

IBM SAN Volume Controller Model 2145-SV1, 2147-SV1
and 2145-DH8

Hardware Maintenance Guide



Note

Before using this information and the product it supports, read the following information:

- The general information in “Notices” on page 287
- The information in the “Safety and environmental notices” on page xi
- The information in the *IBM Environmental Notices and User Guide* (provided on a DVD)

This edition applies to version 8, release 1, modification 3, and to all subsequent modifications until otherwise indicated in new editions.

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Safety and environmental notices

Review all safety notices, environmental notices, and electronic emission notices before you install and use the product.

Suitability for telecommunication environment: This product is not intended to connect directly or indirectly by any means whatsoever to interfaces of public telecommunications networks.

To find the translated text for a caution or danger notice, complete the following steps.

1. Look for the identification number at the end of each caution notice or each danger notice. In the following examples, the numbers (C001) and (D002) are the identification numbers.

CAUTION:

A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. (C001)

DANGER

A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. (D002)

2. Locate the *IBM System Storage SAN Volume Controller Safety Notices* with the user publications that were provided with your system hardware.
3. Find the matching identification number in the *IBM System Storage SAN Volume Controller Safety Notices*. Then, review the topics about the safety notices to ensure that you are in compliance.
4. (Optional) Read the multilingual safety instructions on the system website.
 - a. Go to www.ibm.com/support
 - b. Search for "SAN Volume Controller "
 - c. Click the documentation link.

Safety notices and labels

Review the safety notices and safety information labels before you use this product.

To view a PDF file, you need Adobe Acrobat Reader. You can download it at no charge from the Adobe website:

www.adobe.com/support/downloads/main.html

IBM® Systems Safety Notices

This publication contains the safety notices for the IBM Systems products in English and other languages. Anyone who plans, installs, operates, or services the system must be familiar with and understand the safety notices. Read the related safety notices before you begin work.

Note: The *IBM System Safety Notices* document is organized into two sections. The danger and caution notices without labels are organized alphabetically by language in the "Danger and caution notices by language" section. The danger and caution notices that are accompanied with a label are organized by label reference number in the "Labels" section.

Note: You can find and download the current *IBM System Safety Notices* by searching for Publication number **G229-9054** in the IBM Publications Center.

The following notices and statements are used in IBM documents. They are listed in order of decreasing severity of potential hazards.

Danger notice definition

A special note that emphasizes a situation that is potentially lethal or extremely hazardous to people.

Caution notice definition

A special note that emphasizes a situation that is potentially hazardous to people because of some existing condition, or to a potentially dangerous situation that might develop because of some unsafe practice.

Note: In addition to these notices, labels might be attached to the product to warn of potential hazards.

Finding translated notices

Each safety notice contains an identification number. You can use this identification number to check the safety notice in each language.

To find the translated text for a caution or danger notice:

1. In the product documentation, look for the identification number at the end of each caution notice or each danger notice. In the following examples, the numbers (D002) and (C001) are the identification numbers.

DANGER

A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. (D002)

CAUTION:

A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. (C001)

2. After you download the *IBM System Safety Notices* document, open it.
3. Under the language, find the matching identification number. Review the topics about the safety notices to ensure that you are in compliance.

Note: This product was designed, tested, and manufactured to comply with IEC 60950-1, and where required, to relevant national standards that are based on IEC 60950-1.

Caution notices for the system

Ensure that you understand the caution notices for the system.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

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. (C003)

CAUTION:

		
33.6-46.3 kg (74-102 lbs)	46.3-61.7 kg (102-136 lbs)	≥61.7-100 kg (136-220 lbs)

svr01053

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)

CAUTION:

To avoid personal injury, before lifting this unit, remove all appropriate subassemblies per instructions to reduce the system weight. (C012)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors closed at the conclusion of the service operation. (C013)

CAUTION:

CAUTION regarding IBM provided VENDOR LIFT TOOL:

- Operation of LIFT TOOL by authorized personnel only
- LIFT TOOL intended for use to assist, lift, install, remove units (load) up into rack elevations. It is not to be used loaded transporting over major ramps nor as a replacement for such designated tools like pallet jacks, walkies, fork trucks and such related relocation practices. When this is not practicable, specially trained persons or services must be used (for instance, riggers or movers). Read and completely understand the contents of LIFT TOOL operator's manual before using.
- Read and completely understand the contents of LIFT TOOL operator's manual before using. Failure to read, understand, obey safety rules, and follow instructions may result in property damage and/or personal injury. If there are questions, contact the vendor's service and support. Local paper manual must remain with machine in provided storage sleeve area. Latest revision manual available on vendor's website.
- Test verify stabilizer brake function before each use. Do not over-force moving or rolling the LIFT TOOL with stabilizer brake engaged.
- Do not raise, lower or slide platform load shelf unless stabilizer (brake pedal jack) is fully engaged. Keep stabilizer brake engaged when not in use or motion.
- Do not move LIFT TOOL while platform is raised, except for minor positioning.
- Do not exceed rated load capacity. See LOAD CAPACITY CHART regarding maximum loads at center versus edge of extended platform.
- Only raise load if properly centered on platform. Do not place more than 200 lb (91 kg) on edge of sliding platform shelf also considering the load's center of mass/gravity (CoG).
- Do not corner load the platform tilt riser accessory option. Secure platform riser tilt option to main shelf in all four (4x) locations with provided hardware only, prior to use. Load objects are designed to slide on/off smooth platforms without appreciable force, so take care not to push or lean. Keep riser tilt option flat at all times except for final minor adjustment when needed.
- Do not stand under overhanging load.
- Do not use on uneven surface, incline or decline (major ramps).
- Do not stack loads. (C048, part 1 of 2)

- Do not operate while under the influence of drugs or alcohol.
- Do not support ladder against LIFT TOOL.
- Tipping hazard. Do not push or lean against load with raised platform.
- Do not use as a personnel lifting platform or step. No riders.
- Do not stand on any part of lift. Not a step.
- Do not climb on mast.
- Do not operate a damaged or malfunctioning LIFT TOOL machine.
- Crush and pinch point hazard below platform. Only lower load in areas clear of personnel and obstructions. Keep hands and feet clear during operation.
- No Forks. Never lift or move bare LIFT TOOL MACHINE with pallet truck, jack or fork lift.
- Mast extends higher than platform. Be aware of ceiling height, cable trays, sprinklers, lights, and other overhead objects.
- Do not leave LIFT TOOL machine unattended with an elevated load.
- Watch and keep hands, fingers, and clothing clear when equipment is in motion.
- Turn Winch with hand power only. If winch handle cannot be cranked easily with one hand, it is probably over-loaded. Do not continue to turn winch past top or bottom of platform travel. Excessive unwinding will detach handle and damage cable. Always hold handle when lowering, unwinding. Always assure self that winch is holding load before releasing winch handle.
- A winch accident could cause serious injury. Not for moving humans. Make certain clicking sound is heard as the equipment is being raised. Be sure winch is locked in position before releasing handle. Read instruction page before operating this winch. Never allow winch to unwind freely. Freewheeling will cause uneven cable wrapping around winch drum, damage cable, and may cause serious injury. (C048, part 2 of 2)

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 part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a 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.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- 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 the pallet and bolt the rack cabinet to the pallet. (R002)

Danger notices for the system

Ensure that you are familiar with the danger notices for your system.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

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:

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

To disconnect:

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

To connect:

1. Turn off everything (unless instructed otherwise).
 2. Attach all cables to the devices.
 3. Attach the signal cables to the connectors.
 4. Attach the power cords to the outlets.
 5. Turn on the devices.
- Sharp edges, corners and joints might be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

DANGER

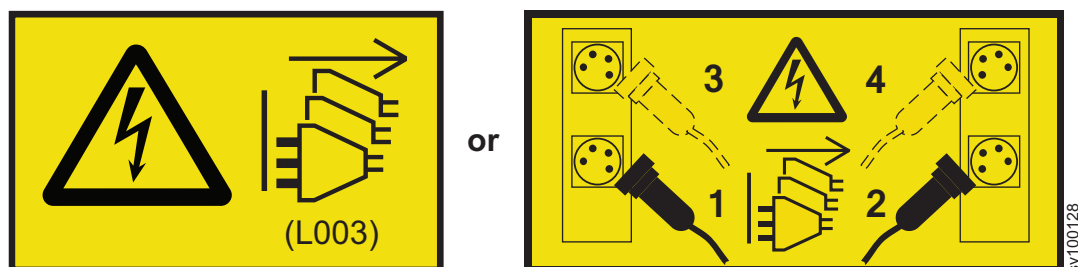
Heavy equipment—personal injury or equipment damage might result if mishandled. (D006)

DANGER

DANGER: Serious injury or death can occur if loaded lift tool falls over or if a heavy load falls off the lift tool. Always completely lower the lift tool load plate and properly secure the load on the lift tool before moving or using the lift tool to lift or move an object. (D010)

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



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. (R001 part 1 of 2)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER


Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)

DANGER:



Main Protective Earth (Ground):

This symbol is marked on the frame of the rack.

The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with . (R010)

Special caution and safety notices

This information describes special safety notices that apply to the system. These notices are in addition to the standard safety notices that are supplied; they address specific issues that are relevant to the equipment provided.

General safety

When you service the SAN Volume Controller, follow general safety guidelines.

Use the following general rules to ensure safety to yourself and others.

- Observe good housekeeping in the area where the devices are kept during and after maintenance.
- Follow the guidelines when lifting any heavy object:
 1. Ensure that you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 18 kg (40 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes a hazard or makes the equipment unsafe.
- Before you start the device, ensure that service representatives and other personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the unit.
- Keep your tool case away from walk areas so that other people cannot trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a device. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconducting clip, approximately 8 cm (3 in.) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.

- Wear safety glasses when you are hammering, drilling, soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.

- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly after you have finished servicing the unit.

Electrical safety

Observe these rules when working on electrical equipment.

DANGER

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

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

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

To disconnect:

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

To connect:

1. Turn off everything (unless instructed otherwise).
 2. Attach all cables to the devices.
 3. Attach the signal cables to the connectors.
 4. Attach the power cords to the outlets.
 5. Turn on the devices.
- Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching.

(D005)

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents. Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before the following activities:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Before you start to work on the unit, unplug the power cord. If you cannot unplug it, ask the customer to power off the wall box that supplies power to the device and to lock the wall box in the off position.
- If you need to work on a device that has exposed electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.

Remember: Another person must be there to switch off the power, if necessary.

- Use only one hand when working with electrical equipment that has the power turned on; keep the other hand in your pocket or behind your back.

Remember: There must be a complete circuit to cause electrical shock. By observing the previous rule, you might prevent a current from passing through your body.

- When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
- Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that power has been powered off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and device damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a device. (This practice ensures correct grounding of the units.)
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators
 - And similar units
- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.
 - Send another person to get medical aid.

Inspecting the system for unsafe conditions

Use caution when you are working in any potential safety hazardous situation that is not covered in the safety checks. If unsafe conditions are present, determine how serious the hazards are and whether you can continue before you correct the problem.

Before you begin

Before you start the safety inspection, make sure that the power is off, and that the power cord is disconnected.

About this task

Each device has the required safety items that are installed to protect users and support personnel from injury. Only those items are addressed.

Important: Good judgment must also be used to identify potential safety hazards due to the attachment of non-IBM features or options that are not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard might be and whether you can continue without first correcting the problem. For example, consider the following conditions and their potential safety hazards:

Electrical hazards (especially primary power)

Primary voltage on the frame can cause serious or lethal electrical shock.

Explosive hazards

A damaged CRT face or a bulging capacitor can cause serious injury.

Mechanical hazards

Loose or missing items (for example, nuts and screws) can cause serious injury.

To inspect each node for unsafe conditions, use the following steps. If necessary, see any suitable safety publications.

Procedure

1. Turn off the system and disconnect the power cord.
2. Check the frame for damage (loose, broken, or sharp edges).
3. Check the power cables by using the following steps:
 - a. Ensure that the third-wire ground connector is in good condition. Use a meter to check that the third-wire ground continuity is 0.1 ohm or less between the external ground pin and the frame ground.
 - b. Ensure that the power cord is the appropriate type, as specified in the parts listings.
 - c. Ensure that the insulation is not worn or damaged.
4. Check for any obvious nonstandard changes, both inside and outside the unit. Use good judgment about the safety of any such changes.
5. Check inside the node for any obvious unsafe conditions, such as metal particles, contamination, water or other fluids, or marks of overheating, fire, or smoke damage.
6. Check for worn, damaged, or pinched cables.
7. Ensure that the voltage that is specified on the product-information label matches the specified voltage of the electrical power outlet. If necessary, verify the voltage.
8. Inspect the power-supply assemblies and check that the fasteners (screws or rivets) in the cover of the power-supply unit are not removed or disturbed.
9. Check the grounding of the network switch before you connect the system to the storage area network (SAN).

Checking external devices

Ensure that you complete an external device check before you install or service the system.

Procedure

To conduct an external device check, complete the following steps.

1. Verify that all external covers are present and are not damaged.
2. Ensure that all latches and hinges are in the correct operating condition.
3. Check the power cords for damage.
4. Check the external signal cables for damage.
5. Check the cover for sharp edges, damage, or alterations that expose the internal parts of the device.
6. Correct any problems that you find.

Checking internal devices

Ensure that you complete an internal device check before you install or service your system.

About this task

To conduct the internal device check, use the following steps.

Procedure

1. Check for any non-IBM changes that were made to the device. If any are present, obtain the "Non-IBM Alteration Attachment Survey," form number R009, from the IBM branch office. Complete the form and return it to the branch office.
2. Check the condition of the inside of the device for any metal or other contaminants, or any indications of water, other fluid, fire, or smoke damage.
3. Check for any obvious mechanical problems, such as loose components.
4. Check any exposed cables and connectors for wear, cracks, or pinching.

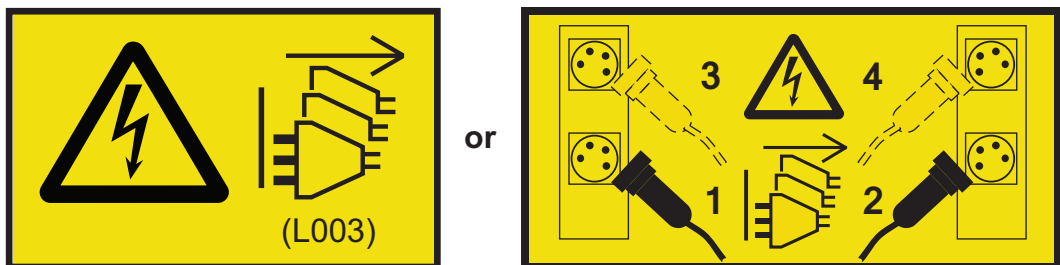
Checking the grounding of the system and redundant AC-power switch

Ensure that you understand how to check the grounding of a system and the optional redundant AC-power switch feature.

About this task

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



To test the grounding of a system node, follow the steps for the specific system configuration that you are using. Before you start, confirm that you know the model type of your system, and whether you are using redundant AC power. Determine the location of the signal cables that are attached to the system.

When you are asked to test the grounding continuity, use your local procedures to initiate the test. The test is successful if the measured resistance is 0.1 ohm or less.

Attention: Some electrical circuits can be damaged if the external signal cables are present at the node while it is undergoing a grounding test.

Procedure

1. Ensure that the node is powered off. See MAP 5350: Powering off a SAN Volume Controller node in the *IBM SAN Volume Controller Troubleshooting Guide*.
2. Disconnect all signal cables from the node, which includes the following cables:
 - The Fibre Channel cables
 - The Ethernet cable or cables
3. If redundant AC power is used, turn off any node that is being supplied from the redundant AC-power switch. Then, remove the power cable to this system from the redundant AC-power switch.
4. Disconnect *both* input power leads from the site power distribution units
5. If redundant AC power is used, test the grounding continuity between a conductive area on the frame and the ground pin on the plug of the main power cable of the redundant AC-power switch. If the test is successful, test the grounding continuity between a conductive area on the frame and the ground pin on the plug of the backup power cable of the redundant AC-power switch. Both tests must be successful.
6. Initiate one of the following procedures after you complete testing the grounding continuity, depending on the outcome of the test.
 - If the test is successful, reconnect any cables that were removed.
 - If the test was not successful, ensure that all cables are securely connected. If the test still fails, test the individual system components. Before you test the individual components, remove all cables from the components. If any component test fails, replace the component. After you test each component and replace any failing ones, repeat the complete system test by returning to step 1. Test the components in the following order:
 - a. The node, from the frame to the ground pin of the input power receptacle
 - b. The redundant AC-power switch, if used, from the ground pin of the main input power receptacle to the ground conductor of the output power receptacle, and from the ground pin of the backup input power receptacle to the ground conductor of the output power receptacle
 - c. The redundant AC-power switch main input-power cable, if used, between the two ground conductors of the cable
 - d. The redundant AC-power switch backup input-power cable, if used, between the two ground conductors of the cable

Inspecting the uninterruptible power supply for unsafe conditions

Ensure that you take the time to inspect the uninterruptible power supply for unsafe conditions.

Before you begin

Consider the following conditions and their potential safety hazards:

Electrical hazards (especially primary power)

Primary voltage on the frame can cause serious or lethal electrical shock.

Explosive hazards

A bulging capacitor can cause serious injury.

Mechanical hazards

Loose or missing items (for example, nuts and screws) can cause serious injury.

About this task

Use caution when you are working in a potential safety hazard that is not covered in the safety checks. If unsafe conditions are present, determine how serious the hazards are and whether you can continue before you correct the problem.

Using the following inspection checklist as a guide, inspect the uninterruptible power supply for unsafe conditions. If necessary, see any suitable safety publications.

Procedure

1. If any equipment was damaged during the shipment, keep the shipping cartons and packing materials.
2. To file a claim for the shipping damage, complete the following steps:
 - a. File with the carrier within 15 days of receipt of the equipment.
 - b. Send a copy of the damage claim within 15 days to your service support representative.

Uninterruptible power-supply requirements

Ensure that you comply with the requirements for the uninterruptible power supply.

The following list describes requirements for the 2145 UPS-1U:

- The voltage that is supplied to the 2145 UPS-1U must be 200 - 240 V single phase.
- The frequency that is supplied must be 50 or 60 Hz.

Note: The 2145 UPS-1U has an integrated circuit breaker and does not need external protection.

Attention:

- If the uninterruptible power supply is cascaded from another uninterruptible power supply, the source uninterruptible power supply must have at least three times the capacity per phase and the total harmonic distortion must be less than 5%.
- The uninterruptible power supply also must have input voltage capture that has a slew rate of no more than 3 Hz per second.

Emergency power-off shutdown

The system supports emergency power-off (EPO) shutdowns.

Handling static-sensitive devices

Ensure that you understand how to handle devices that are sensitive to static electricity.

Attention: Static electricity can damage electronic devices and your system. To avoid damage, keep static-sensitive devices in their static-protective bags until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the device is still in its antistatic bag, touch it to an unpainted metal part of the system unit for at least 2 seconds. (This action removes static electricity from the package and from your body).

- Remove the device from its package and install it directly into your system, without putting it down. If it is necessary to put the device down, place it onto its static-protective bag. (If your device is an adapter, place it component-side up.) Do not place the device onto the cover of the system or onto a metal table.
- Take additional care when you handle devices during cold weather. Indoor humidity tends to decrease in cold weather, causing an increase in static electricity.

Environmental notices

This information contains all the required environmental notices for IBM Systems products in English and other languages.

The *IBM Systems Environmental Notices* includes statements on limitations, product information, product recycling and disposal, battery information, flat panel display, refrigeration and water-cooling systems, external power supplies, and safety data sheets.

About this guide

This guide describes how to service the IBM SAN Volume Controller node.

Information is provided for the following SAN Volume Controller models:

- 2145-SV1 or 2147-SV1
- 2145-DH8
- 2145-CG8
- 2145-CF8

For the purposes of this guide, references to 2145-SV1 also apply to the 2147-SV1 model.

The chapter that follows shows you the parts assembly for each SAN Volume Controller model, the redundant AC-power switch, and the uninterruptible power supply.

You are also provided with step-by-step procedures to remove and replace parts for the SAN Volume Controller and the uninterruptible power supply.

Note: The *IBM SAN Volume Controller Hardware Maintenance Guide* and the *IBM SAN Volume Controller Troubleshooting Guide* were formerly combined in one book that was titled *IBM SAN Volume Controller Service Guide*.

Who should use this guide

This guide is intended for the systems services representative who is responsible for the service of the SAN Volume Controller , the redundant AC-power switch, and the uninterruptible power supply.

Emphasis

Different typefaces are used in this guide to show emphasis.

The following typefaces are used to show emphasis.

Emphasis	Meaning
Boldface	Text in boldface represents menu items.
Bold monospace	Text in bold monospace represents command names.
<i>Italics</i>	Text in <i>italics</i> is used to emphasize a word. In command syntax, it is used for variables for which you supply actual values, such as a default directory or the name of a system.
Monospace	Text in monospace identifies the data or commands that you type, samples of command output, examples of program code or messages from the system, or names of command flags, parameters, arguments, and name-value pairs.

Library and related publications

Product manuals, other publications, and websites that contain information that is related to your system are available.

IBM Knowledge Center for SAN Volume Controller

The information collection in the IBM Knowledge Center contains all of the information that is required to install, configure, and manage the system. The information collection in the IBM Knowledge Center is updated between product releases to provide the most current documentation. The information collection is available at the following website:

<http://www.ibm.com/support/knowledgecenter/STPVGU>

SAN Volume Controller library

Table 1 lists websites where you can find help, services, and more information.

Table 1. IBM websites for help, services, and information

Website	Address
Directory of worldwide contacts	http://www.ibm.com/planetwide
Support for SAN Volume Controller (2145)	www.ibm.com/support
Support for IBM System Storage® and IBM TotalStorage products	www.ibm.com/support

Each PDF publication in the Table 2 library is available in the IBM Knowledge Center by clicking the title in the “Link to PDF” column:

Table 2. SAN Volume Controller library

Title	Description	Link to PDF file
<i>IBM SAN Volume Controller Model 2145-SV1 Hardware Installation Guide</i>	The guide provides the instructions that the IBM service representative uses to install the hardware for SAN Volume Controller model 2145-SV1.	Hardware Installation Guide [PDF]
<i>IBM SAN Volume Controller Hardware Maintenance Guide</i>	The guide provides the instructions that the IBM service representative uses to service the SAN Volume Controller hardware, including the removal and replacement of parts.	Hardware Maintenance Guide [PDF]
<i>IBM SAN Volume Controller Troubleshooting Guide</i>	The guide describes the features of each SAN Volume Controller model, explains how to use the front panel or service assistant GUI, and provides maintenance analysis procedures to help you diagnose and solve problems with the SAN Volume Controller .	Troubleshooting Guide [PDF]
<i>IBM Spectrum Virtualize for Public Cloud, IBM Spectrum Virtualize for SAN Volume Controller and Storwize Family Command-Line Interface User's Guide</i>	The guide describes the commands that you can use from the SAN Volume Controller command-line interface (CLI).	Command-Line Interface User's Guide [PDF]
<i>IBM Spectrum Virtualize REST API</i>	This document provides information on the REST API and related CLI commands.	

IBM documentation and related websites

Table 3 lists websites that provide publications and other information about the SAN Volume Controller or related products or technologies. The IBM Redbooks® publications provide positioning and value guidance, installation and implementation experiences, solution scenarios, and step-by-step procedures for various products.

Table 3. IBM documentation and related websites

Website	Address
IBM Publications Center	ibm.com/shop/publications/order
IBM Redbooks publications	www.redbooks.ibm.com/

Related accessibility information

To view a PDF file, you need Adobe Reader, which can be downloaded from the Adobe website:

www.adobe.com/support/downloads/main.html

Related websites

The following websites provide information about the system, related products, or technologies.

Type of information	Website
SAN Volume Controller support	www.ibm.com/support
Technical support for IBM storage products	www.ibm.com/support
IBM Electronic Support registration	www-01.ibm.com/support/electronic-support/

Sending comments

Your feedback is important in helping to provide the most accurate and highest quality information.

Procedure

To submit any comments about this publication or any other IBM storage product documentation:

Send your comments by email to ibmkc@us.ibm.com. Be sure to include the following information:

- Exact publication title and version
- Page, table, or illustration numbers that you are commenting on
- A detailed description of any information that should be changed

How to get information, help, and technical assistance

If you need help, service, technical assistance, or want more information about IBM products, you can find a wide variety of sources available from IBM to assist you.

Information

IBM maintains pages on the web where you can get information about IBM products and fee services, product implementation and usage assistance, break and fix service support, and the latest technical information. For more information, refer to Table 4 on page xxx.

Table 4. IBM websites for help, services, and information

Website	Address
Directory of worldwide contacts	http://www.ibm.com/planetwide
Support for SAN Volume Controller (2145)	www.ibm.com/support
Support for IBM System Storage and IBM TotalStorage products	www.ibm.com/support

Note: Available services, telephone numbers, and web links are subject to change without notice.

Help and service

Before you call for support, be sure to have your IBM Customer Number available. If you are in the US or Canada, you can call 1 (800) IBM SERV for help and service. From other parts of the world, see <http://www.ibm.com/planetwide> for the number that you can call.

When you call from the US or Canada, choose the **storage** option. The agent decides where to route your call, to either storage software or storage hardware, depending on the nature of your problem.

If you call from somewhere other than the US or Canada, you must choose the **software** or **hardware** option when you call for assistance. Choose the **software** option if you are uncertain if the problem involves the SAN Volume Controller software or hardware. Choose the **hardware** option only if you are certain the problem solely involves the SAN Volume Controller hardware. When you call IBM to service the product, follow these guidelines for the **software** and **hardware** options:

Software option

Identify the SAN Volume Controller product as your product and supply your customer number as proof of purchase. The customer number is a 7-digit number (0000000 - 9999999) assigned by IBM when the product is purchased. Your customer number might be on the customer information worksheet or on the invoice from your storage purchase. If asked for an operating system, use **Storage**.

Hardware option

Provide the serial number and appropriate 4-digit machine type. For SAN Volume Controller , the machine type is 2145.

In the US and Canada, hardware service and support can be extended to 24 x 7 on the same day. The base warranty is 9x5 on the next business day.

Getting help online

You can find information about products, solutions, partners, and support on the IBM website.

To find up-to-date information about products, services, and partners, visit the IBM website at www.ibm.com/support.

Before you call

Make sure that you take steps to try to solve the problem yourself before you call.

Some suggestions for resolving the problem before you call IBM Support include:

- Check all cables to make sure that they are connected.
- Check all power switches to make sure that the system and optional devices are turned on.
- Use the troubleshooting information in your system documentation. The troubleshooting section of the Knowledge Center contains procedures to help you diagnose problems.

- Go to the IBM Support website at www.ibm.com/support to check for technical information, hints, tips, and new device drivers or to submit a request for information.

Using the documentation

Information about your IBM storage system is available in the documentation that comes with the product.

That documentation includes printed documents, online documents, readme files, and help files in addition to the Knowledge Center. See the troubleshooting information for diagnostic instructions. The troubleshooting procedure might require you to download updated device drivers or software. IBM maintains pages on the web where you can get the latest technical information and download device drivers and updates. To access this information, go to www.ibm.com/support and follow the instructions. Also, some documents are available through the IBM Publications Center.

Sign up for the Support Line Offering

If you have questions about how to use and configure the machine, sign up for the IBM Support Line offering to get a professional answer.

The maintenance that is supplied with the system provides support when there is a problem with a hardware component or a fault in the system machine code. At times, you might need expert advice about using a function that is provided by the system or about how to configure the system. Purchasing the IBM Support Line offering gives you access to this professional advice for your system, and in the future.

Contact your local IBM sales representative or your support group for availability and purchase information.

Chapter 1. Parts listing

Part numbers are available for the different parts and field-replaceable units (FRUs) of the nodes, expansion enclosures, the redundant AC-power switch, and the uninterruptible power-supply unit.

The system supports several different types of models. A label on the front of the node indicates the node type, hardware revision (if appropriate), and serial number.

SAN Volume Controller 2145-SV1 parts

The only replaceable SAN Volume Controller 2145-SV1 parts are the field-replaceable units (FRUs) which are replaced by service support representatives (SSRs). There are no customer replaceable parts (CRUs).

For more information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

SAN Volume Controller 2145-SV1 replaceable units

Table 5 provides the part numbers and brief descriptions of the SAN Volume Controller 2145-SV1 parts.

Table 5. FRUs in the SAN Volume Controller 2145-SV1 parts assembly

FRU part Number	Quantity	Description
01EJ624	2	Battery
00RY543	1	3.0-volt CMOS battery
01AF423	6	Drive slot filler
01EJ360	2	Intel E5-2667v4 8c 3.2 GHz 135W microprocessor
01EJ361	4, 8, 12, or 16	16 GB DDR4 DIMM
01EJ260	2	240 GB SATA flash drive assembly
01EJ362	1	Battery backplane power cable
01EJ363	1	Battery backplane power sense cable
01EJ364	1	Battery backplane LPC cable
01EJ365	1 set	Slide rails
01EJ366	1	Cable management arm (CMA)
01EJ367	1	Chassis metalwork kit (the enclosure without all the other FRUs)
01EJ368	1	SV1 operator information panel
01EJ369	1	Front left ear assembly
01EJ370	1	Front right ear assembly
01EJ372	1	Operator information panel USB cable
01EJ373	1	Operator information panel LED and power button cable

Table 5. FRUs in the SAN Volume Controller 2145-SV1 parts assembly (continued)

FRU part Number	Quantity	Description
01EJ374 01YM716	1	SATA drive backplane
01EJ375	1	SATA drive backplane power cable
01EJ376	2	SATA drive backplane SATA cable
01EJ377	2	AC power supply unit
01EJ378	6	Fan module
01EJ379	1	Fan cage assembly
01EJ380	1	Trusted Platform Module (TPM)
01EJ381 01YM718	1	Main board with tray
01EJ382	1	Microprocessor heat sink
01EJ383	2	3-slot PCIe riser assembly
01EJ384	1	1-slot PCIe riser assembly
01EJ385	1	4-port Ethernet edge board
01EJ387	1	Top cover, front
01EJ389	1	Top cover, back
01LJ163	1	Battery backplane
00WY983	0 - 4	4-port 16 Gbps Fibre Channel adapter
01LJ590	0 - 3	2-port 25 Gbps Ethernet (RoCE) adapter
01LJ591	0 - 3	2-port 25 Gbps Ethernet (iWARP) adapter
00AR319	0 or 1	4-port 10 Gbps optical Ethernet adapter
01AC573	0 or 1	12 Gbps SAS adapter
00RY191	0 - 4	16 Gbps long-wave SFP
31P1549	0 - 4	10 Gbps short-wave SFP
00RY190	0 - 16	16 Gbps short-wave SFP
01FT777	0 - 3	25 Gbps short wave SFP28 (RoCE)
01NN193	0 - 3	25 Gbps short wave SFP28 (iWARP)
01EJ817	0 - 2	Compression accelerator
39M5700	0 - 16	5 m fiber cable
39M5701	0 - 16	25 m fiber cable
45D4774	0 - 3	5 m OM3 optical cable
41V2120	0 - 4	10 m OM3 fiber cable
15R8848	0 - 3	25 m OM3 optical cable
39M5068	0 or 2	Power cord, Argentina

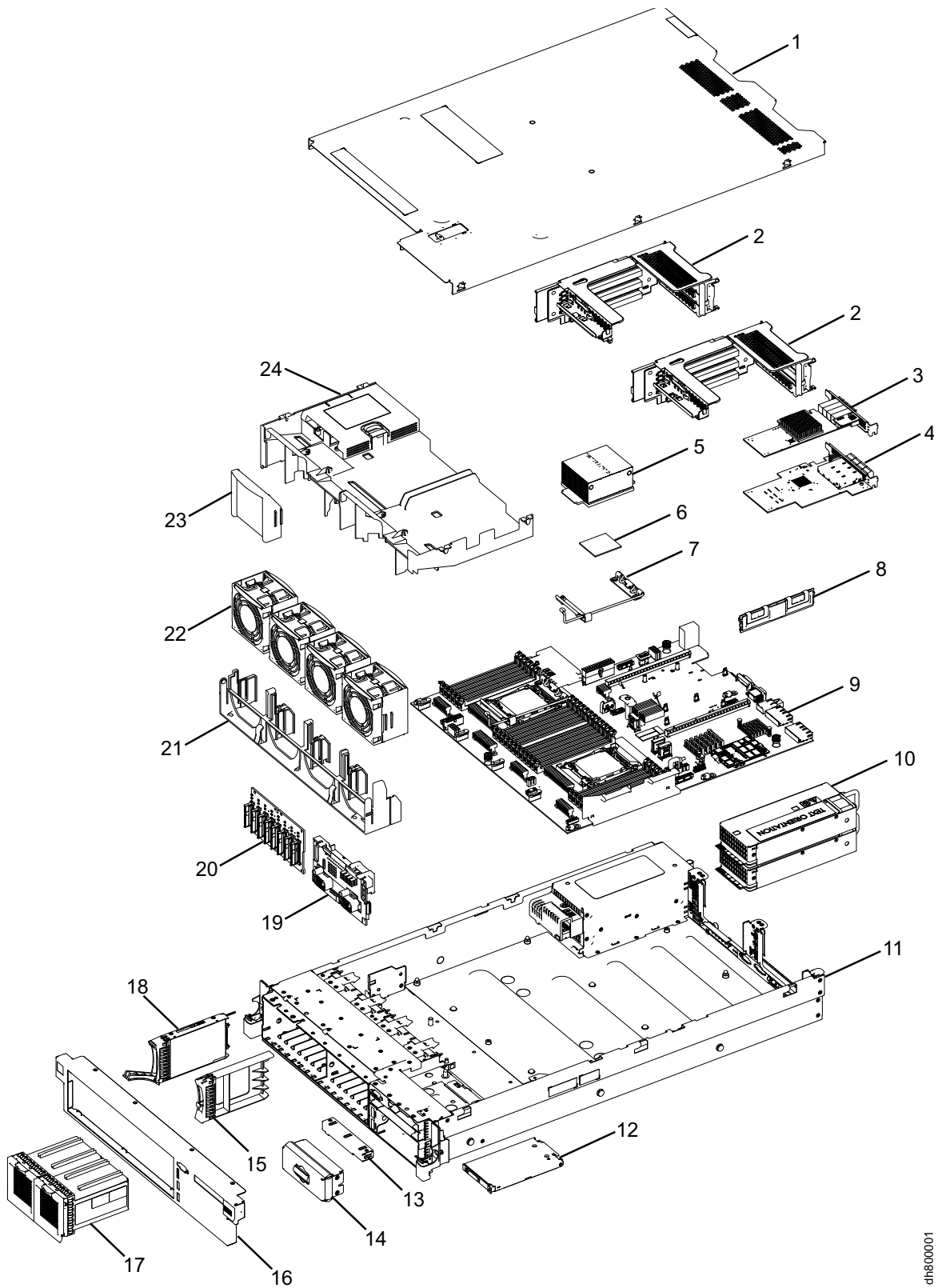
Table 5. FRUs in the SAN Volume Controller 2145-SV1 parts assembly (continued)

FRU part Number	Quantity	Description
39M5080	0 or 2	Power cord, Chicago
39M5081	0 or 2	Power cord, US / group 1
39M5102	0 or 2	Power cord, Australia / New Zealand
39M5123	0 or 2	Power cord, Europe / Africa
39M5130	0 or 2	Power cord, Denmark
39M5144	0 or 2	Power cord, South Africa
39M5151	0 or 2	Power cord, EMEA
39M5158	0 or 2	Power cord, Switzerland
39M5165	0 or 2	Power cord, Chile / Italy
39M5172	0 or 2	Power cord, Israel
39M5199	0 or 2	Power cord, Japan
39M5206	0 or 2	Power cord, China
39M5219	0 or 2	Power cord, Korea
39M5226	0 or 2	Power cord, India
39M5240	0 or 2	Power cord, Brazil
39M5247	0 or 2	Power cord, Taiwan
39M5377	0 or 2	Power cord, PDU connection
41Y9292	1	Thermal grease
59P4739	1	Alcohol wipes

SAN Volume Controller 2145-DH8 parts

The only replaceable SAN Volume Controller 2145-DH8 parts are the field-replaceable units (FRUs) which are replaced by IBM Service Support Representatives (SSRs). No customer replaceable parts (CRUs) are available.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.



dh800001

Figure 1. SAN Volume Controller 2145-DH8 replaceable parts in exploded view diagram

SAN Volume Controller 2145-DH8 replaceable units

The following tables identify part numbers and provide brief descriptions of the SAN Volume Controller 2145-DH8 parts. Use the assembly index number to locate and identify the parts that are shown in Figure 1 on page 4.

- Table 6 calls out the FRUs that are referred to in service procedures.
- Table 7 on page 7 calls out the FRUs that are not referred to by any SAN Volume Controller 2145-DH8 service procedure, but that might be replaced in some circumstances.
- Table 8 on page 8 calls out the FRU parts that are required by the long-wave small-form factor pluggable (SFP) transceiver feature.

Table 6. FRUs in the SAN Volume Controller 2145-DH8 parts assembly

Figure Index	FRU part Number	Quantity	Description
1	94Y6622	1	Top cover assembly
2	94Y6704	2	PCI Express riser card assembly. Each expansion slot might contain one of the optional adapters. There must be at least one Fibre Channel (FC) or one 10 gigabits-per-second (Gbps) Ethernet adapter in riser card assembly 1.
3	64P8485	0-1	12 Gbps SAS adapter (optional). This adapter connects the SAN Volume Controller 2145-DH8 to the SAN Volume Controller 2145-24F expansion enclosure. It is installed into PCI express expansion slot 3.
4	31P1702	0-3	A 4-port 8 Gbps FC adapter (optional). Important: If the system is using alternative SFPs, replace the SFPs on the FRU part with the SFPs from the FC adapter that is being replaced.
	31P1630	0-12	8 Gbps Shortwave small form-factor pluggable (SFP) transceiver. This SFP transceiver provides an auto-negotiating 2, 4, or 8 Gbps shortwave optical connection on a 8 Gbps FC adapter. Important: It is possible that SFPs other than those that are shipped with the product are in use on the FC host bus adapter. It is a customer responsibility to obtain replacement parts for such SFPs. The FRU part number is shown as "Non-standard - supplied by customer" in the vital product data.
	00RY004	0-4	2-port 16 Gbps FC host bus adapter (optional). Important: If the system is using alternative SFPs, replace the SFPs on the FRU part with the SFPs from the FC adapter that is being replaced.
	00WY983	0-4	4-port 16 Gbps FC adapter (optional). Important: <ul style="list-style-type: none"> • If the system is using alternative SFPs, replace the SFPs on the FRU part with the SFPs from the FC adapter that is being replaced. • Before you add this adapter, ensure that the system is running software version 7.6 or later.
	00RY190	0-16	16 Gbps Shortwave small form-factor pluggable (SFP) transceiver. This SFP transceiver provides an auto-negotiating 2, 4, 8 or 16 Gbps shortwave optical connection on a 16 Gbps FC adapter. Important: It is possible that SFPs other than those that are shipped with the product are in use on the FC adapter. It is the customer responsibility to obtain replacement parts for such SFPs. The FRU part number is shown as "Non-standard - supplied by customer" in the vital product data.

Table 6. FRUs in the SAN Volume Controller 2145-DH8 parts assembly (continued)

Figure Index	FRU part Number	Quantity	Description
	00AR319	0-1	10 Gbps Ethernet adapter (optional). This includes a 10 Gbps Ethernet adapter that provides connectivity for up to four 10 Gbps fiber optic Ethernet cables. These cables are used for Fibre Channel over Ethernet (FCoE) and for iSCSI communications.
	31P1549	0-4	10 Gbps Shortwave SFP small form-factor pluggable (SFP) transceiver.
	00AR065	0-2	Compression accelerator (optional). This option accelerates I/O between nodes and compressed volumes. The second microprocessor and eight memory modules must be installed. The compression accelerator can be installed only in PCI expansion slots 4 and 6.
5	94Y6618	1-2	Heat sink. 95 W heat sink for the microprocessor. When you replace this part, you need alcohol wipes and thermal grease.
6	00Y2783	1-2	Microprocessor. Intel Xeon E5-2650V2, 2.60 GHz, 8 core, 20 MB cache, 95 W. Important: This part is the microprocessor only. When replaced, you must also have alcohol wipes and thermal grease.
7	94Y7739	1-2	Heat sink retention module.
8	00D5034	4-8	Memory module. 8 GB, single-rank, 1.5 V, DDR3, 1866 MHz, RDIMM. Four memory modules are installed if there is one microprocessor. Eight memory modules are installed if two microprocessors are available.
9	00AM209	1	System board. Important: This part is also called the <i>planar</i> , and is the system board only. When you replace this part, you must use the microprocessor, DIMMs, and CMOS battery from the system board that you are replacing.
	33F8354	1	CMOS battery. 3.0 V. This part maintains the system BIOS settings.
10	94Y8114 or 94Y8116	2	Power supply unit. Two power units are shown in Figure 1 on page 4.
11	94Y6619	1	Safety cover. 240 V AC.
12	00AM393	1	Operator-information panel This assembly includes the information panel that contains the power-control button and diagnostic LEDs.
	90Y4768	1	Operator-information panel cable.
13	00KA089	1	DVD bay EMC shield.
14	00AR186	1	Tape bay EMC shield.
15	44T2248	6	Drive-slot blank EMC filler assembly.
16	00WY584	1	Bezel with node LEDs.

Table 6. FRUs in the SAN Volume Controller 2145-DH8 parts assembly (continued)

Figure Index	FRU part Number	Quantity	Description
	00NV626	1	Bezel overlay This part fits over the bezel.
17	01EJ624	2	Battery. The batteries provide temporary power to save the write cache and node status to disk if main power is lost. Two batteries are shown in Figure 1 on page 4.
18	90Y8878	2	Boot disk drive. 300 GB, SAS, 2.5 inches.
19	00RY001	1	Battery backplane. This part manages the batteries and switches the node to battery power if main power is lost.
	81Y6674	2	SAS signal cable. 820 mm, SAS. Connects the disk drive backplane to the system board.
	81Y6773	1	Disk drive backplane configuration cable.
20	46W9187	1	Disk drive backplane. Hot-swappable, SAS, 2.5 inches.
	00FK347	1	Disk and battery backplane power and emergency power off warning (EPOW) cable. The EPOW cable is a Y cable; one end connects to the system board and the other two ends connect to the disk drive backplane and the battery backplane.
	00AR497	1	Battery backplane power cable. Supplied with dummy DIMMs.
	00RY335	1	Battery backplane voltage sense cable.
	00AR499	1	Battery backplane low-pin count (LPC) cable.
	00AR496	1	Battery backplane LPC cable converter with clip. This connects the battery backplane LPC cable to the system board.
21	00AM212	1	Fan cage.
22	94Y6620	3-4	Fan assembly. This part is used in each of the 4 fan positions. Four assemblies are shown in Figure 1 on page 4.
23	94Y6736	0-1	Fan blank. This part is used in place of fan 4 when only one microprocessor is installed.
24	94Y6624	1	Airflow baffle.

SAN Volume Controller 2145-DH8 cable replaceable units

Table 7. FRUs to which SAN Volume Controller 2145-DH8 service procedures do not refer

Description	FRU part number
Microprocessor installation tool	94Y9955
Thermal grease	41Y9292

Table 7. FRUs to which SAN Volume Controller 2145-DH8 service procedures do not refer (continued)

Description	FRU part number
Alcohol wipes	59P4739
Support rails	94Y6719
Cable management arm assembly (2U)	90Y6464
VGA cable	81Y6775
USB cable	81Y6770
USB module	94Y6629
Power paddle card	69Y5787
Miscellaneous parts kit	94Y6746
EIA set kit	49Y5356
Bezel screws	00D3010
5 m FC cable	39M5700
25 m FC cable	39M5701
Ethernet Cat 5E cable	46X0581
2.0 m jumper cable	39M5376

SAN Volume Controller 2145-DH8 SFP replaceable units

Table 8. FRU parts for the long-wave small form-factor pluggable (SFP) transceiver feature

Description	FRU part number	Feature Code
8 Gbps Long-wave SFP transceiver. Important: It is possible that SFP transceivers other than those shipped with the product are in use on the FC host bus adapter. It is a customer responsibility to obtain replacement parts for the SFP transceiver. The FRU part number is shown as "Non standard - supplied by customer" in the vital product data.	31P1658	AH1T
16 Gbps Long-wave SFP transceiver (pack of 2). Important: It is possible that SFP transceivers other than those shipped with the product are in use on the FC host bus adapter. It is the customer responsibility to obtain replacement parts for the SFP transceiver. The FRU part number is shown as "Non standard - supplied by customer" in the vital product data.	00RY191	ACHU

Redundant AC-power switch parts

There is a single field-replaceable unit (FRU) assembly for the redundant AC power feature. It consists of the switch and two input-power cables.

The redundant AC-power switch is an optional feature that makes the nodes resilient to the failure of a single power circuit. The redundant AC-power switch is not a replacement for an uninterruptible power supply. You must still use an uninterruptible power supply for each node.

Figure 2 shows the redundant AC-power switch.

Table 9 lists the part numbers for the redundant AC-power switch.



Figure 2. View of the redundant AC-power switch FRU

Table 9. Redundant AC-power switch

Part number	Units	Description
31P0896	1	Redundant AC-power switch assembly

Chapter 2. Removing and replacing parts

You can remove and replace field-replaceable units (FRUs) from the nodes, expansion controllers, and other system units.

Each part has its own removal procedure. Sometimes you can find that a step within a procedure might refer you to a different remove or replace procedure. You might want to complete the new procedure before you continue with the first procedure that you started.

Important: Start all problem determination and repair procedures with MAP 5000. Remove or replace parts only when you are directed to do so.

Enabling concurrent maintenance

To enable concurrent maintenance, configure the system nodes in pairs. If one system node is being serviced, the other node can keep the network operational.

While one system node is being serviced, the other node keeps the I/O group operational. With concurrent maintenance, all field-replaceable units (FRUs) can be removed, replaced, and tested on one system node while the network and host systems are powered on and doing productive work.

Attention: Do not remove the power from both system nodes unless the procedures instruct you to do so.

Verify that concurrent maintenance is enabled before you shut down a node that is part of a system or when you delete the node from a system. To do so, complete the following checks.

1. Confirm that no volumes have dependencies on the node.

In the management GUI, select **Monitoring > System**. Right-click the appropriate node to show a list of actions for that node. Click **Show Dependent Volumes** to display all the volumes that depend on a node. You can also use the node parameter with the `lsdependentvdisks` CLI command to view dependent volumes.

If dependent volumes exist, determine whether the volumes are being used. If the volumes are being used, either restore the redundant configuration or suspend the host application. If a dependent quorum disk is reported, repair the access to the quorum disk or modify the quorum disk configuration.

2. Ensure that the host multipathing device drivers can fail over to the partner node.

Some host multipathing device drivers take a while to update after changes are made on the fabric. Do not shut down a node or delete the node from a cluster if the partner node in the I/O group to which the node belongs has not been online for more than 30 minutes.

If possible, check the status of the host multipathing device drivers before you shut down a node to ensure that the device drivers can fail over to the partner node.

When you shut down the node, follow the procedure that is described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.

Attention: Do not power off any expansion enclosures when you power off a node.

When you delete a node from the clustered system, retain the node information that is described in “Deleting a node from a clustered system using the management GUI” in the *IBM SAN Volume Controller Troubleshooting Guide*. This information helps you avoid data corruption when you add the node back to

the system. The topic describes how to ensure that the multipathing device driver does not rediscover any paths that are manually removed. Other considerations about dependent volumes are also provided.

For more information about working with dependent volumes, see the following topics:

- "Listing node-dependent VDisks (volumes) using the CLI" in the *IBM SAN Volume Controller Troubleshooting Guide*
- "Isnodedependentvdisks" command description in the *IBM Spectrum Virtualize for Public Cloud, IBM Spectrum Virtualize for SAN Volume Controller and Storwize Family Command-Line Interface User's Guide*

Preparing to remove and replace parts

Before you remove and replace parts, you must be aware of all safety issues.

Before you begin

First, read the safety precautions in the *IBM System Storage SAN Volume Controller Safety Notices*. These guidelines help you safely work with the system.

Working inside the node with the power on

When you are servicing the system node, you might need to turn on the node while the cover is off.

Before you begin

Attention: Static electricity that is released to internal components when the node is turned on might cause the node to halt, which might result in the loss of data. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding system when you work inside the node with the power on.

About this task

You might be instructed to turn on the node and look at system-board LEDs while the cover is off. Follow these guidelines when you work inside a node that is turned on:

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server. Do not wear cuff links while you are working inside the node.
- Do not allow your necktie or scarf to hang inside the node.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that could fall into the node as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the node.

Removing and replacing node parts

The remove and replace procedures for the node field replaceable units are described in the topics that follow.

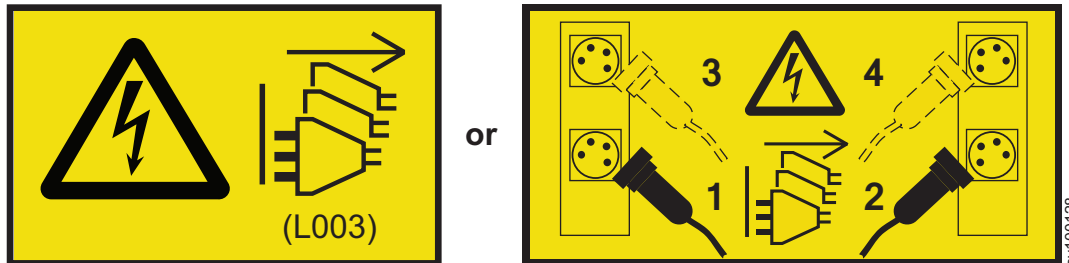
Turning off the node

When instructed to do so, shut down and turn off the node before you remove and replace parts.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



For information about how to turn off the system and retain access to its data, see MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.

Attention:

- Unless host systems or Fibre Channel switches must be switched off for another reason, do not turn them off when you are servicing the system.
- Shut down the system before you remove the power cables.
- You can connect or disconnect Ethernet and Fibre Channel cables at any time.

Removing the cable-management arm

You can remove the cable-management arm from the rack.

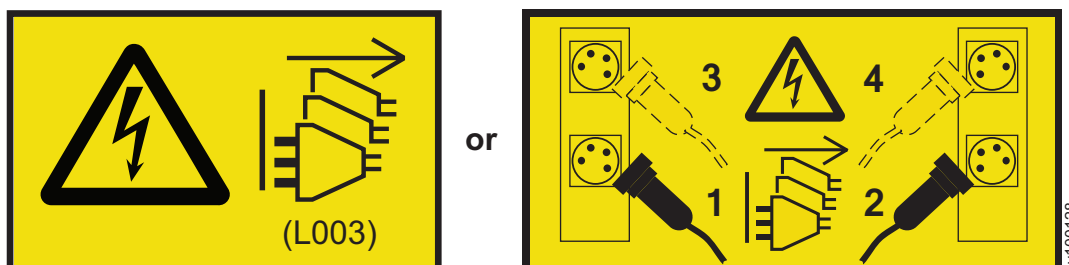
Removing the cable-management arm: 2145-SV1

Use this procedure to remove the SAN Volume Controller 2145-SV1 cable-management arm.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



About this task

To remove the cable-management arm, complete the following steps.

Procedure

1. Remove all power from the node.
2. Optional: Remove the front screws and slide the node out of the rack, as shown in Figure 3.
 - a. Loosen and remove the front M6 screws (**1**).
 - b. Slide the node slightly forward (**2**).
 - c. Pull the disconnect latch forward (**3**).
 - d. Continue sliding the node forward to access the cable-management arm (**4**).

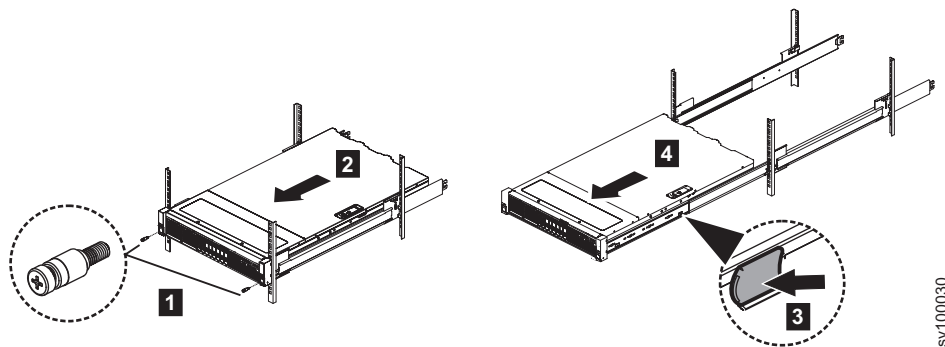


Figure 3. Sliding the node out of the rack and removing the front screws

3. Release the outer member, as shown in Figure 4.
 - a. Press the “Push” button (**1**).
 - b. Pull out the plug-in part of the cable-management arm to draw it out (**2**).

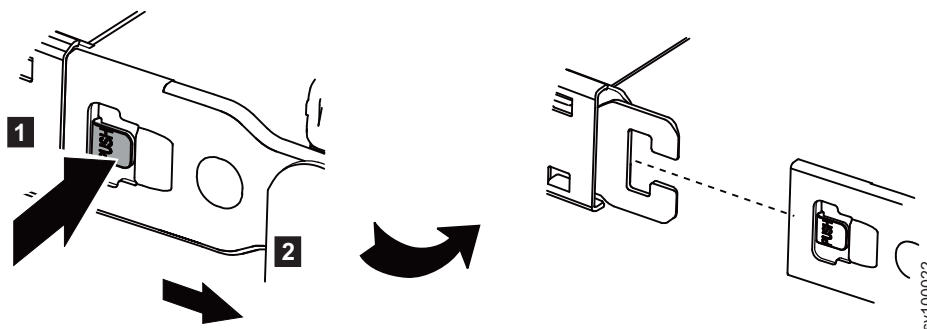


Figure 4. Releasing the outer member of the cable-management arm

4. Release the outer member, as shown in Figure 5 on page 15.
 - a. Turn the cable-management arm to the right hand side to maintain the chassis or resume the removal (**1**).
 - b. Press the “Push” button (**2**).
 - c. Draw out the plug-in part of the cable-management arm (**3**).

