “Activating and deactivating LEDs by using the HMC” on page 102. **This ends the procedure.**
 - Yes:** Continue with the next step.
3. Record the list of open service action events.
4. Examine the details of the open service action event. Is the error code associated with this service action event the same as you gathered earlier.
 - **No:** Select one of the following options:
 - Review the other serviceable events, find one that does match, and continue with the next step.
 - If the log does not match what you had gathered earlier, contact your service provider.
 - **Yes:** Continue with the next step.
5. Select and highlight the service action event from the Error Associated With This Serviceable Event window.
6. Click **Close Event**.
7. Add comments for the serviceable event. Include any unique additional information. Click **OK**.
8. Did you replace, add, or modify a field replaceable unit (FRU) of the open service action event?
 - **No:** Select the **No FRU Replaced for this Serviceable Event** option, and click **OK** to close the service action event.
 - **Yes:** Perform the following steps:
 - a. From the FRU list, select a FRU that you need to update.
 - b. Double-click the FRU and update the FRU information.
 - c. Click **OK** to close the service action event.
9. If you continue to have problems, contact your service provider.

Activating and deactivating LEDs by using the HMC

Use this procedure to activate or deactivate LEDs by using Service Focal Point™ from the Hardware Management Console (HMC).

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

About this task

You can deactivate the attention LED for a system or logical partition if you decide that a problem is not a high priority and you decide to repair the problem at a later time. The deactivation also allows the LED to be activated again when another problem occurs.

To deactivate a system attention LED by using HMC, complete the following steps:

Procedure

1. In the navigation area, open **Systems Management**.
2. Open **Servers** and select the required system.
3. In the content area, select the required partition.
4. Select **Tasks > Operations > Deactivate Attention LED**. A confirmation window is displayed with an indication that there still might be open problems with the system.
5. Click **OK** to continue with the deactivation. A window is displayed that provides the details of the system or partition, and a confirmation that the system or logical partition attention LED was deactivated.

Activating or deactivating an identify LED by using the HMC:

About this task

The system provides several LEDs that help identify various components, such as enclosures or field replaceable units (FRUs), in the system. For this reason, they are called *identify LEDs*.

You can activate or deactivate the following types of identify LEDs:

- **Identify LED for an enclosure** If you want to add an adapter to a specific drawer (enclosure), you need to know the machine type, model, and serial number (MTMS) of the drawer. To determine whether you have the correct MTMS for the drawer that needs the new adapter, you can activate the LED for a drawer and verify that the MTMS corresponds to the drawer that requires the new adapter.
- **Identify LED for a FRU associated with a specified enclosure** If you want to hook up a cable to a specific I/O adapter, you can activate the LED for the adapter which is a field replaceable unit (FRU), and then physically check to see where you should hook up the cable. This is especially useful when you have several adapters with open ports.

To activate or deactivate an identify LED for an enclosure or FRU, follow these steps:

Procedure

1. In the navigation area, open **Systems Management**.
2. Select **Servers**.
3. In the content area, check the box for the appropriate System.
4. Select **Tasks > Operations > LED Status > Identify LED**.
5. To activate or deactivate an identify LED for an enclosure, select an enclosure from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
6. To activate or deactivate an identify LED for a FRU, select an enclosure from the table and click **List FRUs**.
7. Select one or more FRUs from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Viewing serviceable events by using the HMC

Use this procedure to view a serviceable event, including details, comments, and service history.

About this task

To view serviceable events and other information about the events, you must be a member of one of the following roles:

- Super administrator
- Service representative
- Operator
- Product engineer
- Viewer

To view serviceable events, follow these steps:

Procedure

1. In the navigation area, select **Service Management**.
2. Select **Manage Serviceable Events**.
3. Select the criteria for the serviceable events that you want to view, and click **OK**. The Serviceable Event Overview window opens. The list shows all serviceable events that match your selection criteria. You can use the menu options to perform actions on the serviceable events.
4. Select a line in the Serviceable Event Overview window, and select **Selected > View Details**. The Serviceable Event Details window opens, showing detailed information about the serviceable event. The upper table shows information, such as problem number and reference code. The lower table shows the field replaceable units (FRUs) associated with this event.
5. Select the error for which you want to view comments and history, and follow these steps:
 - a. Select **Actions > View Comments**.
 - b. When you are finished viewing the comments, click **Close**.
 - c. Select **Actions > View Service History**. The Service History window opens, showing service history associated with the selected error.
 - d. When you are finished viewing the service history, click **Close**.
6. When you are finished, click **Cancel** twice to close the Serviceable Event Details window and the Serviceable Event Overview window.