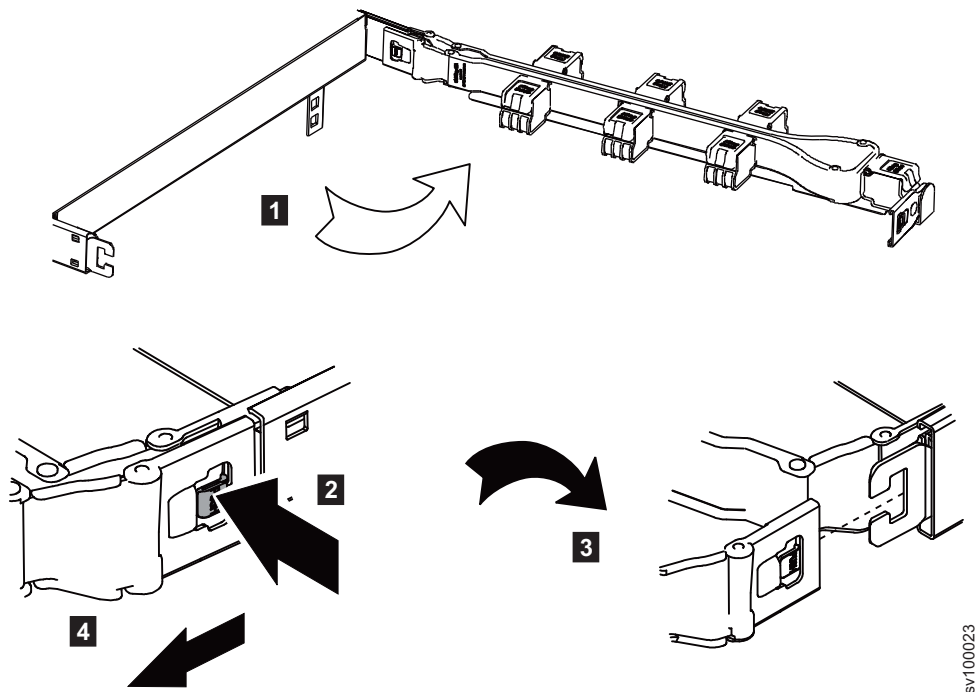


Figure 5. Removing the outer member of the cable-management arm

5. Release the inner member, as shown in Figure 6.
 - a. Press the “Push” button (**1**).
 - b. Draw out the plug-in part of the cable-management arm (**2**).

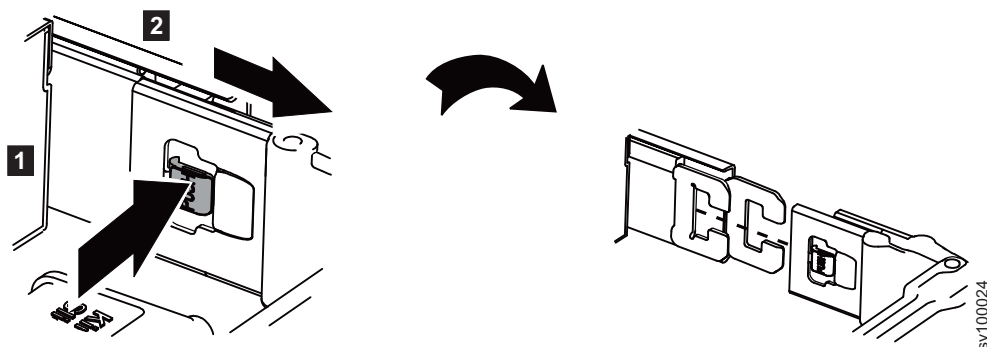


Figure 6. Releasing the inner member of the cable-management arm

6. Reconnect the power cords.

Removing the cable-management arm: 2145-DH8

Use this procedure to remove the SAN Volume Controller 2145-DH8 cable-management arm.

About this task

To remove the cable-management arm, complete the following steps:

Procedure

1. Remove all power from the node.

See MAP 5350 in the *IBM System Storage SAN Volume Controller Troubleshooting Guide* for information about turning off a node.

2. Optional: Remove the front screws and slide the node out of the rack, as shown in Figure 7.
 - a. Loosen and remove the front M6 screws. **2**
 - b. Press the release latches **1**.

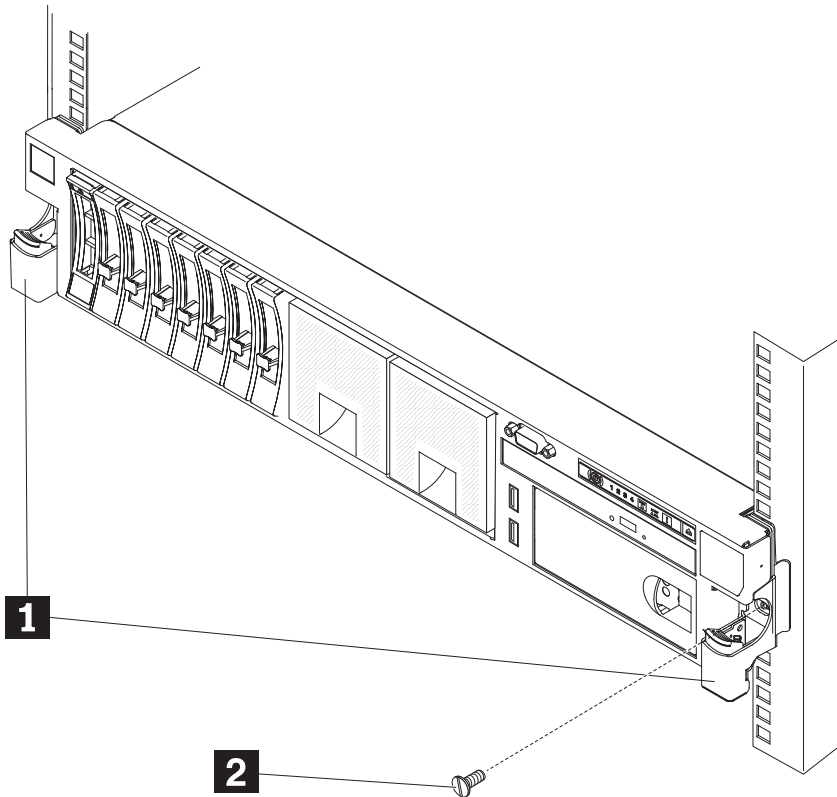


Figure 7. Sliding the node out of the rack and removing the front screws

3. Detach the hook-and-loop fastener strap, as shown in Figure 8 on page 17.

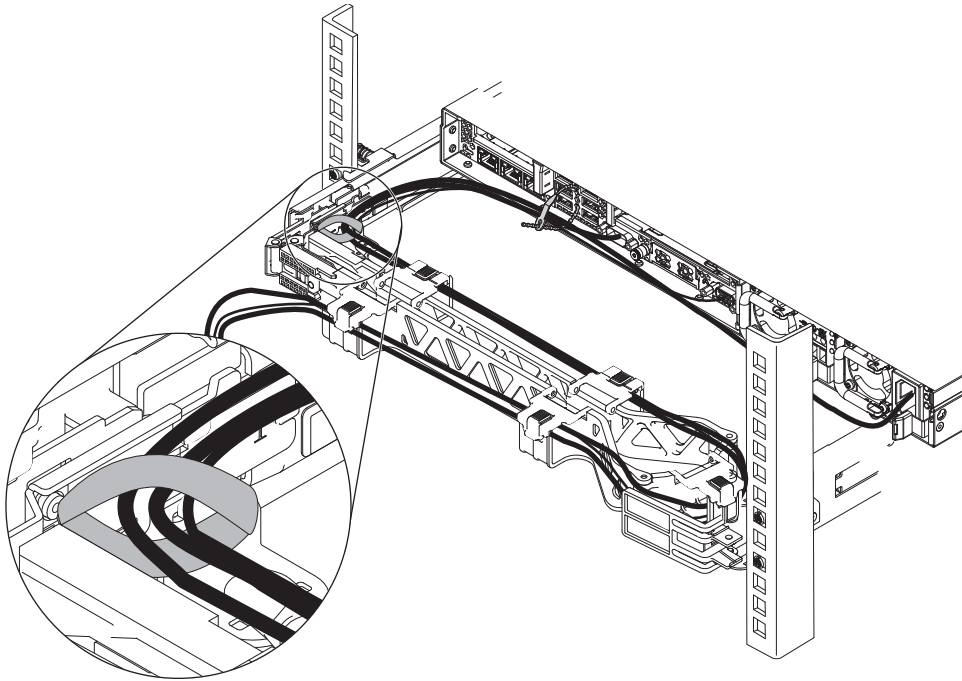


Figure 8. Detaching the hook-and-loop fastener strap

4. Disconnect the routed cables, as shown in Figure 9 on page 18.
 - a. Disconnect the cable ties and hook-and-loop fasteners that hold the routed cables and power cords on the cable-management arm.
 - b. Detach the power cords and other cables at the rear of the node.

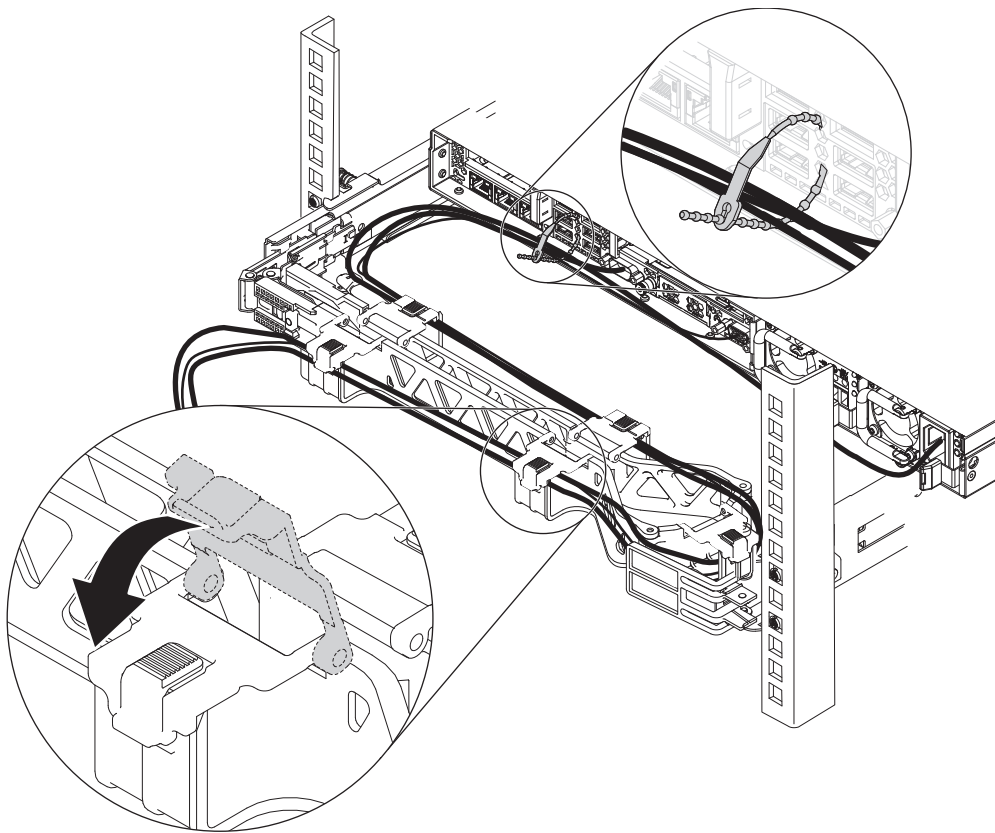


Figure 9. Disconnecting the cables and ties

Note: The location of the cable straps can vary in different systems.

5. Open the cable-management support stop, as shown in Figure 10 on page 19.
 - a. Push the tabs above and below the cable-management support stop bracket to open it.
 - b. Close the stop bracket.

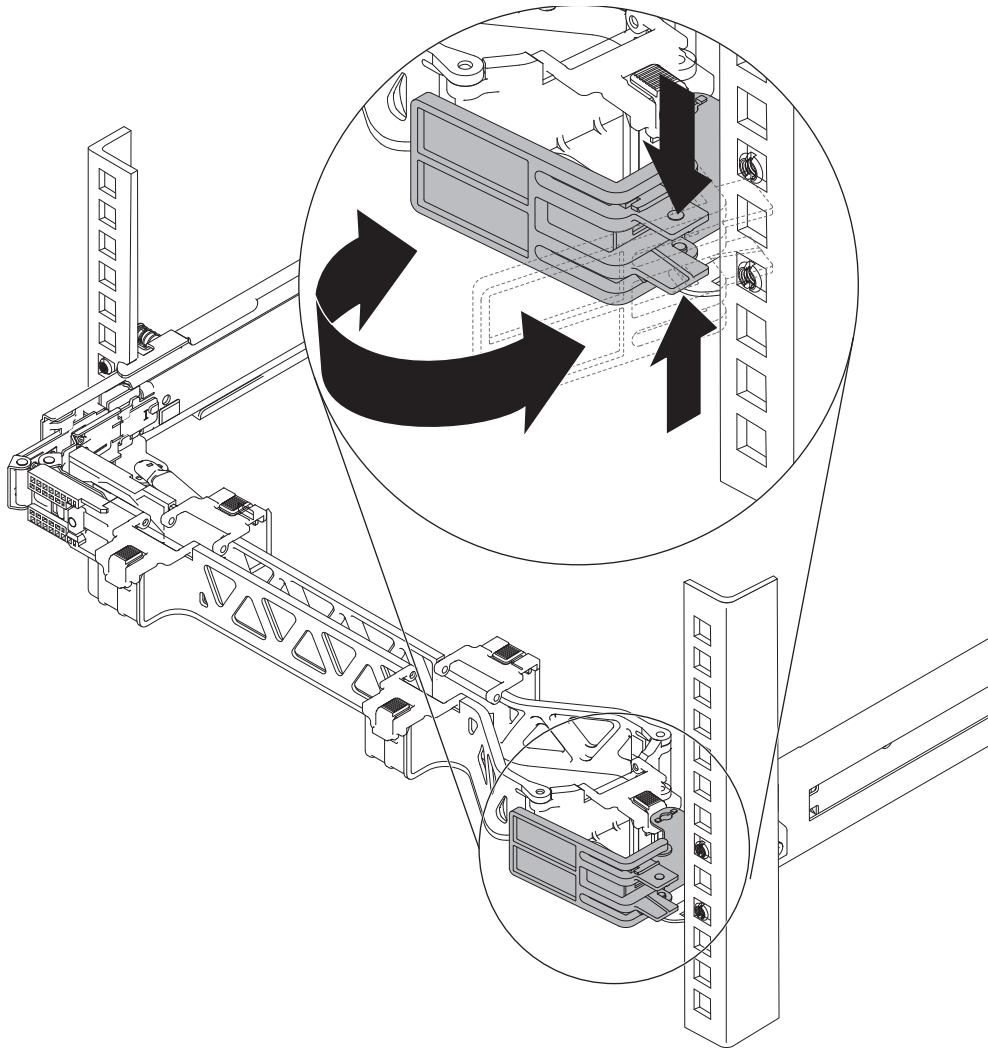


Figure 10. Opening the cable-management support stop

6. Remove the cable-management arm stop bracket, as shown by Figure 11 on page 20.
 - a. Pull the tabs to unsnap.
 - b. Slide the cable-management arm tabs to disconnect from the slots of the slide rail.
 - c. Pull in both the inside and the outside pins of the cable-management arm.
 - d. Remove the cable-management arm from the support arm.

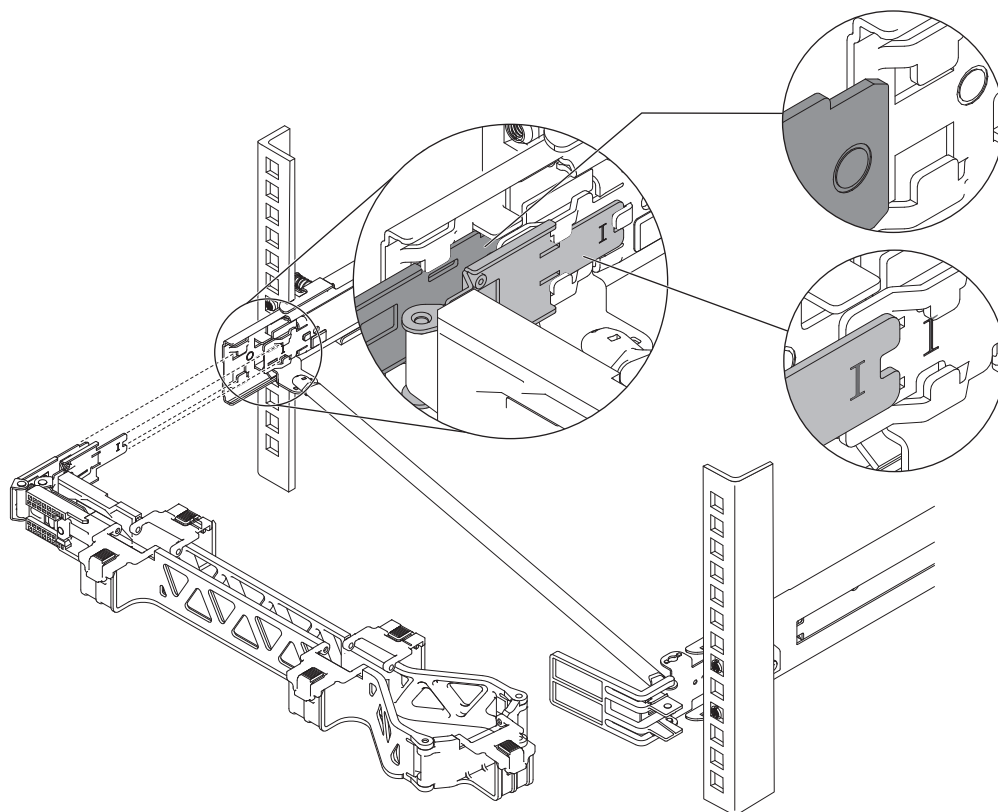


Figure 11. Removing the cable-management arm stop bracket

7. Disconnect the stop bracket from the slide rail, as shown in Figure 12 on page 21 and remove the cable-management stop bracket.

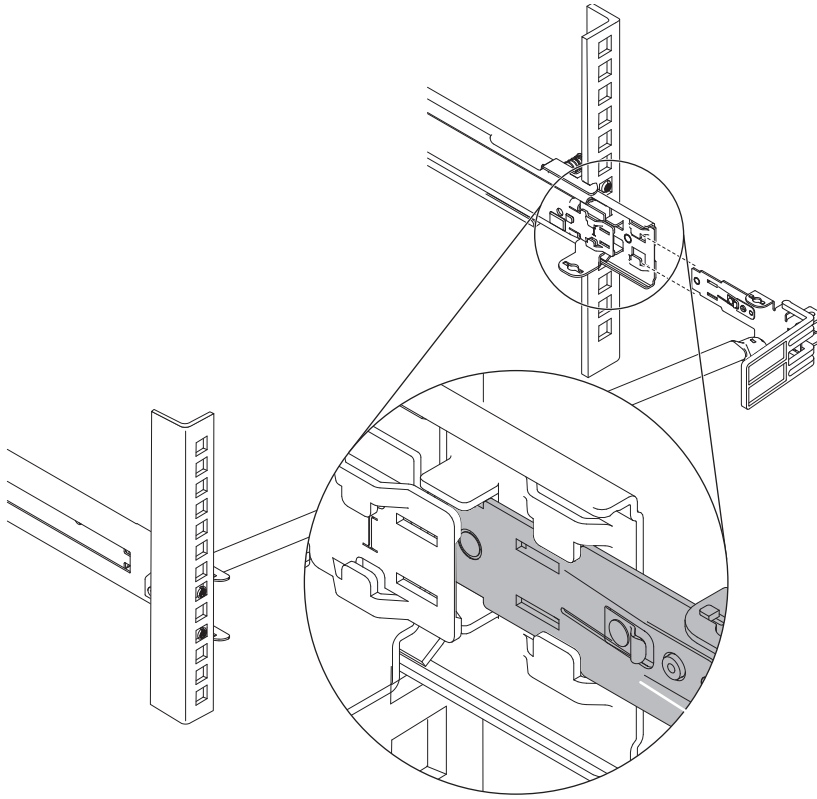


Figure 12. Disconnecting the stop bracket from the slide rail

8. Disconnect the other end of the support arm from the stop bracket, as shown in Figure 13.

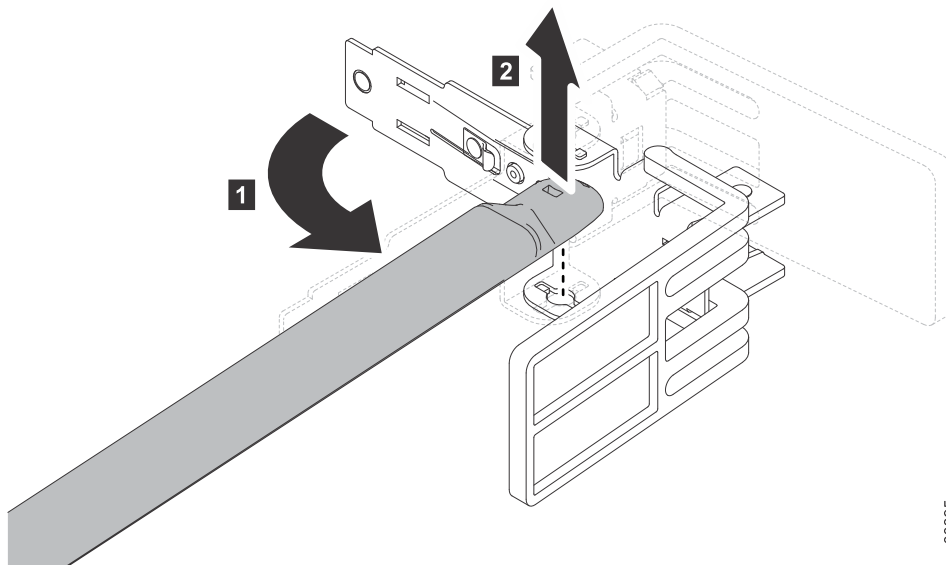
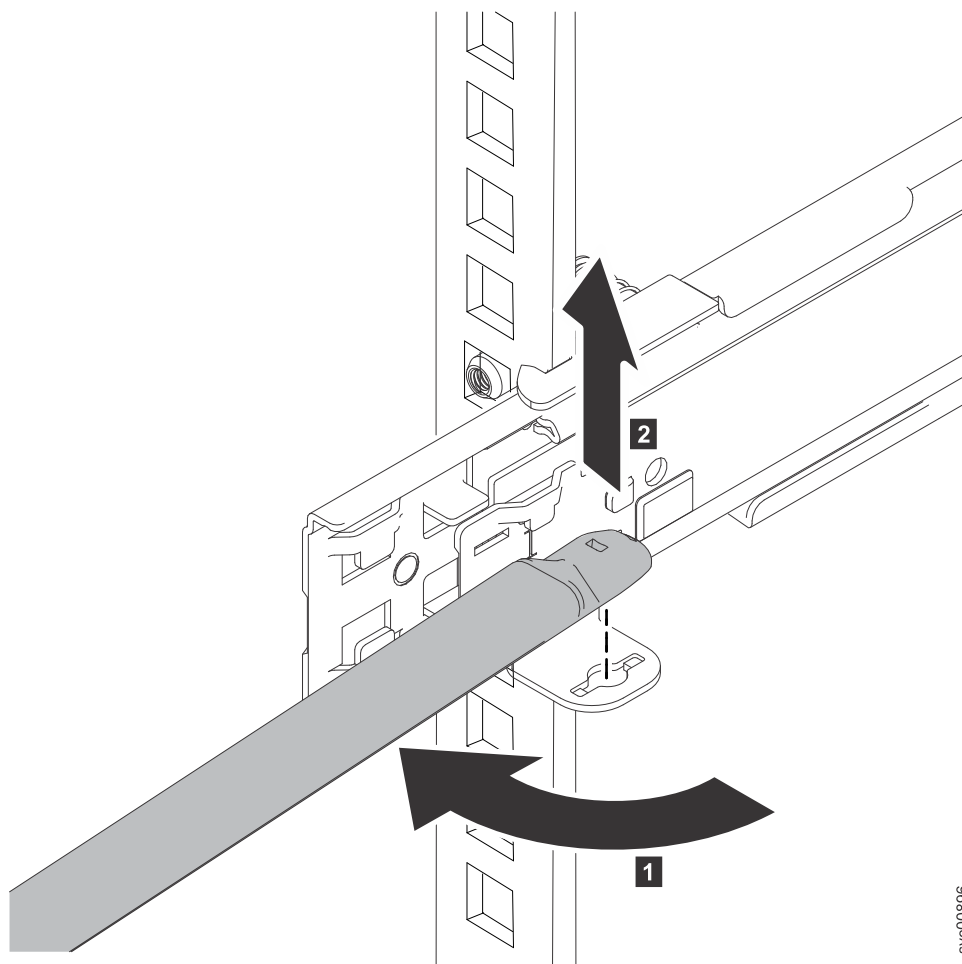


Figure 13. Disconnecting the cable-management support arm from the stop bracket

9. Remove the cable-management arm on the left-rear side of the node, as shown in Figure 14 on page 22.
 - a. Swing the other end of the support arm away from the node.
 - b. Disconnect the end of the support arm from the slide rail.



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Figure 14. Removing the cable-management arm

Replacing the cable-management arm

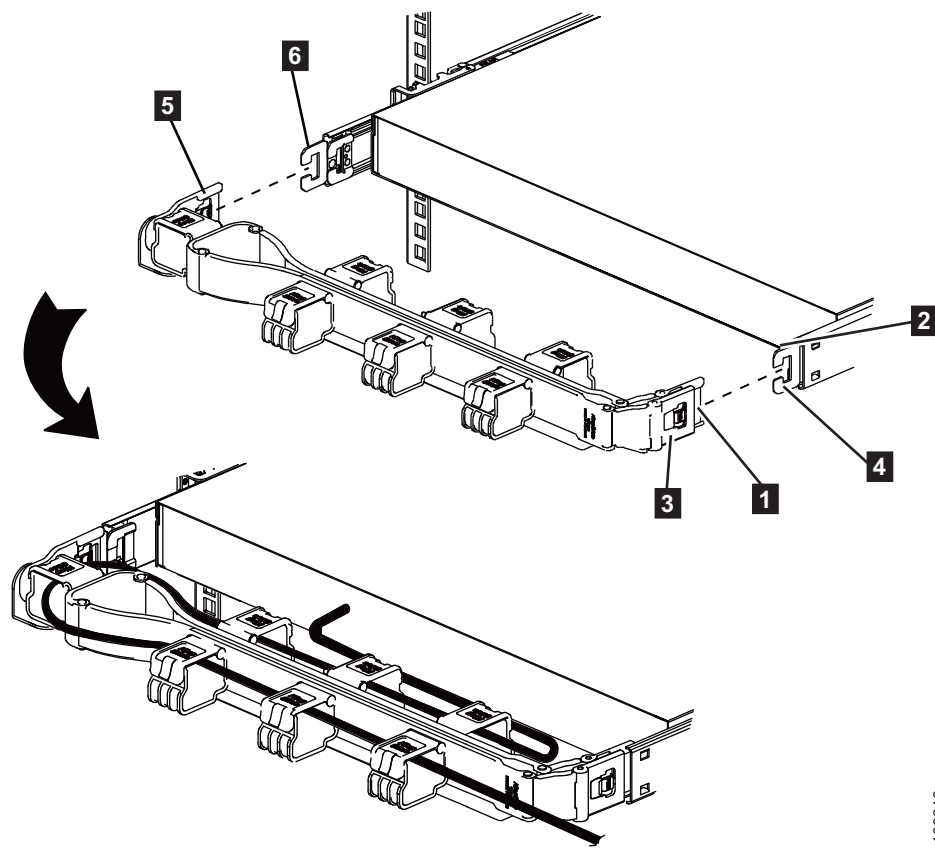
Replace the cable-management arm after you install the node into the rack.

Replacing the cable-management arm: 2145-SV1

You can use this procedure to replace the SAN Volume Controller 2145-SV1 cable-management arm.

Before you begin

After you replace the 2145-SV1 node in the rack, replace the cable-management arm. If needed, review the parts that comprise the cable-management arm assembly. Figure 15 on page 23 shows the parts that are used to install the CMA assembly.



sv100018

Figure 15. Parts for installing the 2145-SV1 cable-management arm assembly

- 1 CMA inner connector
- 2 CMA connector base on inner member
- 3 CMA outer connector
- 4 CMA connector base on outer member
- 5 CMA connector beside the center body
- 6 CMA connector base on outer member

About this task

To replace the cable-management arm after completing a service procedure, complete the following steps.

Procedure

To replace the cable-management arm assembly, complete the following steps.

1. Optional: The cable-management arm can be installed on either side of the node. If necessary, reverse the left-right orientation of the CMA.
 - a. Press the button marked **PUSH** in Figure 16 on page 24.

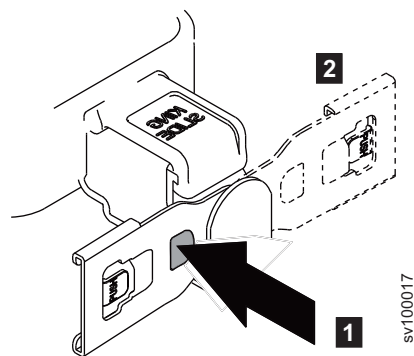


Figure 16. Reversing the orientation of the assembly

- b. Turn the connector 180 degrees.
2. Install the cable-management arm CMA inner connector (1) onto the cable-management arm connector base on the inner member (2) as shown in Figure 17.

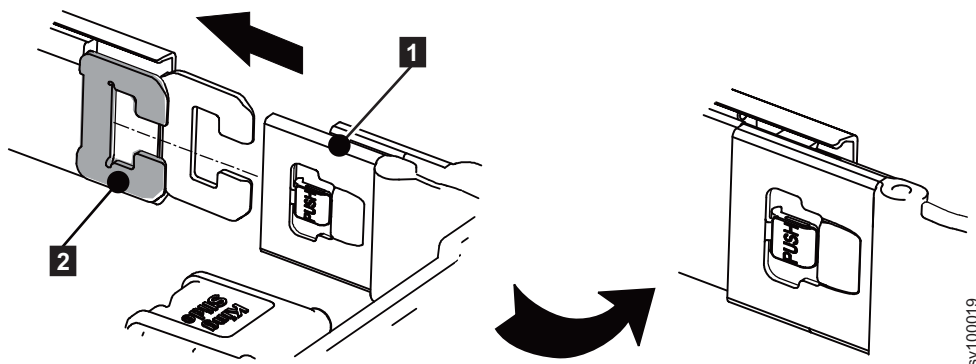


Figure 17. Install the inner member

3. Install the cable-management arm outer connector (3) onto the cable-management arm connector base on the outer member (4). Refer to Figure 18.

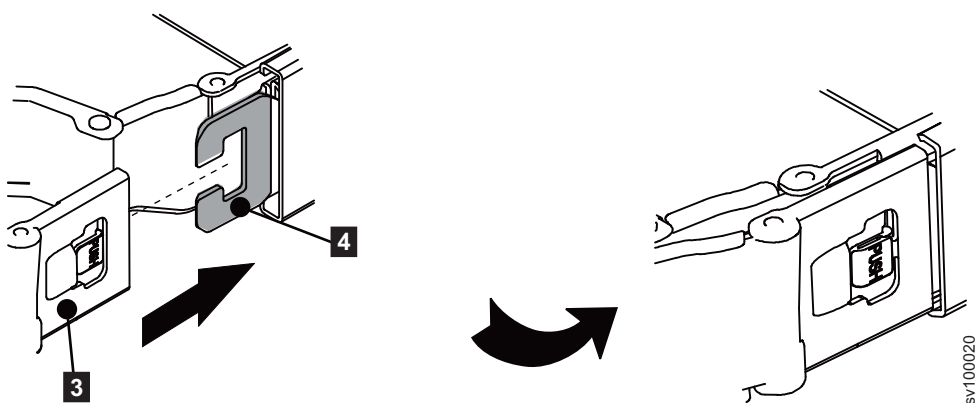


Figure 18. Install the outer member

4. Install the opposite cable-management arm connector (**5**) to the opposite outer cable-management arm connector base (**6**). Refer to Figure 19.

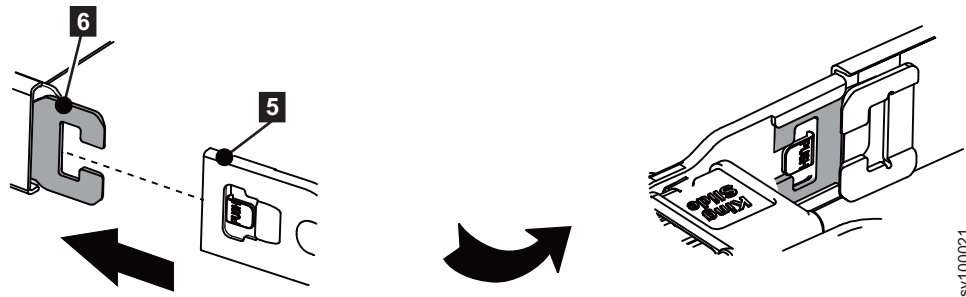


Figure 19. Install the other outer member

5. Connect and route the cables.
 - a. Reconnect the power cords and other cables to the rear of the node.
 - b. Route the cables and power cords on the CMA and secure them with cable ties or hook-and-loop fasteners.

Notes:

- The location of the cable straps can vary in different systems.
- Use the cable straps that are provided on the rear of the system to retain the cables and prevent them from sagging.
- Allow slack in all of the cables to avoid tension in the cables as the CMA moves.

Replacing the cable-management arm: 2145-DH8

You can use this procedure to replace the SAN Volume Controller 2145-DH8 cable-management arm.

Before you begin

Replace the cable-management arm after you replace the node in the rack.

Note:

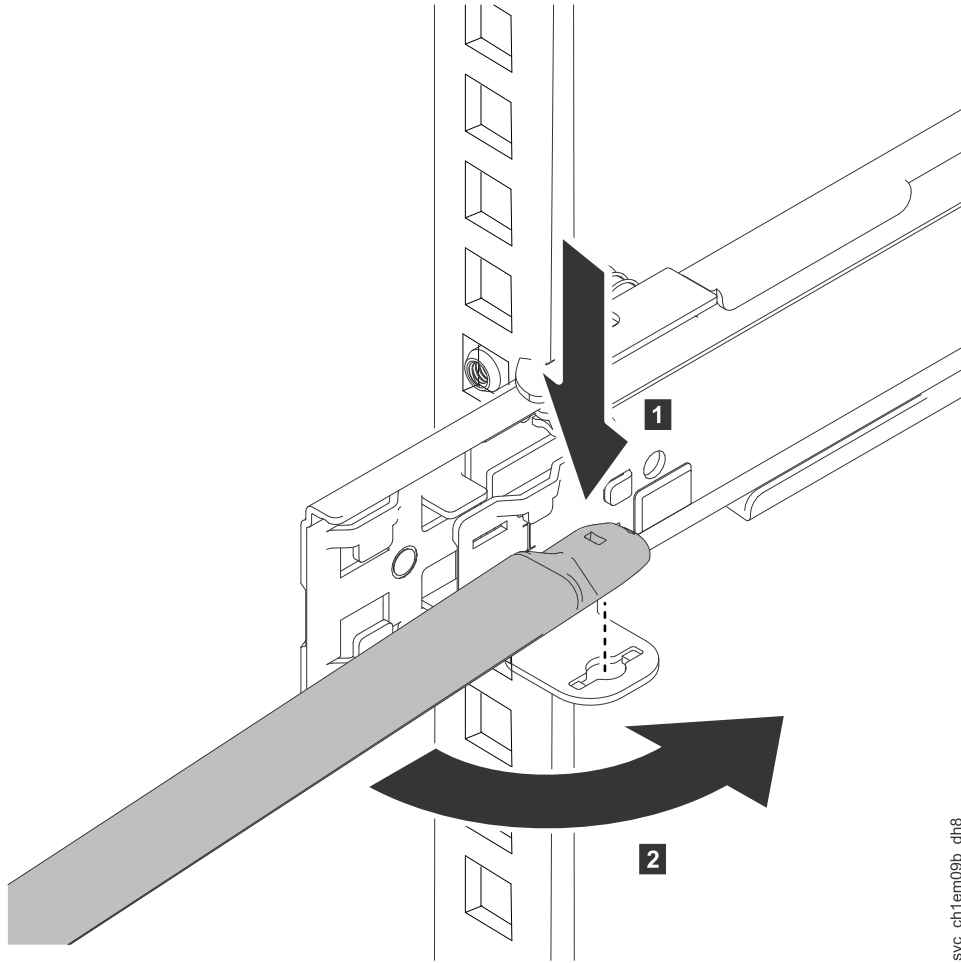
- The cable-management arm can be installed on either side of the node.
- Make sure the inner rail of the cable management support arm must be on top to work correctly.

About this task

To replace the cable-management arm, complete the following steps:

Procedure

1. Install the cable management arm on the left-rear side of the node, as shown in Figure 20 on page 26
 - a. Connect one end of the support arm to the same slide rail to which you plan to attach the cable management arm.
 - b. Swing the other end of the support arm toward the rack.



svc_ch1em09b_dh8

Figure 20. Installing the cable-management arm

2. Connect the other end of the support arm to the stop bracket, as shown in Figure 21 on page 27.

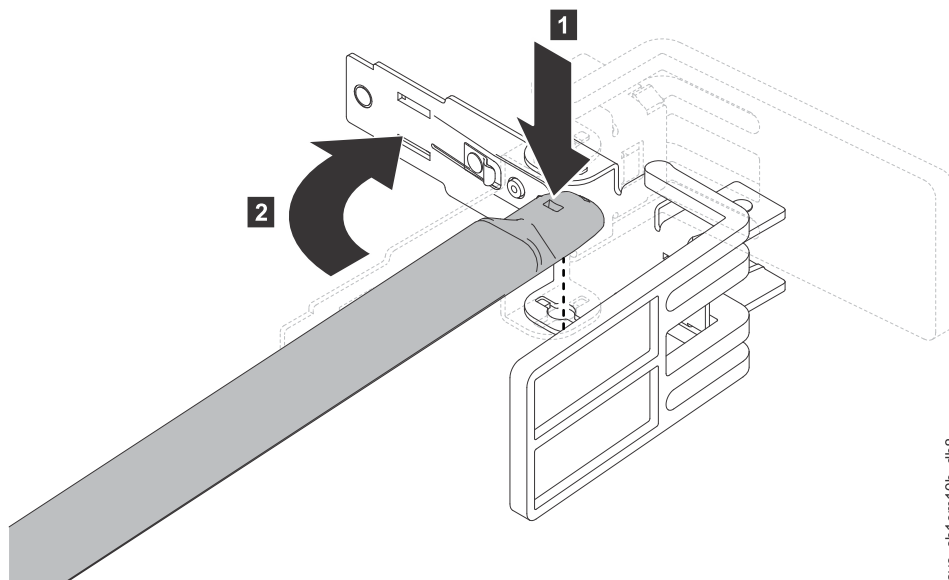


Figure 21. Connecting the cable management support arm to the stop bracket

3. Connect the stop bracket to the slide rail, as shown in Figure 22 on page 28.
 - a. The capital letters I and O are printed on cable management arm pins to identify the inside and outside pins.
 - b. Install the cable management stop bracket (with capital letter O) on the unattached end of the support arm.
 - c. Verify that the support arm is securely installed.

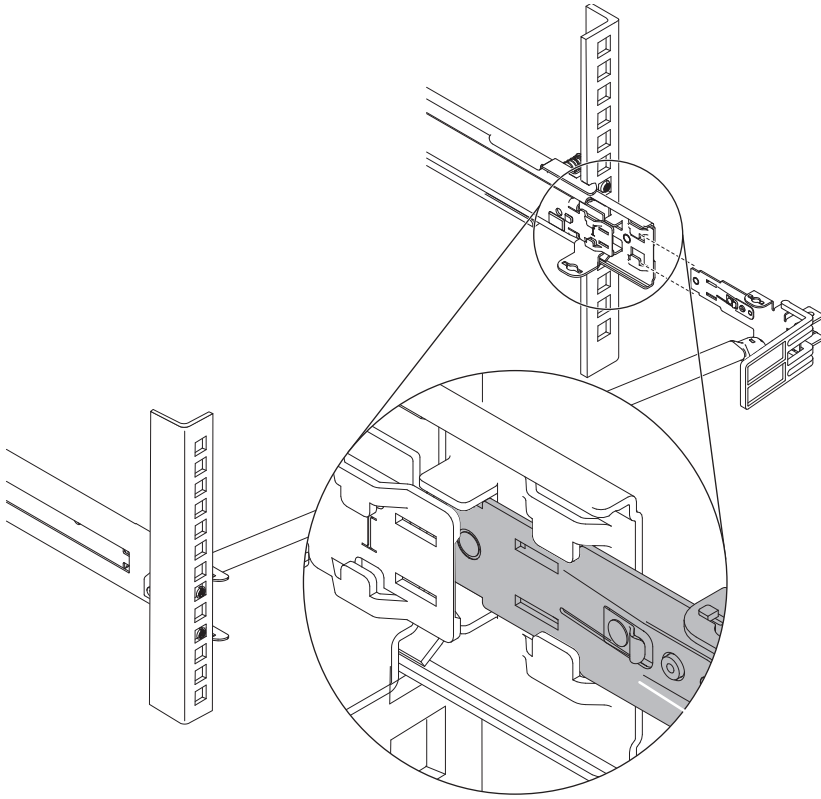


Figure 22. Connecting the stop bracket to the slide rail

4. Install the cable management arm stop bracket, as shown by Figure 23 on page 29.
 - a. Place the cable management arm on the support arm.
 - b. Pull out both the inside and the outside pins of the cable management arm.
 - c. Slide the cable management arm tabs into both the inside and the outside slots of the slide rail.
 - d. Push the tabs until they snap into places.

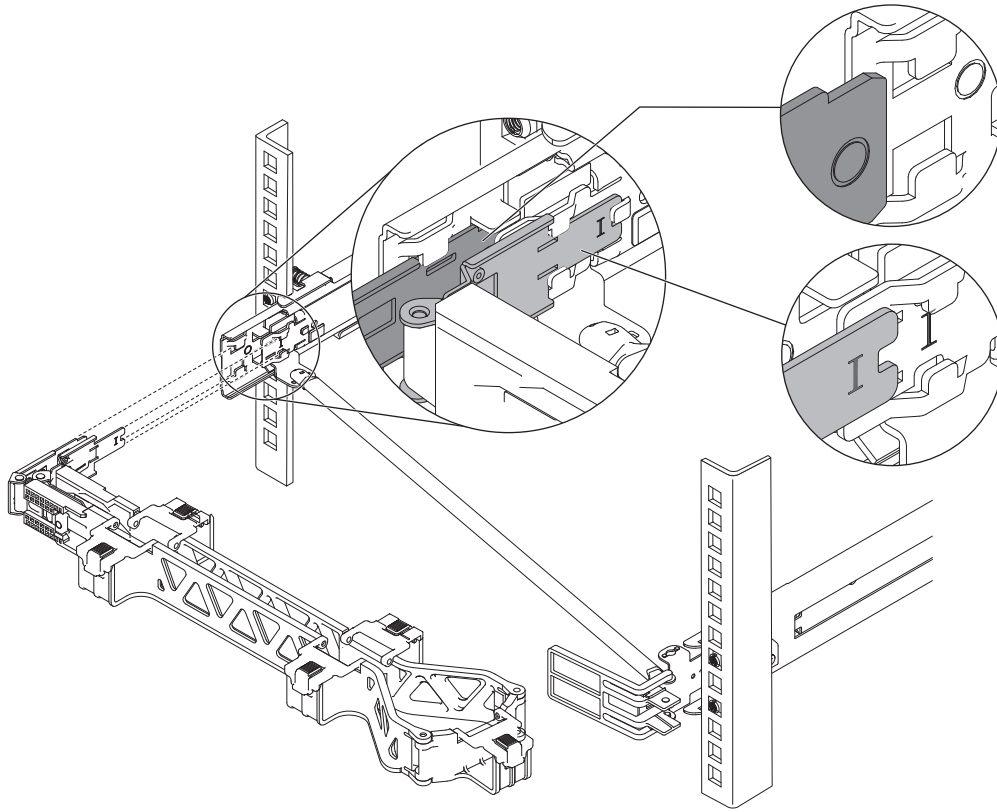


Figure 23. Installing the cable management arm stop bracket

5. Close the cable management support stop, as shown in Figure 24 on page 30.
 - a. Open the stop bracket, which makes rotating the cable management arm on and off the cable management support arm easier.
 - b. Push the tabs above and below the cable management support stop bracket for closing it.

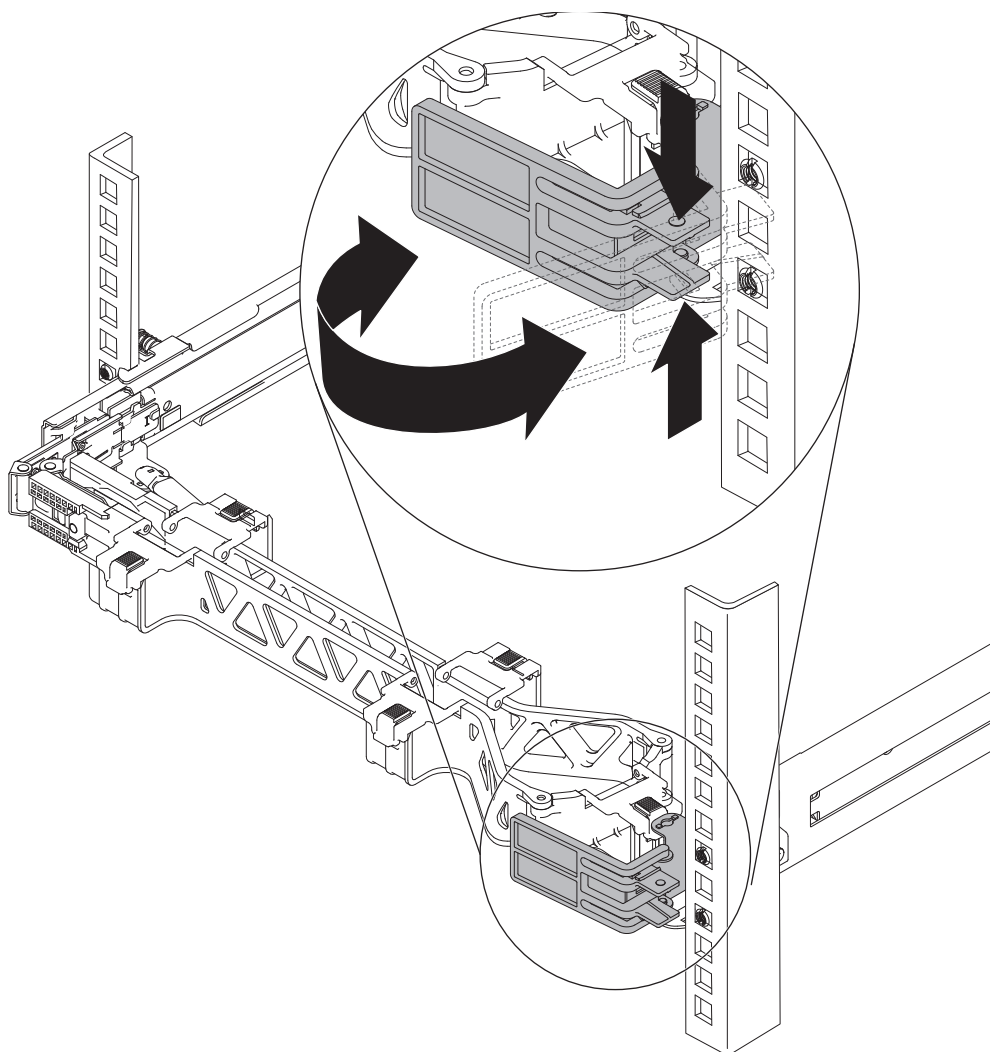


Figure 24. Closing the cable management support stop

6. Connect and route the cables, as shown in Figure 25 on page 31.
 - a. Attach the power cords and other cables to the rear of the node.
 - b. Route the cables and power cords on the cable management arm and secure them with cable ties or hook-and-loop fasteners.

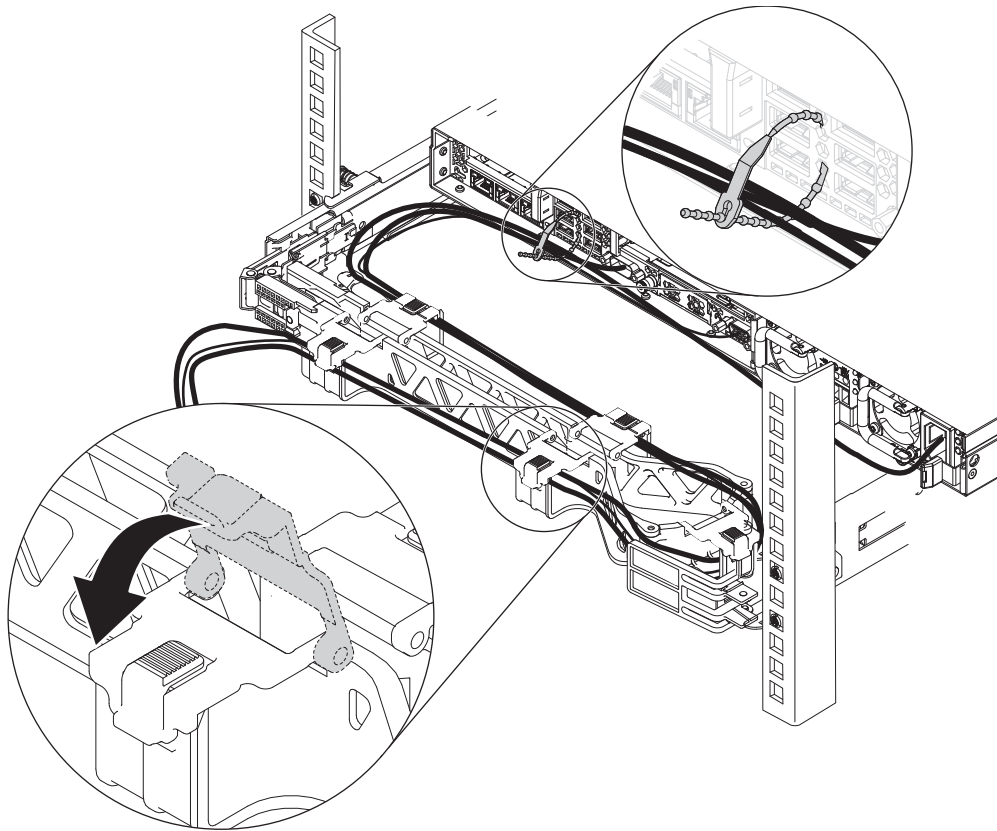


Figure 25. Connecting and routing the cables

Note:

- The location of the cable straps can vary in different systems.
 - Use the cable straps that are provided on the rear of the system to retain the cables and prevent them from sagging.
7. Secure the cables with the hook-and-loop fastener strap, as shown in Figure 26 on page 32. Cables must be bundled with the hook-and-loop fastener strap to ensure full range of movement of the cable management arm.

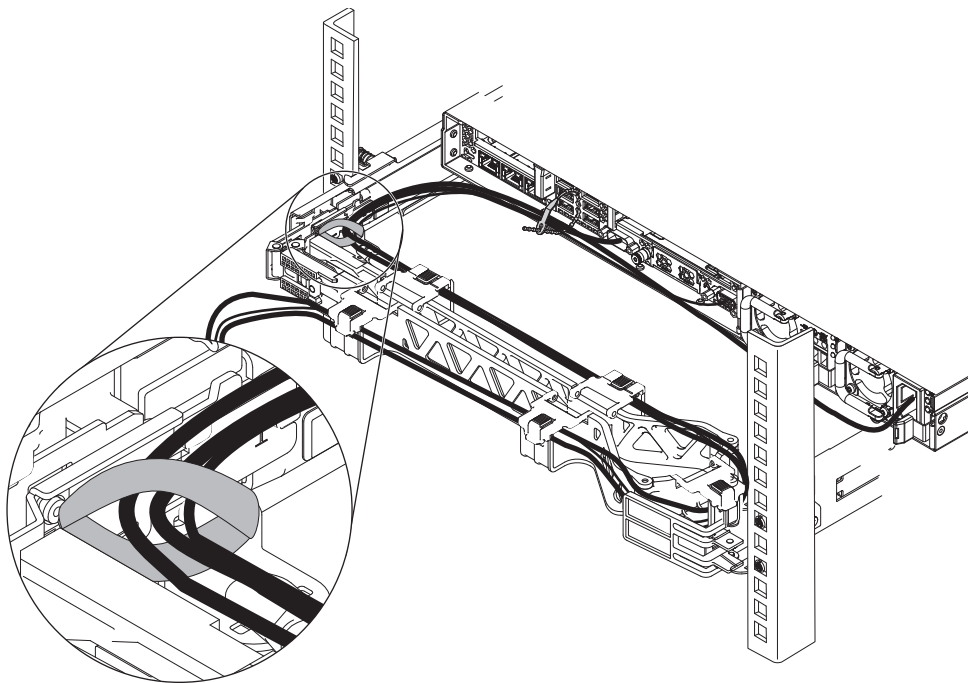


Figure 26. Securing the cables with hook-and-loop fastener strap

Note:

- Make sure that the cables do not sag below the U space so they cannot interfere with the lower systems.
 - Allow slack in all cables to avoid tension in the cables as the cable management arm moves.
8. Optional: Secure the cable management arm and the node in the rack for shipping, as shown in Figure 27 on page 33.
 - a. If you are shipping the rack with the system installed, or if you are in a vibration-prone area, insert the M6 screws to the rear of the slides.
 - b. Use a cable tie to secure the free end of the cable management arm to the rack.