Verifying the installed part by using the SDMC

If you installed or replaced a part, use the Systems Director Management Console (SDMC) to update your SDMC records after you have completed a service action on your server. If you have reference codes, symptoms, or location codes that you used during the service action, locate the records for use during this procedure.

About this task

To verify the installed part, complete these steps:

Procedure

1. From the SDMC, examine the service action event log for any open service action events. See "Viewing serviceable events by using the SDMC" on page 105 for details.
2. Are there any service action events that are open?

No: If the system attention LED is still on, use the SDMC to turn off the LED. See "Activating and deactivating LEDs by using the SDMC" on page 104. **This ends the procedure.**

Yes: Continue with the next step.

3. Record the list of open service action events.
4. Examine the details of the open service action event. Is the error code associated with this service action event the same as you gathered earlier.
 - **No:** Select one of the following options:
 - Review the other serviceable events, find one that does match, and continue with the next step.
 - If the log does not match what you had gathered earlier, contact your service provider.
 - **Yes:** Continue with the next step.
5. Select and highlight the service action event from the Error Associated With This Serviceable Event window.
6. Click **Delete** or **Ignore**.

Note: These options are only available from the problem event log.

Activating and deactivating LEDs by using the SDMC

Use this procedure to activate or deactivate LEDs by using the Systems Director Management Console (SDMC).

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

About this task

You can deactivate a system attention LED or a logical partition LED. For example, you might determine that a problem is not a high priority and decide to repair the problem at a later time. However, you want to be alerted if another problem occurs, so you must deactivate the system attention LED so that it can be activated again if another problem occurs.

To deactivate the system attention LED, complete the following steps:

Procedure

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions > Service and Support > Hardware > System Attention LED**.
3. Select **Deactivate System Attention LED**. A confirmation window is displayed that provides the following information:
 - A verification that the system attention LED was deactivated.
 - An indication that there still might be open problems within the system.
 - An indication that you cannot activate the system attention LED.
4. Select one of the virtual servers, and select **Deactivate System Attention LED**. A confirmation window is displayed that provides the following information:
 - A verification that the system attention LED was deactivated.
 - An indication that there still might be open problems within the logical partition.
 - An indication that you cannot activate the virtual server LED.

Activating or deactivating an identify LED by using the SDMC:

About this task

The system provides several LEDs that help identify various components, such as enclosures or field replaceable units (FRUs). For this reason, they are called *identify LEDs*.

You can activate or deactivate the following types of identify LEDs:

- **Identify LED for an enclosure** If you want to add an adapter to a specific drawer (enclosure), you need to know the machine type, model, and serial number (MTMS) of the drawer. To determine whether you have the correct MTMS for the drawer that needs the new adapter, you can activate the LED for a drawer and verify that the MTMS corresponds to the drawer that requires the new adapter.

- **Identify LED for a FRU associated with a specified enclosure** If you want to hook up a cable to a specific I/O adapter, you can activate the LED for the adapter which is a field replaceable unit (FRU), and then physically check to see where you should hook up the cable. This is especially useful when you have several adapters with open ports.

To activate or deactivate an identify LED for an enclosure or FRU, follow these steps:

Procedure

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions > Service and Support > Hardware > Identify LED**.
3. In the Identify LED, Select Enclosure window, select the system unit or enclosure.
4. To activate or deactivate an identify LED, click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.
5. To activate or deactivate an identify LED for a FRU, select a system or enclosure from the table, and then click **List FRUs**.
6. Select one or more FRUs from the table, and click either **Activate LED** or **Deactivate LED**. The associated LED is either turned on or off.

Viewing serviceable events by using the SDMC

Use this procedure to view a serviceable event, including details, comments, and service history.