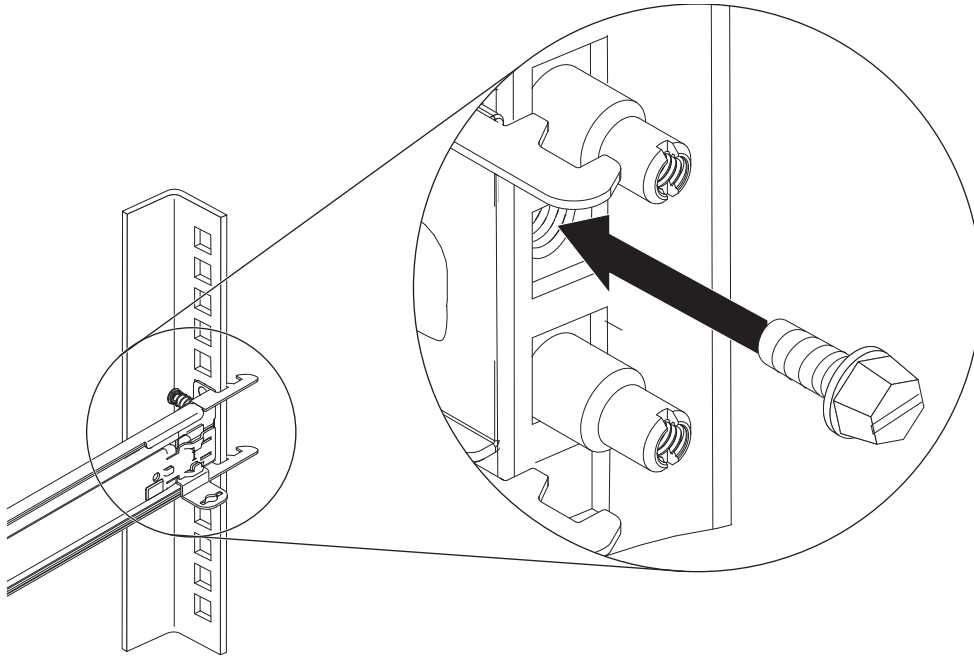


Figure 27. Securing the cable management arm and node for shipping

9. Optional: Install the front screws, as shown in Figure 28 on page 34.
 - a. To slide the node out of the rack, press on the release latches **1**.
 - b. When you move the rack cabinet, or if you install the rack cabinet in a vibration-prone area, insert the M6 screws **2** in the front of the node.

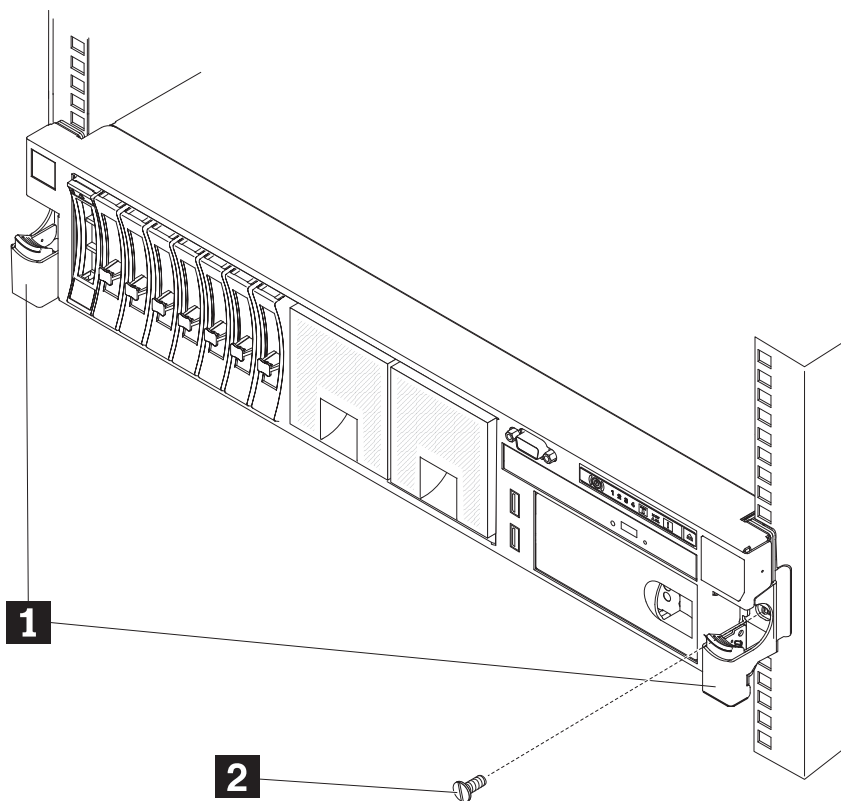


Figure 28. Installing the front screws

10. Optional: You can install the cable management arm on the opposite side, as shown in Figure 29 on page 35.
 - a. Press the release buttons **1** and slide the mounting brackets **2** out of the cable management arm.
 - b. Then, rotate the cable management arm **3**,
 - c. Flip the mounting brackets **4**,
 - d. Insert the inner bracket (marked with a capital letter I) and outer bracket (marked with a capital letter O) into the cable management arm **5**.

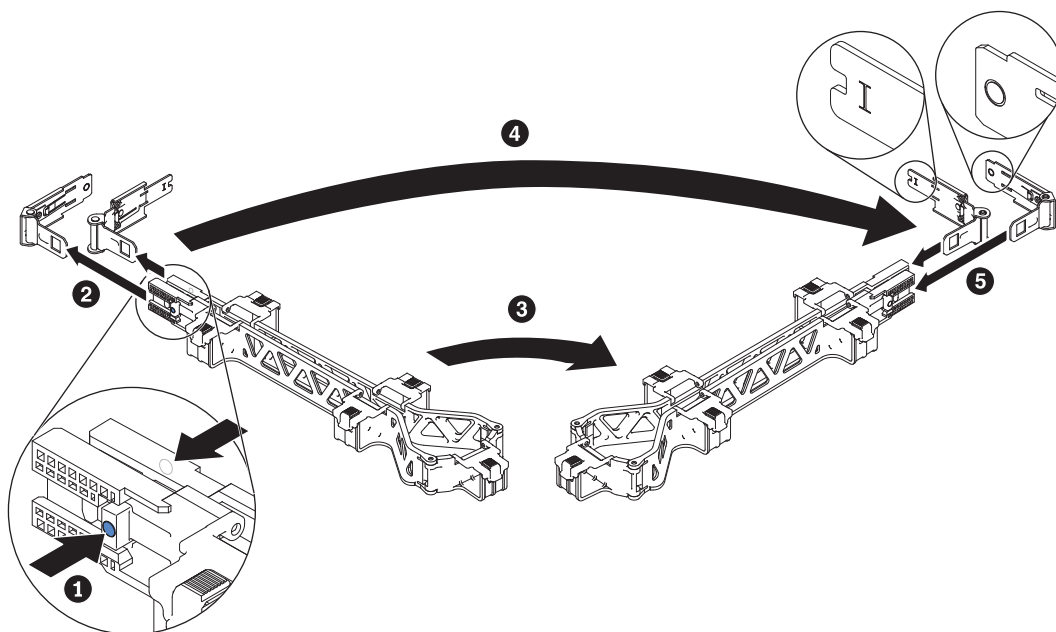


Figure 29. Installing the cable management arm on the opposite side

Removing a node from a rack

During some service procedures, you might need to remove a node from a rack.

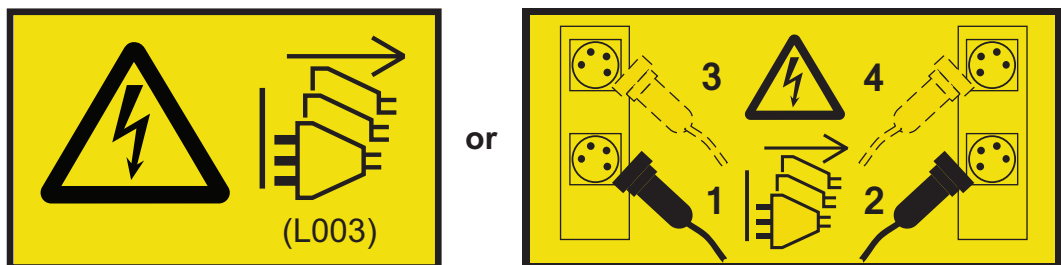
Removing a node from a rack: 2145-SV1

You might need to remove a SAN Volume Controller 2145-SV1 node from a rack.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Attention: Do not touch the power control switches on adjacent SAN Volume Controller nodes when you remove or install SAN Volume Controller nodes in a rack. Touching these switches on adjacent SAN Volume Controller nodes might cause those devices to turn off and make customer data inaccessible.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

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. (R001 part 1 of 2)

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 part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a 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.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- 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 the pallet and bolt the rack cabinet to the pallet. (R002)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)

CAUTION:

- Rack is not intended to serve as an enclosure and does not provide any degrees of protection required of enclosures.
- It is intended that equipment installed within this rack will have its own enclosure. (R005).

CAUTION:

Tighten the stabilizer brackets until they are flush against the rack. (R006)

CAUTION:

Use safe practices when lifting. (R007)

CAUTION:

Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

CAUTION:


If the rack is designed to be coupled to another rack only the same model rack should be coupled together with another same model rack. (R009)

DANGER:



Main Protective Earth (Ground):

This symbol is marked on the frame of the rack.

The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with . (R010)

About this task

Important: You can accomplish most service actions when the node is fully extended from the rack on its slide rails.

To remove the SAN Volume Controller 2145-SV1 node from the rack, complete these steps. Ensure that you have two people when you lift the server; position their hands as shown in Figure 31 on page 39.

Procedure

1. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.
2. Pull back the cable-management arm if you are working from the rear of the rack, or slide the node out of the rack to the fully extended rail position if you are working from the front.
3. To make sure that you can replace all cables in the same ports from which they were removed, record the position of all Fibre Channel, SAS, and Ethernet cables; then remove all cables from the back of the node.
4. To remove the chassis, complete the steps that are shown in Figure 30 on page 39

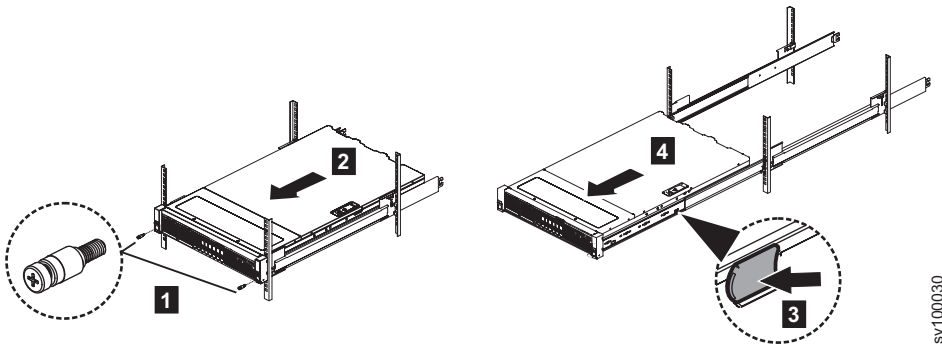


Figure 30. Remove the 2145-SV1 node chassis from the rack

- a. Loosen the shipping screws (**1**).
- b. Extend the chassis on the rails (**2**).
- c. Slide the disconnect tab forward (**3**).
- d. With the help of multiple persons, pull the chassis (and inner member) free from the middle member of the rail assembly (**4**).
5. Lift the node, as shown in Figure 31, and place it on a sturdy surface.

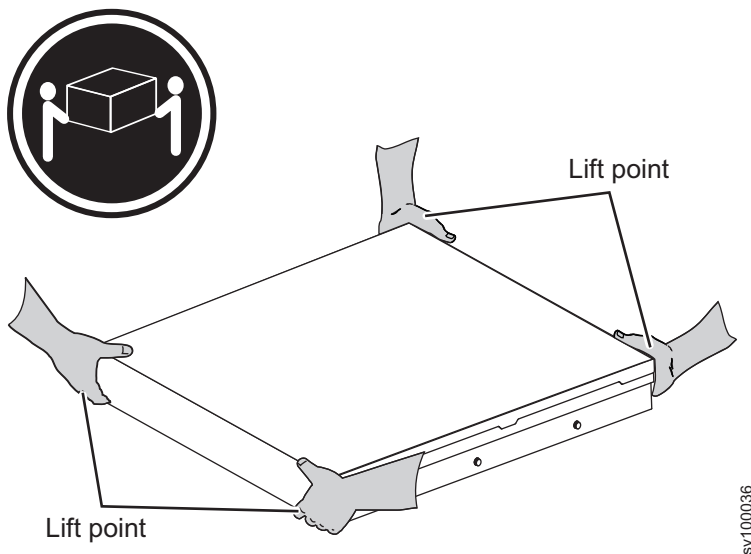


Figure 31. Lifting the 2145-SV1 node from the rack

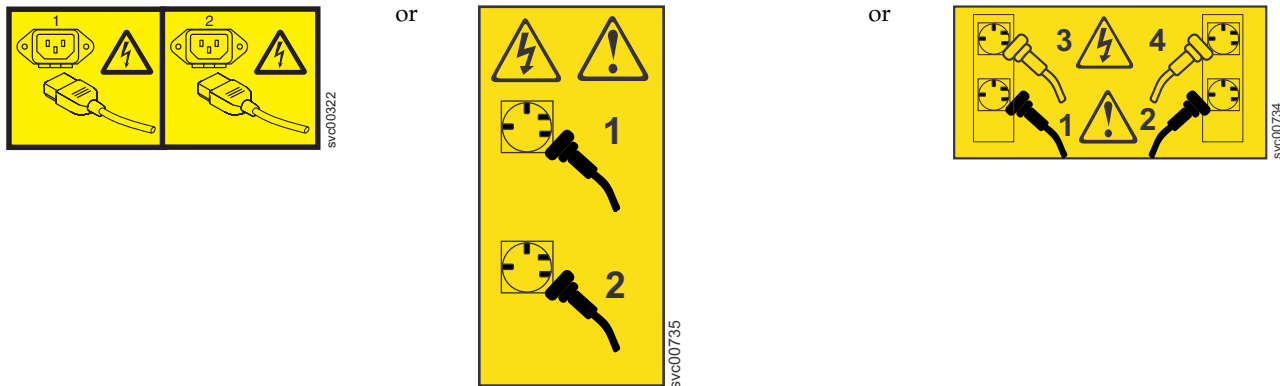
Removing a node from a rack: 2145-DH8

You might need to remove a SAN Volume Controller 2145-DH8 node from a rack.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Attention: Do not touch the power control switches on adjacent SAN Volume Controller nodes when you remove or install SAN Volume Controller nodes in a rack. Touching these switches on adjacent SAN Volume Controller nodes might cause those devices to turn off and make customer data inaccessible.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

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. (R001 part 1 of 2)

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 part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a 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.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- 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 the pallet and bolt the rack cabinet to the pallet. (R002)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)

CAUTION:

- Rack is not intended to serve as an enclosure and does not provide any degrees of protection required of enclosures.
- It is intended that equipment installed within this rack will have its own enclosure. (R005).

CAUTION:

Tighten the stabilizer brackets until they are flush against the rack. (R006)

CAUTION:

Use safe practices when lifting. (R007)

CAUTION:

Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

CAUTION:


If the rack is designed to be coupled to another rack only the same model rack should be coupled together with another same model rack. (R009)

DANGER:



Main Protective Earth (Ground):

This symbol is marked on the frame of the rack.

The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with . (R010)

About this task

Important: You can accomplish most service actions when the node is fully extended from the rack on its slide rails.

To remove the SAN Volume Controller 2145-DH8 from the rack, complete these steps:

Note: If you are removing a 2U server, make sure that you have two people when you lift the server; position their hands as shown in Figure 32 on page 43.

Procedure

1. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.
2. Pull back the cable-management arm if you are working from the rear of the rack, or slide the node out of the rack to the fully extended rail position if you are working from the front.
3. To make sure that you can replace all cables in the same ports from which they were removed, record the position of all Fibre Channel, SAS, and Ethernet cables; then remove all cables from the back of the node.
4. Pull the locking levers **1** forward, as shown in Figure 32.
5. Support the rear of the server, and lift the front of the server up slightly **2** to clear the nail head **3** from the slot.

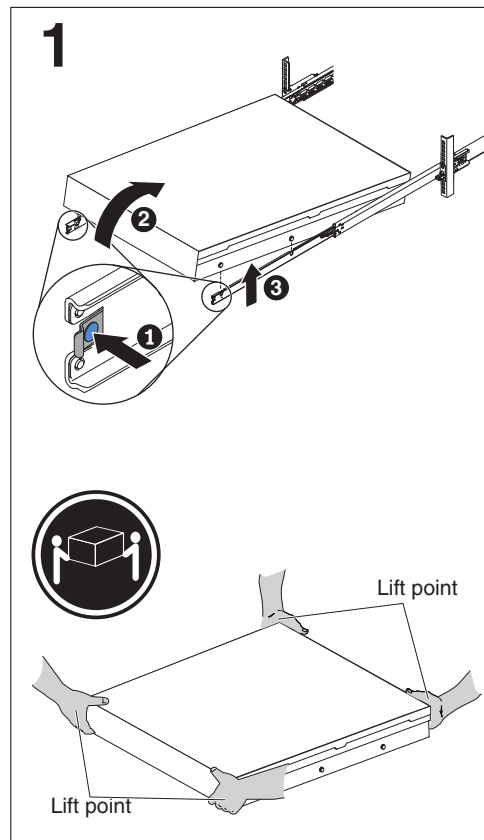


Figure 32. Removing the SAN Volume Controller 2145-DH8 from the rack

6. Lift the rear **1** of the server to level the server after the front nail heads clear the latches, as shown in Figure 33 on page 44.
7. Lift the server out of the rack **2** and place it on a sturdy surface.

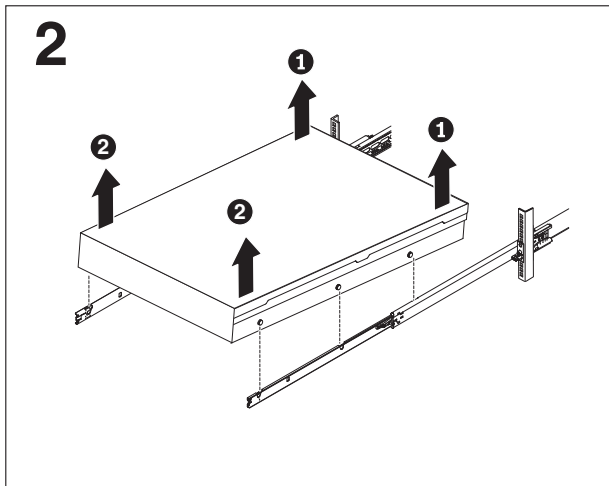


Figure 33. Lifting the server off the slide rails

Replacing a node in a rack

You must use caution when you replace a system node in a rack.

Before you begin

Note: If you recently replaced a field-replaceable unit (FRU) in the node, the repaired node normally rejoins the cluster as soon as it is powered-on and completes its self-tests. There are some exceptions to this behavior, such as when a disk drive was replaced, or when for some other reason the node lost its identity or the integrity of its cluster metadata. Under these circumstances, the node goes offline. If you are performing this repair under fix procedures, those procedures automatically restore the node to the cluster. If you are not performing the repair under fix procedures, you might be required to delete and add the node back into the cluster.

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. (R001 part 1 of 2)

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 part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a 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.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- 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 the pallet and bolt the rack cabinet to the pallet. (R002)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)

CAUTION:

- Rack is not intended to serve as an enclosure and does not provide any degrees of protection required of enclosures.
- It is intended that equipment installed within this rack will have its own enclosure. (R005).

CAUTION:

Tighten the stabilizer brackets until they are flush against the rack. (R006)

CAUTION:
Use safe practices when lifting. (R007)

CAUTION:
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

CAUTION:
If the rack is designed to be coupled to another rack only the same model rack should be coupled together with another same model rack. (R009)

DANGER:



Main Protective Earth (Ground):

This symbol is marked on the frame of the rack.

The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with \perp . (R010)

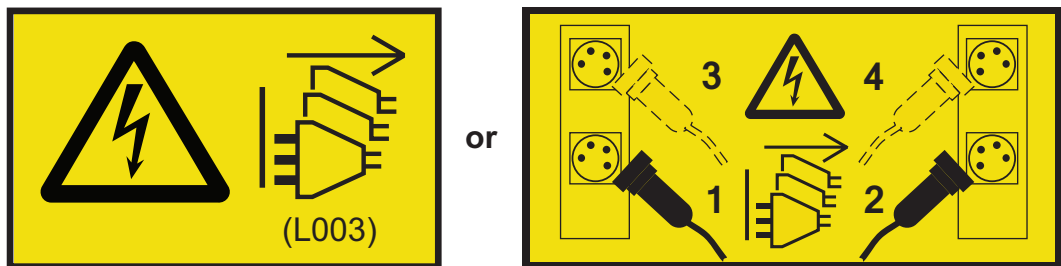
Replacing a node in a rack: 2145-SV1

You might need to replace the SAN Volume Controller 2145-SV1 node in a rack.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Attention: Do not touch the power control switches on adjacent SAN Volume Controller nodes when you remove or install SAN Volume Controller nodes in a rack. Touching these switches on adjacent SAN Volume Controller nodes might cause those devices to turn off and make customer data inaccessible.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

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. (R001 part 1 of 2)

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 part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a 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.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- 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 the pallet and bolt the rack cabinet to the pallet. (R002)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)

CAUTION:

- Rack is not intended to serve as an enclosure and does not provide any degrees of protection required of enclosures.
- It is intended that equipment installed within this rack will have its own enclosure. (R005).

CAUTION:

Tighten the stabilizer brackets until they are flush against the rack. (R006)

CAUTION:
Use safe practices when lifting. (R007)

CAUTION:
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

CAUTION:
If the rack is designed to be coupled to another rack only the same model rack should be coupled together with another same model rack. (R009)

DANGER:



Main Protective Earth (Ground):

This symbol is marked on the frame of the rack.

The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with \perp . (R010)

About this task

To replace the SAN Volume Controller 2145-SV1 node in a rack, perform the following steps, as shown in Figure 34.

Procedure

1. Fully extend the middle support rail member and ensure it is in the locked position (**1**).

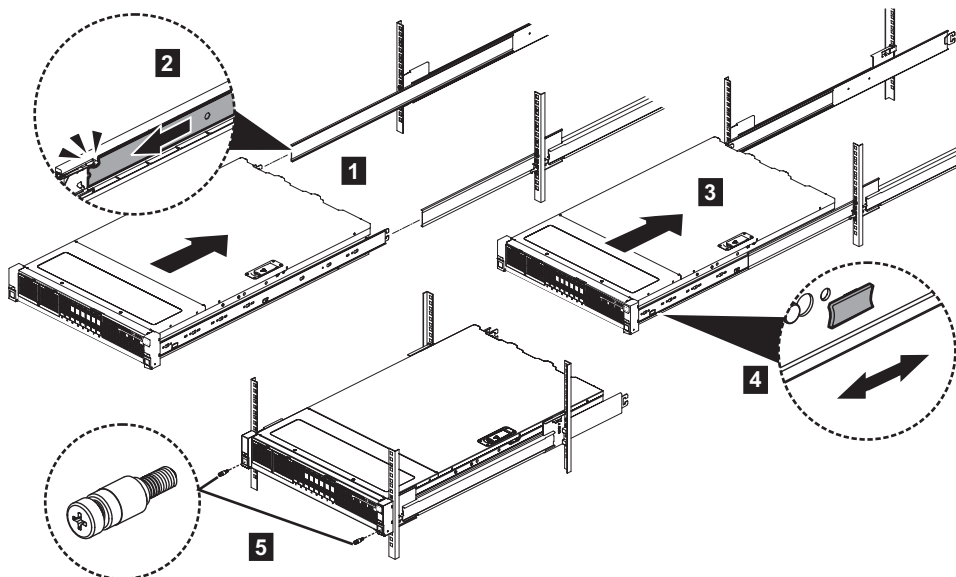


Figure 34. Replacing the 2145-SV1 chassis in the rack

2. Ensure that the ball bearing retainer is at the front of the middle member (**2**).
3. Insert the 2145-SV1 chassis into the middle outer rail member until you feel the rail stop (**3**).
4. Pull the release tab to unlock the rail; then, push the tab to retract the chassis into the rack (**4**)
5. Tighten the chassis into the rack with the screws (**5**).

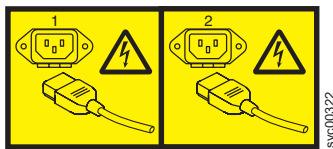
Replacing a node in a rack: 2145-DH8

You might need to replace the SAN Volume Controller 2145-DH8 node.

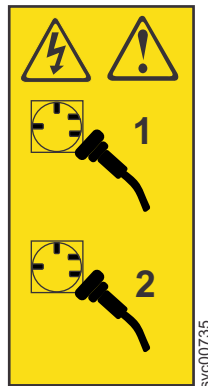
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Attention: Do not touch the power control switches on adjacent SAN Volume Controller nodes when you remove or install SAN Volume Controller nodes in a rack. Touching these switches on adjacent SAN Volume Controller nodes might cause those devices to turn off and make customer data inaccessible.

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. (R001 part 1 of 2)

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 part 2 of 2)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during a 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.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- 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 the pallet and bolt the rack cabinet to the pallet. (R002)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork truck unless it is properly packaged, secured on top of the supplied pallet. (R004)

CAUTION:

- Rack is not intended to serve as an enclosure and does not provide any degrees of protection required of enclosures.
- It is intended that equipment installed within this rack will have its own enclosure. (R005).

CAUTION:

Tighten the stabilizer brackets until they are flush against the rack. (R006)

CAUTION:

Use safe practices when lifting. (R007)

CAUTION:

Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf. (R008)

CAUTION:


If the rack is designed to be coupled to another rack only the same model rack should be coupled together with another same model rack. (R009)

DANGER:



Main Protective Earth (Ground):

This symbol is marked on the frame of the rack.

The PROTECTIVE EARTHING CONDUCTORS should be terminated at that point. A recognized or certified closed loop connector (ring terminal) should be used and secured to the frame with a lock washer using a bolt or stud. The connector should be properly sized to be suitable for the bolt or stud, the locking washer, the rating for the conducting wire used, and the considered rating of the breaker. The intent is to ensure the frame is electrically bonded to the PROTECTIVE EARTHING CONDUCTORS. The hole that the bolt or stud goes into where the terminal conductor and the lock washer contact should be free of any non-conductive material to allow for metal to metal contact. All PROTECTIVE EARTHING CONDUCTORS should terminate at this main protective earthing terminal or at points marked with . (R010)

About this task

To replace the SAN Volume Controller 2145-DH8 node in a rack, follow these steps:

Procedure

1. Place the SAN Volume Controller 2145-DH8 in the rails on the rack.
 - a. Pull the slide rails **1** forward until they click twice into place (as shown in Figure 35 on page 55).
 - b. Carefully lift the server and tilt it into position over the slide rails.
 - c. Line up the rear nail heads **2** on the server with the rear slots **3** on the slide rails.
 - d. Slide the server down until the rear nail heads slip into the two rear slots.
 - e. Slowly lower the front of the server until the other nail heads slip into the other slots on the slide rails.
 - f. Verify that the front latch slides over the nail heads.

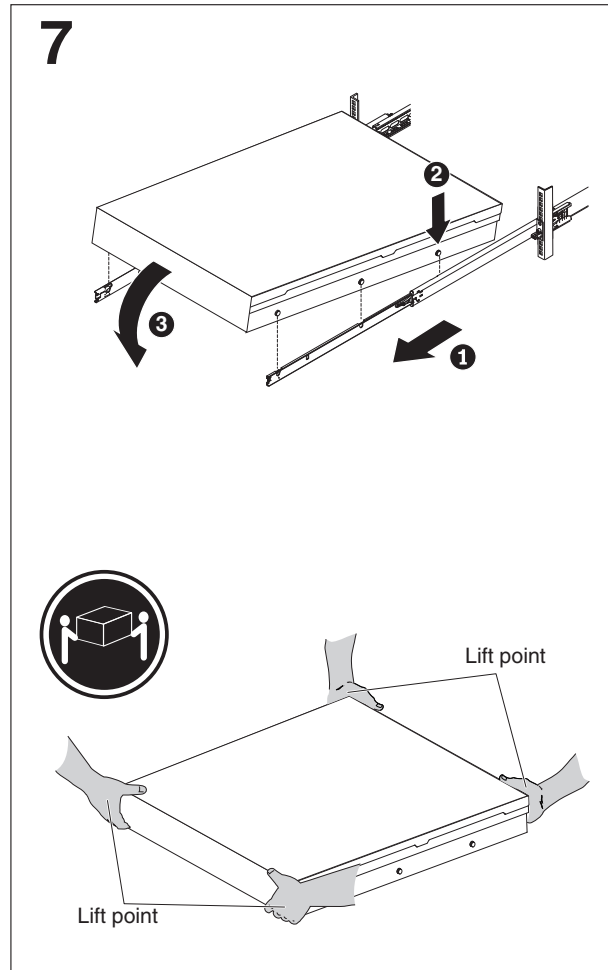


Figure 35. Installing the SAN Volume Controller 2145-DH8 node in the slide rails of the rack

2. Lift the locking levers (**1** in Figure 36) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

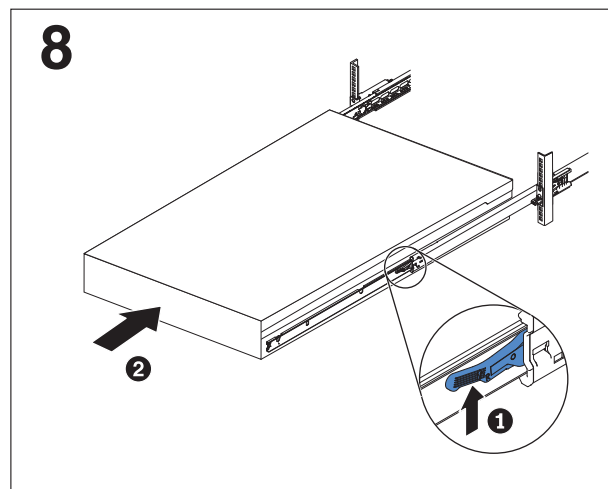


Figure 36. Raising the SAN Volume Controller 2145-DH8 locking levers of the slide rails of the rack

3. Replace the cable-management arm.

4. Reconnect the Fibre Channel, SAS, and Ethernet cables. Ensure that you replace the Fibre Channel and Ethernet cables in the same ports from which they were removed.
5. Connect the power cable to the node and replace the cable-retention bracket.
6. Turn on the node.

Removing the support rails

The support rails can be removed if you need to move the system node.

Removing the support rails: 2145-SV1

You can remove the support rails that hold the SAN Volume Controller 2145-SV1 node.

Procedure

To remove the support rails, complete the following steps.

1. If needed, remove the node from the rack. Follow the procedure in “Removing a node from a rack: 2145-SV1” on page 35.
2. Remove the slide rails, as shown in Figure 37.

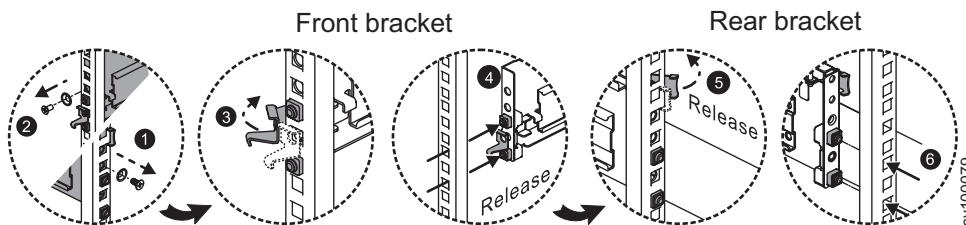


Figure 37. Removing the slide rails

Removing the support rails: 2145-DH8

You can remove the support rails that hold the SAN Volume Controller 2145-DH8 node.

Procedure

To remove the support rails, complete the following steps.

1. If needed, remove the node from the rack. Follow the procedure in “Removing a node from a rack: 2145-DH8” on page 39.
2. Remove the front end of the slide rails, as shown in Figure 38 on page 57.
 - a. Push up the front tab and slide out the front latch.
 - b. Press the blue button **1** and lift slightly on the front of the slide rail.
 - c. Remove the slide rail from the rack.

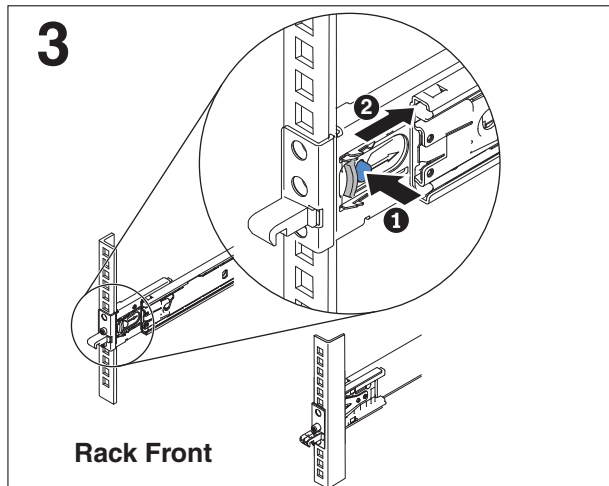


Figure 38. Removing the front end of the slide rails

3. Disengage the slide rails from the rear of the rack, as shown in Figure 39.
 - a. Pull the front of the slide rail forward to unlatch the rear hooks.
 - b. Remove the rails from the rack.

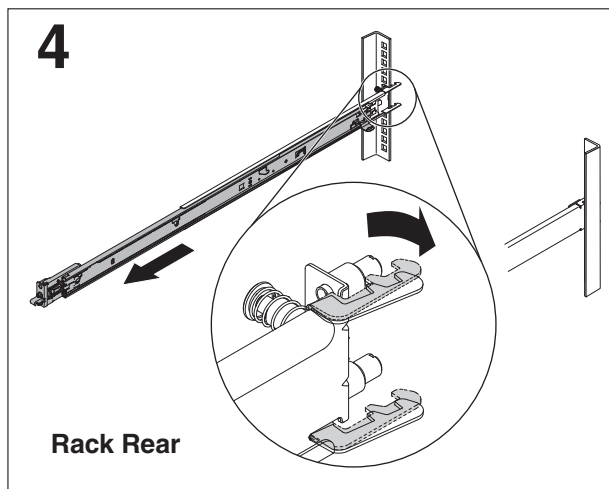


Figure 39. Removing the rear end of the slide rails

Replacing the support rails

You must replace or reinstall the support rails that hold the node, if they were removed.

Before you begin

The instructions for replacing or installing the node are found in the topics that follow.

Installing the support rails: 2145-SV1

You must install the support rails before you install a SAN Volume Controller 2145-SV1 node in a rack.

Procedure

To install the support rails, complete the following steps.

1. Locate the hardware that is used to install the rails, including the rail-mounting pins, M5 screws, and M5 washers. Set the hardware aside for use later in the installation process.
2. Select an available 2U space (depending on the node you are installing) in your rack to install your node, as shown in Figure 40.

Note: When you install a SAN Volume Controller 2145-SV1, be sure to install the slide rails in the bottom U of the 2U area in the rack.

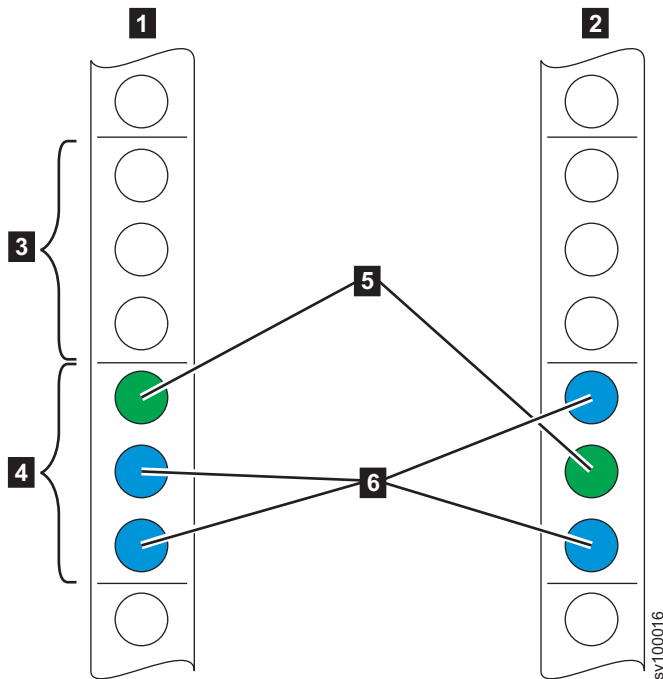


Figure 40. Identifying rack space

- 1** Front
- 2** Rear
- 3** Upper U (for 2U system)
- 4** Lower U
- 5** Location of optional screws for securing enclosure to rack
- 6** Location of rail-mounting pins

3. Detach the inner section of one 3-part rail, as shown in Figure 41 on page 59.

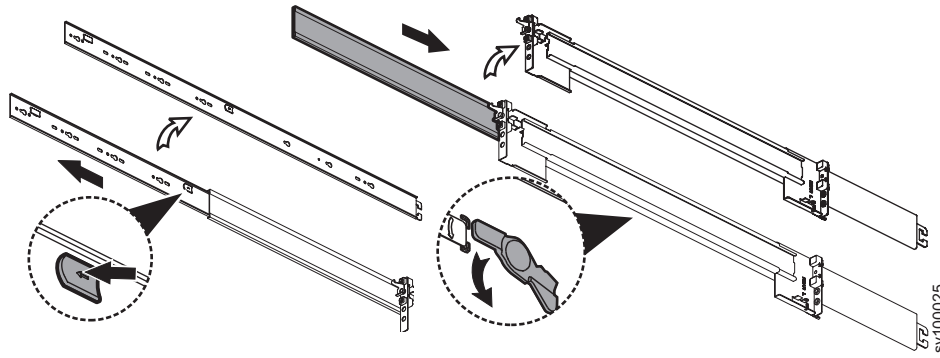


Figure 41. Detaching the inner rail section

- a. Pull the tab forward.
 - b. Turn the rotation plate upward.
 - c. Slide the middle section back.
4. Install the inner section of the rail onto the chassis. No screws are required. Fit the holes in the inner rail section over the heads of the pins on the side of the appliance, then slide the rail toward the rear of the appliance to lock, as shown in Figure 42.

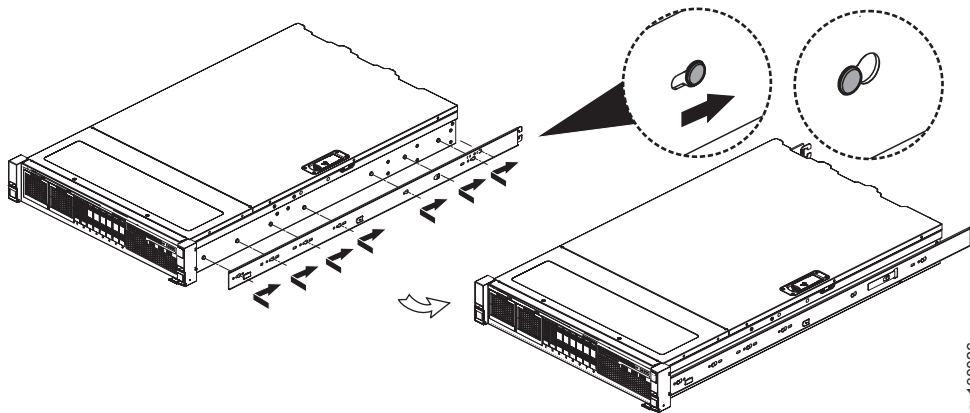


Figure 42. Attach inner rail section to chassis

5. Repeat steps 3 on page 58-4 for the opposite rail.
6. Install the outer section of the rail to the front frame, as shown in the following figure.

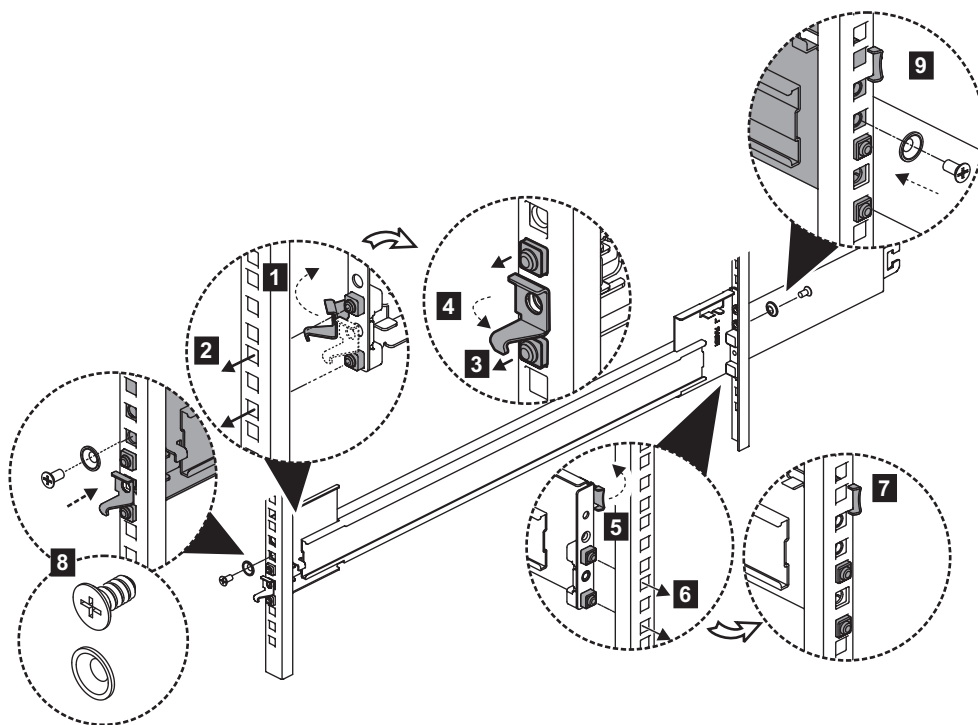


Figure 43. Install the bracket assembly to the frame

- a. Open the front latch hook (**1**).
- b. Fit the tool-less rail-mounting pin to the front rack post (**2**).
- c. Click the rail-mounting pin into place (**3**).
- d. Close the front latch hook (**4**).
7. Install the outer section of the rail to the rear frame, as shown in Figure 43.
 - a. Open the rear latch hook (**5**).
 - b. Click the rear bracket into place on the rear frame (**6**).
 - c. Close the rear latch hook (**7**).
8. Using an M5 x 10 mm screw and M5 washer, anchor the front bracket to the front frame (**8**).
9. Using an M5 x 10 mm screw and M5 washer, anchor the rear bracket to the rear frame (**9**).
10. Repeat steps 6 on page 59-9 for the opposite rail.

Installing the support rails: 2145-DH8

Before you can install a SAN Volume Controller 2145-DH8 node, you must install the support rails.

Procedure

To install the support rails, complete the following steps.

1. Select an available 2U space (depending on the node you are installing) in your rack to install your node, as shown in Figure 44 on page 61.

Note: When you install a SAN Volume Controller 2145-DH8, be sure to install the slide rails in the bottom U of the 2U area in the rack.

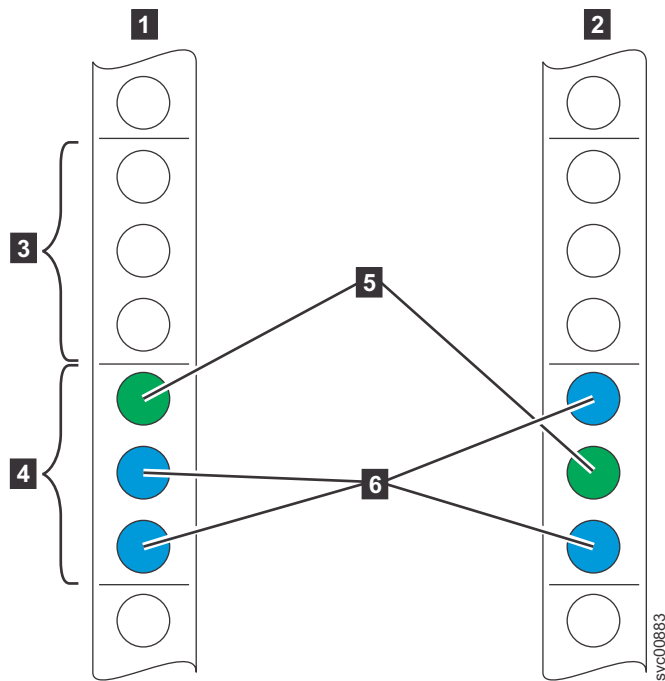


Figure 44. Identifying rack space

- 1** Front
- 2** Rear
- 3** Upper U (for 2U system)
- 4** Lower U
- 5** Optional screws for securing enclosure to rack
- 6** Pins

2. Open the rear-slide-rail hooks, as shown in Figure 45 on page 62.
 - a. Each slide rail is marked with either an R (right) or an L (left).
 - b. Select one of the slide rails and pull the rear bracket all the way back until the spring-loaded hooks open.

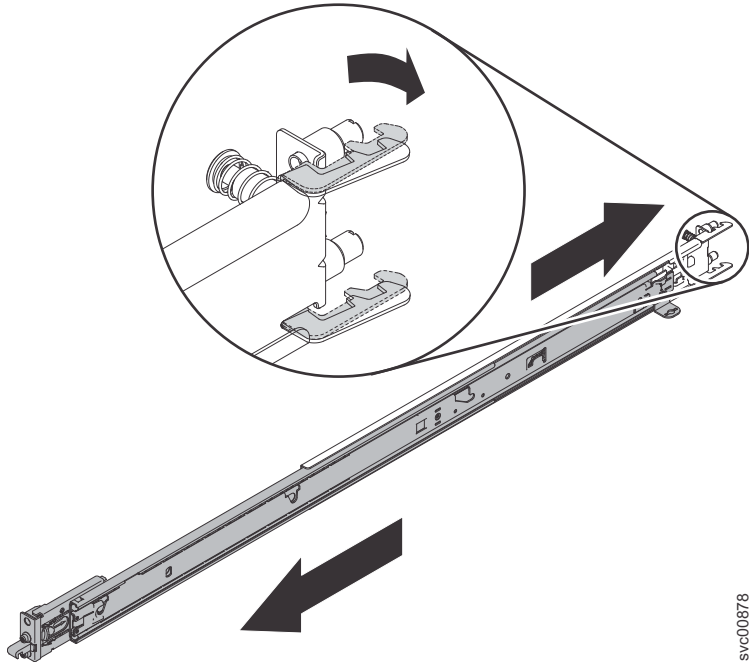


Figure 45. Opening the rear slide-rail hooks

3. Install the rear end of the slide rails, as shown in Figure 46 on page 63.
 - a. From the front of the rack, line up the two pins on the rear of the slide rail with the rear of the rack.
 - b. Push the rails so that the pins go into the holes, then slide the rails into the rack to lock the rear of the slide rails into the rack.

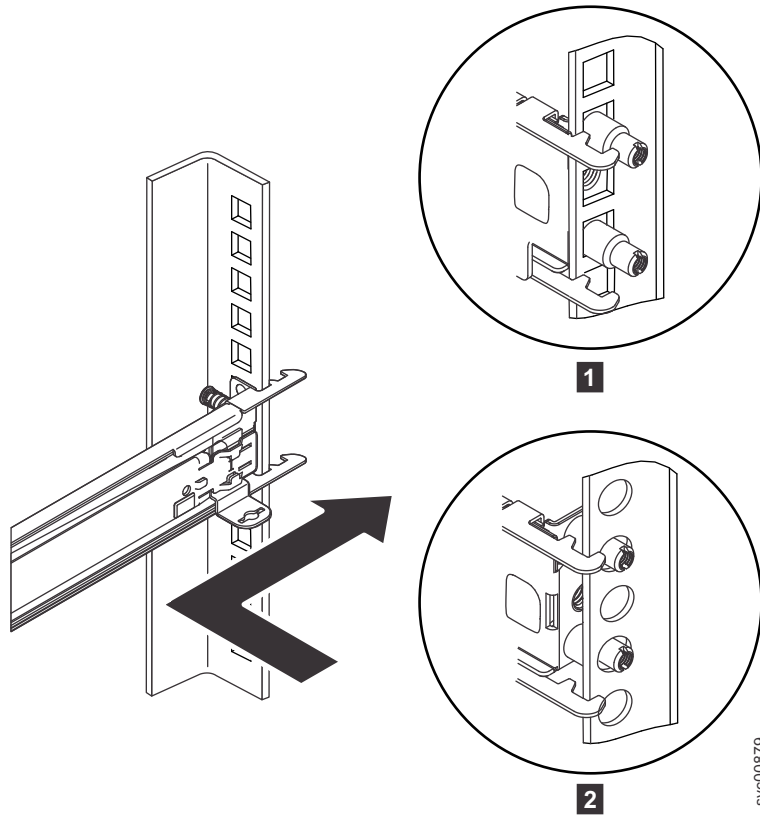
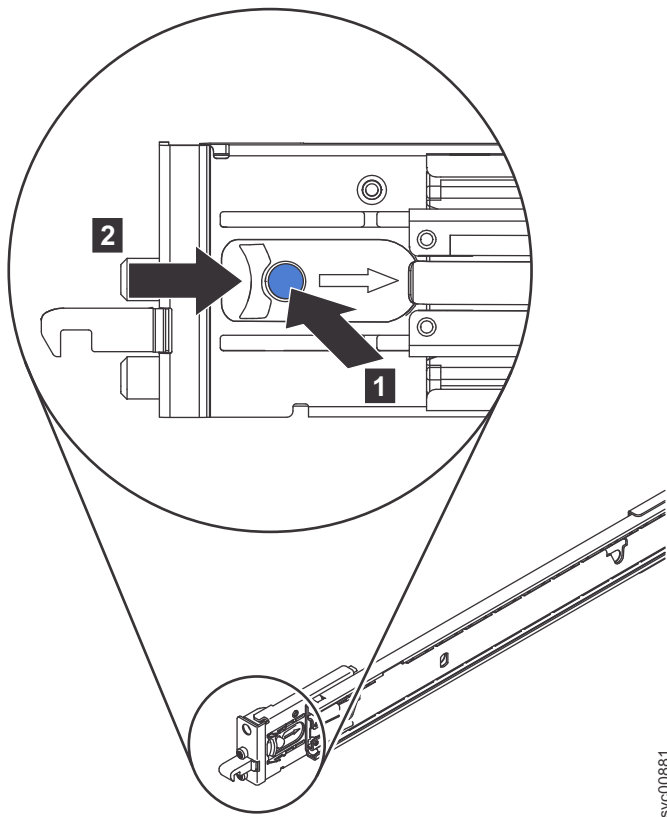


Figure 46. Installing rear end of slide rail

- 1** Square-hole rack
- 2** Round-hole rack

4. If they are closed when you receive them, open the latches by pushing the blue button **1** in and pushing the latch **2** back, as shown in Figure 47 on page 64.

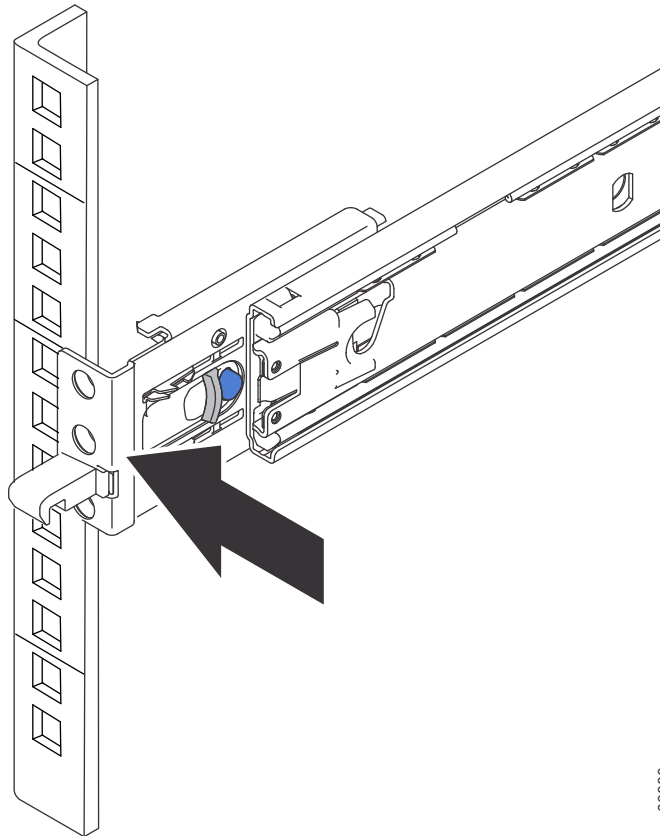
Note: If your slide rails are shipped with the front latches in the open position, skip this step and go to step 5 on page 64.



svc00881

Figure 47. Opening the front slide rail latch

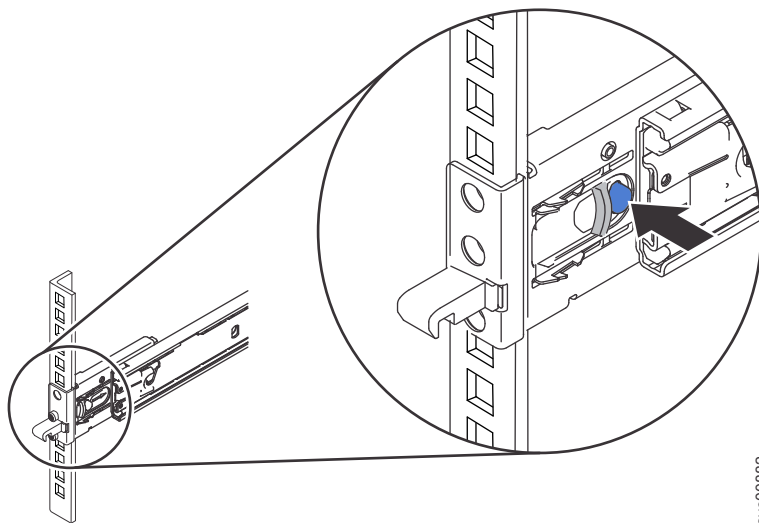
5. Align front of slide rails, as shown in Figure 48 on page 65.
 - a. Pull the slide rails forward and locate the front latches in the appropriate U spaces in front of the rack EIA rails.
 - b. Adjust the length of the rail as needed.
 - c. Make sure that the front end is being rotated into position with the front latch in front of the EIA rail of the rack.



svc00880

Figure 48. Aligning front of slide rail to rack front

6. Install the front end of the slide rails, as shown in Figure 49.
 - a. Press the blue button to close the bracket with the pins.
 - b. Move the slide rail up and down to ensure that the rail is fully engaged.
 - c. Push the front latch in all the way, and make sure that the latch is fully engaged.



svc00882

Figure 49. Installing front end of slide rail

7. Repeat steps 1 on page 60 through 6 on page 65 to install the other rail into the rack.
8. Make sure that each front latch is fully engaged.

Removing the top cover

You can remove the top cover of the node if maintenance is necessary.

About this task

Note: On some system models, the top cover consists of two parts: a back cover and a front cover.

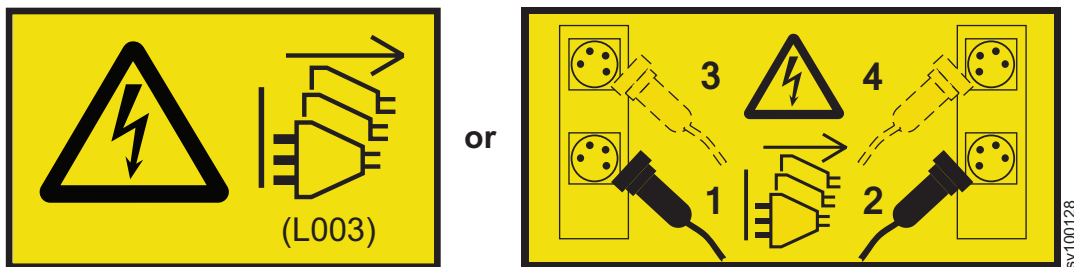
Removing the top covers: 2145-SV1

You might be required to remove the top covers from a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Procedure

1. Remove the node from the rack, if needed, or pull out the node on to the slide rails.
2. Remove both power cables.

Removing the top back cover

3. Lift the back cover release latch, as shown in Figure 50 on page 67.



Figure 50. 2145-SV1 back cover release latch

4. Slide the back cover toward the rear of the node.
5. Hold the release latch and lift the back edge of the back cover, as shown in Figure 51.



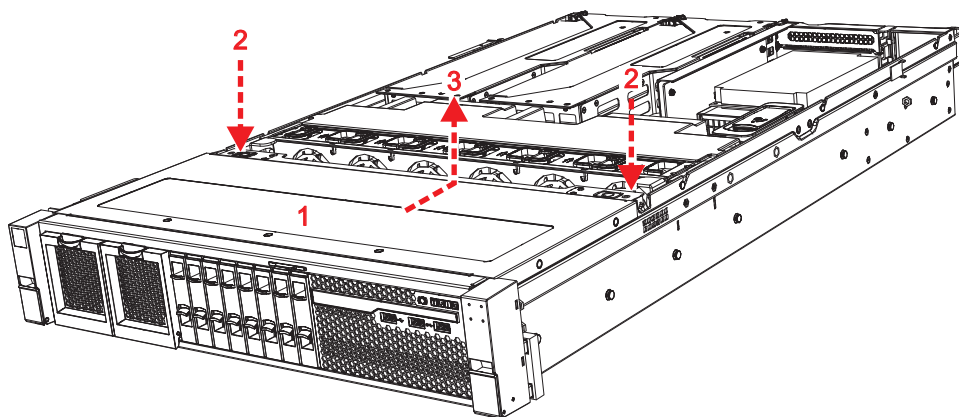
Figure 51. Removing the 2145-SV1 back cover

6. Place the back cover in a safe location.

Removing the top front cover

Note: You do not need to remove the front cover, unless it is a required step in a service procedure. You cannot remove the top front cover unless the top back cover is removed.

7. Press lightly on both latches (**2** in Figure 52 on page 68) at the back edge of the top cover.



sv100108

Figure 52. Removing the 2145-SV1 top front cover

- 1** Top front cover
- 2** Front cover release latches
- 3** Direction in which to slide the top cover

8. Slide the front top cover back (**3** in Figure 52) until you can lift it up.
9. Place the front cover in a safe location.

Removing the top cover: 2145-DH8

You might be required to remove the SAN Volume Controller 2145-DH8 top cover.

Before you begin

Important: Before you slide the cover forward, make sure that all the tabs on both the front, rear, and side of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be difficult to remove the cover later.

Procedure

1. Remove the node from the rack.
2. To make sure that you can replace cables in the same ports from which they were removed, label the port position of the Fibre Channel, SAS, and Ethernet cables.
3. Remove all cables.
4. Lift the cover release latch (**2**).
5. Slide the cover toward the rear of the node and remove, as shown in Figure 53 on page 69.

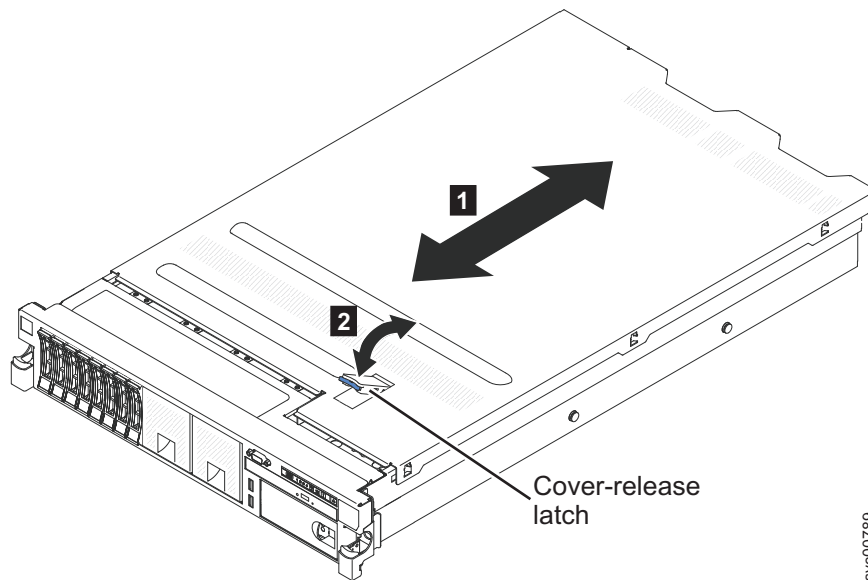


Figure 53. Removing the 2145-DH8 cover

- 1** Cover
- 2** Cover release latch

Replacing the cover

You must replace the cover on the node after maintenance is completed.

About this task

Note: On some models, the cover consists of two parts: a back cover and a front cover.

Replacing the top covers: 2145-SV1

You might be required to replace the top covers on a SAN Volume Controller 2145-SV1 node.

About this task

To replace the top covers on the SAN Volume Controller 2145-SV1 node, complete the following steps.

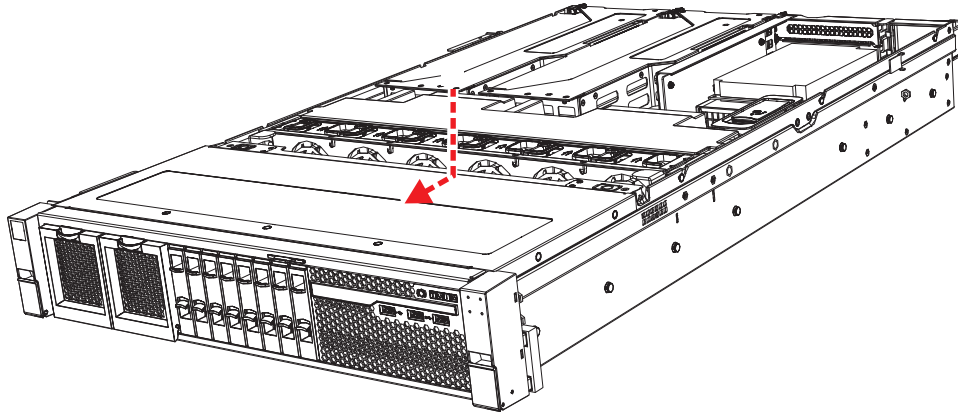
Procedure

1. If you removed the node from the rack, replace it in the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.

Replacing the top front cover

Note: If you did not remove the front cover, continue to step 4 on page 70 for information about replacing the back cover.

2. Place the front cover close to the front of the node. Ensure that it is aligned correctly.
3. Slide the front cover forward until it stops, as shown in Figure 54 on page 70.



sv100109

Figure 54. Replacing the 2145-SV1 top front cover

Replacing the top back cover

Note: If the front cover was also removed, you must reinstall it before you replace the back cover.

4. Position the back cover on top of the 2145-SV1 node.

Important: Before you slide the cover forward, make sure that all the tabs on both the front, rear, and side of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be difficult to remove the cover later.

5. Raise the release latch and slide the back cover toward the front of the node, as shown in Figure 55.



sv100068

Figure 55. Replacing the 2145-SV1 back cover

6. Verify that the cover correctly engages the cover release latch and all of the inset tabs on the node.

Important: Both of the top covers must be fitted correctly before you reconnect the AC power to the 2145-SV1 node.

Replacing the top cover: 2145-DH8

You might be required to replace the SAN Volume Controller 2145-DH8 node top cover.

Before you begin

Important: Before you slide the cover forward, make sure that all the tabs on both the front, rear, and side of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be difficult to remove the cover later.

About this task

To replace the top cover on the SAN Volume Controller 2145-DH8, complete the following steps:

Procedure

1. If you removed the node from the rack, replace the node in the rack.
2. To make sure that you can replace cables in the same ports from which they were removed, label the port position of the Fibre Channel, SAS, and Ethernet cables.
3. Position the cover on top of the SAN Volume Controller 2145-DH8.

Important: Before you slide the cover forward, make sure that all the tabs on both the front, rear, and side of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be difficult to remove the cover later.

4. Slide the cover toward the front of the node, as shown in Figure 56.

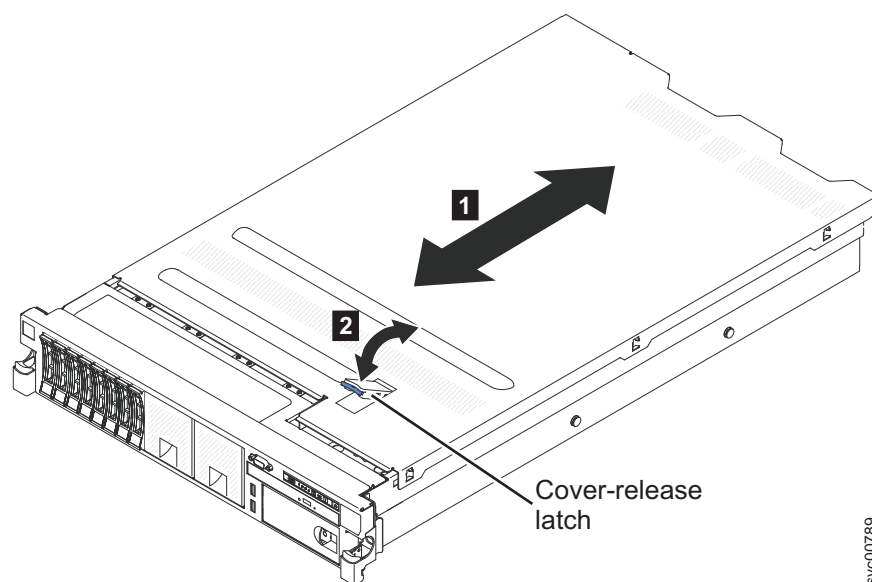


Figure 56. Replacing the SAN Volume Controller 2145-DH8 cover

- 1** Cover
- 2** Cover release latch

5. Verify that the cover correctly engages the cover release latch, and all the inset tabs on the node.

Removing the air baffle

You can remove the air baffle from a node.

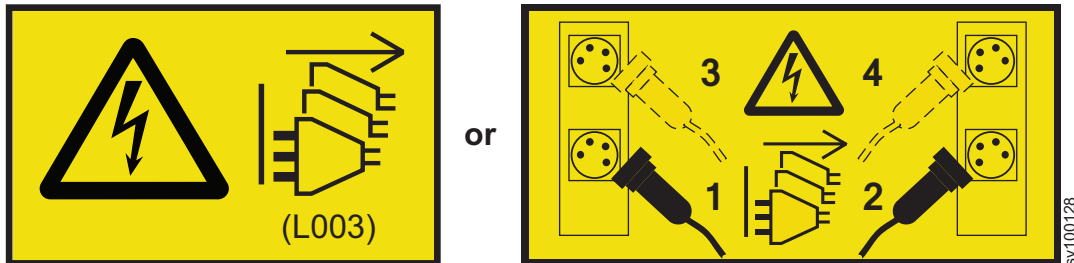
Removing the air baffle: 2145-SV1

You can remove the air baffle on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes the following conditions:

- You are not operating the SAN Volume Controller 2145-SV1 without the air baffle.
- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The back cover is removed from the node.
- PCIe riser assemblies 1 and 2 are removed.

To remove the air baffle, complete the following steps.

Procedure

1. Read the safety information.
2. Place your fingers on the side of the air baffle, as shown in Figure 57 on page 73.



Figure 57. Removing the air baffle

3. Hold the air baffle at an angle and lift it out of the node, as shown in Figure 58 on page 74. Be careful to avoid the top cover latch posts that are on the left side of the chassis.



Figure 58. Removing the air baffle

Attention: To maintain cooling and airflow, replace the air baffle before you turn on the node. Operating the server with the air baffle removed might damage node components.

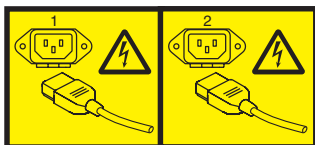
Removing the air baffle: 2145-DH8

You can remove the air baffle on a SAN Volume Controller 2145-DH8 node.

Before you begin

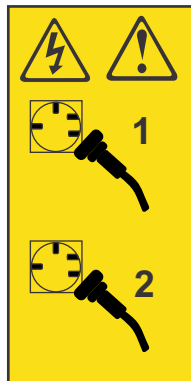
DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



svc00322

or



svc00735

or



svc00734

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes the following conditions:

- You are not operating the SAN Volume Controller 2145-DH8 without the air baffle.
- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top cover is removed.

To remove the air baffle, complete the following steps.

Procedure

1. Read the safety information.
2. Place your fingers under the front and back of the top of the air baffle. Then, lift the air baffle out of the server, as shown in Figure 59.

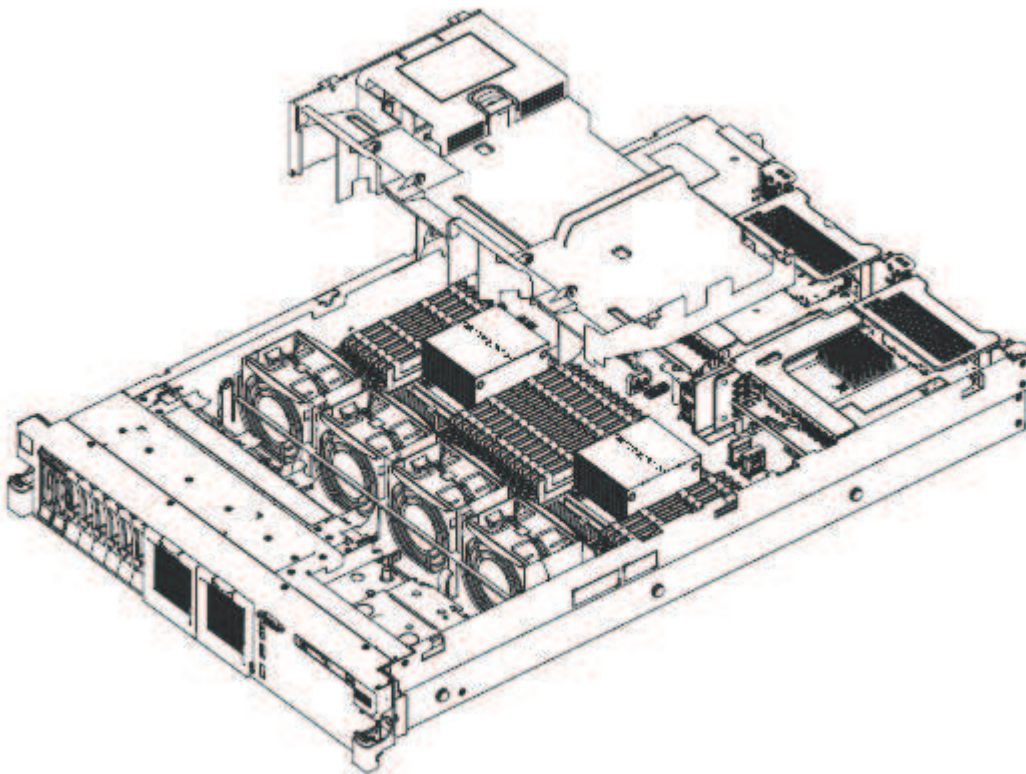


Figure 59. Removing the air baffle

Attention: To maintain cooling and airflow, replace the air baffle before you turn on the node. Operating the server with the air baffle removed might damage node components.

Replacing the air baffle

You can replace the air baffle from a node.

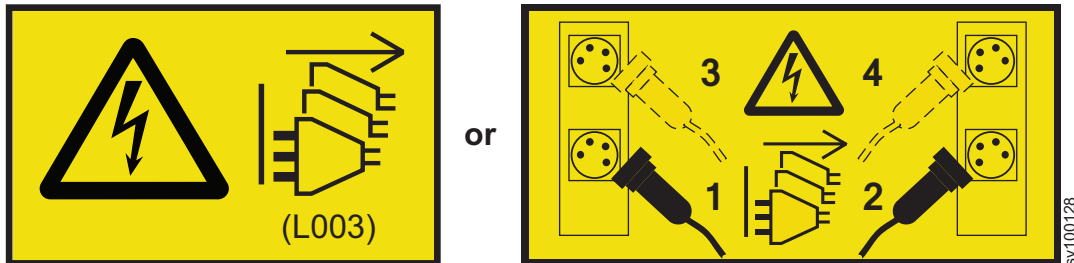
Replacing the air baffle: 2145-SV1

You can replace the air baffle on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

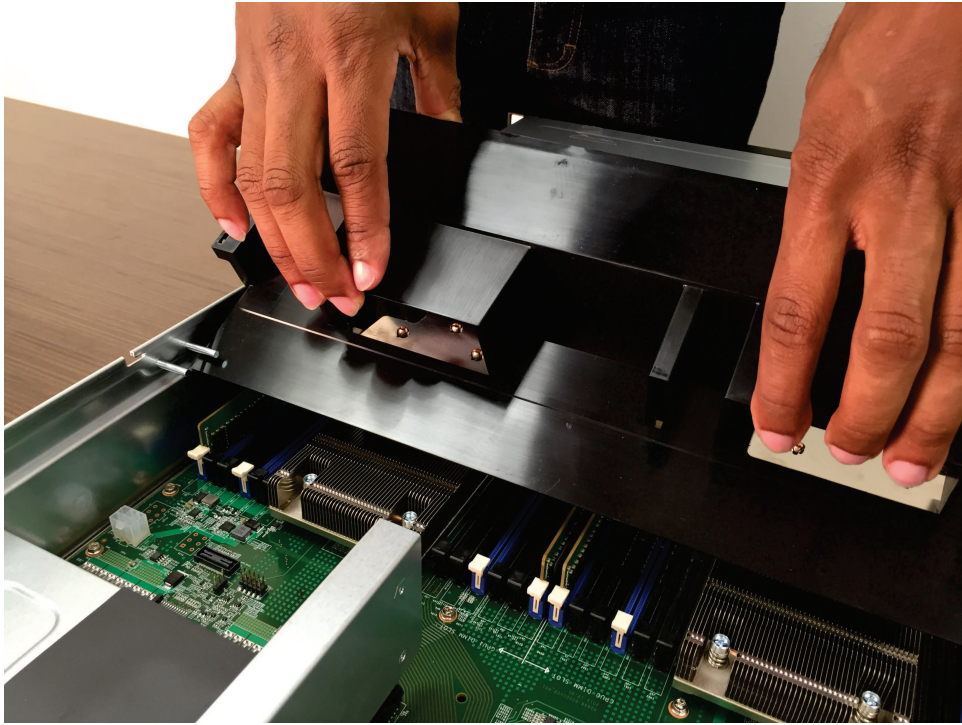
This service action assumes:

- You are not operating the 2145-SV1 node without the air baffle.
- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top back cover is removed.

To replace the air baffle, complete the following steps.

Procedure

1. Read the safety information.
2. Hold the air baffle at a slight angle to align it within the sides of the chassis, as shown in Figure 60 on page 77.



sv100118

Figure 60. Aligning the air baffle

3. Lower the air baffle into place; make sure that all cables are out of the way.
4. Press the air baffle down until it is securely seated, as shown in Figure 61 on page 78.

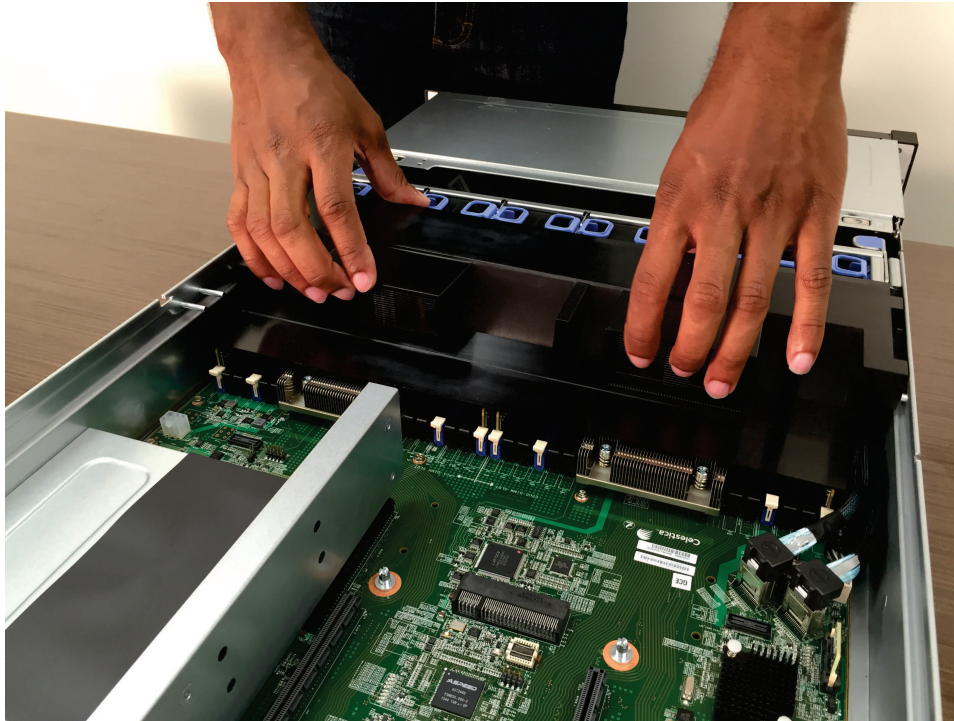


Figure 61. Replacing the air baffle

5. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
6. If you removed the node from the rack, replace it, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
7. If you removed any Fibre Channel or Ethernet cables, reconnect them to the same ports from which they were removed.
8. Reconnect the power cords. The node powers on when the cords are reconnected.

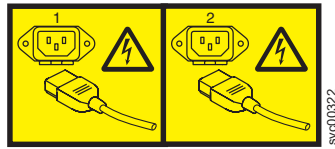
Replacing the air baffle: 2145-DH8

You can replace the air baffle on a SAN Volume Controller 2145-DH8 node.

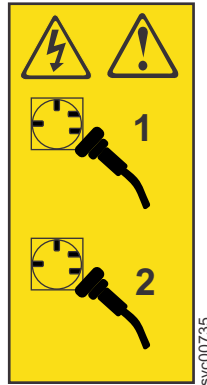
Before you begin

DANGER

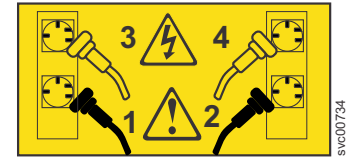
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- You are not operating the SAN Volume Controller 2145-DH8 without the air baffle.
- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top cover is removed.

To replace the air baffle, complete the following steps.

Procedure

1. Read the safety information.
2. Align the air baffle pins with the two baffle pin slots on both sides of chassis.
3. Lower the air baffle into place, as shown in Figure 62 on page 80, making sure that all cables are out of the way. Press the air baffle down until it is securely seated.

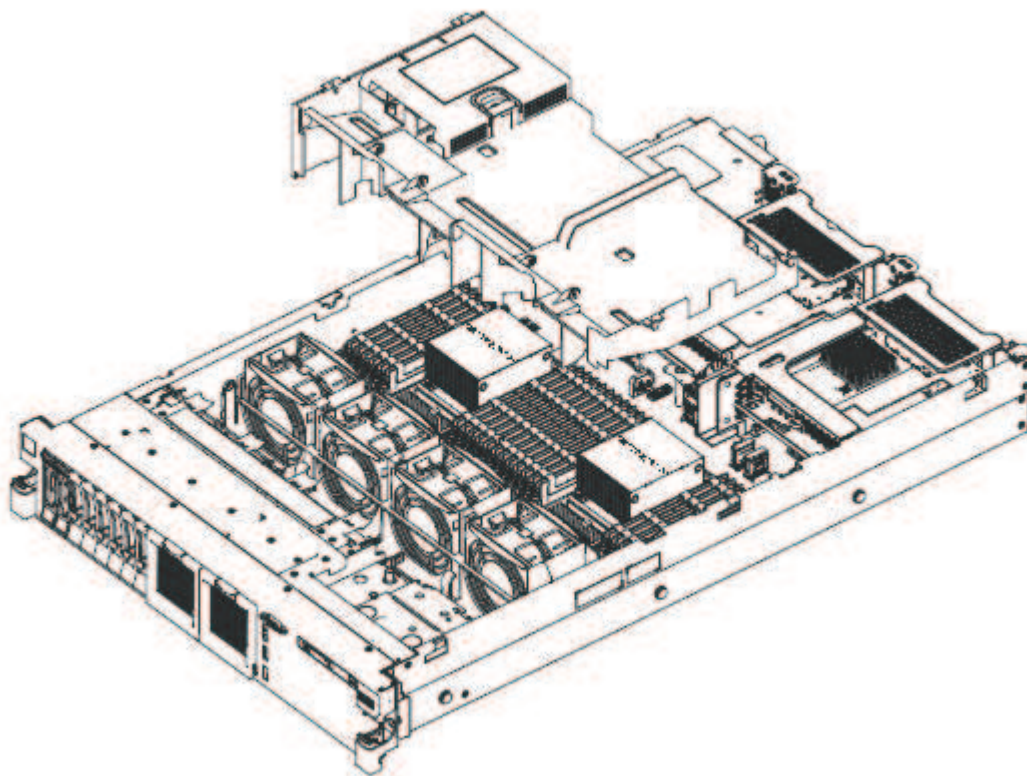


Figure 62. Replacing the air baffle

4. Replace the top cover.
5. If you removed the node from the rack, replace the node in the rack.
6. If you removed any Fibre Channel or Ethernet cables, replace them in the same ports from which they were removed.
7. If you removed the power cords, replace the power cords and the cable-retention brackets.
8. Lift the locking levers (**1** in Figure 63) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

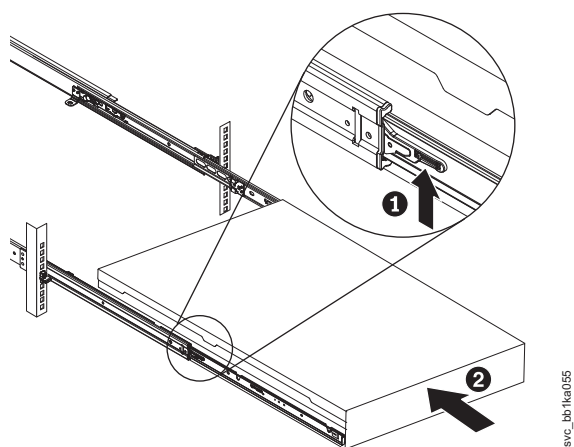


Figure 63. Raising the locking levers of the slide rails of the rack

9. Turn on the node.

Removing the bezel

You might be prompted to remove the bezel.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

Removing the bezel: 2145-DH8

You can remove the bezel on a SAN Volume Controller 2145-DH8 node.

Procedure

1. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.
2. Optionally remove the node from the rack. Pull the locking levers (**1** in Figure 64) forward, and pull the server forward along the slide rails.

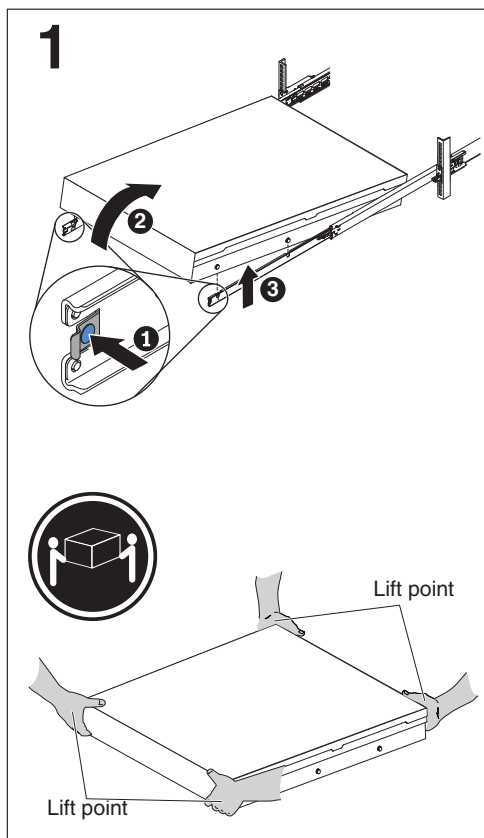


Figure 64. Removing the SAN Volume Controller 2145-DH8 from the rack

3. Remove the power cords and the cable-retention brackets, as described in Removing the cable-retention bracket.
4. To make sure that you can replace all cables in the same ports from which they were removed, record the position of all Fibre Channel, SAS, and Ethernet cables; then remove all cables from the back of the node.

5. Remove the node from the rack.
6. Remove the batteries.
7. Remove the screws on the top of the bezel, and lift the tabs on the bottom of the bezel out of the slots on the underside of the chassis, as shown in Figure 65.

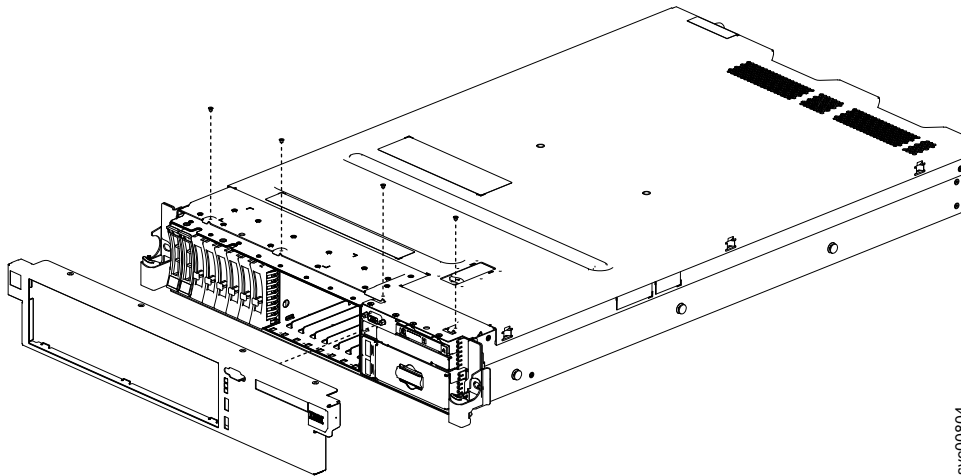


Figure 65. Removing the 2145-DH8 bezel

8. Remove the LED cable from the LED PCB on the back of the bezel assembly as shown in Figure 66.

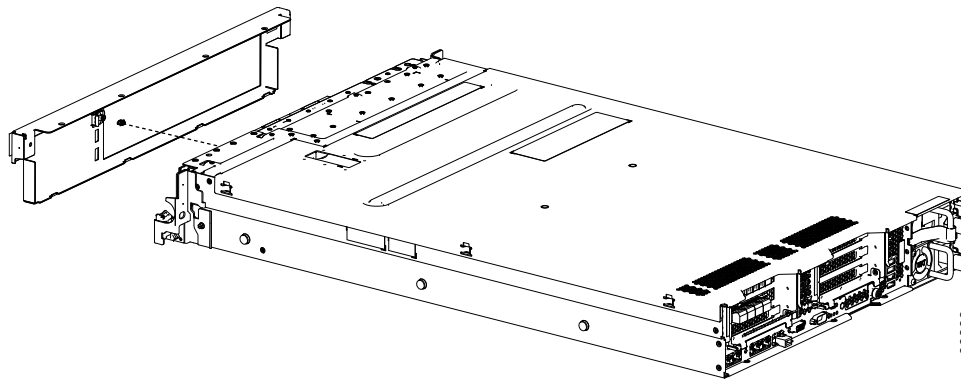


Figure 66. Removing the LED cable from the back of the bezel assembly

Replacing the bezel

You might be prompted to replace the bezel.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

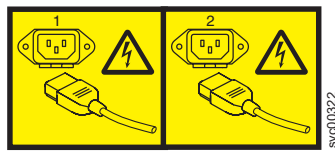
Replacing the bezel: 2145-DH8

You can replace the bezel on a SAN Volume Controller 2145-DH8 node.

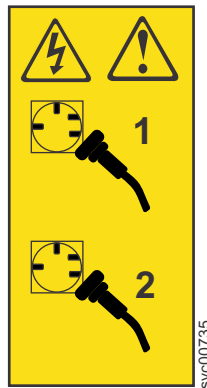
Before you begin

DANGER

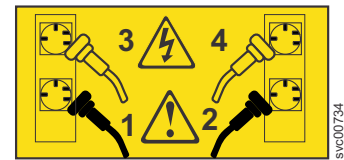
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The batteries are removed.

To replace the bezel, complete the following steps.

Procedure

1. Connect the LED cable to the LED PCB on the back of the bezel assembly as shown in Figure 67.

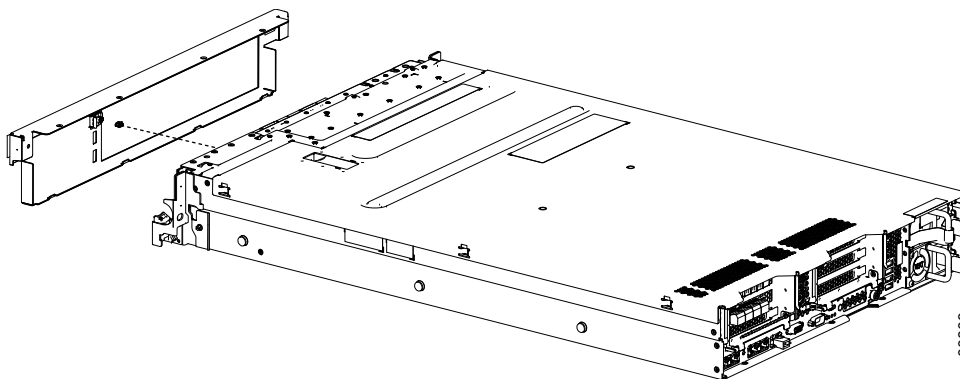


Figure 67. Connecting the LED cable to the back of the bezel assembly

2. Insert the tabs on the bottom of the bezel into the slots on the underside of the chassis, and attach it with the screws, as shown in Figure 68 on page 84.

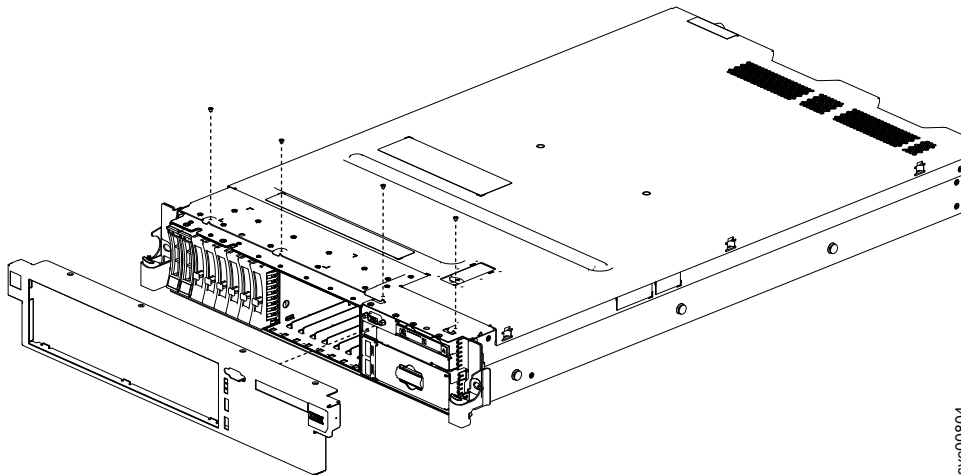


Figure 68. Replacing the SAN Volume Controller 2145-DH8 bezel

3. If the VGA connector bolts prevent the bezel from closing up to the chassis, remove them to complete the step and then install them again.
4. Replace the batteries.
5. If you removed the node from the rack, replace the node in the rack.
6. If you removed any Fibre Channel or Ethernet cables, using the labels that you placed on each cable, replace them in the same ports from which they were removed.
7. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in Replacing the cable-retention bracket.
8. Lift the locking levers (**1** in Figure 69) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

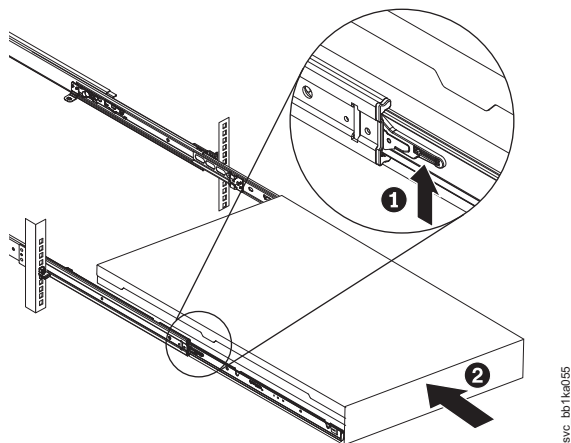


Figure 69. Raising the locking levers of the slide rails of the rack

9. Turn on the node.

Removing the 240 VA safety cover

You might need to remove the 240 VA safety cover.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

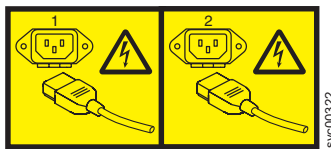
Removing the 240 VA safety cover: 2145-DH8

You can remove the 240 VA safety cover on a SAN Volume Controller 2145-DH8 node.

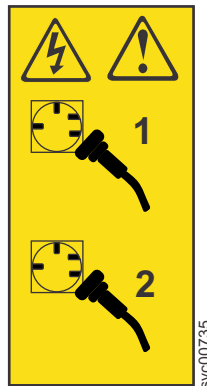
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cords and external cables are disconnected.
- The top cover is removed.
- The air baffle is removed.
- The PCI express rise-card assemblies are removed.

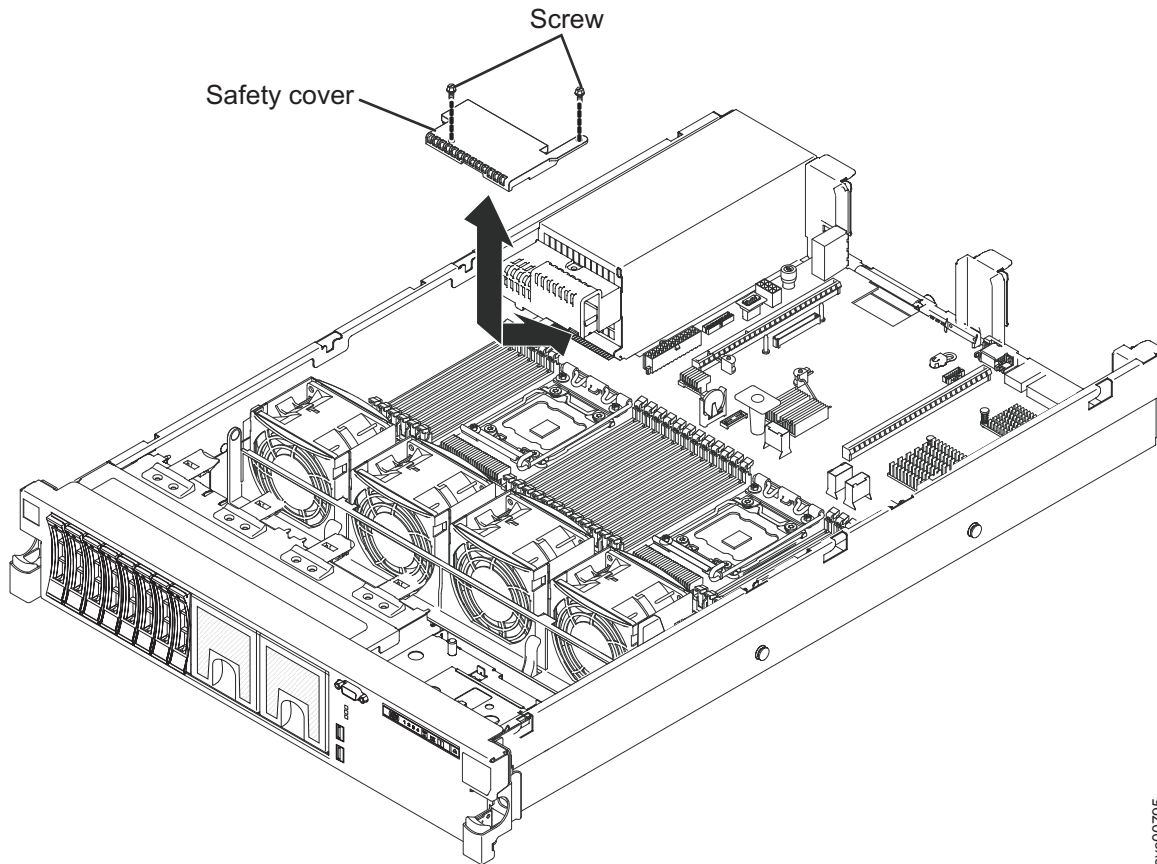


Figure 70. Removing the SAN Volume Controller 2145-DH8 240 VA safety cover

To remove the 240 VA safety cover, complete the following steps.

Procedure

1. Read the safety information.
2. Pull the server out of the rack.
3. Disconnect the hard disk drive backplane power cables from the connector in front of the safety cover.
4. Remove the screw from the safety cover.
5. Slide the cover forward to disengage it from the system board, and then lift it out of the server, as shown in Figure 70.
6. If you are instructed to return the 240 VA safety cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the 240 VA safety cover

You might need to replace the 240 VA safety cover.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see "Handling static-sensitive devices" on page xxiv.

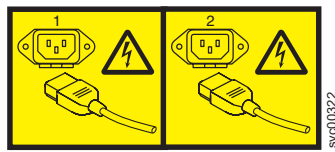
Replacing the 240 VA safety cover: 2145-DH8

You can replace the 240 VA safety cover on a SAN Volume Controller 2145-DH8 node.

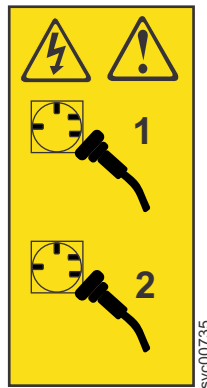
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

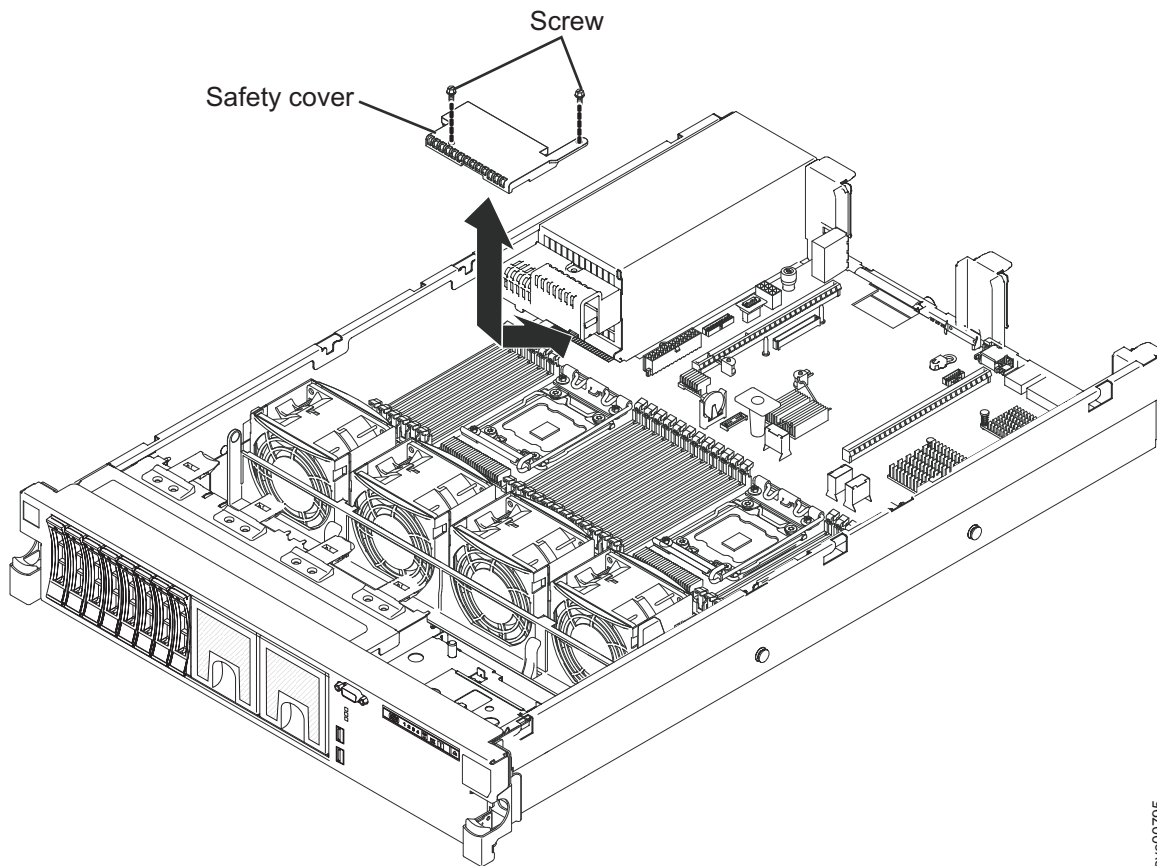
This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top cover is removed.
- The air baffle is removed.
- The PCI express rise-card assemblies are removed.

To replace the 240 VA safety cover, complete the following steps.

Procedure

1. Line up and insert the tabs on the bottom of the safety cover into the slots on the system board, as shown in Figure 71 on page 88.



svc00795

Figure 71. Replacing the SAN Volume Controller 2145-DH8 240 VA safety cover

2. Slide the safety cover toward the back of the SAN Volume Controller 2145-DH8 until it is secure.
3. Connect the power cables to the connector in front of the safety cover.
4. Install the screw into the safety cover.
5. Replace the PCI express rise-card assemblies.
6. Replace the air baffle.
7. Replace the top cover.
8. If you removed the node from the rack, replace the node in the rack.
9. If you removed any Fibre Channel or Ethernet cables, using the labels that you placed on each cable, replace them in the same ports from which they were removed.
10. If you removed the power cords, replace the power cords and the cable-retention brackets.
11. Lift the locking levers (**1** in Figure 72 on page 89) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

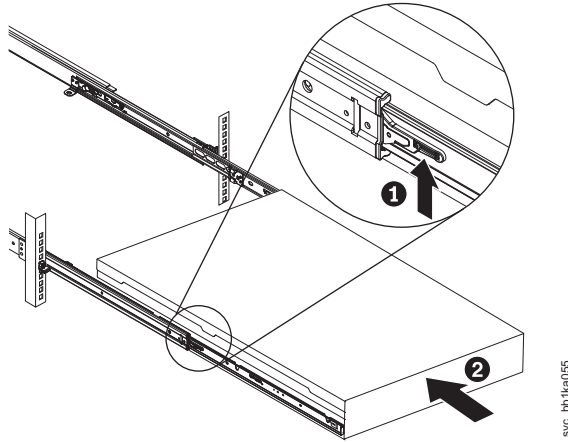


Figure 72. Raising the locking levers of the slide rails of the rack

12. Turn on the node.

Removing the memory modules (DIMM)

You can remove a memory module from any system node. The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

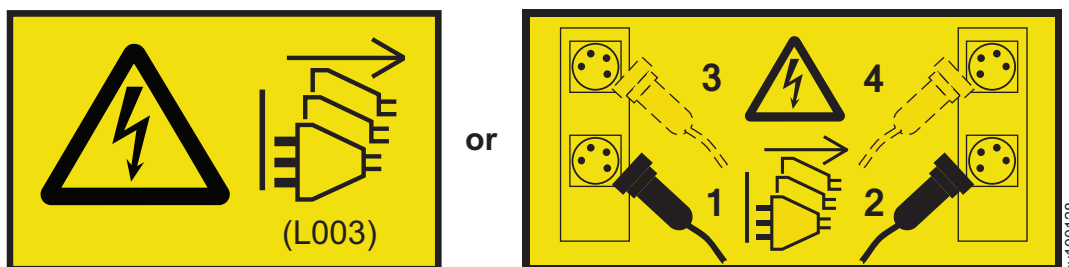
Removing the memory modules: 2145-SV1

You can remove a memory module from a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Review the following information before you begin the removal process.

- The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.
- Refer to Figure 73 on page 90 to locate the dual inline memory module (DIMM) that you want to replace.
 - The system has two processors (CPU0 and CPU1).
 - Each processor has four memory channels, which are labeled A-D.
 - Each memory channel has 3 DIMM slots, numbered 0-2. For example, DIMM slots A0, A1, and A2 are in memory slot A.

- On the system board, the DIMM slots are labeled according to their associated processor, memory channel, and slot. For example, the label “C0A0” identifies DIMM slot A0 for CPU0. If an error occurs, the error event also includes a similar identifier (for example, CPU0_DIMMA0 or CPU0DIMMA0).

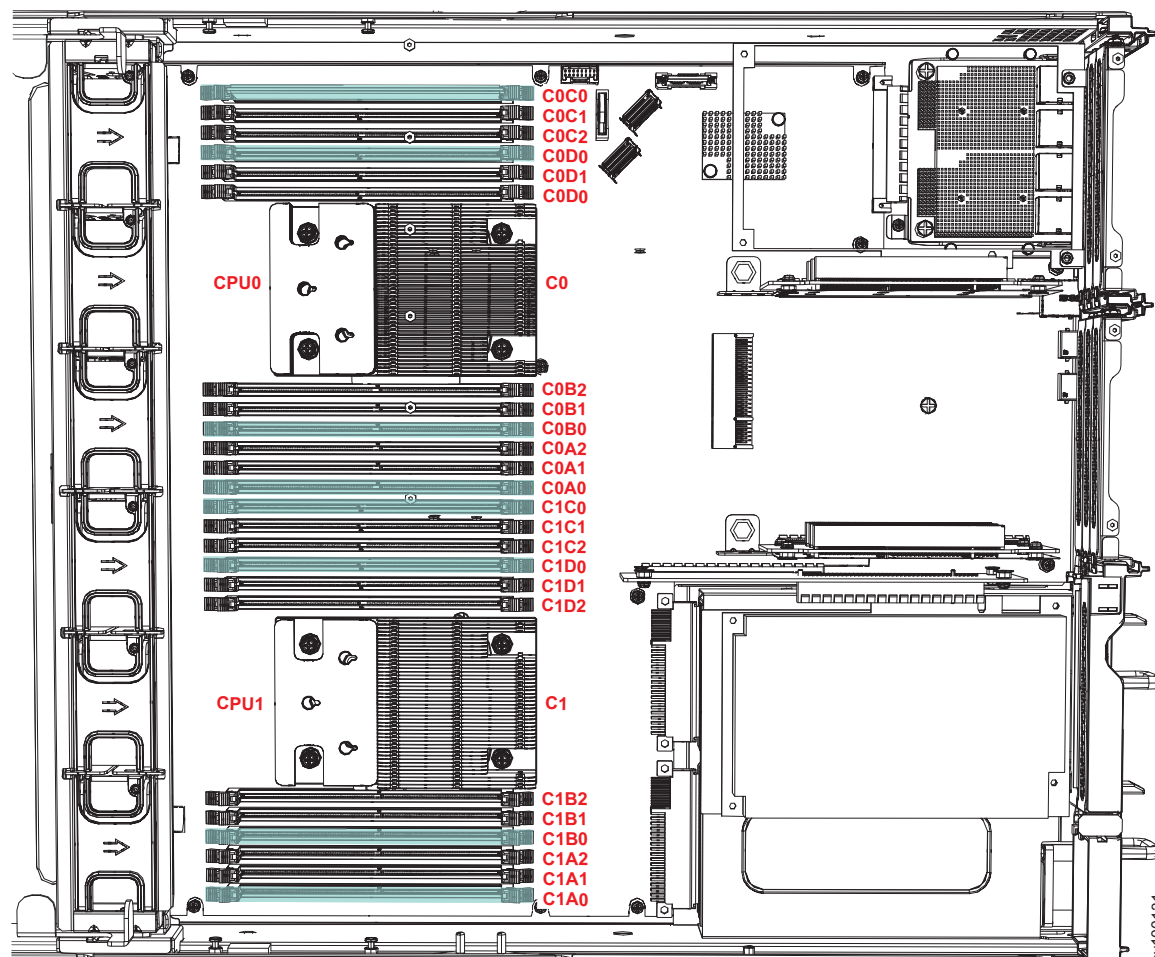


Figure 73. Locations of the DIMM connectors on the system board

- You do not have to replace all of the modules.

Attention: If a memory DIMM failure to any node is encountered during the update process, you might be required to remove and replace a memory module. Steps to recover the update when a DIMM failure occurs are described in the topic about updating in the IBM Knowledge Center.

About this task

Perform the following steps to remove the memory modules.

Procedure

1. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.
2. Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 35.
3. Remove the top cover, as described in “Removing the top covers: 2145-SV1” on page 66.

4. Remove the air baffle, as described in “Removing the air baffle: 2145-SV1” on page 71.
5. Press the locking tabs on the side of the DIMM to eject it, as shown in Figure 74.