About this task

To view serviceable events, follow these steps:

Procedure

1. On the Resources tab, select the appropriate host or virtual server.
2. Select **Actions > System Status and Health > Event Log**.
3. Optional: You can narrow the event criteria by using the Event filter menu.
4. Select a line in the Events window, and select **Actions > Properties**. The Properties window opens, showing detailed information about the serviceable event. The table shows information, such as problem number, reference code, and the field replaceable units (FRUs) associated with this event.

Verifying an installed part or replaced part on a system or logical partition by using Virtual I/O Server tools

If you installed or replaced a part, you might want to use the tools in Virtual I/O Server (VIOS) to verify that the part is recognized by the system or logical partition.

Verifying the installed part by using VIOS

You can verify the operation of a newly installed part or a replacement part.

About this task

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

Procedure

1. Log in as root user.
2. At the command line, type `diagmenu` and press Enter.
3. Select **Advanced Diagnostics Routines** and press Enter.
4. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
5. When the **Advanced Diagnostic Selection** menu appears, do one of the following steps:

- To test a single resource, select the resource that you just installed from the list of resources and press Enter.
 - To test all the resources available to the operating system, select **All Resources** and press Enter.
6. Select **Commit**, and wait until the diagnostic programs run to completion, responding to any prompts that appear.
 7. Did the diagnostics run to completion and display the message No trouble was found?
 - **No:** If a service request number (SRN) or other reference code is displayed, suspect a loose adapter or cable connection. Review the installation procedures to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system is running in LPAR mode, note the logical partition in which you installed the part. Contact your service provider for assistance.
 - **Yes:** The new device is installed correctly. Exit the diagnostic programs and return the system to normal operations.

Verify the replacement part by using VIOS

To verify the operation of a newly installed part or replacement part, complete the following steps:

Procedure

1. Did you replace the part by using either VIOS or the online diagnostics service aid's concurrent (hot-swap) service operation?
 - **No:** Go to step 2.
 - **Yes:** Go to step 5.
2. Is the system powered off?
 - **No:** Go to step 4.
 - **Yes:** If the system supports slow boot, set the system to perform a slow boot. For information, see *Performing a slow boot*.
3. Start the system and wait until the VIOS operating system login prompt displays or until apparent system activity on the operator panel or display has stopped. Did the VIOS login prompt display?
 - **No:** If an SRN or other reference code is displayed, suspect a loose adapter or cable connection. Review the procedures for the part that you replaced to ensure that the new part is installed correctly. If you cannot correct the problem, collect all SRNs or any other reference code information that you see. If the system does not start or you have no login prompt, see *Problems with loading and starting the operating system*.
If the system is partitioned, note the logical partition in which you replaced the part. Contact your service provider for assistance.
 - **Yes:** Go to step 4.
4. At the command prompt, type `diag -a` and press Enter to check for missing resources. If you see a command prompt, go to step 5.
If the **Diagnostic selection** menu is shown with **M** appearing next to any resource, follow these steps:
 - a. Select the resource and press Enter.
 - b. Select **Commit**.
 - c. Follow any instructions that are shown.
 - d. If a *Do you want to review the previously displayed error?* message is shown, select **Yes** and press Enter.
 - e. If an SRN is shown, suspect a loose card or connection. If no obvious problem is shown, record the SRN and contact your service provider for assistance.
 - f. If no SRN is shown, go to 5.
5. Test the part by doing the following:
 - a. At the command line, type `diagmenu` and press Enter.