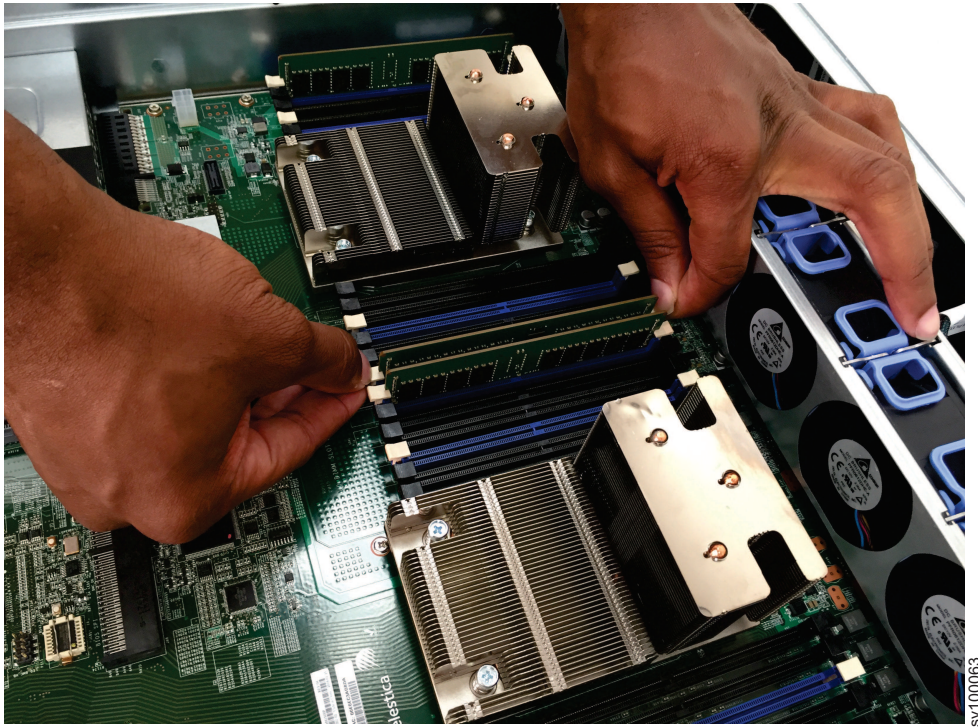


Figure 74. Ejecting a memory module

6. Lift the DIMM up and out of the slot, as Figure 75 on page 92 shows.

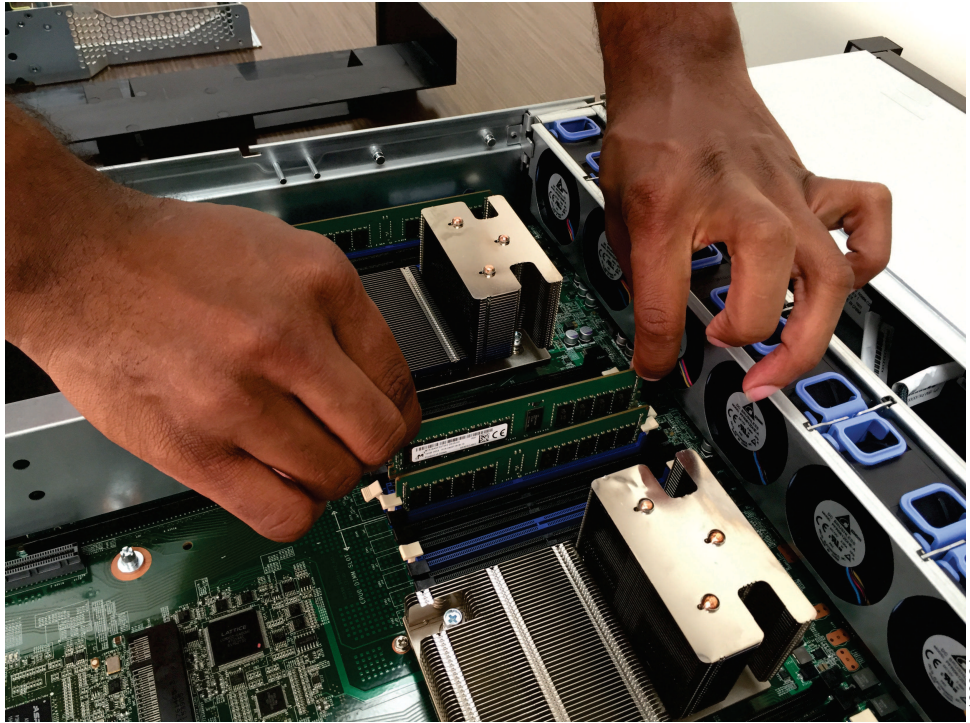


Figure 75. Removing a memory module

7. If you have other tasks to complete inside the SAN Volume Controller node, do those tasks now.

Removing the memory modules: 2145-DH8

You can remove a memory module from a SAN Volume Controller 2145-DH8 node.

Before you begin

Review the following information before you begin the removal process.

- The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.
- Locate the memory module that you want to replace. You do not have to replace all of the modules.
- If more than one DIMM is indicated by the light path diagnostics, replace the DIMMs one-at-a-time, starting at the lowest numbered DIMM slot that is indicated by the diagnostics. If the fault is isolated only to the bank of modules instead of to a particular module, exchange all modules of the bank.

Attention: If a memory DIMM failure to any node is encountered during the update process, you might be required to remove and replace a memory module. Steps to recover the update when a DIMM failure occurs are described in the topic about updating the system software in the Knowledge Center.

- The SAN Volume Controller 2145-DH8 node uses four modules in DIMM slots 1, 4, 9, and 12 (and four modules in slots 13, 16, 21, and 24 if the second processor is fitted), as shown in Figure 76 on page 93.

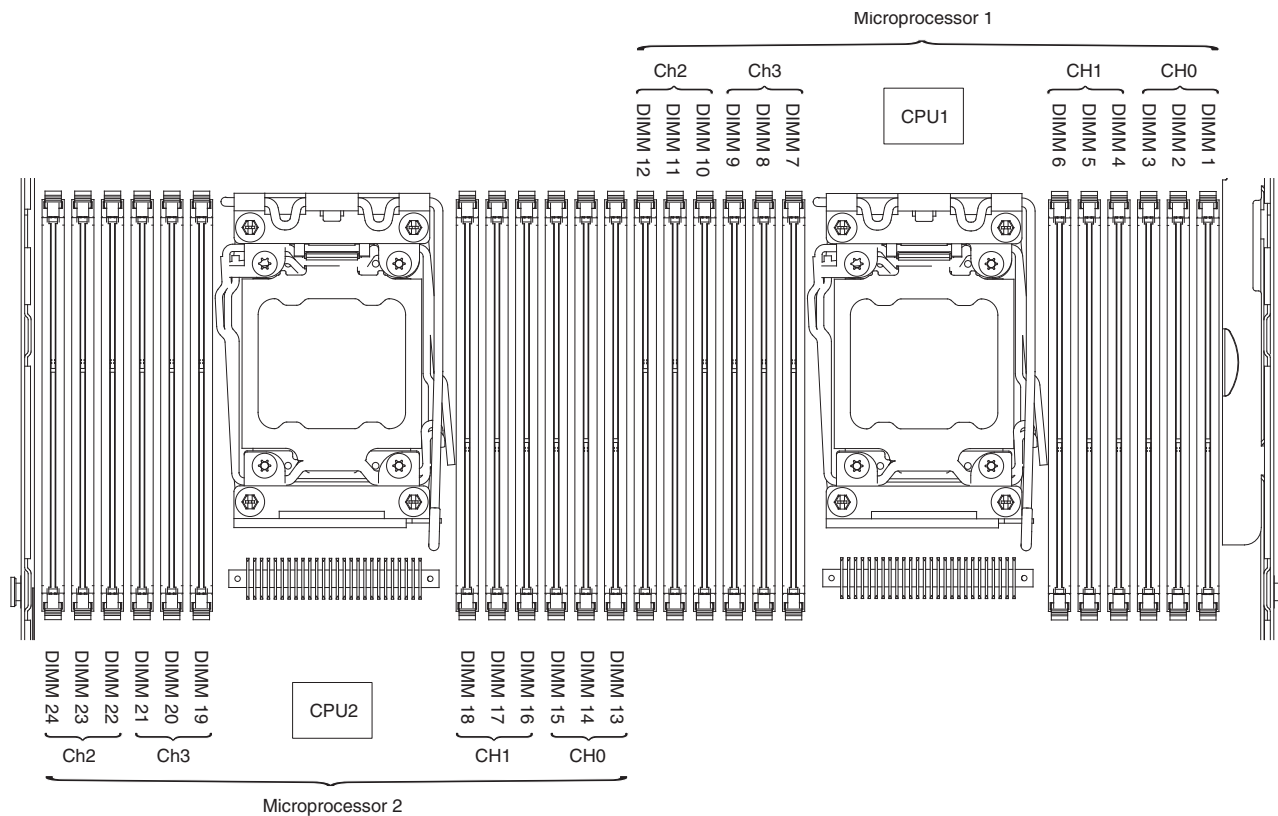


Figure 76. Locations of the DIMM connectors on the system board

About this task

Perform the following steps to remove the memory modules:

Procedure

1. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.
2. Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 35.
3. Remove the top cover. See “Removing the top cover” on page 66.
4. Lift the baffle up, making sure that the pin comes out of the pin hole on the system board to the left of DIMM connector 8.
5. Exchange the appropriate memory modules.
6. Open the clips **2** by pressing them outward, as shown in Figure 77 on page 94. This action pulls the memory module **3** out of the connector.

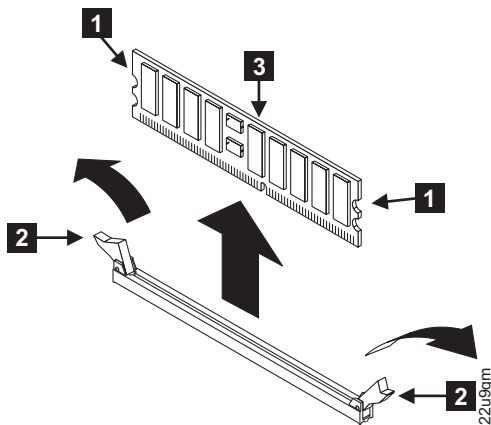


Figure 77. Removing the memory modules

- 1 Side connector latch
- 2 Memory clips
- 3 Memory module

7. If you have other tasks to complete inside the SAN Volume Controller node, do those tasks now.

Replacing the memory modules (DIMM)

You can replace the memory modules (DIMM) on system nodes. The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

Replacing the memory modules: 2145-SV1

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity when you replace the memory modules in a SAN Volume Controller 2145-SV1 node. You can also use this procedure to add more memory to your node.

Before you begin

Review Figure 78 on page 95 to identify the locations of the dual inline memory module (DIMM) connectors on the main board. If the DIMMs are not correctly configured into the slots, the node will not boot up.

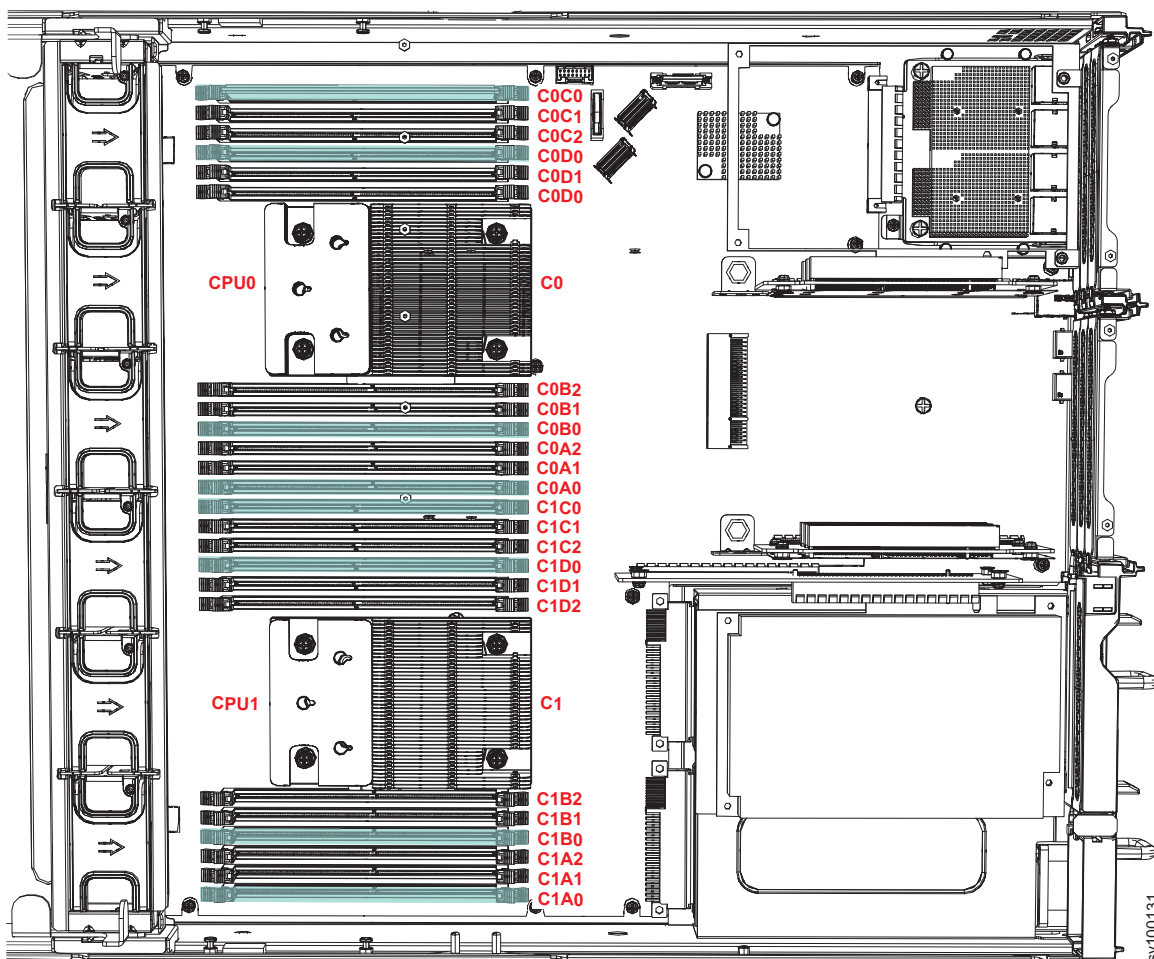


Figure 78. Locations of the DIMM connectors

Table 10 summarizes where to populate the 16 DIMM slots to add the memory RDIMM. Ensure that the DIMMs are evenly installed across the memory channels and CPUs.

Table 10. DIMM slots populated with the memory RDIMM

Memory	Populated DIMM slots
64 GB	A0, C0 (the outer blue slots for each processor)
128 GB	A0, C0, B0, D0 (all of the blue slots)
192 GB	A0, C0, B0, D0, A1, C1
256 GB	A0, C0, B0, D0, A1 C1, B1, D1

Important: If you are adding memory to a node, you must remove the node from the system configuration before you start the following procedure. To do so, you can use the management GUI or the CLI.

- To use the management GUI, right-click the node and select **Remove**.
- To use the CLI, enter the following command, where *node_id* | *node_name* identifies the node that receives the additional memory:

```
svctask rmnode node_id | node_name
```

If you are replacing a faulty DIMM with a new one from FRU stock, you do not need to remove the node from the system configuration.

Procedure

1. Remove PCIe riser assembly 1 and 2, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.
2. Remove the air baffle over the DIMMs, as described in “Removing the air baffle: 2145-SV1” on page 71.
3. Open the retaining clip on each end of the DIMM connector.
Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
4. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the file module. Remove the DIMM from the package.
5. Turn the DIMM so that the DIMM keys align correctly with the connector.
6. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector, as shown in Figure 79. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

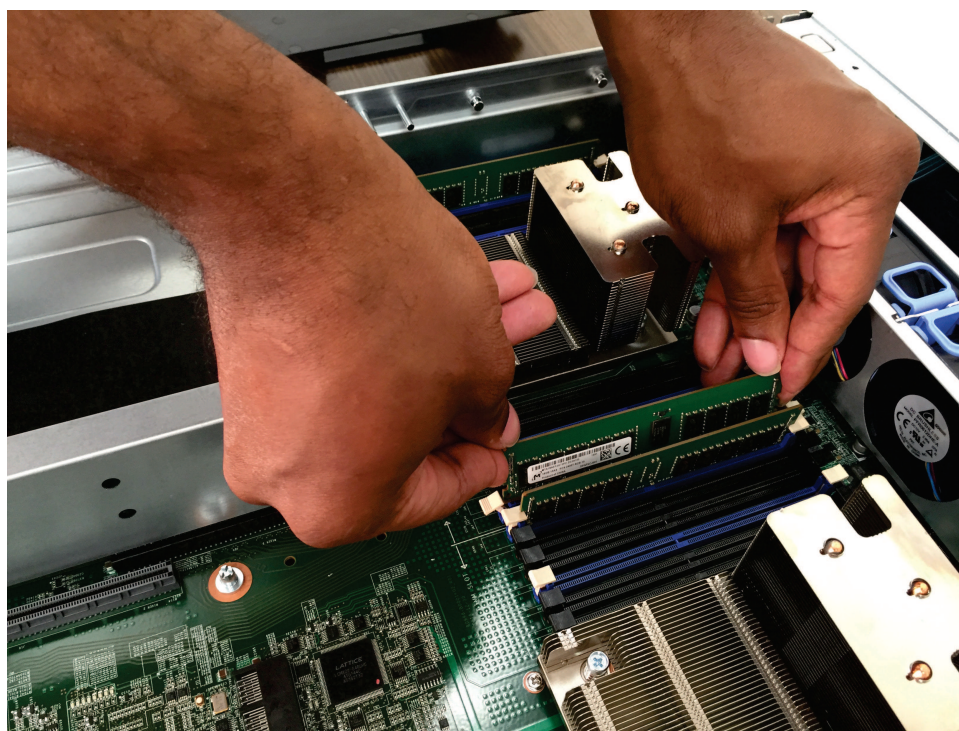


Figure 79. Installing the DIMM

Attention: If there is a gap between the DIMM and the retaining clips, the DIMM is not correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

7. Repeat steps 3 through 6 until all the new or replacement DIMMs are installed.
8. Replace the air baffle over the DIMMs, as described in “Replacing the air baffle: 2145-SV1” on page 75.
9. Replace PCIe riser assembly 1 and 2, as described “Replacing a PCI express riser-card assembly: 2145-SV1” on page 177.
10. Install the cover, as described in “Replacing the top covers: 2145-SV1” on page 69.

11. When the node is active again, go to the management GUI and look for any unfixed events that are related to the DIMMs.

Replacing the memory modules: 2145-DH8

The memory modules are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity when you replace the SAN Volume Controller 2145-DH8 memory modules. You can also use this procedure to add more memory to your node.

About this task

See Figure 80 for the locations of the DIMM connectors on the system board.

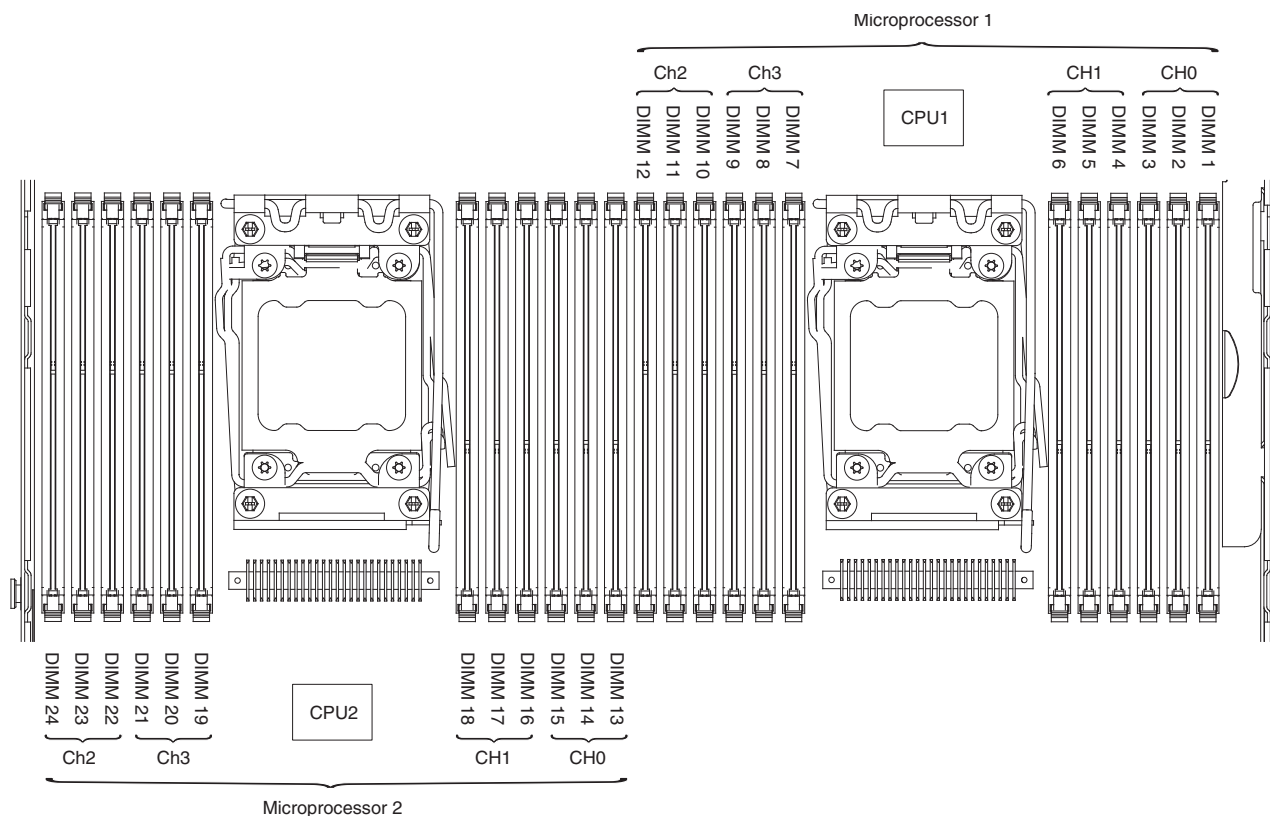


Figure 80. Locations of the DIMM connectors on the system board

Table 11 lists the eight DIMM slots that are populated with the memory RDIMM.

Table 11. DIMM slots populated with the memory RDIMM

Processor	DIMM Slot Number
1	1 - 8 GB RDIMM
	4 - 8 GB RDIMM
	9 - 8 GB RDIMM
	12 - 8 GB RDIMM
2 (if fitted)	13 - 8 GB RDIMM
	16 - 8 GB RDIMM
	21 - 8 GB RDIMM
	24 - 8 GB RDIMM

Note: Do not put any DIMM into DIMM slots 2, 3, 5, 6, 7, 8, 10, 11, or slots 13 - 24 if processor 2 is not fitted.

Important: If you are adding memory to a node, you must remove the node from the system configuration before you start the following procedure. To do so, you can use the management GUI or the CLI.

- To use the management GUI, right-click the node and select **Remove**.
- To use the CLI, enter the following command, where *node_id* | *node_name* identifies the node that receives the additional memory:

```
svctask rmnode node_id | node_name
```

If you are replacing a faulty DIMM with a new one from FRU stock, you do not need to remove the node from the system configuration.

Procedure

1. Remove the air baffle over the DIMMs.
2. Open the retaining clip on each end of the DIMM connector.
Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
3. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the file module, and then remove the DIMM from the package.
4. Turn the DIMM so that the DIMM keys align correctly with the connector.
5. Insert the DIMM into the connector by aligning the edges of the DIMM with the slots at the ends of the DIMM connector, as shown in Figure 81. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.

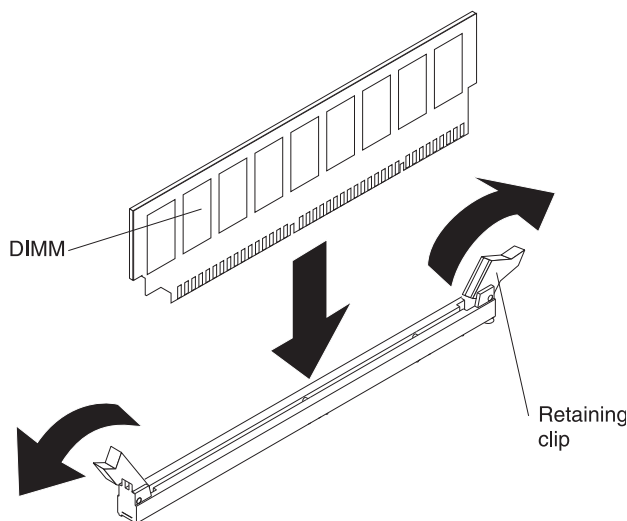


Figure 81. Installing the DIMM

Attention: If there is a gap between the DIMM and the retaining clips, the DIMM is not correctly inserted; open the retaining clips, remove the DIMM, and then reinsert it.

6. Repeat steps 1 through 5 until all the new or replacement DIMMs are installed.
7. Replace the air baffle over the DIMMs, making sure that all cables are out of the way.
8. Install the cover.
9. Slide the file module into the rack.

10. Go to the management GUI and look for any unfixed events that are related to the DIMMs.

Removing the boot drive

You might have to remove the boot disk drive to perform a service action.

About this task

The type of boot drive varies, depending on the type of node.

- SAN Volume Controller 2145-SV1 node use serial advanced technology attachment (SATA) boot drives.
- SAN Volume Controller 2145-DH8 nodes use serial attached SCSI (SAS) boot drives.

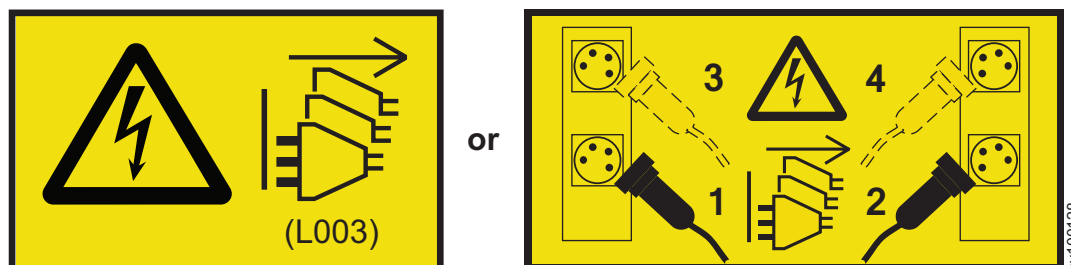
Removing the SATA boot drive: 2145-SV1

You can remove a serial advanced technology attachment (SATA) boot drive from the SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



About this task

Note: If you want to remove a drive without powering off the SAN Volume Controller 2145-SV1 node:

- Look at the hardware panel in the service assistant GUI and verify that this drive slot has **no** in the **Active** column.
- Shutdown or restart the node if the drive slot has **yes** in the **Active** column.

To remove a 2145-SV1 disk drive, complete the following steps.

Procedure

1. Read the safety information.
2. Make sure that the node covers are in place and fully closed.

Attention: To avoid damage to the disk-drive connectors, make sure that the node covers are in place and fully closed whenever you remove or replace a disk drive.

3. Press the release handle down to the open (unlocked) position, as shown in Figure 82 on page 100.



Figure 82. Operating the release handle on a 2145-SV1 boot drive

4. Gently pull the drive assembly from the slot, as shown in Figure 83.



Figure 83. Removing a 2145-SV1 boot drive

5. If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

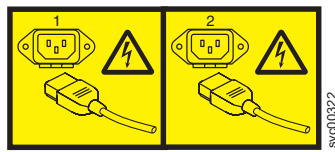
Removing the SAS boot drive: 2145-DH8

You can remove a serial attached SCSI (SAS) boot drive from the SAN Volume Controller 2145-DH8 node.

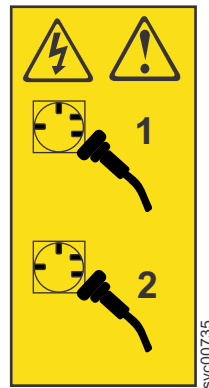
Before you begin

DANGER

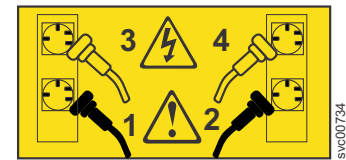
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



About this task

Note: If you want to remove a drive without powering off the SAN Volume Controller 2145-DH8 node:

- Look at the hardware panel in the service assistant GUI and verify that this drive slot has **no** in the **Active** column.
- Shutdown or restart the node if the drive slot has **yes** in the **Active** column.

To remove a 2145-DH8 disk drive, perform the following steps.

Procedure

1. Read the safety information.
2. Make sure that the node cover is in place and fully closed.
Attention: To avoid damage to the disk-drive connectors, make sure that the node cover is in place and fully closed whenever you remove or replace a disk drive.
3. Touch the static-protective package that contains the drive to any unpainted metal surface on the node; then, remove the drive from the package and place it on a static-protective surface.
4. Rotate the handle to the open (unlocked) position.
5. Gently pull the drive assembly from the slot, as shown in Figure 84 on page 102.

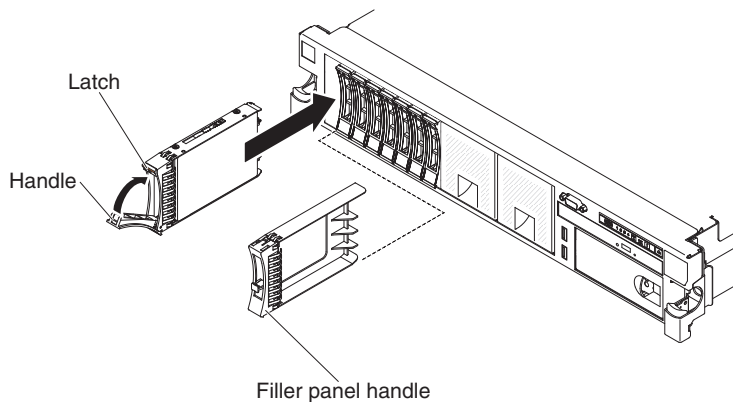


Figure 84. Removing a 2145-DH8 boot drive

6. If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the boot drive

You might have to replace the boot disk drive after you complete a service action.

About this task

The type of boot drive varies, depending on the type of node.

- SAN Volume Controller 2145-SV1 nodes use serial advanced technology attachment (SATA) boot drives.
- SAN Volume Controller 2145-DH8 nodes use serial attached SCSI (SAS) boot drives.

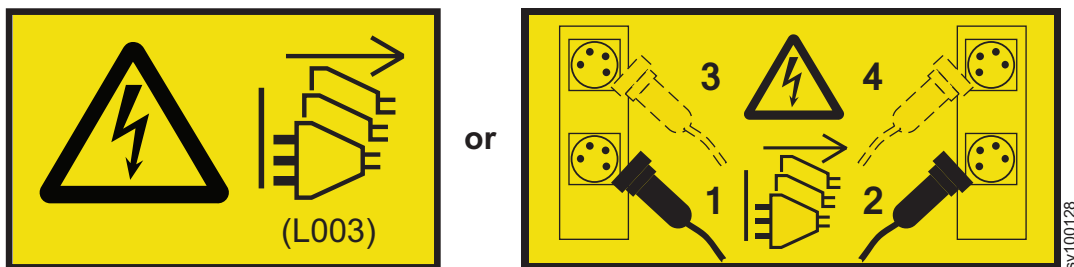
Replacing the SATA boot drive: 2145-SV1

You can replace a serial advanced technology attachment (SATA) boot drive for the SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



About this task

Review the following considerations before when you install a hard disk drive (boot drive) in the 2145-SV1 node.

Notes:

- Locate the documentation that comes with the disk drive.
- Install the boot drive in drive bay 1 or 2 in the 2145-SV1 node.
- Avoid changing both boot drives at the same time. If you do, contact IBM Remote Technical support to help you install the software on the node.
- Do not use a drive that is already used in another node.
- Do not swap the two boot drives between slots.
- Do not install a boot drive in slots 3 - 8.
- Do not replace both boot drives and the system board with FRUs all at the same time. If you do, then all Vital Product Data on the node is lost and the whole node needs to be replaced.

To replace a SAN Volume Controller 2145-SV1 disk drive, complete the following steps.

Procedure

1. Read the safety information.
2. Make sure that the node cover is in place and fully closed.
Attention: To avoid damage to the disk-drive connectors, make sure that the node cover is in place and fully closed whenever you remove or replace a disk drive.
3. Touch the static-protective package that contains the drive to any unpainted metal surface on the node; then, remove the drive from the package and place it on a static-protective surface.
4. Align the drive assembly within the drive slot, as Figure 85 shows.



Figure 85. Aligning the 2145-SV1 boot drive

5. Gently push the drive assembly into the slot until the drive stops, as shown in Figure 86 on page 104.



Figure 86. Replacing a 2145-SV1 boot drive

6. Lift the release handle to the closed (locked) position, as Figure 87 shows.



Figure 87. Closing the release handle on a 2145-SV1 boot drive

7. If you removed the node from the rack, replace it, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
8. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the node. Make sure that all internal cables are correctly routed. If you disconnected the Fibre Channel and Ethernet cables, make sure that each cable is reconnected to the same port from which it was removed.
9. If you removed the power cords, replace them. The node automatically reboots when power is reconnected. If this drive was a clean, new FRU drive, the node rejoins the system. If this drive was already in this node, then a node error might occur.

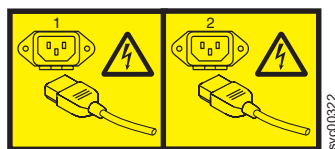
Replacing the SAS boot drive: 2145-DH8

You can replace a serial attached SCSI (SAS) boot drive for the SAN Volume Controller 2145-DH8 node.

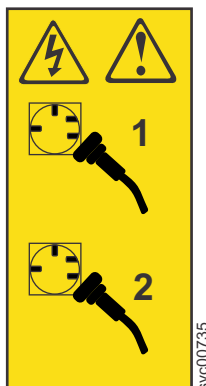
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



About this task

The following notes describe information that you must consider when you install a hard disk drive (boot drive) in the SAN Volume Controller 2145-DH8:

Notes:

- Locate the documentation that comes with the disk drive.
- Install the boot drive in drive bay 1 or 2 in the SAN Volume Controller 2145-DH8 node.
- Avoid changing both boot drives at the same time. If you do, contact IBM Remote Technical support to help you install the software on the node.
- Do not use a drive that is already used in another node.
- Do not swap the two boot drives between slots.
- Do not install a boot drive in slots 3 - 8.
- Do not replace both boot drives and the system board with FRUs all at the same time. If you do, then all Vital Product Data on the node is lost and the whole node needs to be replaced.

To replace a SAN Volume Controller 2145-DH8 disk drive, complete the following steps:

Procedure

1. Read the safety information.
2. Make sure that the node cover is in place and fully closed.

Attention: To avoid damage to the disk-drive connectors, make sure that the node cover is in place and fully closed whenever you remove or replace a disk drive.

Specifying `chnodebootdrive -sync` reboots a specified node. This reboot is not successful if any volume is dependent on that node.

Note: Note: If `chnodebootdrive -force` is also specified, the system does not check for dependent volumes.

3. Touch the static-protective package that contains the drive to any unpainted metal surface on the node; then, remove the drive from the package and place it on a static-protective surface.

4. Make sure that the disk-drive handle is in the open (unlocked) position, as shown in Figure 88.

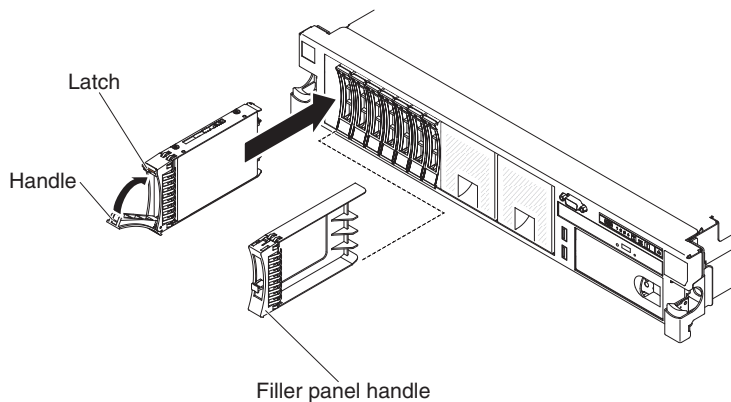


Figure 88. Replacing a SAN Volume Controller 2145-DH8 boot drive

5. Align the drive assembly with the guide rails in the drive slot.
6. Gently push the drive assembly into the slot until the drive stops.
7. Rotate the handle to the closed (locked) position.
8. If you removed the node from the rack, replace the node in the rack.
9. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the node. Make sure that all internal cables are correctly routed. If you disconnected the Fibre Channel and Ethernet cables, make sure that each cable is reconnected to the same port from which it was removed.
10. If you removed the power cords, replace the power cords.
11. Turn on the node. If this drive was a clean, new FRU drive, then the node rejoins the system. If this drive was already in this node, then a node error might occur.

Removing the drive backplane

You might need to remove the drive backplane in a node.

Before you begin

The type of backplane varies for each node.

- A SATA drive backplane is installed in a SAN Volume Controller 2145-SV1 node.
- A disk-drive backplane backplane is installed on a SAN Volume Controller 2145-DH8 node.

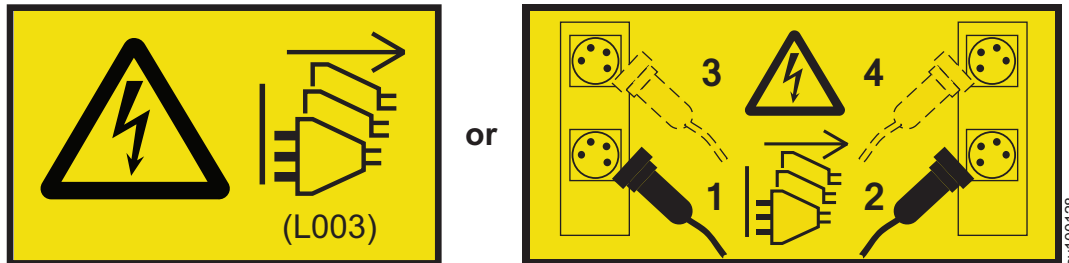
Removing the SATA drive backplane and cables: 2145-SV1

You can remove the SATA drive backplane and cables on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



This service action assumes that the following conditions exist.

- The node is turned off. Ensure that hosts do not lose access to data in volumes by following the procedure that is described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.

About this task

Procedure

To remove the SAN Volume Controller 2145-SV1 SATA drive backplane, complete the following steps.

1. Read the safety information.
2. Remove both of the top covers, as described in “Removing the top covers: 2145-SV1” on page 66.
3. Pull the boot drives out of the node slightly to disengage them from the drive backplane.
4. Remove PCI express riser assembly 1 and PCI express riser assembly 2, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.
5. Remove the air baffle, as described in “Removing the air baffle: 2145-SV1” on page 71.
6. Remove the fan bracket, as described in “Removing the fan bracket: 2145-SV1” on page 218.
7. Remove fans 1 and 2, as described in “Removing the fans: 2145-SV1” on page 209.
8. Lift the two front tabs and rotate the backplane assembly toward the rear of the node to remove it, as shown in Figure 89 on page 108.

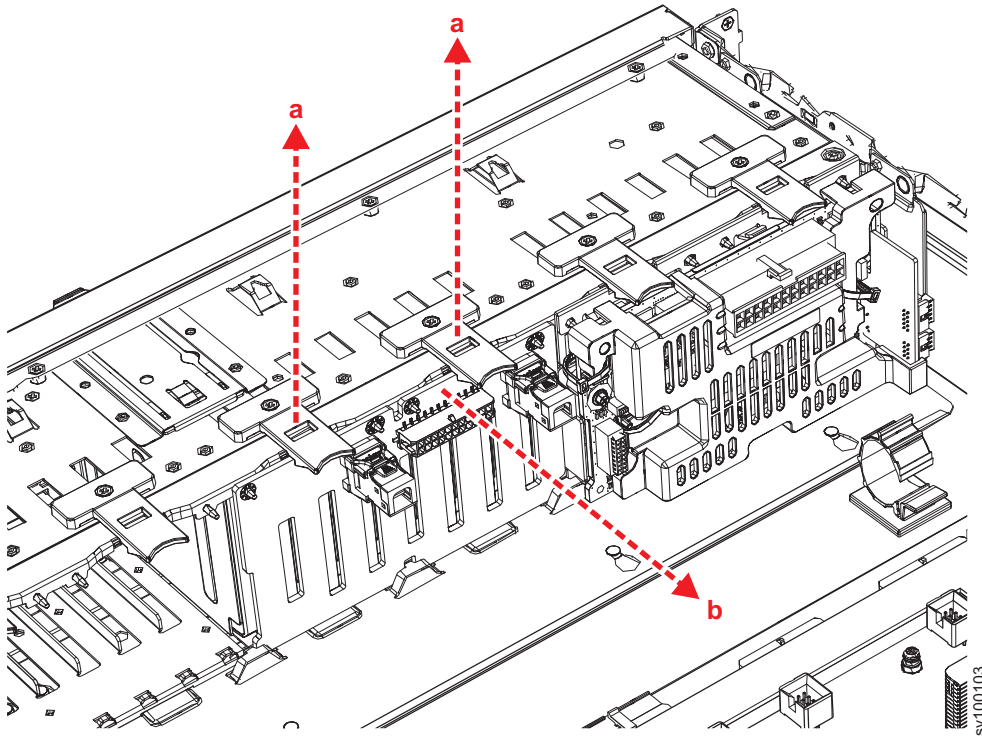


Figure 89. Removing the 2145-SV1 SATA drive backplane

9. Disconnect all cables from the SATA drive backplane. Figure 90 shows the location of the SATA drive backplane and connectors.

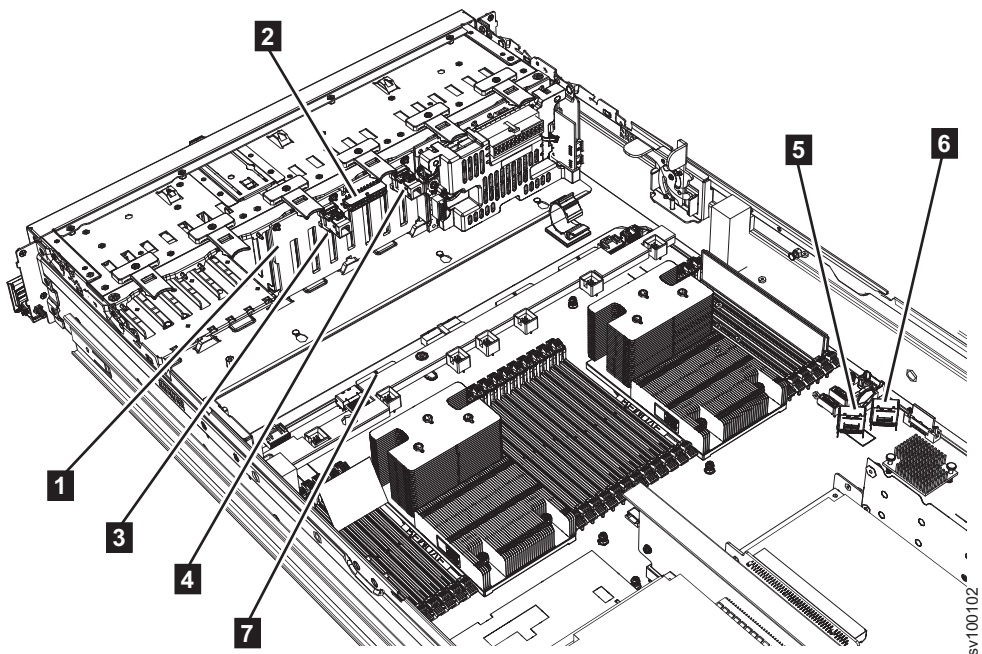


Figure 90. The 2145-SV1 SATA drive backplane and connectors

- 1** SATA drive backplane

- 2** SATA drive backplane power cable connector on the SATA drive backplane
 - 3** SATA drive backplane SATA cable connector 2
 - 4** SATA drive backplane SATA cable connector 1
 - 5** SATA cable connector 2 on the main board
 - 6** SATA cable connector 1 on the main board
 - 7** SATA drive backplane power cable connector on the main board
10. If you are instructed to return the SATA backplane assembly, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

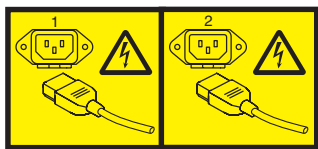
Removing the disk-drive backplane: 2145-DH8

You can remove the SAN Volume Controller 2145-DH8 disk-drive backplane, which includes the SAS backplane.

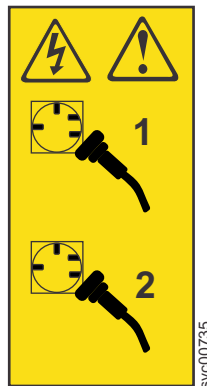
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



This service action assumes that the following conditions exist:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.

About this task

Procedure

To remove the SAN Volume Controller 2145-DH8 disk-drive backplane, complete the following steps:

1. Read the safety information.
2. Turn off the server and peripheral devices and disconnect the power cords and all external cables, if necessary.
3. Remove the top cover.
4. Pull the hard disk drives out of the server slightly to disengage them from the hard disk drive backplane assembly/backplane.
5. To obtain more working room, remove the fans.

6. Lift the two front tabs and rotate the backplane assembly/backplane toward the rear of the server to remove the backplane assembly/backplane, as shown in Figure 91.

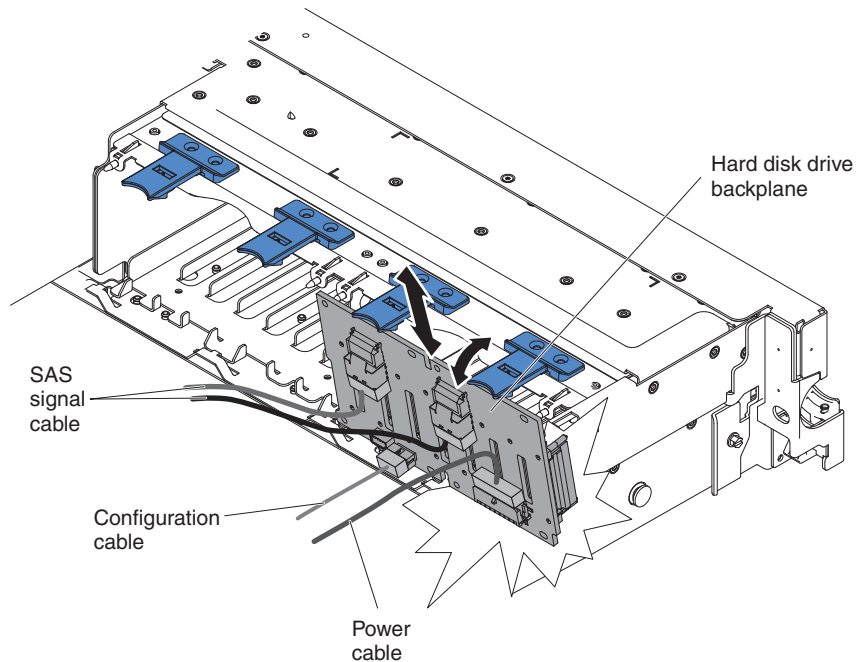


Figure 91. The 2145-DH8 disk drive backplane

7. Disconnect all cables from the hard disk drive backplane.
8. If you are instructed to return the hard disk drive backplane assembly/backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the drive backplane

You might have to replace the drive backplane on a node.

Before you begin

The type of backplane varies for each node.

- A SATA drive backplane is installed in a SAN Volume Controller 2145-SV1 node.
- A disk-drive backplane backplane is installed on a SAN Volume Controller 2145-DH8 node.

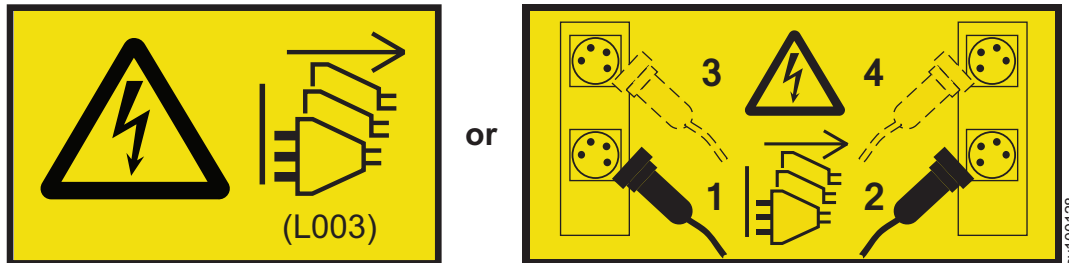
Replacing the SATA drive backplane and cables: 2145-SV1

You can replace the SATA drive backplane and cables on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



This service action assumes that the following conditions exist.

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top covers are removed, as described in “Removing the top covers: 2145-SV1” on page 66.

If you need to replace the SATA cables, the following conditions must also be met.

- The PCI express riser assembly 1 is removed, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.
- The air baffle is removed, as described in “Removing the air baffle: 2145-SV1” on page 71.
- The fan cage assembly is removed, as described in “Removing the fan bracket: 2145-SV1” on page 218.

About this task

Procedure

Figure 92 on page 112 shows the location of the SATA drive backplane and connectors. To replace the disk-drive backplane, complete the following steps.

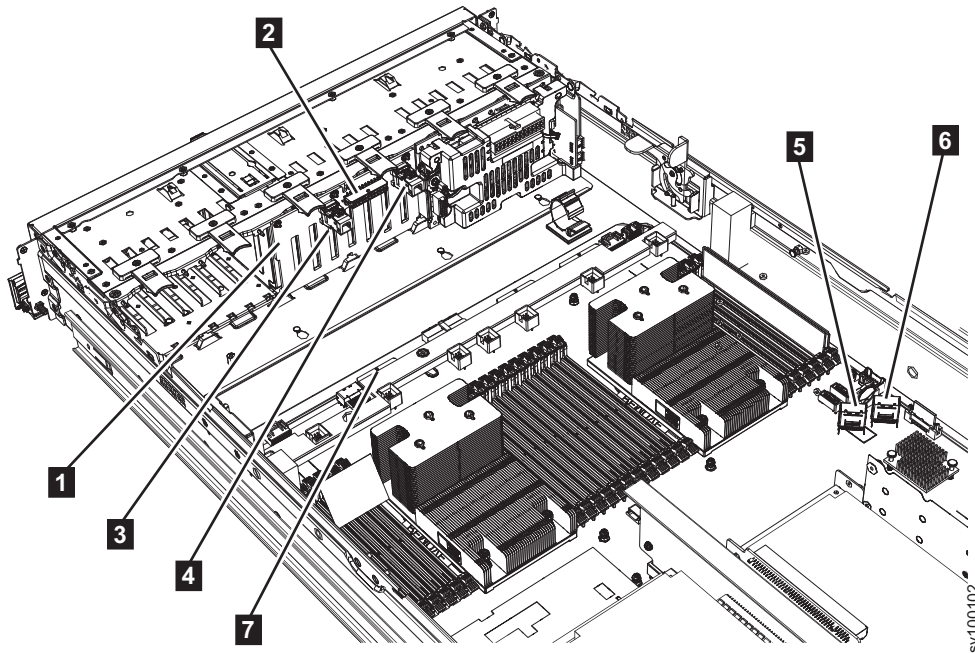


Figure 92. 2145-SV1 SATA drive backplane

- 1** SATA drive backplane
 - 2** SATA drive backplane power cable connector on the SATA drive backplane
 - 3** SATA drive backplane SATA cable connector 2
 - 4** SATA drive backplane SATA cable connector 1 (connects to SATA cable connector 1 on the main board)
 - 5** SATA cable connector 2 on the main board
 - 6** SATA cable connector 1 on the main board
 - 7** SATA drive backplane power cable connector on the main board
1. Connect the power and signal cables to the replacement backplane.

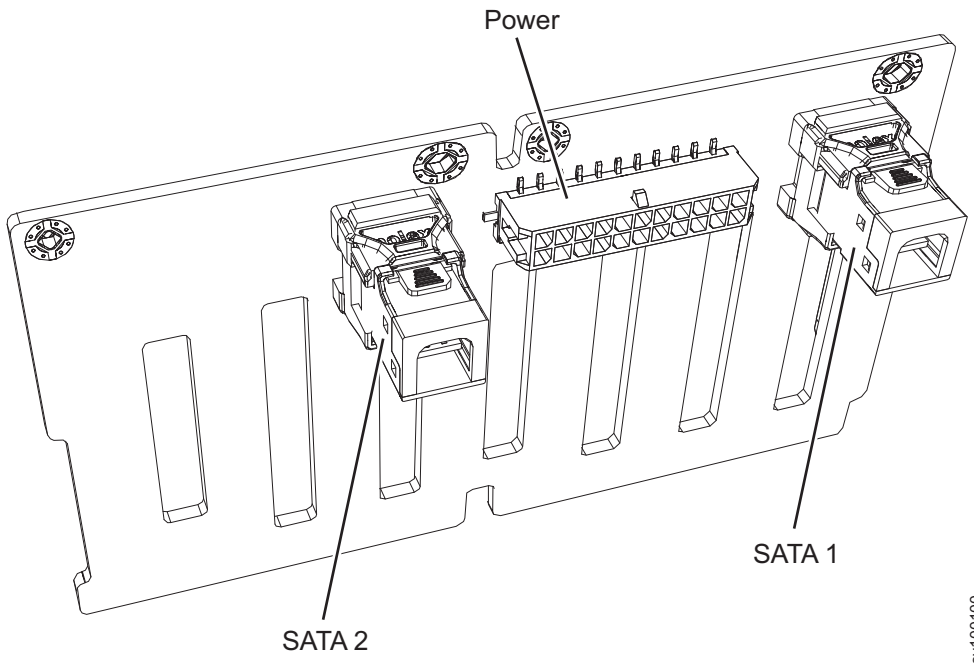


Figure 93. Power and cable connectors on the 2145-SV1 disk drive backplane

2. Align the backplane with the backplane slot in the chassis and the small slots on top of the hard disk drive cage.
3. Lower the backplane into the slots on the chassis.
4. Rotate the top of the backplane until the front tab clicks into place into the latches on the chassis.
 - a. Use one of the SATA cables to connect SATA 1 on the backplane to SATA 1 on the main board (that is, the leftmost SATA connectors as viewed from the front of the 2145-SV1).
 - b. Use the other SATA cable to connect SATA 2 on the backplane to SATA 2 on the main board (that is, the rightmost SATA connectors as viewed from the front of the 2145-SV1).
 - c. Connect the SATA drive backplane power cable between the backplane and the main board.
5. If you removed the fans, reinstall them, as described in “Replacing the fans: 2145-SV1” on page 213.
6. Reinstall the covers, as described in “Replacing the top covers: 2145-SV1” on page 69.
7. Reinstall the disk drives and drive-bay blank electromagnetic compatibility (EMC) filler assemblies.
8. If you removed the node from the rack, replace the node in the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
9. If you removed any Fibre Channel or Ethernet cables, use the labels on each cable to replace them in the same ports from which they were removed.
10. If the node fault LED comes on after you power on the 2145-SV1, then look for the node error code in the service assistant GUI through the technician port.
 - a. If the node error is 543, then check which slots the boot drives appear to be in by using the boot drive information section of the service assistant GUI. If the boot drives appear to be in drive slots 5 and 6, then SATA 2 on the backplane is mistakenly connected to SATA 1 on the main board.

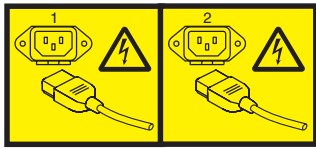
Replacing the disk-drive backplane: 2145-DH8

You can replace the SAN Volume Controller 2145-DH8 disk-drive backplane, which includes the SAS backplane.

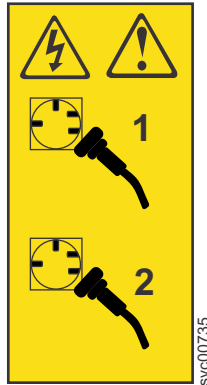
Before you begin

DANGER

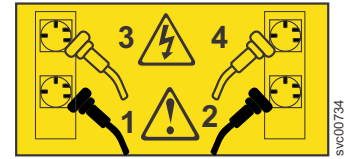
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



This service action assumes that the following conditions exist:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top cover is removed.