- b. From the **Function Selection** menu, select **Advanced Diagnostics Routines** and press Enter.
 - c. From the **Diagnostic Mode Selection** menu, select **System Verification** and press Enter.
 - d. Select **All Resources**, or select the diagnostics for the individual part to test only the part you replaced, and any devices that are attached to the part you replaced and press Enter.
Did the **Resource Repair Action** menu appear?
 - **No:** Go to step 6.
 - **Yes:** Go to step 7.
6. Did the *Testing Complete, No trouble was found* message appear?
- **No:** There is still a problem. Contact your service provider. **This ends the procedure.**
 - **Yes:** Select **Log Repair Action**, if not previously logged, from the **Task Selection** menu to update the error log. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action is not displayed on the Resource List, select **sysplanar0** and press Enter.
- Tip:** This action changes the indicator light for the part from the fault state to the normal state. Go to step 9.
7. Select the resource for the replaced part from the **Resource Repair Action** menu. When a test is run on a resource in system verification mode, and that resource has an entry in the error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the error log to indicate that a system-detectable part has been replaced. On systems with a indicator light for the failing part, this changes the indicator light to the normal state.
- a. Select the resource that has been replaced from the **Resource Repair Action** menu. If the repair action was reseating a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**. Press Enter.
 - b. Select **Commit** after you make your selections. Did another **Resource Repair Action** display appear?
 - **No:** If the **No Trouble Found** display appears, go to step 9.
 - **Yes:** Go to step 8.
8. Select the parent or child of the resource for the replaced part from the **Resource Repair Action** menu if necessary. When a test is run on a resource in system verification mode, and that resource has an entry in the error log, if the test on the resource was successful, the **Resource Repair Action** menu appears. Complete the following steps to update the error log to indicate that a system-detectable part has been replaced. This changes the indicator light for the part from the fault state to the normal state.
- a. From the **Resource Repair Action** menu, select the parent or child of the resource that has been replaced. If the repair action was to reseat a cable or adapter, select the resource associated with that repair action. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**. Press Enter.
 - b. Select **Commit** after you make your selections.
 - a. If the **No Trouble Found** display appears, go to step 9.
9. If you changed the service processor or network settings, as instructed in previous procedures, restore the settings to the values they had prior to servicing the system.
10. Did you do any hot-plug procedures before doing this procedure?
- **No:** Go to step 11.
 - **Yes:** Go to step 12 on page 108.
11. Start the operating system, with the system or logical partition in normal mode. Were you able to start the operating system?
- **No:** Contact your service provider. **This ends the procedure.**
 - **Yes:** Go to step 12 on page 108.

12. Are the indicator lights still on?
 - **No:** This ends the procedure.
 - **Yes.** Turn off the lights. For instructions, see Changing service indicators.

Installing a part by using the SDMC

You can use the Systems Director Management Console (SDMC) to perform many service actions, including the installation of a new field-replaceable unit (FRU) or part.

Before you begin

To install a part into a system or expansion unit that is managed by an SDMC, complete the following steps:

Procedure

1. In the Power Systems Resources area, select the system on which you want to install a part.
2. From the **Actions** menu, expand **Service and Support > Hardware > MES Tasks > Add FRU**.
3. On the Add FRU page, select the system or enclosure type from the **Enclosure type** list.
4. Select the FRU type that you are installing, and click **Next**.
5. Select the location code for the location to install, and click **Add**.
6. After the part is placed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to install the part.

Note: The SDMC might open external instructions for installing the feature. If so, follow those instructions to install the part.

Replacing a part by using the SDMC

You can use the Systems Director Management Console (SDMC) to perform many service actions, including exchanging a field-replaceable unit (FRU) or part.

About this task

To replace a part by using the SDMC, complete the following steps:

Procedure

1. In the Power Systems Resource area, select the managed system in which you are exchanging a part.
2. Select one of the following options:
 - If you are replacing a part that is not part of a serviceable event from the **Actions** menu, expand **Service and Support > Hardware > Exchange FRU**.
 - If you are exchanging a part to repair a serviceable event, see Starting a repair action.
3. On the Exchange FRU page, select the enclosure from which you want to replace the part from the **Installed Enclosure Types** list.
4. Select the type of part that you want to exchange, and click **Next**.
5. Select the location code of the part that you want to exchange, and click **Add**.
6. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to exchange the part.

Note: The SDMC might open external instructions for replacing the part. If so, follow those instructions to replace the part.

Removing a part by using the SDMC

You can use the Systems Director Management Console (SDMC) to perform many service actions, including the removal of a field-replaceable unit (FRU) or part.

About this task

To remove a part in a system or expansion unit that is managed by an SDMC, complete the following steps:

Procedure

1. In the Power Systems Resources area, select the managed system from which you are removing a part.
2. From the **Actions** menu, expand **Service and Support > Hardware > MES Tasks > Remove FRU**.
3. On the Remove FRU page, select the enclosure from which you want to remove the part from the **Installed Enclosures** list.
4. Select the type of the part that you are removing, and click **Next**.
5. Select the location of the part that you are removing, and click **Add**.
6. After the part is listed in the **Pending Actions** section, click **Launch Procedure** and follow the instructions to remove the part.