About this task

Procedure

To replace the SAN Volume Controller 2145-DH8 disk-drive backplane, complete the following steps:

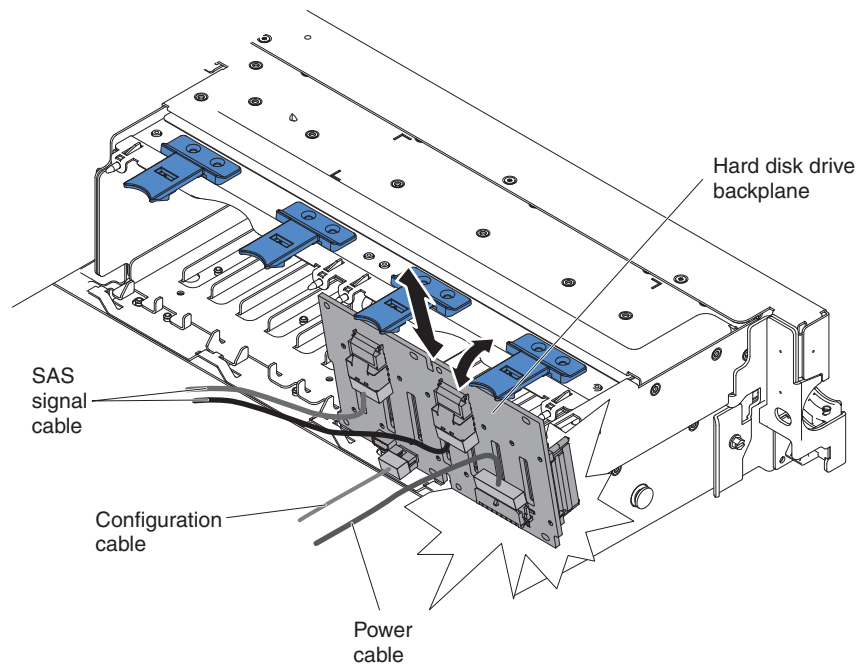


Figure 94. The 2145-DH8 disk drive backplane

1. Connect the power and signal cables to the replacement backplane.
2. Align the backplane with the backplane slot in the chassis and the small slots on top of the hard disk drive cage.
3. Lower the backplane into the slots on the chassis.
4. Rotate the top of the backplane until the front tab clicks into place into the latches on the chassis.
5. Reinstall the fans if you removed them.
6. Reinstall the cover.
7. Reinstall the disk drives and drive-bay blank electromagnetic compatibility (EMC) filler assemblies.
8. If you removed the node from the rack, replace the node in the rack.
9. If you removed any Fibre Channel or Ethernet cables, use the labels on each cable to replace them in the same ports from which they were removed.
10. If you removed the power cords, replace the power cords.
11. Lift the locking levers (**1** in Figure 95 on page 116) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

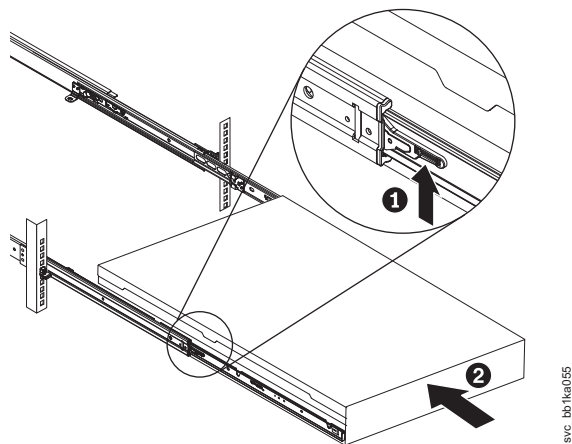


Figure 95. Raising the 2145-DH8 locking levers of the slide rails of the rack

12. Turn on the node.

Removing the battery backplane and cables

You can remove the battery backplane and cables on a SAN Volume Controller 2145-SV1 or SAN Volume Controller 2145-DH8 node.

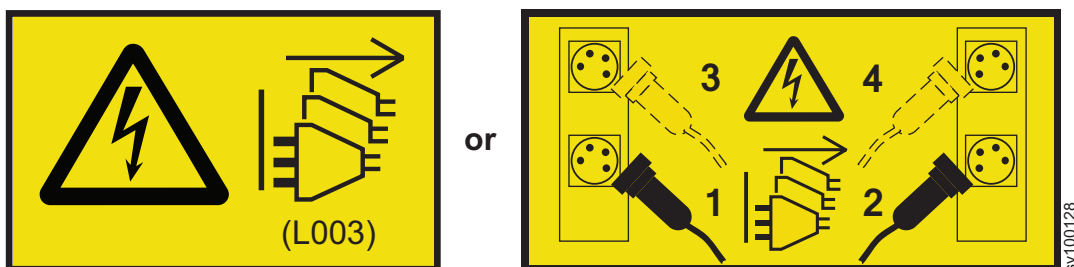
Removing the battery backplane and cables: 2145-SV1

You can remove the battery backplane and cables in a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



This service action assumes that the following conditions are met.

- The node is turned off. Ensure that its data is mirrored and synchronized, and that there are no dependent volumes, as described in MAP 5350: Powering off a node.
- The power cables are disconnected.
- The top covers are removed, as described in “Removing the top covers: 2145-SV1” on page 66.
- The batteries are removed, as described in “Removing the battery: 2145-SV1” on page 142.
- The PCI express riser assemblies 1 and 2 are removed, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.
- The air baffle is removed, as described in “Removing the air baffle: 2145-SV1” on page 71.

- The fan cage assembly is removed, as described in “Removing the fan bracket: 2145-SV1” on page 218.

About this task

To remove the SAN Volume Controller 2145-SV1 battery backplane or the attached cables, complete the following steps, as needed. Figure 96 shows the location of the battery backplane and the cable connectors.

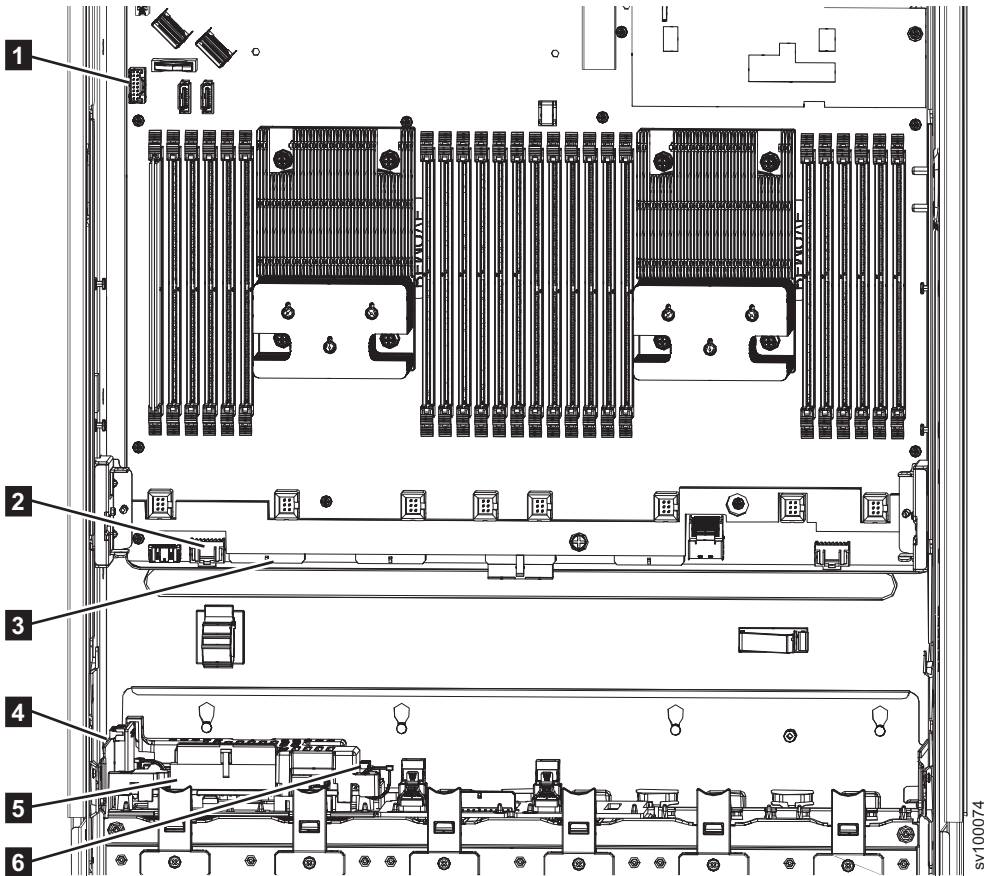


Figure 96. 2145-SV1 battery backplane and cable connectors

- 1** Low Pin Count (LPC) cable connector on the main board
- 2** Battery backplane power sense cable connector on the main board
- 3** Battery backplane power cable connector on the main board
- 4** Battery backplane power sense cable connector on the battery backplane
- 5** Battery backplane power cable connector on the battery backplane
- 6** Battery backplane LPC cable connector on the battery backplane

Figure 97 on page 118 shows the battery backplane and several cables.

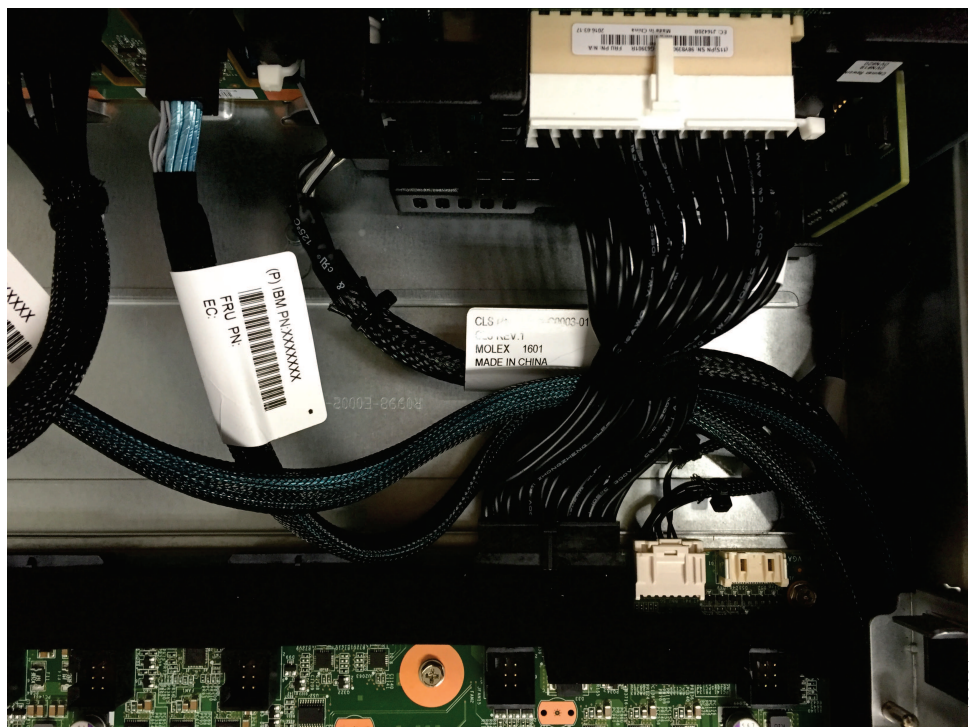


Figure 97. 2145-SV1 backplane and cables

Procedure

1. Raise the blue locking tabs and slightly pull back the battery backplane, as shown in Figure 98 on page 119. Then, lift the battery backplane from the chassis.

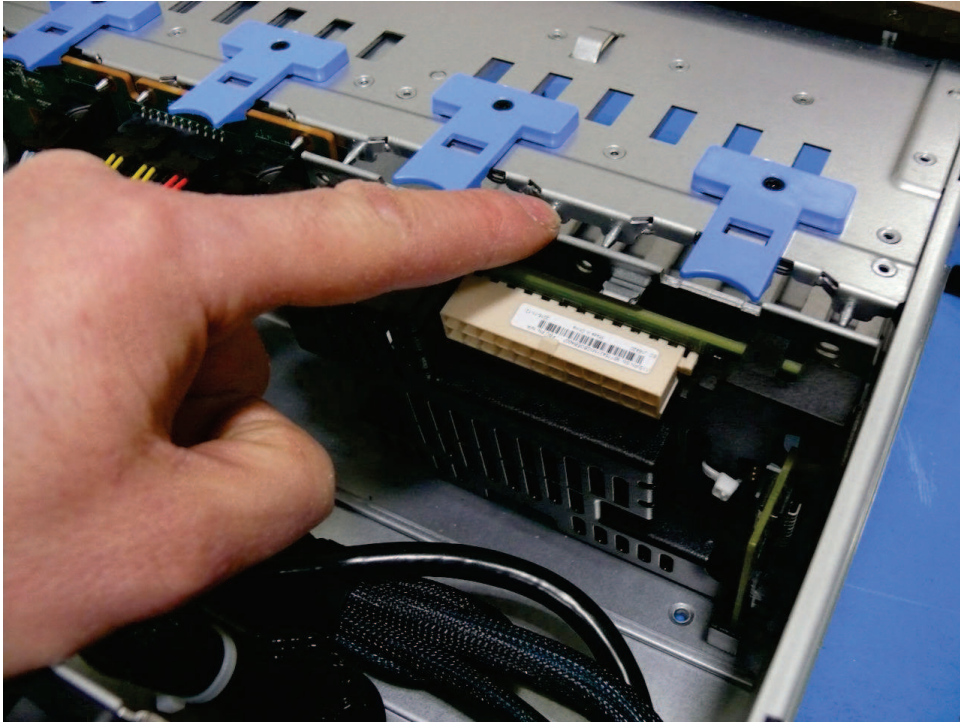


Figure 98. Removing the 2145-SV1 battery backplane

2. Remove the cables from the cable connectors on the battery backplane.
3. Remove the LPC cable from the LPC connector on the main board.

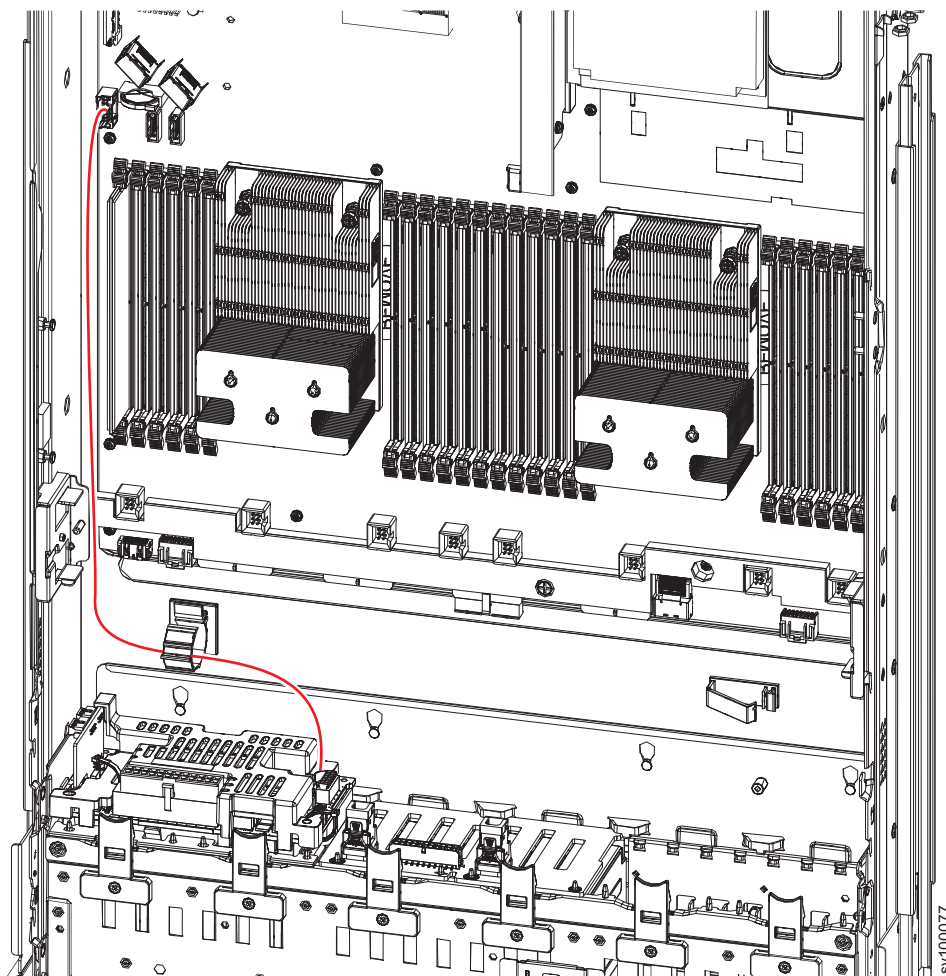


Figure 99. 2145-SV1 battery backplane LPC cable and connector

4. Remove the power sense cable between the battery backplane and the main board, as shown in Figure 100 on page 121.

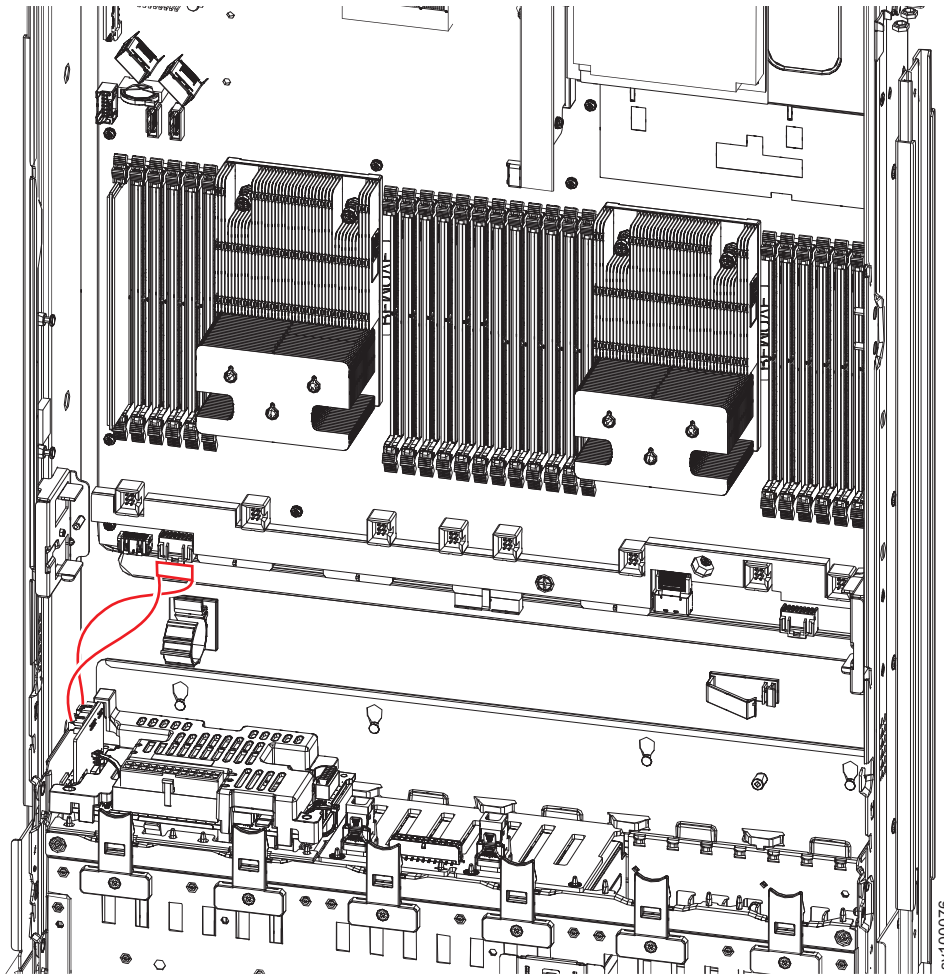


Figure 100. 2145-SV1 battery backplane power sense cable

5. Remove the power cable between the battery backplane and the system board, as shown in Figure 101 on page 122.

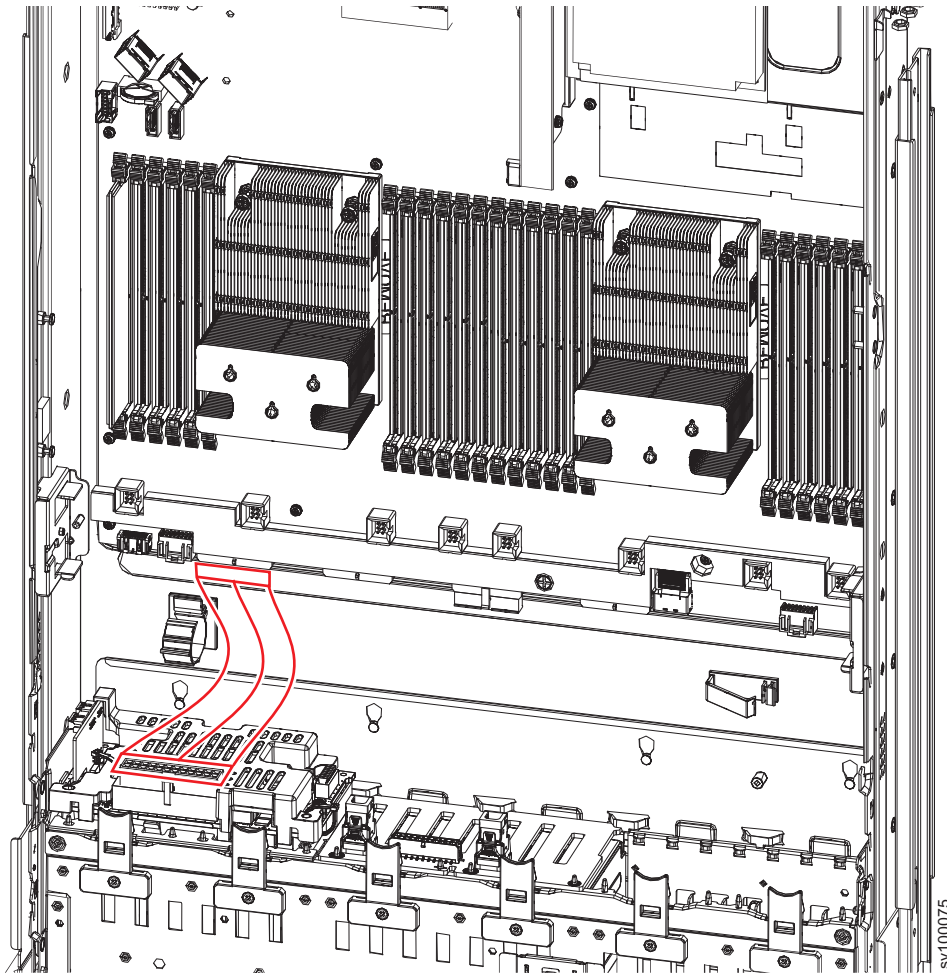


Figure 101. 2145-SV1 battery backplane power cable

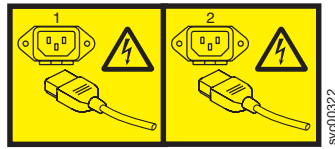
Removing the battery backplane and cables: 2145-DH8

You can remove the battery backplane and cables in a SAN Volume Controller 2145-DH8 node.

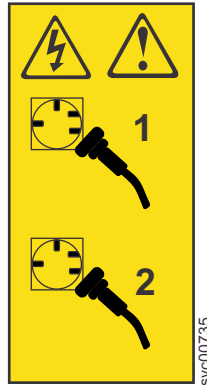
Before you begin

DANGER

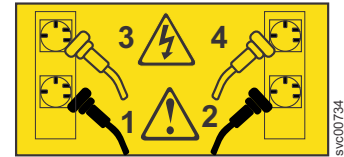
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



This service action assumes:

- The node is turned off. If you must turn off the node, ensure that its data is mirrored and synchronized, and that there are no dependent volumes, as described in MAP 5350: Powering off a node.
- The power cables are disconnected.
- The top cover is removed.
- The batteries are removed.
- The air baffle is removed.
- The PCI express riser assemblies are removed.

About this task

To remove the SAN Volume Controller 2145-DH8 battery backplane or the attached cables, complete the following steps as needed. Figure 102 on page 124 and Figure 103 on page 125 show the backplane and associated cables.

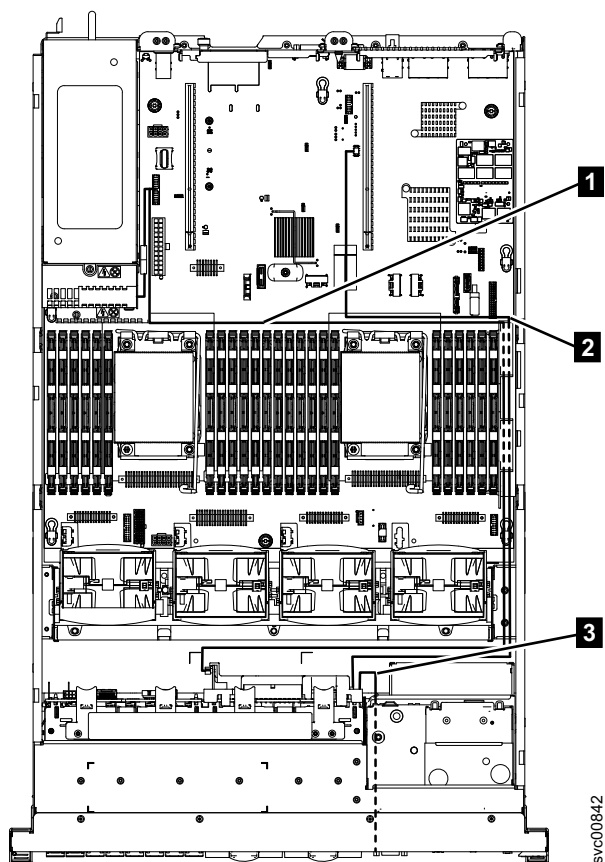


Figure 102. 2145-DH8 Battery backplane-power sense, LPC, and LED cables

- 1** Power sense cable
- 2** Low Pin Count (LPC) interface cable
- 3** LED cable

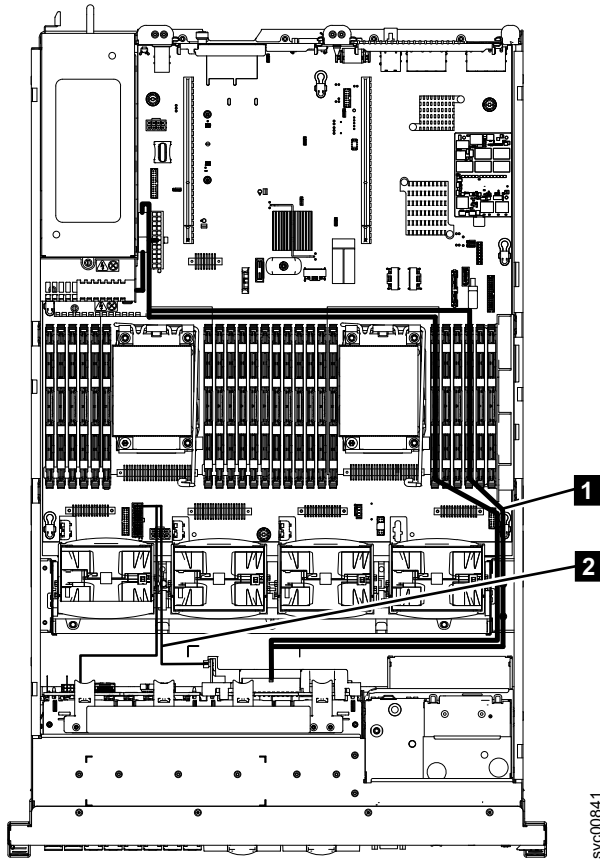


Figure 103. 2145-DH8 Battery backplane-power and EPOW cables

- 1** Power cable
- 2** Emergency power off Warning (EPOW) cable

Procedure

1. Raise the locking tabs, and slightly pull back and lift the battery backplane from the chassis, as shown in Figure 104 on page 126.

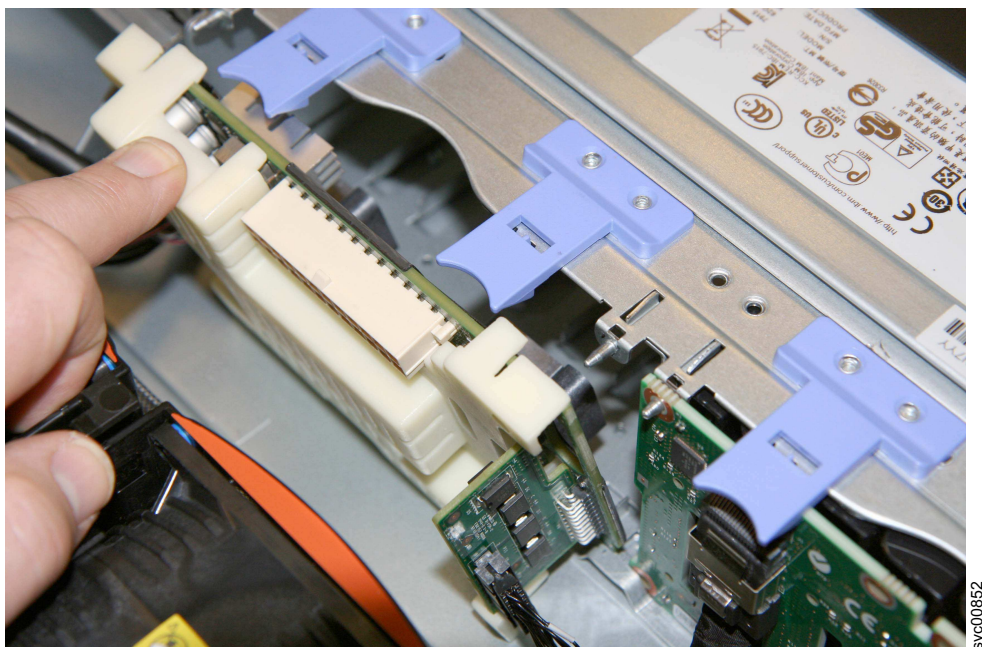


Figure 104. Removing the battery backplane

2. Remove the LPC cable from the LPC adapter on the LPC connector.
3. Remove the LPC adapter board from the LPC connector on the system board, as shown in Figure 105 on page 127.

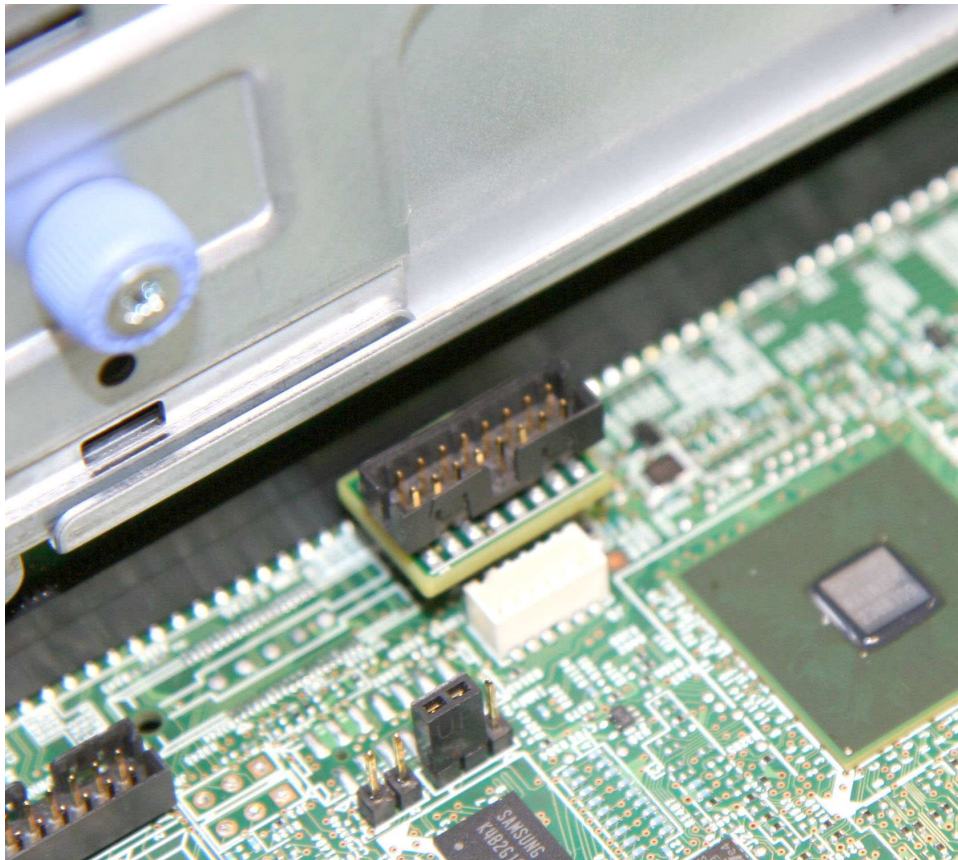


Figure 105. The LPC adapter that is fitted to the LPC connector on the system board, two views

4. Remove the EPOW cable from the system board to the disk drive backplane and from the system board to the battery backplane.

Note: The short wire is connected to the disk drive backplane and the long wire to the battery backplane.

5. Remove the dummy DIMM from slot 6; the slot is shown in Figure 106 on page 128, with the DIMM wrapped by the power sense cable.

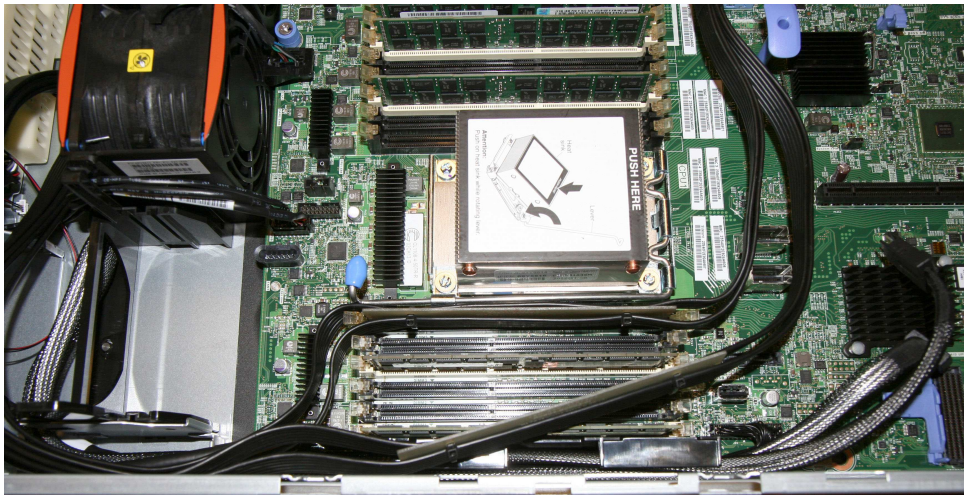
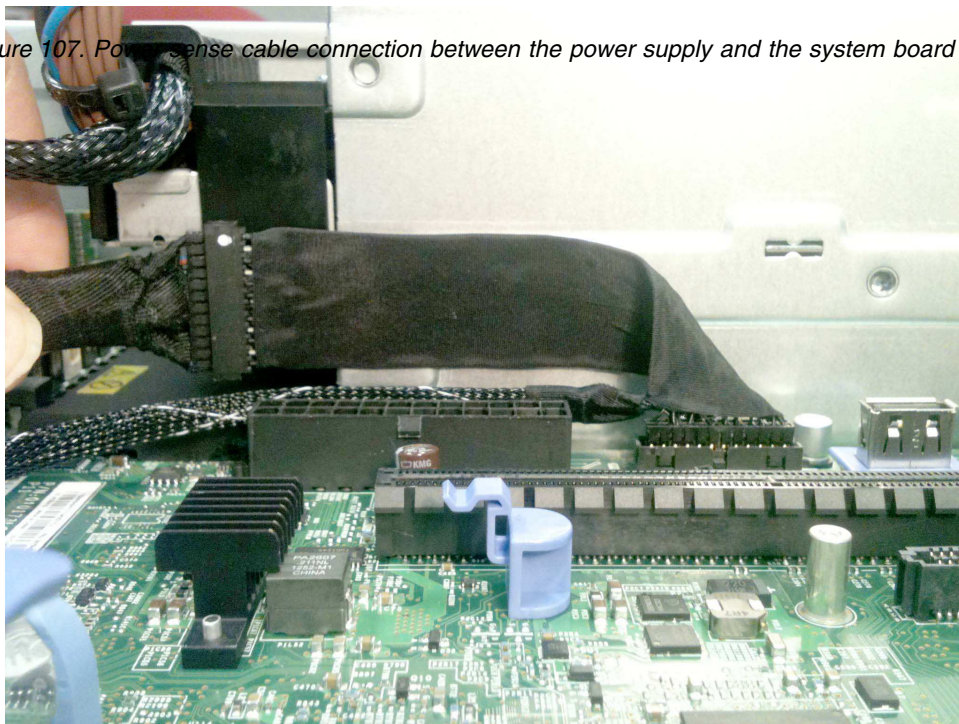


Figure 106. Dummy DIMM, slot 6

6. Remove the second dummy DIMM from slot 3.
7. Remove the power sense cable from between the power supply unit and the system board, as shown in Figure 107.

Figure 107. Power sense cable connection between the power supply and the system board



Replacing the battery backplane and cables

You can replace the battery backplane and cables on a SAN Volume Controller 2145-SV1 or SAN Volume Controller 2145-DH8 node.

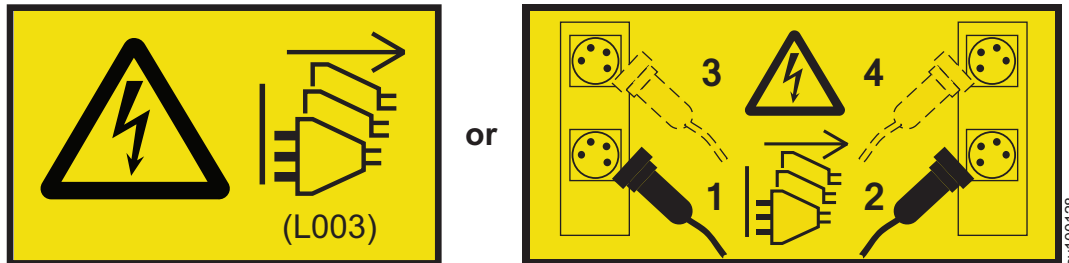
Replacing the battery backplane and cables: 2145-SV1

You can replace the battery backplane and cables in a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top covers are removed.
- The batteries are removed.
- The PCI express riser assemblies (1,2) and the air baffle are removed, if the battery backplane LPC cable must be replaced.

About this task

To replace the SAN Volume Controller 2145-SV1 battery backplane and the attached cables, complete the following steps. It is easier to connect all cables, except for the power cable, to the battery backplane before the backplane is fitted. Figure 108 on page 130 shows the backplane and the cable connectors on the main board.

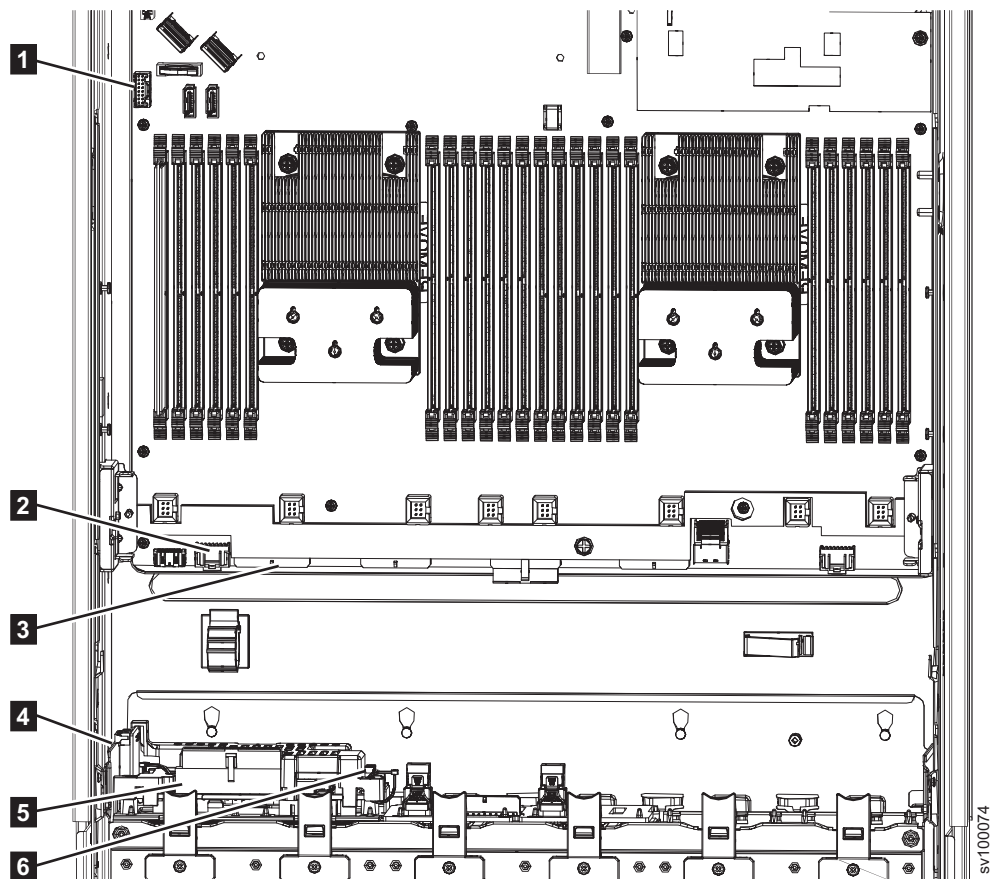


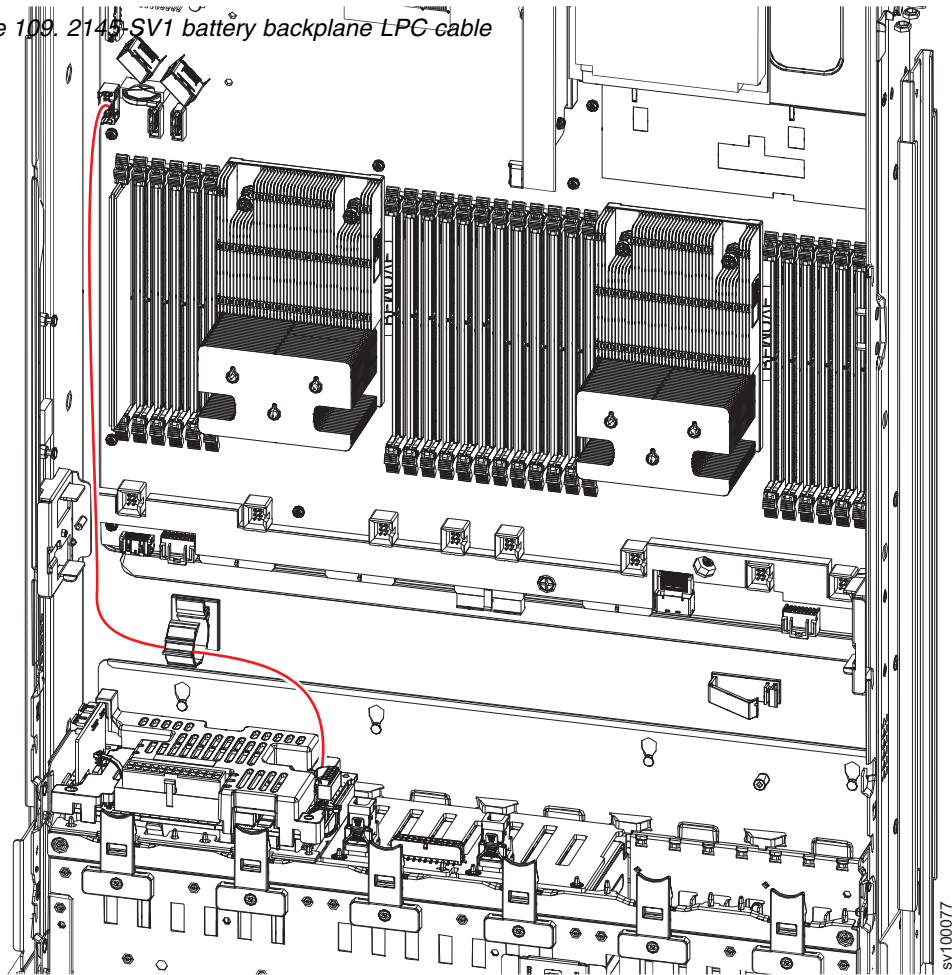
Figure 108. 2145-SV1 battery backplane and cable connectors

- 1** Low Pin Count (LPC) cable connector on the main board
- 2** Battery backplane power sense cable connector on the main board
- 3** Battery backplane power cable connector on the main board
- 4** Battery backplane power sense cable connector on the battery backplane
- 5** Battery backplane power cable connector on the battery backplane
- 6** Battery backplane LPC cable connector on the battery backplane

Procedure

1. Attach the battery backplane LPC cable to the main board, if needed, as shown in Figure 109.

Figure 109. 2145 SV1 battery backplane LPC cable



2. Attach the battery backplane LPC cable to the battery backplane, as shown in Figure 109.
3. Attach the battery backplane power sense cable to the main board, if needed, as shown in Figure 110 on page 132.

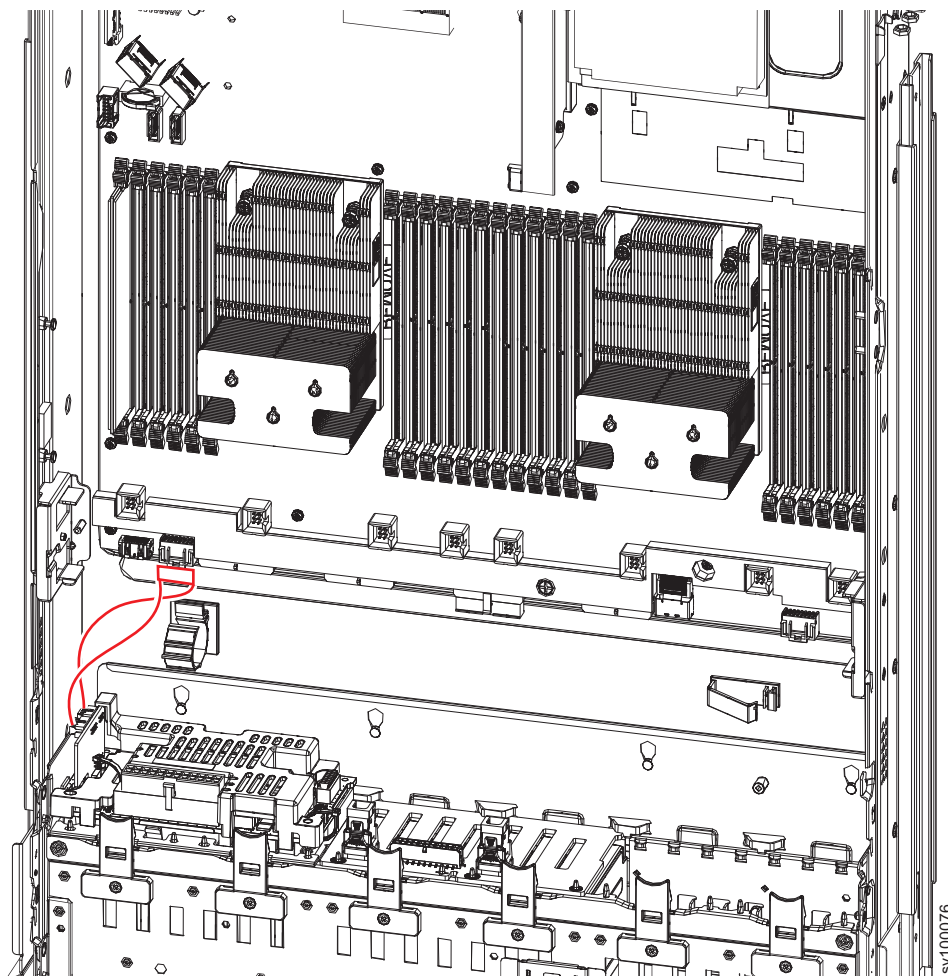


Figure 110. 2145-SV1 battery backplane power sense cable

4. Attach the battery backplane power sense cable to the battery backplane, as shown in Figure 110.
5. Attach the battery backplane power cable to the main board, if needed, as shown in Figure 111 on page 133.

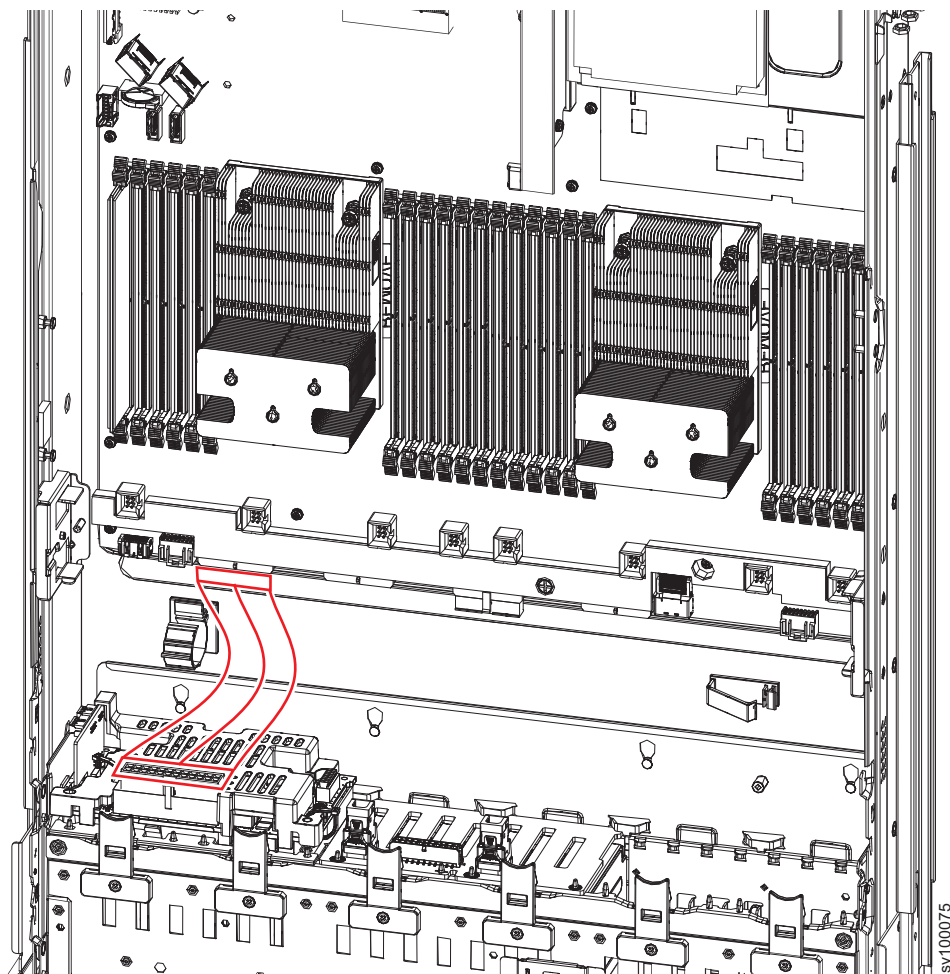


Figure 111. 2145-SV1 battery backplane power cable

6. Fit the lower edge of the battery backplane into the chassis. Push the top into position until it locks in place, as shown in Figure 112 on page 134.

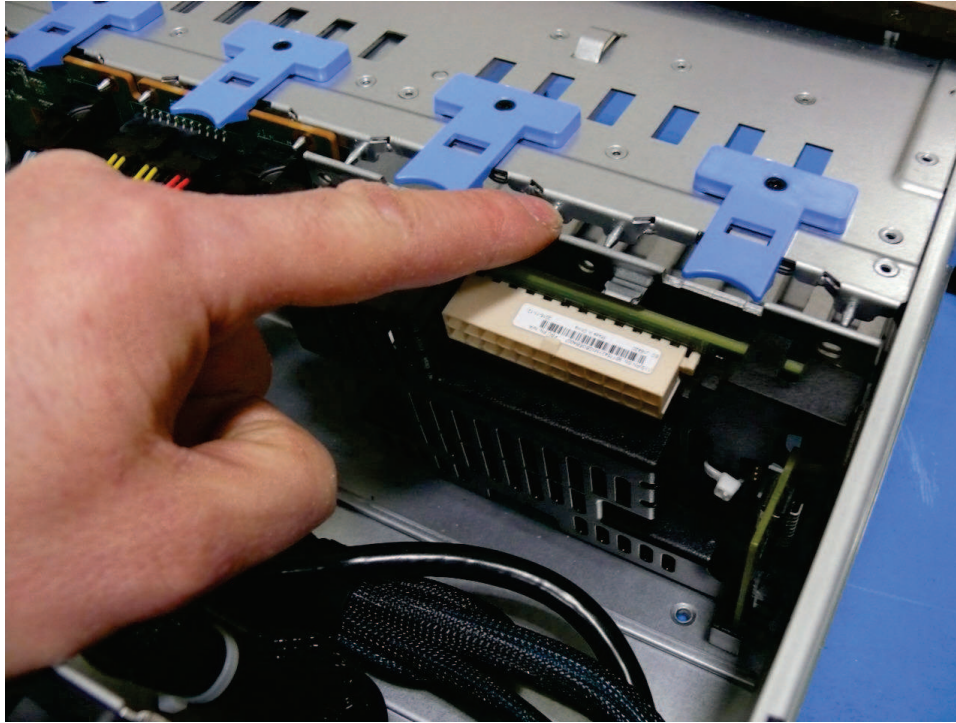


Figure 112. Battery backplane in the 2145-SV1 chassis

7. Connect the end of the power cable to the battery backplane.
8. If needed, replace the air baffle, as described in “Replacing the air baffle: 2145-SV1” on page 75.
9. If needed, replace the PCI express riser card assemblies in the original order, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 177.
10. Replace the top covers, as described in “Replacing the top covers: 2145-SV1” on page 69.
11. If you removed the node from the rack, replace it, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
12. Reconnect any signal cables.
13. Turn on the node by reconnecting both power cords.

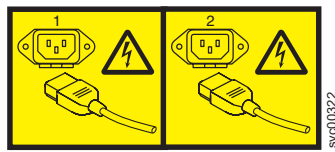
Replacing the battery backplane and cables: 2145-DH8

You can replace the battery backplane and cables in a SAN Volume Controller 2145-DH8 node.

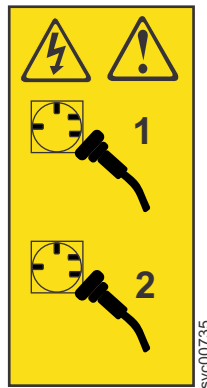
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



This service action assumes:

- The node is turned off. If you must turn off the node, ensure that its data is mirrored and synchronized, and that there are no dependent volumes, as described in MAP 5350: Powering off a node.
- The power cables are disconnected.
- The top cover is removed.
- The batteries are removed.
- The air baffle is removed.
- The PCI express riser assemblies are removed.

About this task

To replace the SAN Volume Controller 2145-DH8 battery backplane or the attached cables, complete the following steps as needed. It is easier to connect all cables, except for the power cable, to the battery backplane before the backplane is fitted. Figure 113 on page 136 and Figure 114 on page 137 show the backplane and associated cables.

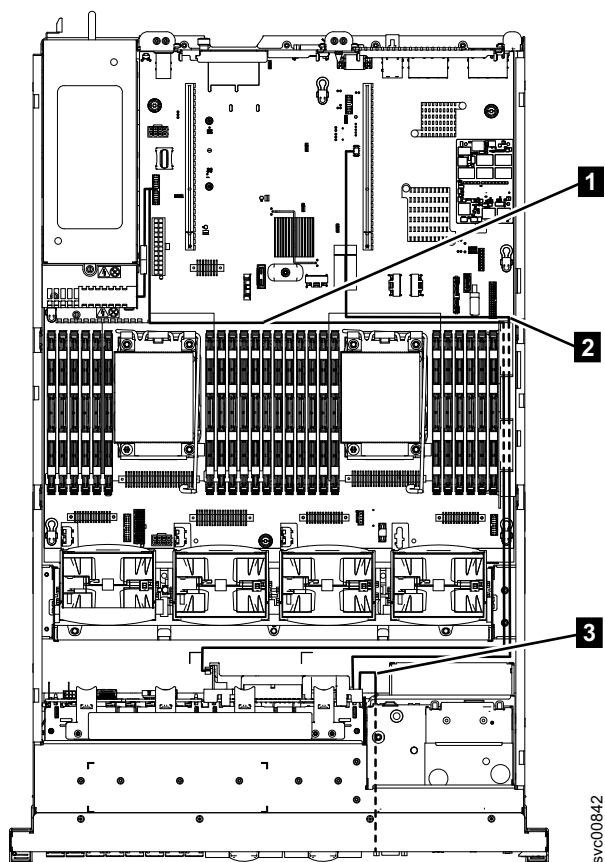


Figure 113. 2145-DH8 Battery backplane-power sense, LPC, and LED cables

- 1** Power sense cable
- 2** Low Pin Count (LPC) interface cable
- 3** LED cable

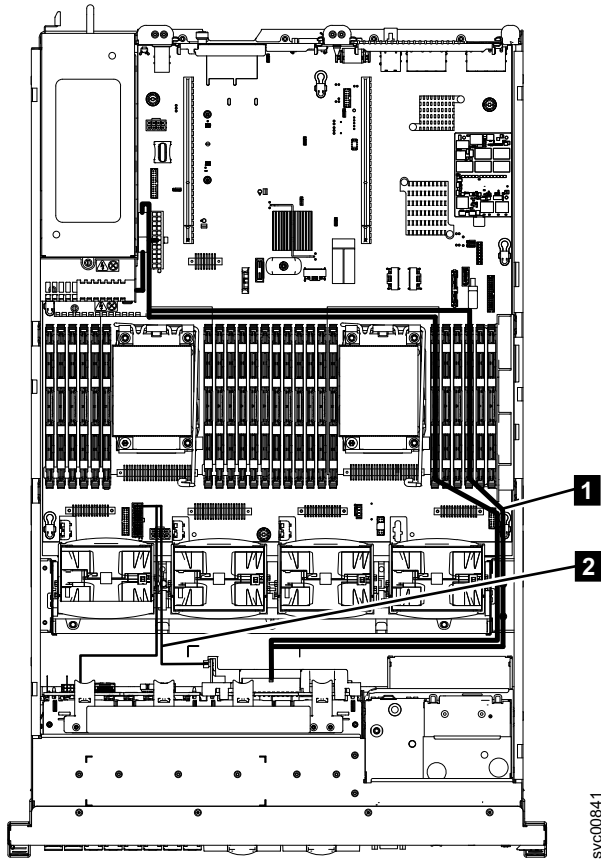


Figure 114. 2145-DH8 Battery backplane-power and EPOW cables

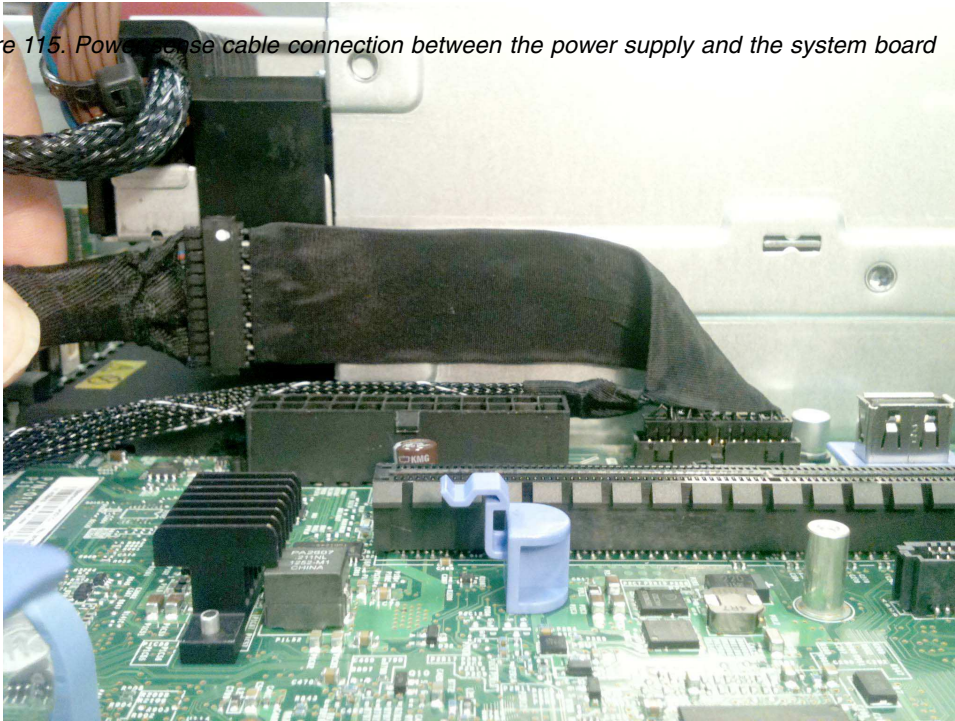
- 1 Power cable
- 2 Emergency power off Warning (EPOW) cable

Procedure

Power Sense cable (power supply unit end that is shown in Figure 115 on page 138)

1. Attach the power sense cable between the power sense cable from the power supply unit and the system board.

Figure 115. Power sense cable connection between the power supply and the system board



svc00844

2. Route the power sense cable to the front of the 2145-DH8.
Power Cable (power supply end that is shown in Figure 116)
3. Position the power connector from the power supply unit, flat against the power supply unit case and then fit the power cable.



svc00845

Figure 116. Power cable connection between the power supply unit and the system board

4. Bend the power cable so that it fits between the memory DIMM slots and the end of the PCI express riser card assemblies.

Verify that the PCI express riser card assembly can be fitted

5. The power cable touches the PCI express riser card assembly, and care must be taken when fitting the assembly that the cable is not pinched.
6. Remove the PCI express riser card assembly so that it is easier to fit the next section of the power cable.
7. Verify that the power sense cable is not pulled out.

Power Cable Dummy DIMM (Power Cable Dummy DIMMs fit into the two DIMM sockets.)

8. If the dummy DIMMs have covers fitted to protect the ends during shipping, then remove them.
9. Part the cables at each end of the dummy DIMM so that the DIMM catch passes through the gap between the cables.
10. Press the dummy DIMM down to lock in position in slot 6, and bend the cable to avoid the raised heat sink, as shown in Figure 117.

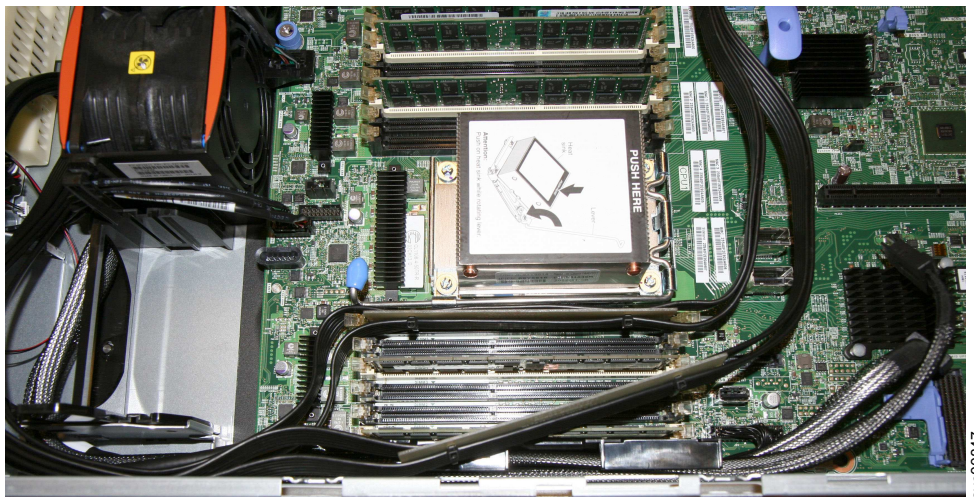


Figure 117. Bend the power cable after the dummy DIMM to avoid the heat sink

11. Fit the second dummy DIMM in slot 3, following steps 8 and 9.
 12. Route the power cables next to the fan.
- Emergency power-off warning (EPOW)
13. Replace the EPOW cable from the system board to the disk drive backplane and from the system board to the battery backplane.

Note: The short wire connects to the disk drive backplane and the long wire to the battery backplane.

LPC Cable adapter

14. Locate the LPC connector on the system board.
15. Fit the LPC adapter board to the LPC connector on the system board, as shown in Figure 118 on page 140.

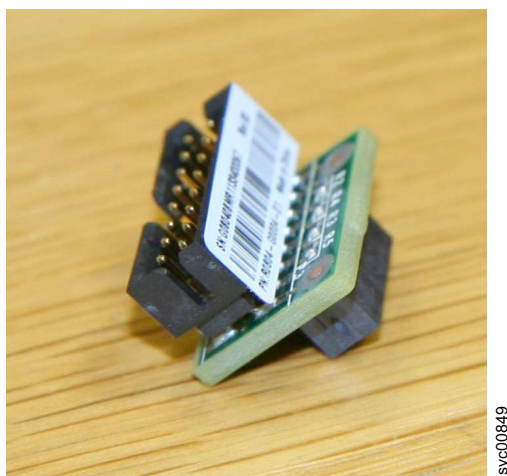
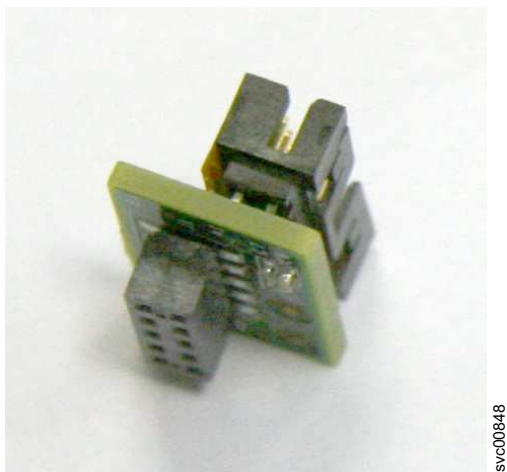


Figure 118. The LPC adapter fitted to the LPC connector on the system board, two views

LPC Cable Routing

16. Route the LPC cable from the battery backplane past the fans then inside the cable trunking next to the DIMMs.
17. Continue around the PCI express riser card assembly and attach to the LPC adapter on the LPC connector.

LED Cable

18. Route the LED cable from the battery backplane through the bay below the operator-information panel.

Battery backplane (shown in Figure 119 on page 141)

19. Fit the lower edge of the battery backplane into the chassis, and push the top into position until it locks in place.

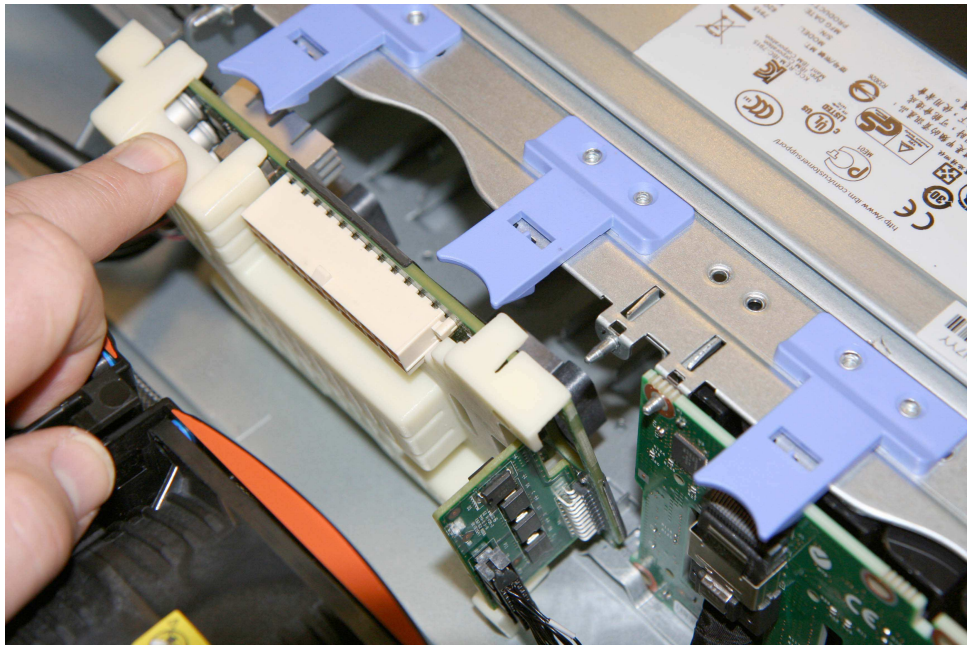


Figure 119. Fitting the battery backplane

20. Connect the end of the power cable to the battery backplane.
21. Verify that all of the signal cables are connected to the battery backplane.
22. If you removed the bezel to connect the LED cable to the node LEDs, then replace it now.
23. Replace the PCI express riser card assemblies in the original order.
24. Replace the air baffle.
25. Replace the batteries.
26. Replace the top cover.
27. If you removed the node from the rack, replace the node in the rack.
28. If you removed any Fibre Channel or Ethernet cables, use the labels on each cable to replace them in the same ports from which they were removed.
29. If you removed the power cords, replace the power cords.
30. Lift the locking levers (**1** in Figure 120 on page 142) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

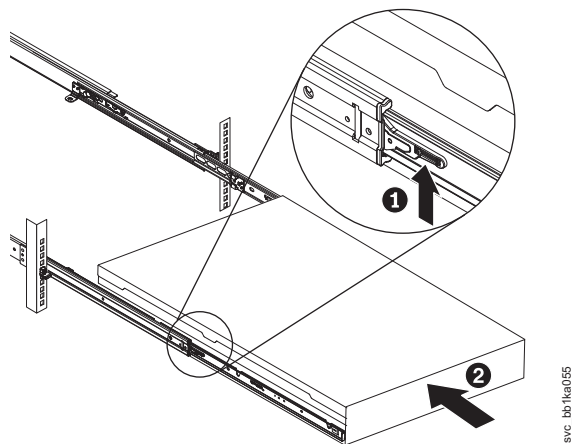


Figure 120. Raising the 2145-DH8 locking levers of the slide rails of the rack

31. Turn on the node.

Removing the battery

You must remove the battery if you intend to replace it.

Before you begin

If you remove the battery, you must adhere to all safety instructions.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

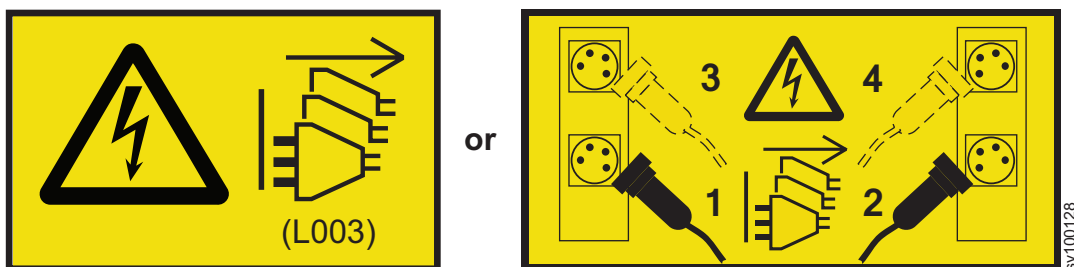
Removing the battery: 2145-SV1

Following all safety notices, you can replace either battery in a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



CAUTION:

The battery is a lithium ion battery. To avoid possible explosions, do not burn. Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C007a)

Use the reference number in parentheses at the end of the notice to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

About this task

Before you remove the battery, consider the following conditions:

- A battery can be removed while the 2145-SV1 node powered on if one of the following conditions is true:
 - A fix procedure directed you to remove this battery and identified which battery to remove by flashing the battery fault LED.
 - The service assistant GUI or the **lsnodebattery** command identifies it is safe to remove this battery.
 - The node status is “service” or “candidate”; the node status LED is flashing once per second.
 - The battery fault LED is on.

Important: If at least one of these conditions are not met, the node might change states. The node might leave the system state and enter the service state. This change of state happens because the batteries do not have enough charge for the system state and I/O cache to be saved to disk.

- Both batteries can be replaced when the 2145-SV1 is powered off.
- Locate the battery documentation and follow those instructions, in addition to these instructions.

Procedure

1. Read the safety information before you remove and replace parts, as described in “Preparing to remove and replace parts” on page 12.
2. Pull the battery catch and swing down the front cover of the battery, as shown in Figure 121.



Figure 121. Release the battery module on the 2145-SV1 node

3. Gently pull the battery assembly out of the battery slot, as shown in Figure 122 on page 144.



Figure 122. Removing the battery in the 2145-SV1 node

4. Recycle or discard the battery as instructed by local regulations. Review the caution notice for more instructions about handling the battery.

Removing the battery: 2145-DH8

Following all safety notices, you can replace either battery for the SAN Volume Controller 2145-DH8 node.

Before you begin

CAUTION:

The battery is a lithium ion battery. To avoid possible explosions, do not burn. Exchange only with the approved part. Recycle or discard the battery as instructed by local regulations. (C007a)

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

About this task

Before you remove the battery, consider the following conditions:

- A battery can be removed with the 2145-DH8 node powered on if one of the following is true:
 - A fix procedure directed you to remove this battery, and identified which battery to remove by flashing the battery fault LED.
 - The service assistant GUI or the **lsnodebattery** command identifies it is safe to remove this battery.
 - The node status is “service” or “candidate”; the node status LED is flashing once per second.
 - The battery fault LED is on.

Important: If at least one of these conditions are not met, then the node might change states, leaving the system state and entering the service state. This change of state happens because the batteries do not have enough charge for the system state and I/O cache to be saved to disk.

- Both batteries can be replaced when the 2145-DH8 is powered off.
- Locate the battery documentation and follow those instructions, in addition to these instructions.

Procedure

1. Read the safety information before you remove and replace parts, as described in “Preparing to remove and replace parts” on page 12.
2. Pull the battery catch and swing down the front cover of the battery.
3. Gently pull the battery assembly out of the battery slot, as shown in Figure 123.

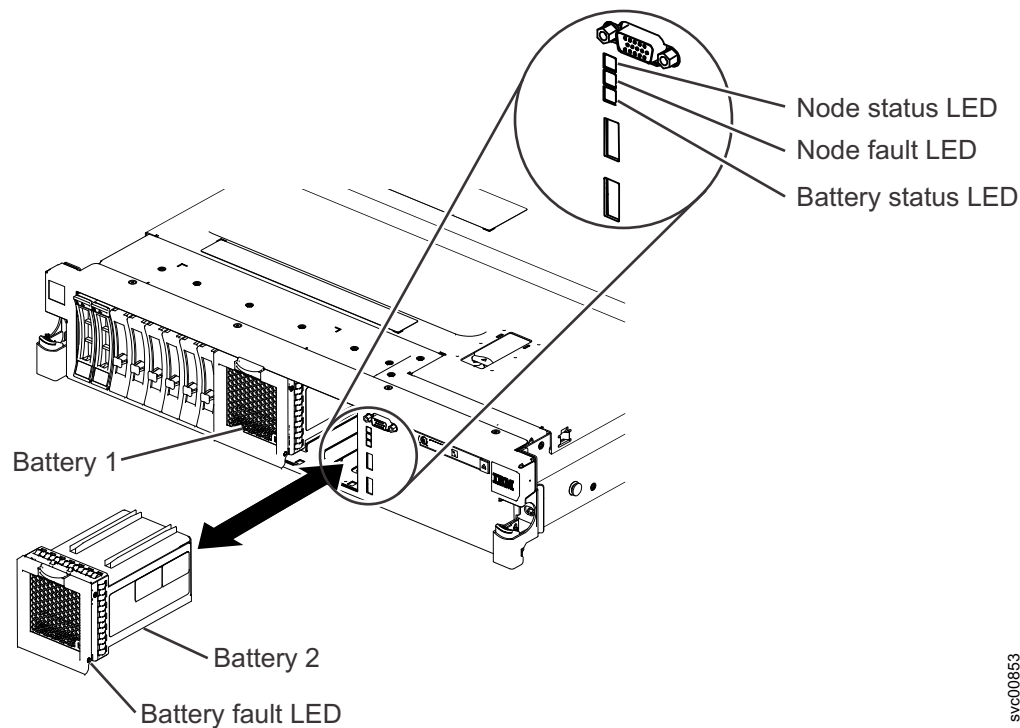


Figure 123. Removing the battery in the SAN Volume Controller 2145-DH8 node

- 1 Battery 1
 - 2 Battery fault LED (one on each battery)
 - 3 Battery 2
 - 4 Battery status LED
 - 5 Node fault LED
 - 6 Node status LED
4. Recycle or discard the battery as instructed by local regulations. For further battery handling instructions, see the warning at the beginning of this topic.

Replacing the battery

You might need to replace the battery.

Before you begin

If you replace the battery, you must adhere to all safety instructions.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

Replacing the battery: 2145-SV1

Following all safety notices, you can replace either battery for the SAN Volume Controller 2145-SV1 node.

Before you begin

Before you replace the battery, consider the following conditions:

- A battery can be replaced with the 2145-SV1 node powered on if one of the following situations is true:
 - A fix procedure directed you to replace this battery, and identified which battery to replace by flashing the battery fault LED.
 - The service assistant GUI or the **lsnodebattery** command identifies it is safe to remove this battery.
 - The node status is “service” or “candidate”; the node status LED is flashing once per second.
 - The battery slot is empty.
 - The battery fault LED is on.

Important: If at least one of these conditions are not met, then the node might change states, leaving the system state and entering the service state. This change of state happens because the batteries do not have enough charge for the system state and I/O cache to be saved to disk.

- Both batteries can be replaced when the 2145-SV1 is powered off.
- Locate the battery documentation and follow those instructions, in addition to these instructions.
- Install the battery in battery slot 1 or 2 of the 2145-SV1 node.

Procedure

1. Read the safety information before you remove and replace parts, as described in “Preparing to remove and replace parts” on page 12.
2. Touch the static-protective package that contains the battery to any unpainted metal surface on the node, then remove the battery from the package and place it on a static-protective surface.
3. Align the battery assembly with the battery slot guide rails, as shown in Figure 124 on page 147.



Figure 124. Replacing the battery in the 2145-SV1 node

4. Gently push the battery assembly completely into the battery slot and raise the battery release handle, as shown in Figure 125.



Figure 125. Closing the battery release handle

5. If you removed the node from the rack, replace the node in the rack, as described in “Replacing a node in a rack” on page 44.
6. Verify that the following processes are complete:
 - All cables, adapters, and other components are installed and seated correctly
 - All internal cables are correctly routed

- If you disconnected the Fibre Channel and Ethernet cables, make sure that each cable is reconnected to the same port from which it was removed.
7. If you removed the power cords, replace the power cords. When the power cord is plugged in, the 2145-SV1 node turns on.

Replacing the battery: 2145-DH8

Following all safety notices, you can replace either battery for the SAN Volume Controller 2145-DH8 node.

Before you begin

Before you replace the battery, consider the following conditions:

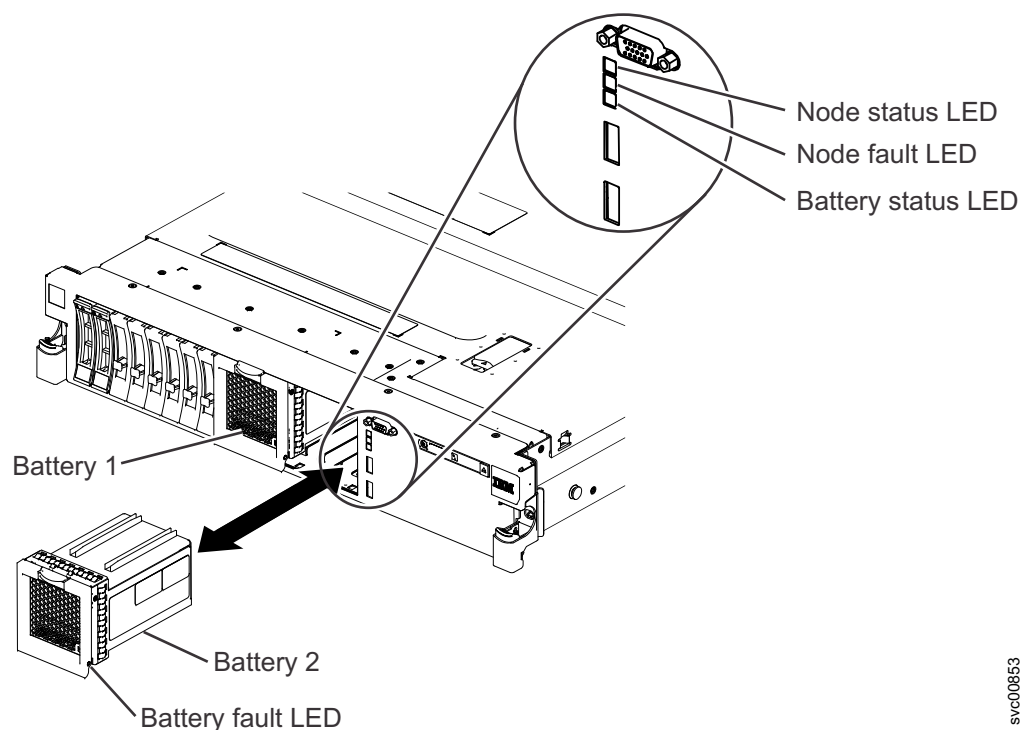
- A battery can be replaced with the 2145-DH8 node powered on if one of the following conditions is true:
 - A fix procedure directed you to replace this battery, and identified which battery to replace by flashing the battery fault LED.
 - The service assistant GUI or the **lsnodebattery** command identifies it is safe to remove this battery.
 - The node status is “service” or “candidate”; the node status LED is flashing once per second.
 - The battery slot is empty.
 - The battery fault LED is on.

Important: If at least one of these conditions are not met, then the node might change states, leaving the system state and entering the service state. This change of state happens because the batteries do not have enough charge for the system state and I/O cache to be saved to disk.

- Both batteries can be replaced when the 2145-DH8 is powered off.
- Locate the battery documentation and follow those instructions, in addition to these instructions.
- Install the battery in battery slot 1 or 2 of the SAN Volume Controller 2145-DH8 node.

Procedure

1. Read the safety information before you remove and replace parts, as described in "Preparing to remove and replace parts."
2. Touch the static-protective package that contains the battery to any unpainted metal surface on the node, then, remove the battery from the package and place it on a static-protective surface.
3. Align the battery assembly with the battery slot guide rails, as shown in Figure 126 on page 149.



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Figure 126. Replacing the battery in the SAN Volume Controller 2145-DH8 node

4. Gently push the battery assembly completely into the battery slot.
5. If you removed the node from the rack, replace the node in the rack.
6. Verify that the following processes are complete:
 - All cables, adapters, and other components are installed and seated correctly
 - All internal cables are correctly routed
 - If you disconnected the Fibre Channel and Ethernet cables, make sure that each cable is reconnected to the same port from which it was removed.
7. If you removed the power cords, replace the power cords.
8. Turn on the node.

Removing the CMOS battery

You must remove the system board complementary metal-oxide semiconductor (CMOS), or system board, battery to replace it or to perform routine maintenance.

Before you begin

This product was designed with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to all safety instructions.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

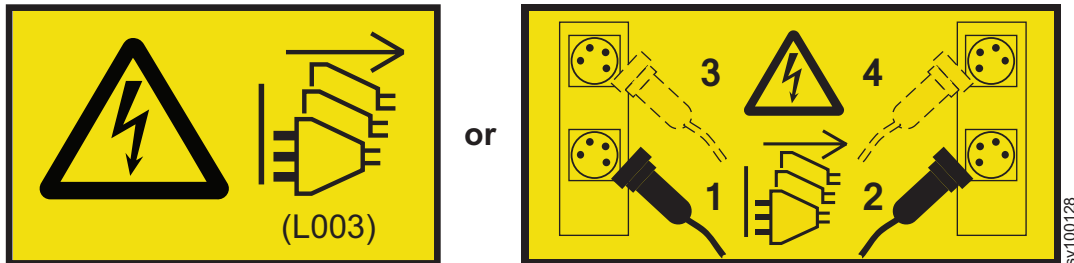
Removing the CMOS battery: 2145-SV1

You might have to remove the main board CMOS battery from a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)

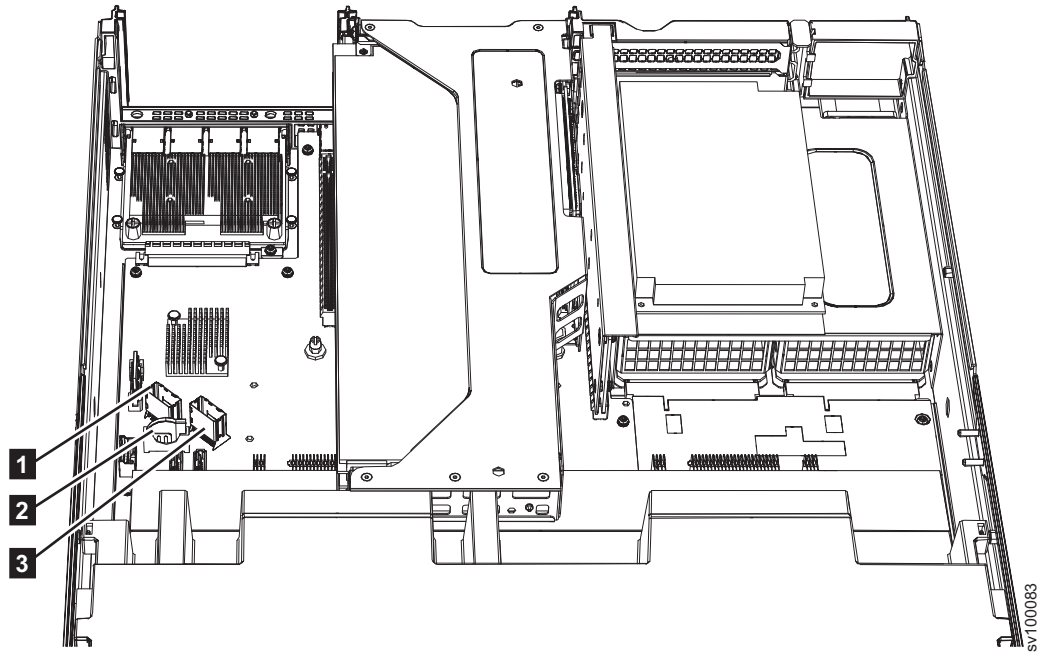


About this task

Complete the following steps to remove the CMOS battery from the SAN Volume Controller 2145-SV1 system board.

Procedure

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Read the safety information that is described in “Preparing to remove and replace parts” on page 12.
3. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.
4. Slide the node out on its slide rails to the fully extended position.
You can accomplish most service actions when the node is fully extended from the rack on its slide rails. You can leave the Fibre Channel and Ethernet cables connected, if you are using the cable-management arm and if you are not removing the node from the rack. If the location of the node in the rack is too high or too low to work comfortably, you can remove the node from the rack.
5. When the node is turned off, disconnect the power cables.
6. Optional: If you must remove the node from the rack to work on it, perform the following procedure to remove all cables and remove the node from the rack:
 - a. To make sure that you can replace all cables in the same ports from which they were removed, label the port position of each Fibre Channel and Ethernet cable; then remove all cables from the back of the node.
 - b. Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack: 2145-SV1” on page 35.
7. Remove the top back cover, as described in “Removing the top covers: 2145-SV1” on page 66.
8. Remove the PCI express riser assembly 1, as described in Removing the PCI express riser-card assembly: 2145-SV1.
9. Locate the battery on the main board, as shown in Figure 127 on page 151.



- 1** SATA cable connector 1
- 2** CMOS battery in the battery holder on the main board
- 3** SATA cable connector 2

Figure 127. Location of the 2145-SV1 CMOS battery holder

10. Disconnect the SATA cables from the SATA cable connectors 1 and 2. Make sure that you will be able to put the SATA cables back in the same order after the battery is replaced.
11. Remove the battery.
 - a. Pull the battery holder catch **4** away from the battery in the direction (a) shown in Figure 128.
 - b. Use your thumb and index finger to lift the battery from the holder **5** in the direction (b) shown in Figure 128.

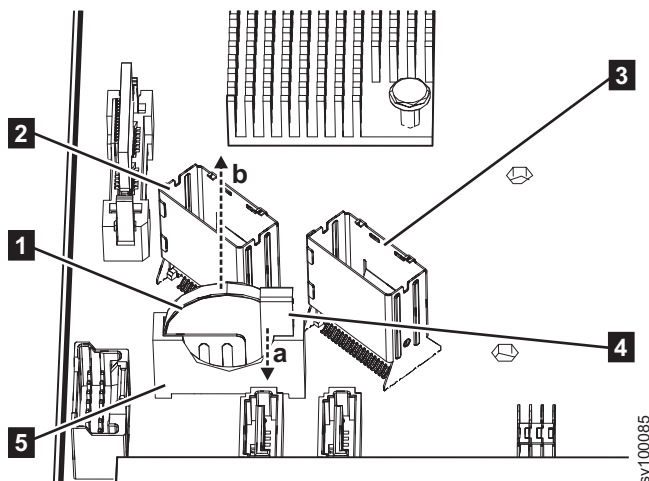


Figure 128. Removing the 2145-SV1 CMOS battery

- 1** CMOS battery in the battery holder on the main board

- 2** SATA cable connector 1
- 3** SATA cable connector 2
- 4** Battery catch
- 5** Battery holder

12. Recycle or discard the battery as instructed by local regulations.

Ensure that you follow the directions for handling the battery, as described in the Caution notice.

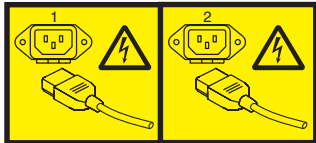
Removing the CMOS battery: 2145-DH8

You might have to remove the system-board CMOS battery from a SAN Volume Controller 2145-DH8 node.

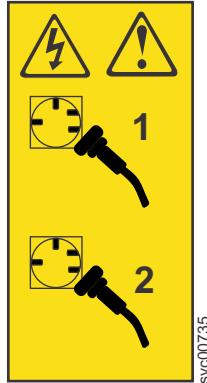
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



CAUTION:

If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

Dispose of the battery as required by local ordinances or regulations. (C045)

About this task

Complete the following steps to remove the SAN Volume Controller 2145-DH8 system-board CMOS battery:

Procedure

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Read the safety information to which “Preparing to remove and replace parts” on page 12 refers.

3. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.
4. Slide the node out on its slide rails to the fully extended position.
You can accomplish most service actions when the node is fully extended from the rack on its slide rails. You can leave the Fibre Channel and Ethernet cables connected, if you are using the cable-management arm and if you are not removing the node from the rack. If the location of the node in the rack is too high or too low to work comfortably, you can remove the node from the rack.
5. When the node is completely turned off, disconnect the power cables.
6. Optional: If you must remove the node from the rack to work on it, perform the following procedure to remove all cables and remove the node from the rack:
 - a. To make sure that you can replace all cables in the same ports from which they were removed, label the port position of each Fibre Channel and Ethernet cable; then remove all cables from the back of the node.
 - b. Remove the node from the rack and place it on a flat, static-protective surface. See "Removing a node from a rack" on page 35.
7. Remove the top cover, as described in "Removing the top cover: 2145-DH8" on page 68.
8. Locate the battery on the system board, as shown by Figure 129.

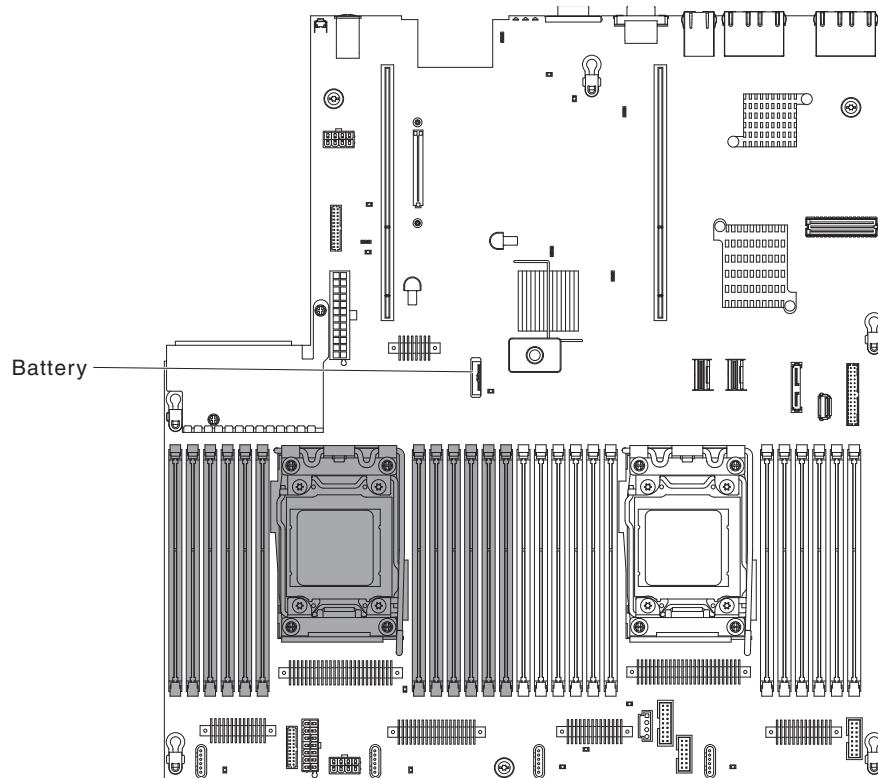


Figure 129. Location of the SAN Volume Controller 2145-DH8 CMOS battery holder

9. Remove the battery:
 - a. Use a fingernail to press the top of the battery clip away from the battery. The battery pops up when released.
 - b. Use your thumb and index finger to lift the battery from the socket, as shown in Figure 130 on page 154.

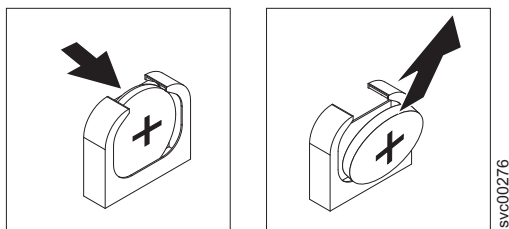


Figure 130. SAN Volume Controller 2145-DH8 CMOS battery holder

10. Recycle or discard the battery as instructed by local regulations.

See the caution at the beginning of this topic for further instructions regarding handling the battery.

Replacing the CMOS battery

You must replace the system board complementary metal-oxide semiconductor (CMOS) battery after you complete routine maintenance.

Before you begin

The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to all safety instructions.

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

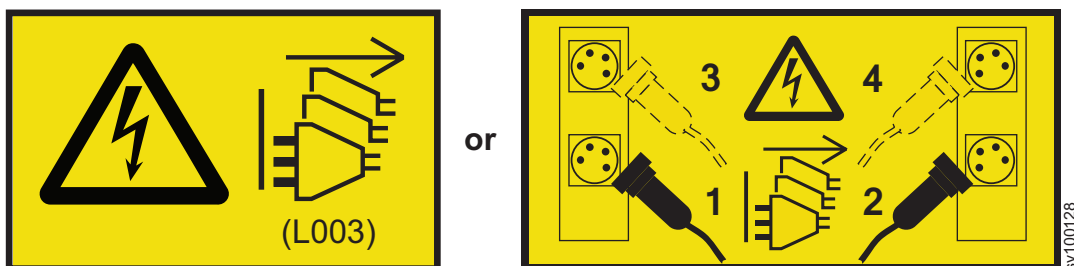
Replacing the CMOS battery: 2145-SV1

Perform the following procedure if you need to replace the main board CMOS battery on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords: The product is equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



About this task

This service action assumes that the following tasks were completed:

- The node is turned off.
- The power cables are disconnected.
- All LED indicators, such as the node status LED, are off.

- The CMOS battery is removed from the node, as described in “Removing the CMOS battery: 2145-SV1” on page 149.
- The top back cover is removed, as described in Removing the top covers: 2145-SV1.
- PCI express riser assembly 1 is removed, as described in Removing the PCI express riser-card assembly: 2145-SV1.
- The SATA cables are unplugged from the main board SATA cable connectors, as described in “Removing the main board: 2145-SV1” on page 242.

Procedure

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Locate the battery on the main board (**2**), as shown in Figure 131.

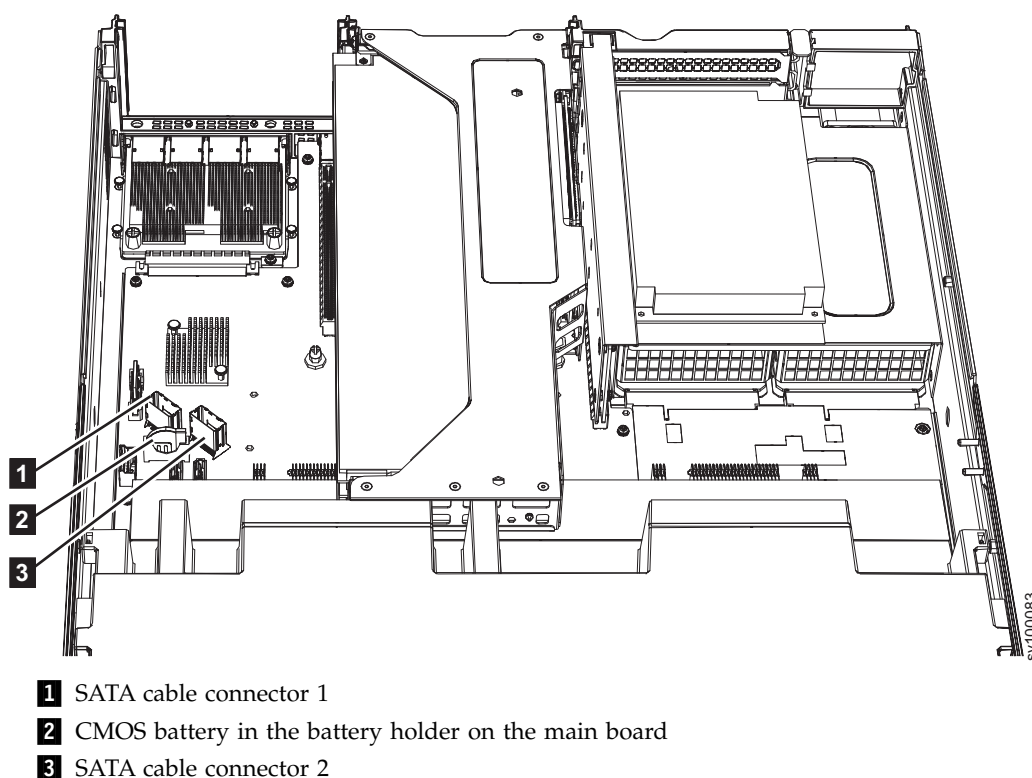


Figure 131. Location of the 2145-SV1 CMOS battery holder

3. Insert the new battery:
 - a. Pull the battery holder catch **4** in the direction (a) shown in Figure 132 on page 156.
 - b. Insert the battery into the holder **5** in the direction (b) shown in Figure 132 on page 156. The “+” mark on the battery must face towards the front of the node.

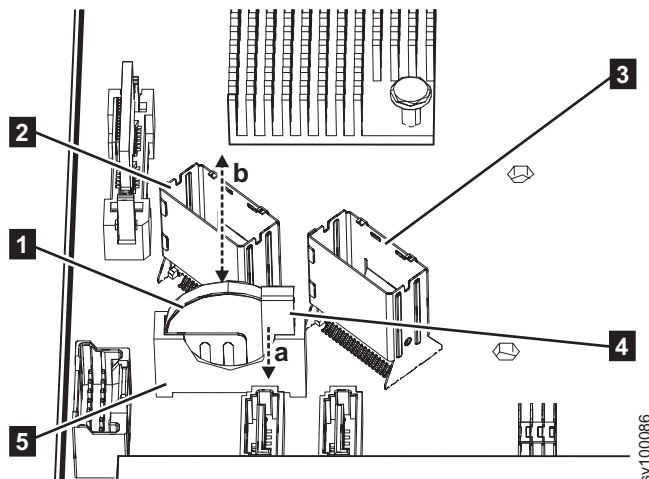


Figure 132. Replacing the 2145-SV1 CMOS battery

- 1** CMOS battery in the battery holder on the main board
- 2** SATA cable connector 1
- 3** SATA cable connector 2
- 4** Battery catch
- 5** Battery holder

c. Release the battery holder catch **4**.

4. Reconnect the SATA cables to the appropriate SATA cable connectors on the main board, **1** and **3**, as shown in Figure 131 on page 155.

For example, SATA cable 1 must be connected to SATA cable connector 1 on the SATA drive backplane. SATA cable connector 1 is closest to the battery backplane. For details, see “Replacing the SATA drive backplane and cables: 2145-SV1” on page 110.

5. Replace PCI express riser assembly 1, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 177.
6. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
7. If you removed the node from the rack, replace the node in the rack. See “Replacing a node in a rack: 2145-SV1” on page 47.
8. If you removed any Fibre Channel or Ethernet cables, use the labels you that placed on each cable to identify the ports from which they were removed.
9. Turn on the node by reconnecting both power cables.

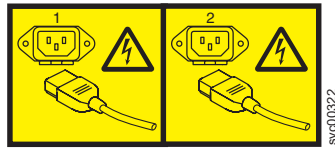
Replacing the CMOS battery: 2145-DH8

Perform the following procedure if you need to replace the system-board CMOS battery on a SAN Volume Controller 2145-DH8 node.

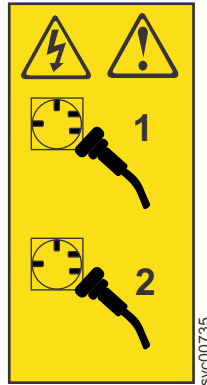
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



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. (C003)

About this task

This service action assumes that the following precautions were taken:

- The node is turned off.
- The power cables are disconnected.
- The battery is removed from the node.
- The top cover is off.

Complete the following steps to replace the SAN Volume Controller 2145-DH8 system-board CMOS battery:

Procedure

1. Follow any special handling and installation instructions that come with the replacement battery.
2. Locate the battery on the system board, as shown by Figure 133 on page 158.

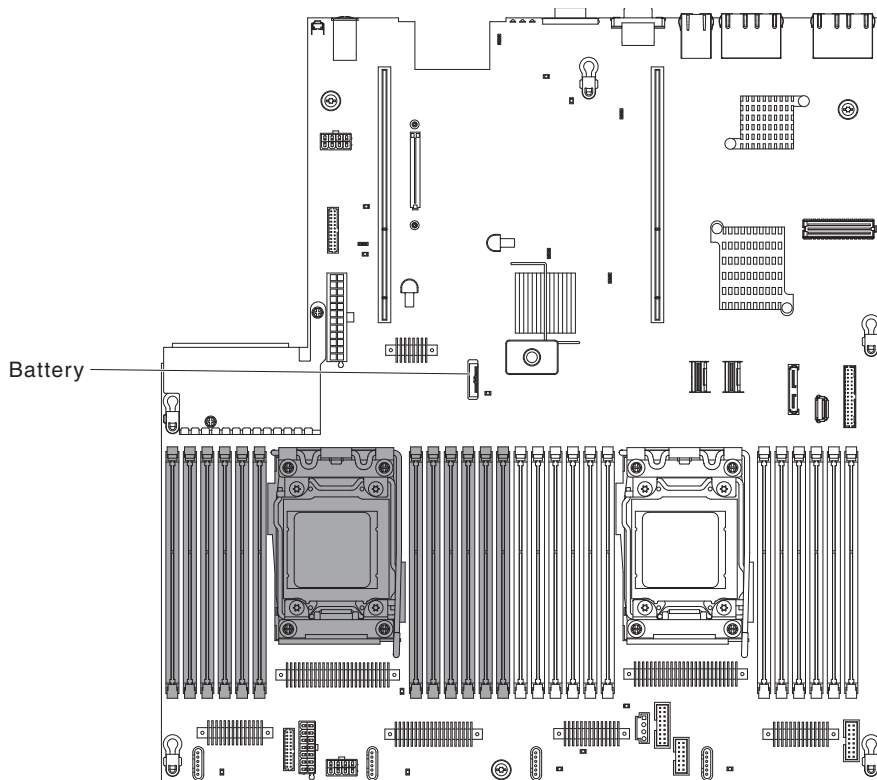


Figure 133. Location of the SAN Volume Controller 2145-DH8 CMOS battery holder

3. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
 - b. Press the battery across into the socket until it clicks into place. Make sure that the battery clip holds the battery securely, as shown in Figure 134.

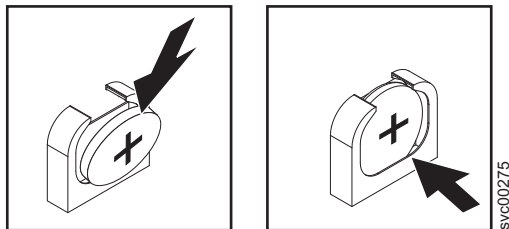


Figure 134. SAN Volume Controller 2145-DH8 CMOS battery holder

- c. If you removed a rubber cover from the battery holder, use your fingers to install the battery cover on top of the battery connector.
4. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the node. Make sure that all internal cables are correctly routed. If you disconnected the Fibre Channel and Ethernet cables, make sure that each cable is reconnected to the same port from which it was removed.
5. Replace the top cover.
6. If you removed the node from the rack, replace the node in the rack.
7. If you removed any Fibre Channel or Ethernet cables, use the labels you that placed on each cable to identify the ports from which they were removed.
8. If you removed the power cords, replace the power cords and the cable-retention brackets.

9. Lift the locking levers (**1** in Figure 135) on the slide rails and push the node **2** all the way into the rack until it clicks into place.

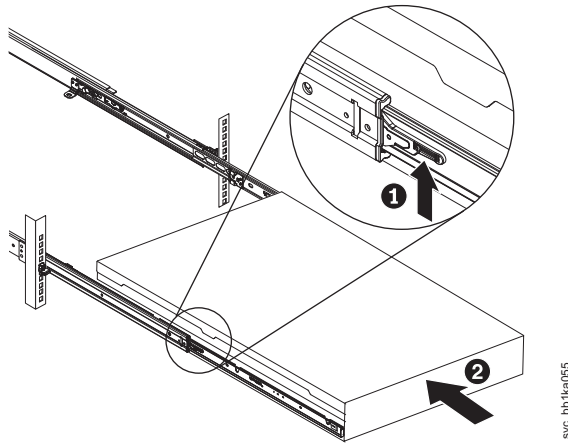


Figure 135. Raising the locking levers of the slide rails of the rack

10. Turn on the node.
11. If a problem causes you to restart the node, see “Resolving a problem with failure to boot” in the *IBM SAN Volume Controller Troubleshooting Guide*. Then, connect a monitor and keyboard to the system and reset the BIOS date and time.

Removing a power supply

You must remove the system power supply if you intend to replace it.

Before you begin

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

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:

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

To disconnect:

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

To connect:

1. Turn off everything (unless instructed otherwise).
 2. Attach all cables to the devices.
 3. Attach the signal cables to the connectors.
 4. Attach the power cords to the outlets.
 5. Turn on the devices.
- Sharp edges, corners and joints might be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

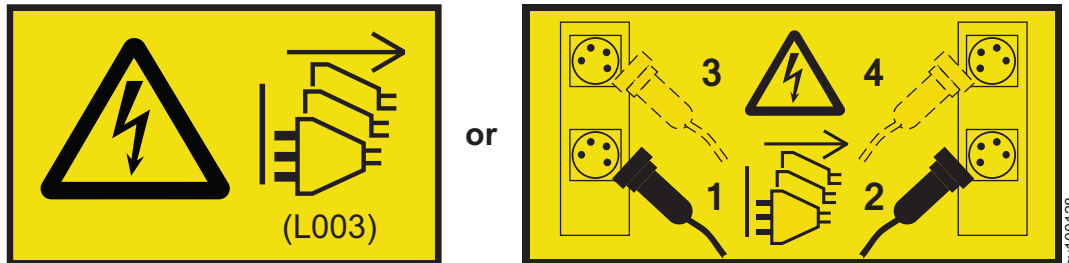
Removing a power supply: 2145-SV1

You can remove either of the two hot-swap redundant power supplies in the SAN Volume Controller 2145-SV1 node. Redundant power supplies operate in parallel, one continuing to power the node if the other fails.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the power supply unit (PSU).

Procedure

1. Read the safety information in “Preparing to remove and replace parts” on page 12.
2. If only one power supply is installed, turn off the node and peripheral devices and disconnect all power cords.
3. If the node is in a rack, pull back the cable management arm to gain access to the rear of the server and the power supply.
4. Press and hold the release tab to the left. Figure 136 shows the release tab for power supply unit 1.



Figure 136. Release in the 2145-SV1 power supply

5. Grasp the handle and pull the power supply out of the node, as shown in Figure 137 on page 162.



Figure 137. Removing the 2145-SV1 power supply

6. If you are instructed to return the power supply, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

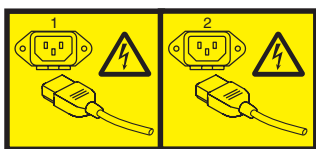
Removing a power supply: 2145-DH8

You can remove either of the two 750 watts hot-swap redundant power supplies in the SAN Volume Controller 2145-DH8 node. Redundant power supplies operate in parallel, one continuing to power the node if the other fails. Due to a configuration limitation in power supply unit 2 (PSU 2), you must put the node into service state to halt I/O before you remove PSU 2 during a service action.