Note: The SDMC might open external instructions for removing the part. If so, follow those instructions to remove the part.

Notices

This information was developed for products and services offered in the U.S.A.

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

The manufacturer may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to the manufacturer.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: THIS PUBLICATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. The manufacturer may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to websites not owned by the manufacturer are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this product and use of those websites is at your own risk.

The manufacturer may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning products not produced by this manufacturer was obtained from the suppliers of those products, their published announcements or other publicly available sources. This manufacturer has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to products not produced by this manufacturer. Questions on the capabilities of products not produced by this manufacturer should be addressed to the suppliers of those products.

All statements regarding the manufacturer's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

The manufacturer's prices shown are the manufacturer's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

If you are viewing this information in softcopy, the photographs and color illustrations may not appear.

The drawings and specifications contained herein shall not be reproduced in whole or in part without the written permission of the manufacturer.

The manufacturer has prepared this information for use with the specific machines indicated. The manufacturer makes no representations that it is suitable for any other purpose.

The manufacturer's computer systems contain mechanisms designed to reduce the possibility of undetected data corruption or loss. This risk, however, cannot be eliminated. Users who experience unplanned outages, system failures, power fluctuations or outages, or component failures must verify the accuracy of operations performed and data saved or transmitted by the system at or near the time of the outage or failure. In addition, users must establish procedures to ensure that there is independent data verification before relying on such data in sensitive or critical operations. Users should periodically check the manufacturer's support websites for updated information and fixes applicable to the system and related software.

Homologation statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at www.ibm.com/legal/copytrade.shtml.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Electronic emission notices

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

Class A Notices

The following Class A statements apply to the servers.

Federal Communications Commission (FCC) statement

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

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

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

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

Industry Canada Compliance Statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

European Community Compliance Statement

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

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

European Community contact:
IBM Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 7032 15 2941
email: lugi@de.ibm.com

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

VCCI Statement - Japan

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

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

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

**Japanese Electronics and Information Technology Industries Association (JEITA)
Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)**

高調波ガイドライン適合品

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

高調波ガイドライン準用品

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

声 明

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

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

Electromagnetic Interference (EMI) Statement - Taiwan

警告使用者：

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

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

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

Electromagnetic Interference (EMI) Statement - Korea

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

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 von IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung von 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 Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.

New Orchard Road

Armonk, New York 10504

Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland GmbH

Technical Regulations, Abteilung M372

IBM-Allee 1, 71139 Ehningen, Germany

Tel: +49 7032 15 2941

email: lugi@de.ibm.com

Generelle Informationen:

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

Electromagnetic Interference (EMI) Statement - Russia

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

Class B Notices

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

Federal Communications Commission (FCC) statement

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

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

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

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

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

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

Industry Canada Compliance Statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

European Community Compliance Statement

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

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

European Community contact:
IBM Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 7032 15 2941
email: lugi@de.ibm.com

VCCI Statement - Japan

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

取扱説明書に従って正しい取り扱いをして下さい。 VCCI-B

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

高調波ガイドライン適合品

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

高調波ガイドライン準用品

Electromagnetic Interference (EMI) Statement - Korea

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

Germany Compliance Statement

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

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

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 von IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung von IBM gesteckt/eingebaut werden.

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse B

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

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland GmbH
Technical Regulations, Abteilung M372
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 7032 15 2941
email: lugi@de.ibm.com

Generelle Informationen:

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

Terms and conditions

Permissions for the use of these publications are granted subject to the following terms and conditions.

Applicability: These terms and conditions are in addition to any terms of use for the the manufacturer website.

Personal Use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative works of these publications, or any portion thereof, without the express consent of the manufacturer.

Commercial Use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of

these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of the manufacturer.

Rights: Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the Publications or any information, data, software or other intellectual property contained therein.

The manufacturer reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by the manufacturer, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

THE MANUFACTURER MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

Printed in USA