Before you begin

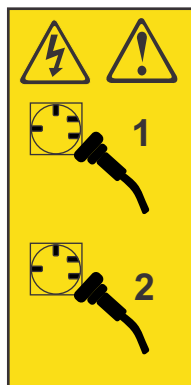
DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



svc00322

or



svc00735

or



svc00734

Ensure that you are aware of the procedures for handling static-sensitive devices before you remove the power supply unit (PSU).

Procedure

1. Read the safety information in “Preparing to remove and replace parts” on page 12.
2. If only one power supply is installed, turn off the node and peripheral devices and disconnect all power cords.

3. If you must remove PSU 2, first put the node into service state.

Attention: To avoid losing state and data from the node, use the **satask startservice** command to put the node into service state so that it no longer processes I/O. Then, you can remove and replace the top power supply unit (PSU 2). This precaution is due to a limitation in the power-supply configuration. Once the service action is complete, run the **satask stopservice** command to let the node rejoin the system.

4. If the node is in a rack, at the back of the server, pull back the cable management arm to gain access to the rear of the server and the power supply.
5. Press and hold the release tab to the left; then, grasp the handle and pull the power supply out of the node, as shown in Figure 138.

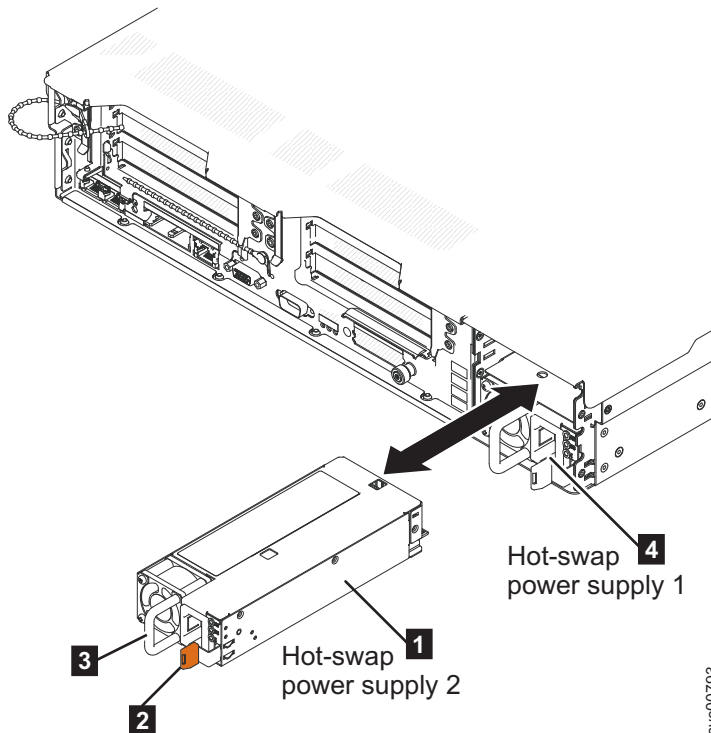


Figure 138. Removing the SAN Volume Controller 2145-DH8 power supply

- 1 Power supply 2
- 2 Power supply release tab
- 3 Power supply handle
- 4 Power supply 1

6. If you are instructed to return the power supply, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing a power supply

You might need to replace the system power supply to perform a service action.

Before you begin

Note: For a translation of the following notice, see *IBM System Storage SAN Volume Controller Safety Notices*.

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:

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

To disconnect:

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

To connect:

1. Turn off everything (unless instructed otherwise).
 2. Attach all cables to the devices.
 3. Attach the signal cables to the connectors.
 4. Attach the power cords to the outlets.
 5. Turn on the devices.
- Sharp edges, corners and joints might be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

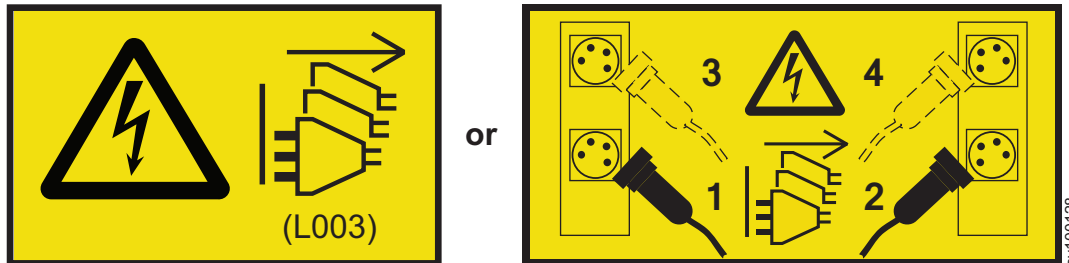
Replacing a power supply: 2145-SV1

You can replace either of the hot-swap redundant power supplies in the SAN Volume Controller 2145-SV1 node. These redundant power supplies operate in parallel; one continues to provide power to the node if the other fails.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Ensure that you are aware of the procedures for handling static-sensitive devices before you replace the power supply.

About this task

Important: You can “hot swap” the power supply. However, using MAP 5350 to power off the node avoids risking an abrupt power failure on the node, which avoids the possible corruption of data. This procedure assumes that you turned off the node by using MAP 5350. If you did not turn off the node, you used MAP 5350 to ensure that the data is mirrored and synchronized, and that there are no dependent volumes. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.

Complete the following steps to replace a power supply on a 2145-SV1 node.

Procedure

1. Read the safety information.
2. Grasp the handle on the rear of the power supply, as shown in Figure 139 on page 166. In this example, power supply 1 is being replaced.
3. Slide the power supply forward fully into the node until it clicks in place. Verify that the power cord connects firmly into the power-supply connector.



Figure 139. Replacing the 2145-SV1 power supply

4. Plug in the power cord to the power supply that you replaced. If necessary, plug in the other power cord.
5. Verify that the AC power LED (**1**) and the DC power LED (**2**) are lit. Each power supply has a set of indicator LEDs, as shown in Figure 140. In this example, the figure shows the LED indicators for power supply 1.
 - **1** Green LED indicates that the AC power supply is operating correctly.
 - **2** Green LED indicates that the DC power supply is operating correctly.
 - **3** Amber LED indicates an error in the power-supply error.

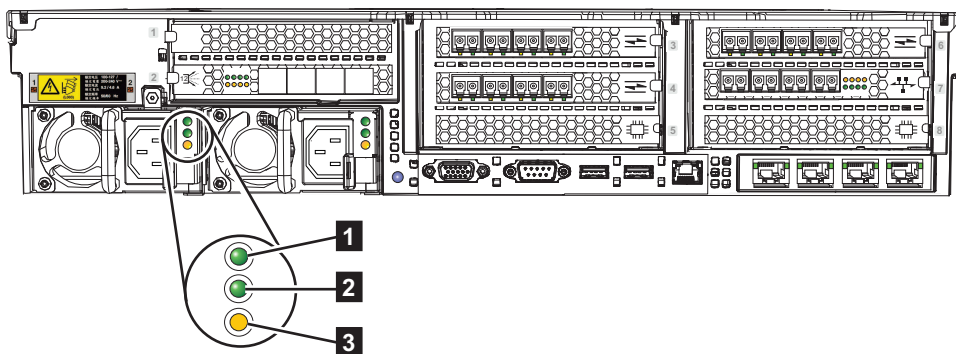


Figure 140. 2145-SV1 AC, DC, and power-error LEDs

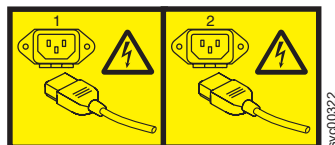
Replacing a power supply: 2145-DH8

You can replace either of the two 750 watt hot-swap redundant power supplies in the SAN Volume Controller 2145-DH8 node. These redundant power supplies operate in parallel; one continues to provide power to the node if the other fails.

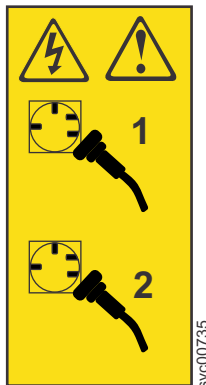
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Ensure that you are aware of the procedures for handling static-sensitive devices before you replace the power supply.

About this task

Important: You can hot swap the power supply. However, using MAP 5350 to power off the node avoids risking an abrupt power failure on the node, which avoids the possible corruption of data. This procedure assumes that you turned off the node by using MAP 5350. Or, that if you did not turn off the node, you used MAP 5350 to ensure that the data is mirrored and synchronized, and that there are no dependent volumes. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.

If you must remove and replace power supply 2, the following information applies to your service action.

Attention: To avoid losing state and data from the node, use the **satask startservice** command to put the node into service state so that it no longer processes I/O. Then, you can remove and replace the top power supply unit (PSU 2). This precaution is due to a limitation in the power-supply configuration. Once the service action is complete, run the **satask stopservice** command to let the node rejoin the system.

Complete the following steps to replace the SAN Volume Controller 2145-DH8 power supply.

Procedure

1. Read the safety information.
2. Grasp the handle on the rear of the power supply, as shown in Figure 141 on page 168, and slide the power supply forward fully into the node until it clicks in place. Verify that the power cord connects firmly into the power-supply connector.

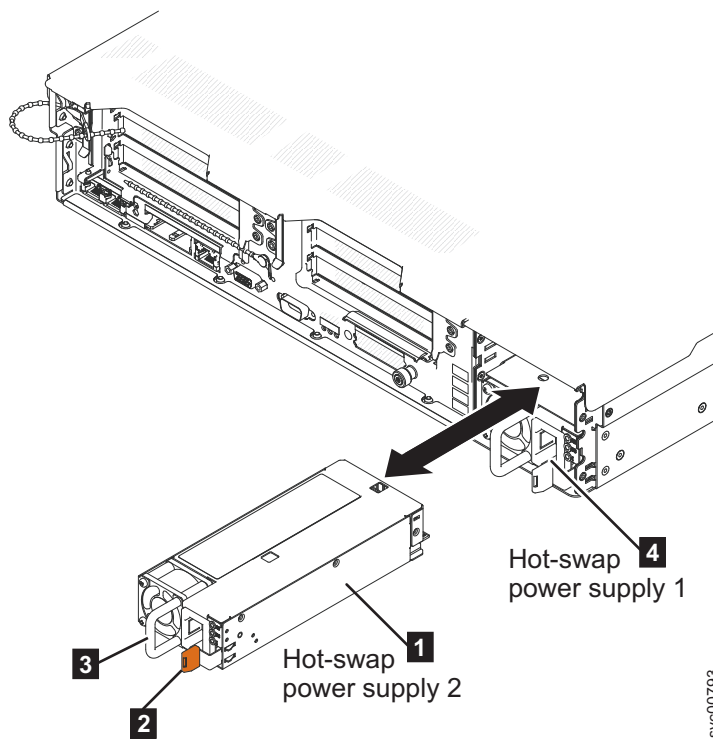
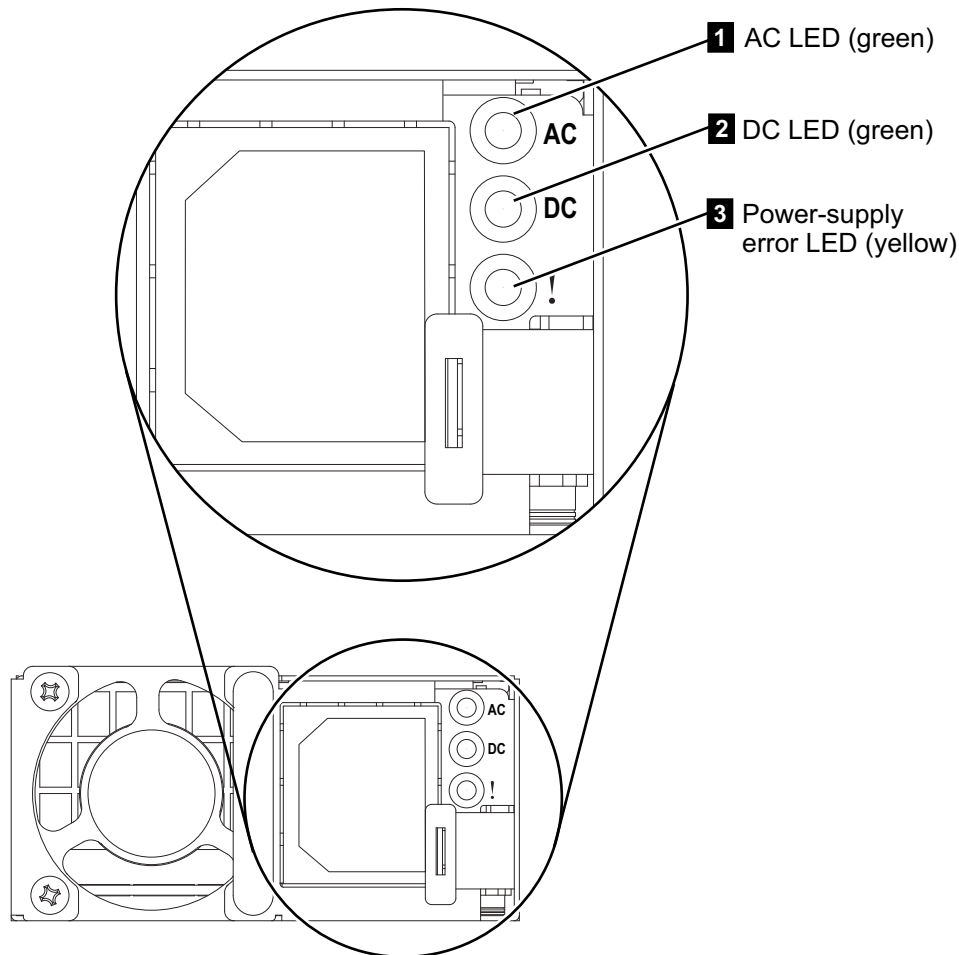


Figure 141. Replacing the SAN Volume Controller 2145-DH8 power supply

- 1 Power supply 2
 - 2 Power supply release tab
 - 3 Power supply handle
 - 4 Power supply 1
3. If necessary, turn on the node.
 4. To the left of the power-cord connector on each power supply, verify that the ac power LED (1 in Figure 142 on page 169) and the dc power LED (2) are lit.
 - Green power LEDs indicate that the power supply is operating correctly.
 - An amber power-supply error LED (3) indicates a power-supply error.



svc00794

Figure 142. SAN Volume Controller 2145-DH8 AC, DC, and power-error LEDs

5. If you replaced power supply 2, use the `satask stopservice` command to let the node rejoin the system and resume I/O.

Removing and replacing a Fibre Channel SFP transceiver

When a failure occurs on a Fibre Channel link, the SFP transceiver might need to be replaced. This procedure is applicable to SAN Volume Controller 2145-SV1 and 2145-DH8 nodes.

Before you begin

The SFP transceiver is designed to be hot-plugged. You do not need to power off the SAN Volume Controller node when you replace an SFP transceiver.

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)

About this task

The following procedure is applicable to all SAN Volume Controller nodes. Complete the following steps to remove and then replace the SFP transceiver.

Procedure

1. Carefully determine the failing physical port connection. See the *IBM SAN Volume Controller Troubleshooting Guide* for examples of the Fibre Channel port locations.

Important: SAN Volume Controller nodes are supported by both long-wave SFP transceivers and short-wave SFP transceivers. A long-wave SFP transceiver has some blue components that are visible even when the SFP transceiver is plugged in. You must replace an SFP transceiver with the same type of SFP transceiver that you are replacing. If you are replacing a long wave SFP transceiver, ensure that you provide a suitable long wave SFP transceiver. Using the wrong type of SFP transceiver might result in loss of data access.

2. Remove the Fibre Channel cable by pressing the release tab and pulling out the cable. Be careful to exert pressure only on the connector and do not pull on the Fibre Channel cables.
3. Remove the SFP transceiver.
 - a. Locate the release handle that is incorporated into the SFP transceiver.
 - b. Unclip the handle.
 - c. Use the handle to pull out the SFP transceiver.

Note: The SFP transceivers might have a plastic tag. If so, pull the tag to remove the SFP transceiver.

4. Push the new SFP transceiver into the aperture and ensure it is securely pushed home. The SFP transceiver usually locks into place without having to swing the release handle until it locks flush with the SFP transceiver. Figure 143 shows an SFP transceiver and its release handle.



Figure 143. SFP transceiver

5. Reconnect the Fibre Channel cable.
6. Confirm that the error is now fixed. Check the Fibre Channel port status by using the front-panel display. If possible, check the status that is given by the SAN monitoring tools of the customer. Either mark the error as fixed or restart the node, depending on the failure indication that you originally noted.

Removing and replacing an Ethernet SFP transceiver

When a failure occurs on a single 10 or 25 gigabits per second (Gbps) Ethernet link, the small form-factor pluggable (SFP) transceiver might need to be replaced.

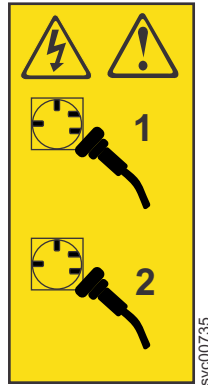
Before you begin

DANGER

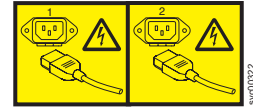
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



The following procedure is applicable to all SAN Volume Controller nodes. However, the location of the Ethernet adapter slots varies on each node. In addition, the type of card that is supported can vary. For example, the 25 Gbps Ethernet adapter (RoCE or iWARP) is only supported on SAN Volume Controller 2145-SV1 nodes. Use the management GUI to see information about the Ethernet ports or issue the **lsportip** command.

About this task

This service action requires the following actions:

- Turn off the node.
- Disconnect the power cables.
- Disconnect the data cables.

Complete the following steps to remove and then replace an SFP transceiver:

Procedure

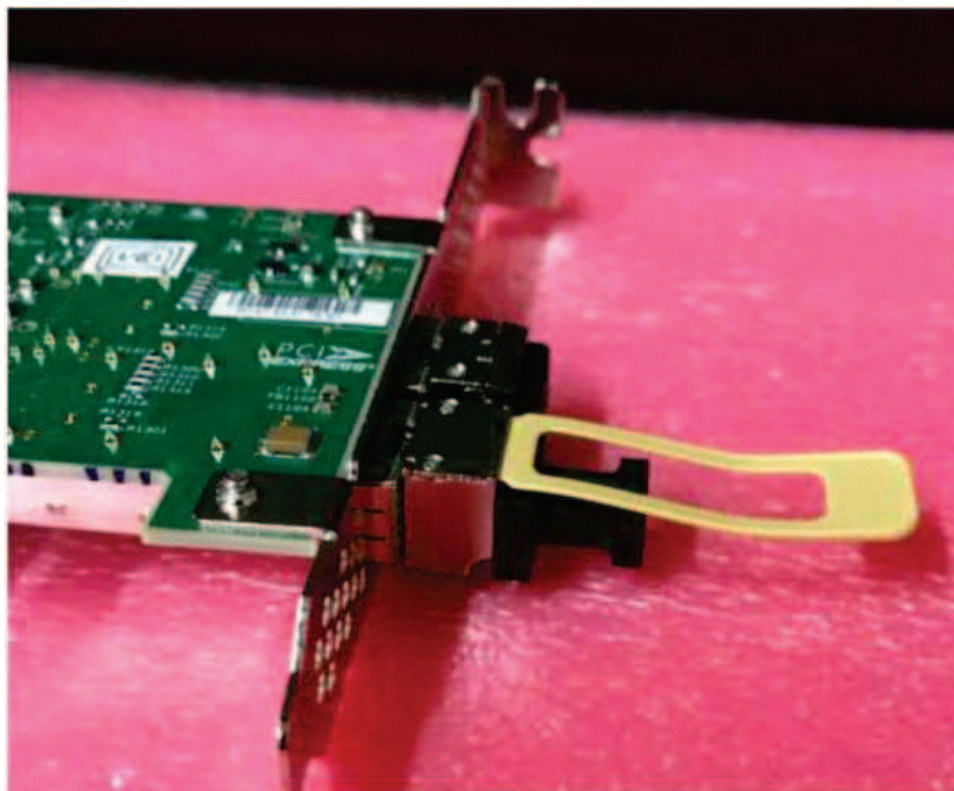
1. Read the safety information that is described in “Preparing to remove and replace parts” on page 12.
2. Identify the 10 or 25 Gbps Ethernet port that is failing.
3. Before you turn off the node, ensure that its data is mirrored and synchronized. For more information, see MAP 5350 in the troubleshooting guide for your system. Power off the node because the serial cable must be removed to give access to the SFP transceivers.
4. Remove the fiber-optic cable from the port that has the problem by pressing its release tab and pulling out the cable. Be careful to exert pressure only on the connector and do not pull on the fiber-optic cable. If necessary, remove the serial cable to get access to the SFP transceiver.
5. Release the the latch on the faulty SFP transceiver and remove it from its slot. The SFP transceiver can vary, depending on the type of network adapter used.
 - Figure 144 on page 172 illustrates an SFP transceiver and its release handle. To release this type of SFP transceiver, unclip the latching handle then pull the latching handle.



svc00418

Figure 144. SFP transceiver

- Figure 145 shows an example of an SFP transceiver for a 25 Gbps (RoCE) networking adapter. To release this type of SFP transceiver, gently pull on the protruding tab of the SFP.



svc10001

Figure 145. 25 Gbps SFP transceiver (RoCE)

- Some SFP transceivers might have a plastic tag. If so, pull the tag to remove the SFP transceiver.

Important: The customer might be using a non-standard SFP transceiver. Always check that the SFP transceiver that you replace matches the SFP transceiver that you remove.

6. Insert the replacement SFP transceiver fully into the aperture that is vacated in step 5 on page 171.
 - To insert an SFP transceiver like the one shown in Figure 144, open the latching handle of the transceiver, push the transceiver fully into its slot, then close the latching handle.

- To insert an SFP transceiver like the one shown in Figure 145 on page 172, press the transceiver into its slot until the device clicks into place.
7. Replace the fiber-optic cable that was removed by gently pushing into the SFP transceiver until it clicks into place.
 8. Replace the serial cable and secure it in place.
 9. Power on the node.
 10. Confirm that the error is now fixed. If possible, check the status that is given by the Ethernet monitoring tools. Depending on the failure indication that you originally noted, either mark the error as fixed or restart the node.

Removing a PCI express riser-card assembly

Use these instructions when you are prompted to remove a PCI express riser-card assembly.

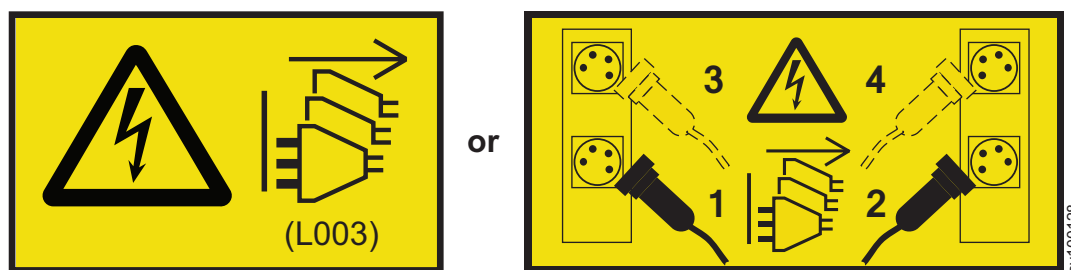
Removing a PCI express riser-card assembly: 2145-SV1

Use these instructions when you are prompted to remove a PCI express riser card assembly from a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



This service action assumes that the following conditions are met:

- The node is turned off. Ensure that hosts do not lose access to data in volumes, as described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*
- The power cables are disconnected.
- The signal cables are disconnected.
- The top back cover is removed, as described in “Removing the top covers: 2145-SV1” on page 66.

About this task

The SAN Volume Controller 2145-SV1 system has three PCI riser-card slots on the system board. The following information indicates the riser card slots.

- The 2145-SV1 comes with three PCI Express riser-card assemblies installed.
- PCI riser slot 1 (the slot farther from the power supplies). You must install a PCI riser-card assembly in slot 1.
- PCI riser slot 2 (the slot farther from the power supplies). You must install a PCI riser-card assembly in slot 2.
- PCI riser slot 3 (the slot closest to the power supplies).

Procedure

1. Grasp the riser-card assembly at the front tab and rear edge.
Figure 146 shows PCI riser-card assembly 1.



Figure 146. Grasping PCI riser-card assembly 1

2. Lift the adapter assembly straight up to remove it from the 2145-SV1 node chassis, as shown in Figure 147 on page 175.



Figure 147. Removing PCI riser card assembly 1

3. Place the riser-card assembly on a flat, static-protective surface.
4. Repeat step 1 on page 174 through 3 to remove the other adapter assemblies, as needed.
For example, Figure 148 on page 176 shows how to grasp and remove PCI riser-card assembly 2 from the chassis of the 2145-SV1 node.



Figure 148. Grasping and removing PCI riser-card assembly 2

Removing a PCI express riser-card assembly: 2145-DH8

Use these instructions when you are prompted to remove a PCI express riser card assembly from a SAN Volume Controller 2145-DH8 node.

About this task

The SAN Volume Controller 2145-DH8 system has two PCI riser-card slots on the system board. The following information indicates the riser card slots:

- The 2145-DH8 comes with two PCI Express riser-card assemblies installed.
- PCI riser slot 1 **1** (the slot farther from the power supplies). You must install a PCI riser-card assembly in slot 1. See Figure 149 on page 177.
- PCI riser slot 2 **2** (the slot closer to the power supplies). You must install a PCI riser-card assembly in slot 2.
- Cards in PCI riser slot 2 are usable only if microprocessor 2 is also fitted.

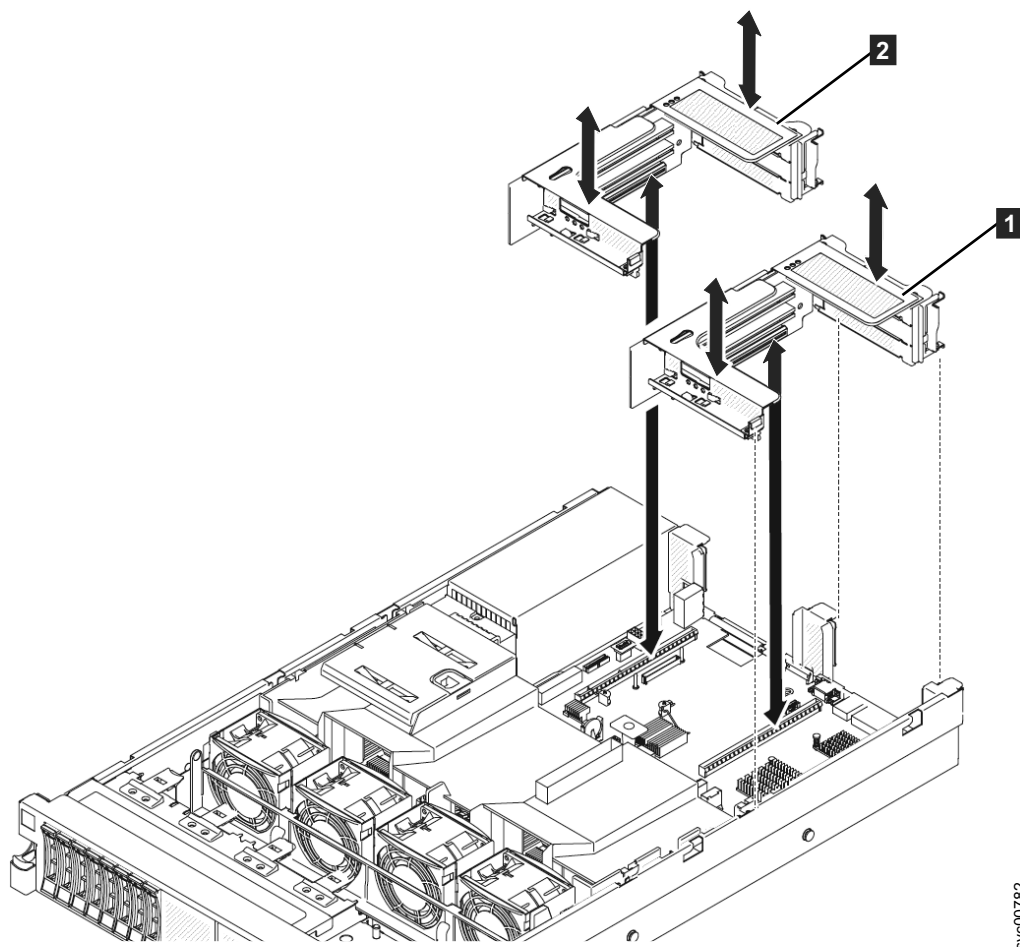


Figure 149. Removing the 2145-DH8 PCI express riser card assembly

This service action assumes that the following conditions are met:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The signal cables are disconnected.
- The top cover is removed.

Procedure

1. Grasp the riser-card assembly at the front tab and rear edge and lift it to remove it from the slot.
2. Place the riser-card assembly on a flat, static-protective surface.

Replacing a PCI express riser-card assembly

Use these instructions when you are prompted to replace a PCI express riser card assembly.

Replacing a PCI express riser-card assembly: 2145-SV1

Use these instructions when you are prompted to replace a PCI express riser card assembly on a SAN Volume Controller 2145-SV1 node.

Before you begin

This service action assumes that the following conditions are met:

- The node is turned off. Ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*
- The power cables are disconnected.
- The top back cover is removed, as described in “Removing the top covers: 2145-SV1” on page 66.
- All PCI express riser-card assemblies are removed, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.

Procedure

The SAN Volume Controller 2145-SV1 node has three PCI riser-card slots on the system board. The 2145-SV1 comes with three PCI Express riser-card assemblies installed.

- The 2145-SV1 comes with three PCI Express riser-card assemblies installed.
- PCI riser slot 1 (the slot farther from the power supplies). You must install a PCI riser-card assembly in slot 1.
- PCI riser slot 2 (the slot in the middle). You must install a PCI riser-card assembly in slot 2.
- PCI riser slot 3 (the slot closest to the power supplies).

For details about supported adapter types for each expansion slot, see the information about optional features. Install any new PCIe expansion cards by gently pushing them into the correct PCIe slot.

1. Reinstall any adapters that were removed in the same slot.
2. Align the PCI riser-card assembly with the selected PCI connector on the system board, as shown in Figure 150.



Figure 150. Aligning PCI riser card assembly 1

The chassis might sag after you remove the riser assembly. In this case, lift the bottom of the chassis to line up the slots on the side of the assembly to the alignment brackets in the side of the chassis.

- a. For PCI connector 1, carefully fit the two alignment slots on the side of the assembly onto the two alignment brackets in the side of the chassis.

- b. For PCI connector 2, carefully align the bottom edge (the contact edge) of the riser-card with the riser-card connector on the system board.
 - c. For PCI connector 3, carefully align the bottom edge (the contact edge) of the riser-card with the riser-card connector on the system board.
3. Press down on the assembly and make sure that each riser-card assembly is fully seated in the riser-card connector on the system board, as Figure 151 shows.

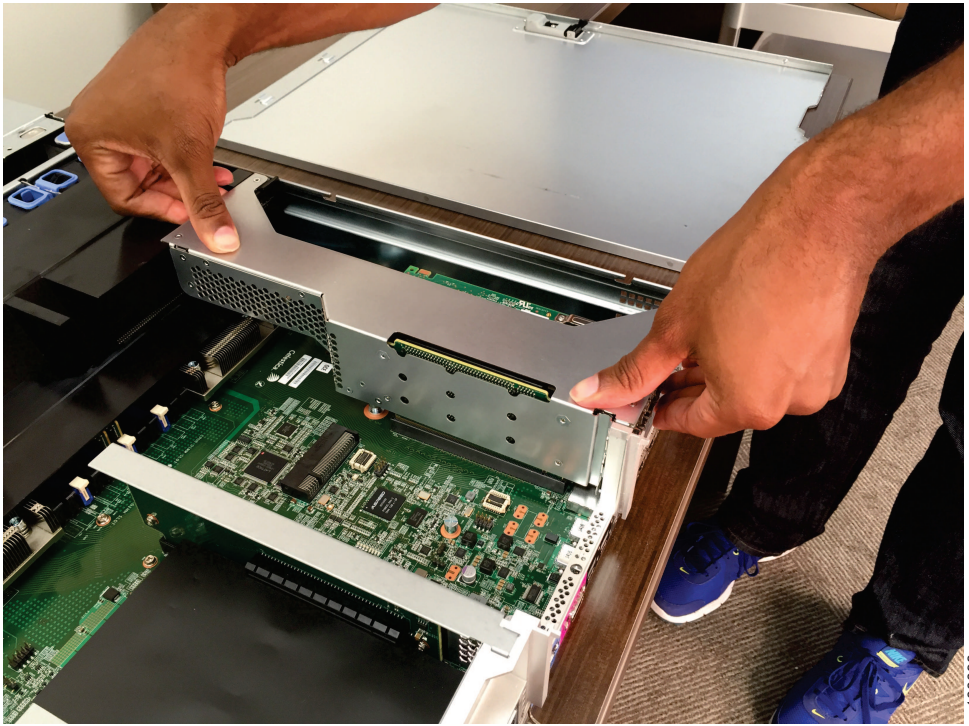


Figure 151. Replacing PCI riser card assembly 1

4. Repeat steps Figure 150 on page 178 and 3 to replace additional PCI riser-assemblies, as needed.
5. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
6. Slide the 2145-SV1 node into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
7. Reconnect all signal cables to the same ports from which they were removed.

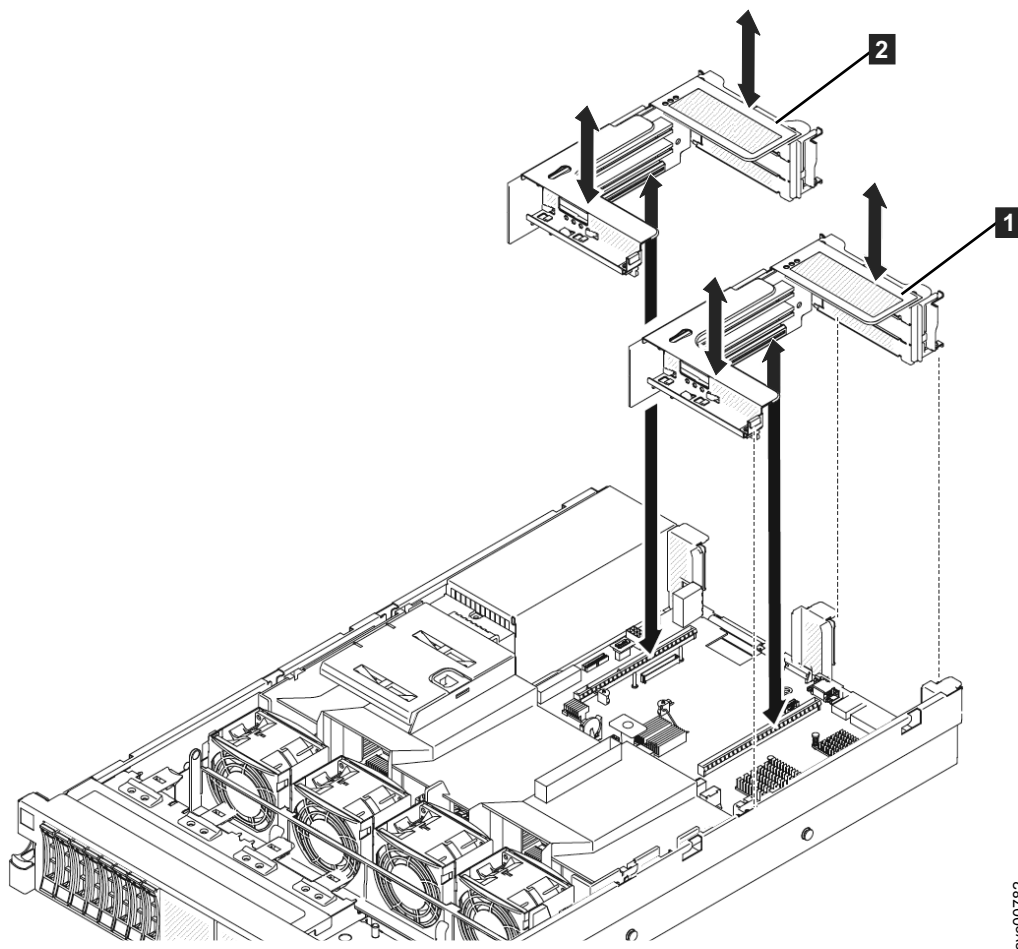
Replacing a PCI express riser-card assembly: 2145-DH8

Use these instructions when you are prompted to replace a PCI express riser card assembly on a SAN Volume Controller 2145-DH8 node.

About this task

The SAN Volume Controller 2145-DH8 node has two PCI riser-card slots on the system board.

- The 2145-DH8 comes with two PCI Express riser-card assemblies installed.
- PCI riser slot 1 **1** (the slot farther from the power supplies): You must install a PCI riser-card assembly in slot 1. See Figure 152 on page 180.
- PCI riser slot 2 **2** (the slot closer to the power supplies): You must install a PCI riser-card assembly in slot 2.
- Adapter cards in PCI riser slot 2 are usable only if microprocessor 2 is also fitted.



svc00782

Figure 152. Replacing the 2145-DH8 PCI express riser card assembly

This service action assumes that the following conditions are met:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The signal cables are disconnected.
- The top cover is removed.
- One or both PCI express rise-card assemblies are removed.

Procedure

For the list of the expansion cards that are supported by each PCIe slot, see Optional features. Install any new PCIe expansion cards by gently pushing them into the correct PCIe slot.

1. Reinstall any adapters that were removed in the same slot.
2. Align the PCI riser-card assembly with the selected PCI connector on the system board.

The chassis might sag after you remove the riser assembly. In this case, lift the bottom of the chassis to line up the slots on the side of the assembly to the alignment brackets in the side of the chassis.

Notes:

- a. PCI connector 1: Carefully fit the two alignment slots on the side of the assembly onto the two alignment brackets in the side of the chassis.

- b. PCI connector 2: Carefully align bottom edge (the contact edge) of the riser-card with the riser-card connector on the system board.
3. Press down on the assembly and make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.
4. Replace the 2145-DH8 cover.
5. Slide the 2145-DH8 into the rack.
6. Reconnect all signal cables to the same ports from which they were removed.

Removing a PCI express adapter

You might need to remove a PCI express adapter from a node.

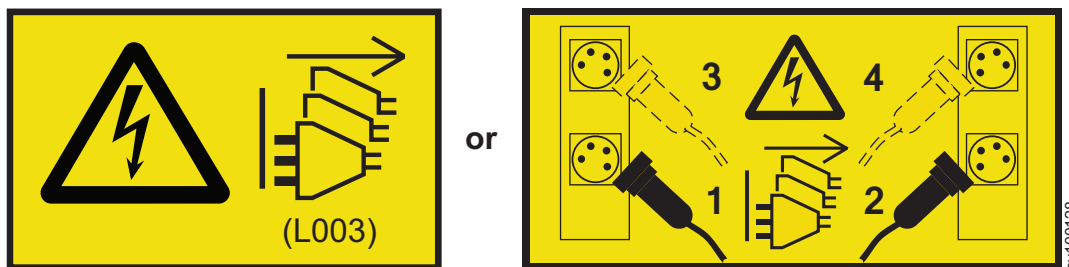
Removing a PCI express adapter: 2145-SV1

You might be prompted to remove a PCI express adapter on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



This service action applies to SAN Volume Controller 2145-SV1 PCI express adapters:

- 10 Gbps Ethernet adapter
- 25 Gbps Ethernet adapter (RoCE or iWARP) for iSCSI
- Compression accelerator adapter
- Fibre Channel adapter
- SAS adapter

This service action assumes that the following conditions exist.

- The node is turned off, data is mirrored and synchronized, and there are no dependent volumes, as described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The node is removed from the rack, as described in “Removing a node from a rack: 2145-SV1” on page 35.
- The top back cover is removed, as described in “Removing the top covers: 2145-SV1” on page 66.
- The PCI riser-card assembly is removed for each adapter you are removing, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.

Procedure

1. Disconnect any cables from the adapter. Note the cable routing, in case you reinstall the adapter.

2. Remove the retaining screw that secures the adapter to the adapter assembly, as Figure 153 shows.

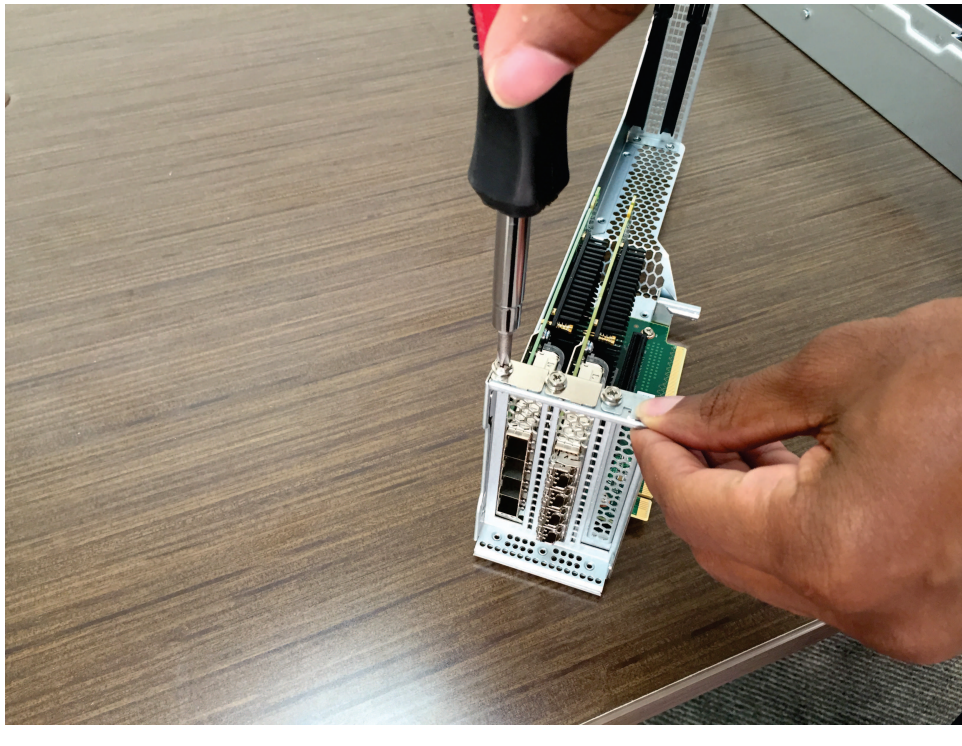


Figure 153. Removing the retaining screw

3. Unseat the adapter from the connector, as shown in Figure 154 on page 183.



Figure 154. Unseating the adapter

4. Carefully grasp the adapter by its top edge or upper corners. Pull the adapter from the PCI expansion slot, as shown in Figure 155.

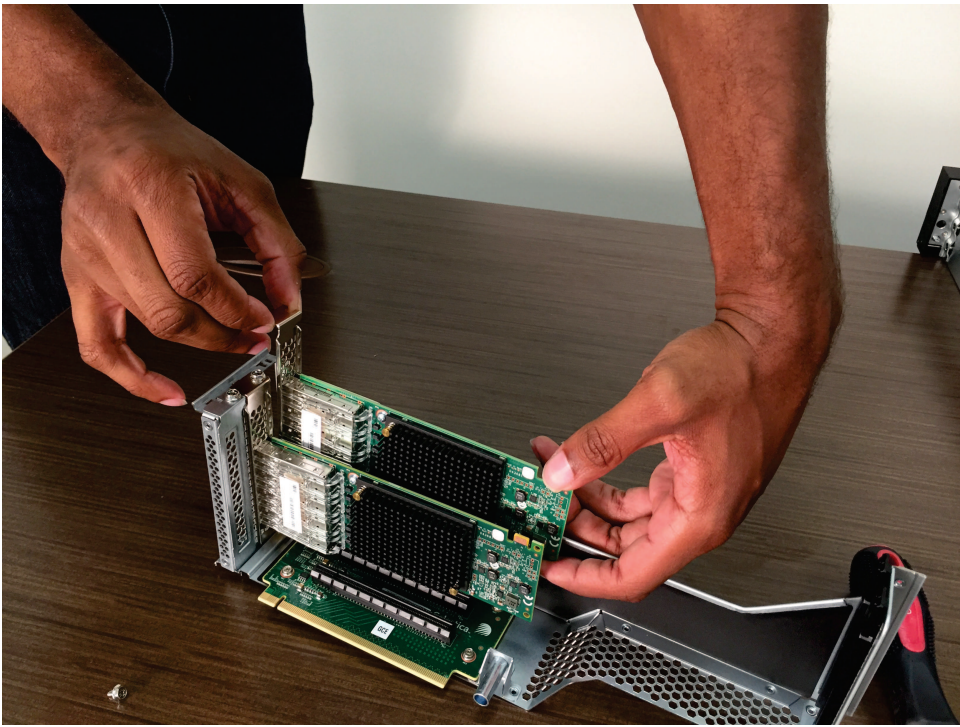


Figure 155. Removing the adapter from the adapter connectors

Note: If the adapter is a full-length adapter in the upper expansion slot of the PCI riser-card assembly, and you do not intend to replace it with another full-length adapter, remove the bracket. Store the full-length bracket on the underside of the top of the PCI riser-card assembly.

5. If you are instructed to return the adapter, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

Removing a PCI express adapter: 2145-DH8

You might be prompted to remove a PCI express adapter on a SAN Volume Controller 2145-DH8 node.

Before you begin

This service action applies to SAN Volume Controller 2145-DH8 PCI express adapters:

- 10 Gbps Ethernet adapter
- Compression accelerator adapter
- Fibre Channel adapter
- SAS adapter

This service action assumes that the following conditions exist:

- The node is turned off, data is mirrored and synchronized, and there are no dependent volumes, as described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The node is removed from the rack.
- The top cover is removed.
- The PCI riser-card assembly is removed.

Procedure

1. Disconnect any cables from the adapter. Note the cable routing, in case you reinstall the adapter.
2. Carefully grasp the adapter by its top edge or upper corners, and pull the adapter from the PCI expansion slot, as shown in Figure 156 on page 185.

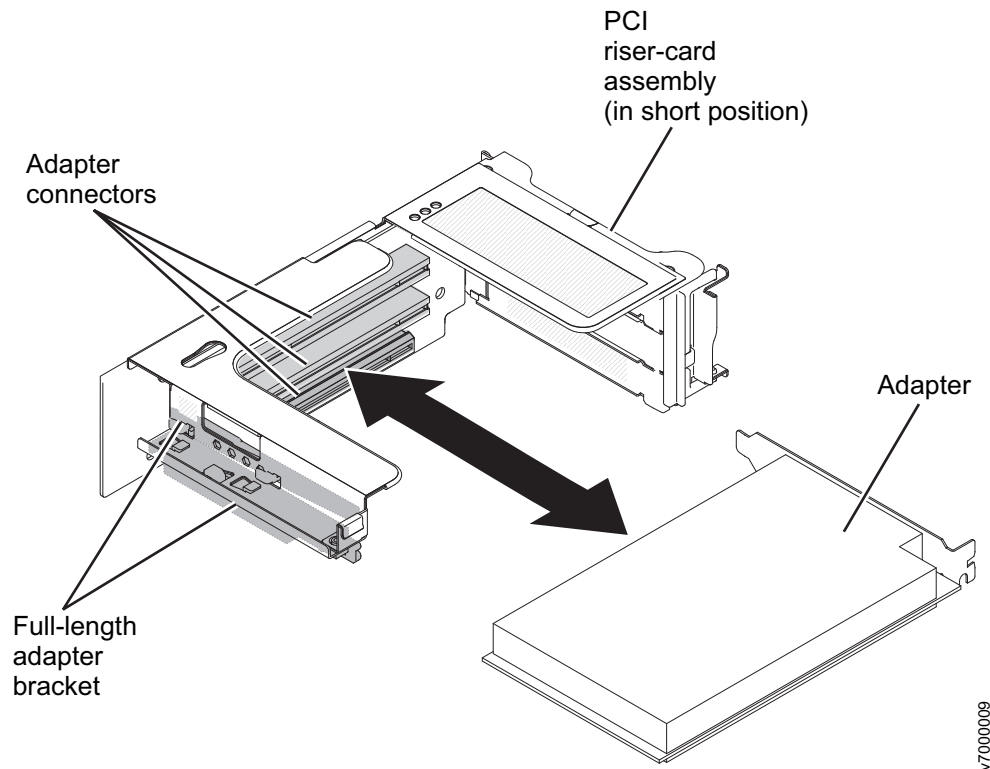


Figure 156. Removing the adapter from the adapter connectors

Note: If the adapter is a full-length adapter in the upper expansion slot of the PCI riser-card assembly, and you do not intend to replace it with another full-length adapter, remove the bracket. Store the full-length bracket on the underside of the top of the PCI riser-card assembly.

3. If you are instructed to return the adapter, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

Replacing a PCI express adapter

You might need to replace a PCI express adapter from a node.

Replacing a PCI express adapter: 2145-SV1

You might need to replace a PCI express adapter on a SAN Volume Controller 2145-SV1 node.

Before you begin

This service action applies to the SAN Volume Controller 2145-SV1 PCI express adapters:

- 10 Gbps Ethernet adapter
- 25 Gbps Ethernet adapter (RoCE or iWARP) for iSCSI
- Compression accelerator adapter
- Fibre Channel adapter
- SAS adapter

About this task

This service action assumes that the node was turned off, removed from the rack, and the PCI express adapter was removed. The adapter is replaced in the same slot from which the same type of adapter was

removed. For details about supported adapter types for each expansion slot, see the information about optional features.

Procedure

To replace an adapter, complete the following steps.

1. Align the adapter with the PCI connector on the riser card and the guide on the external end of the riser-card assembly, as shown in Figure 157.

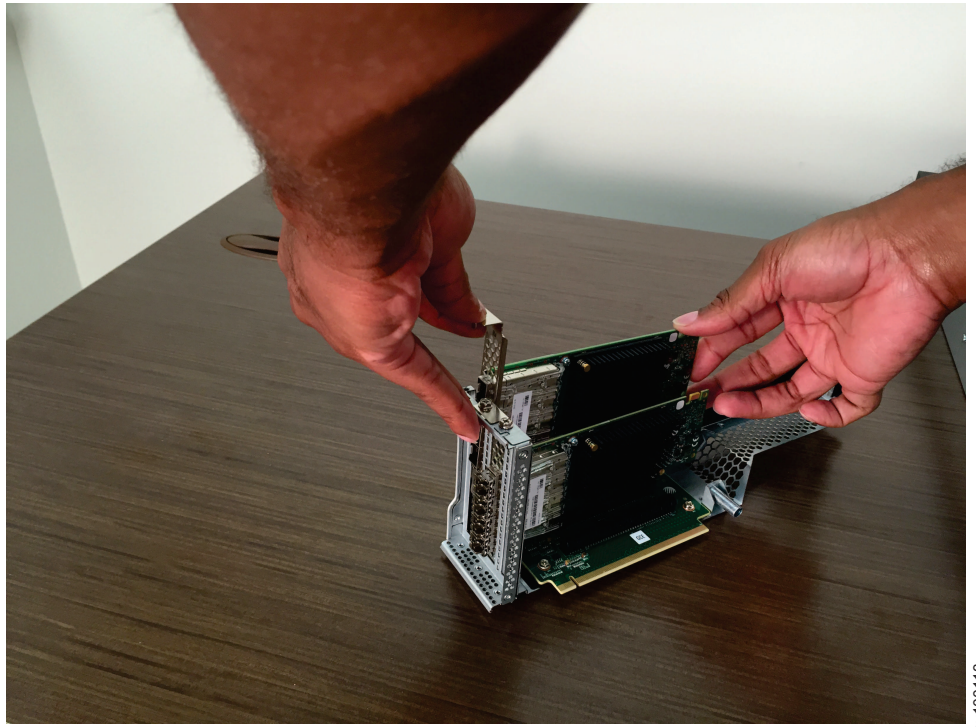


Figure 157. Inserting the adapter into the PCI connector

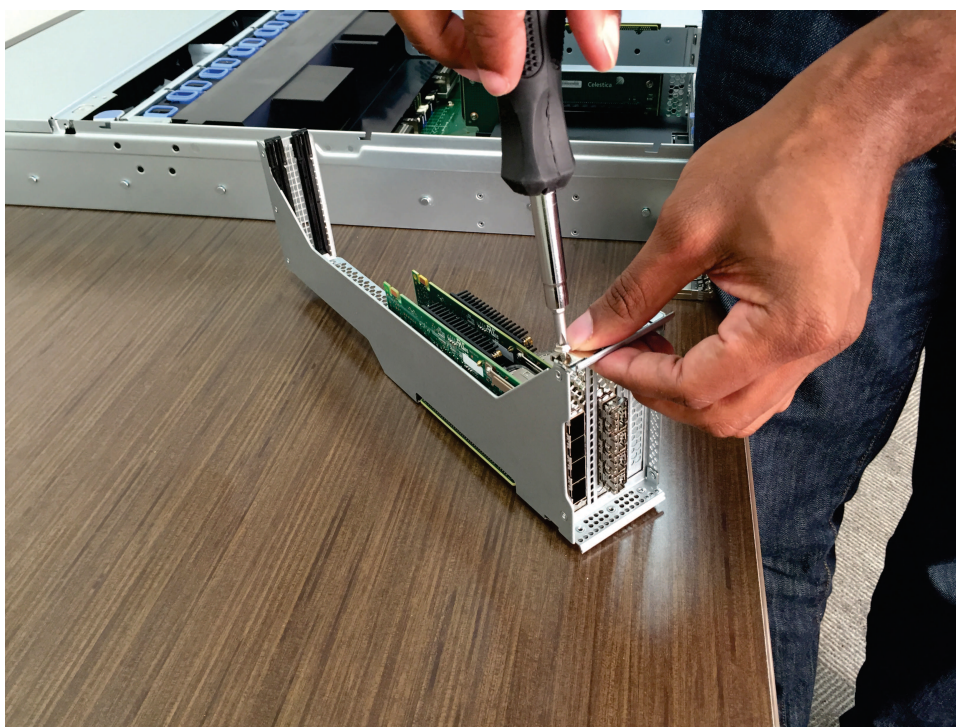
2. Ensure that the slots on the adapter are aligned correctly in to the PCI riser-card assembly, as Figure 158 on page 187 shows.



sv100114

Figure 158. Aligning the adapter into the PCI connector

3. Press the adapter firmly into the PCI connector on the riser card.
4. Securely reattach the adapter to the adapter assembly, as shown in Figure 159.



sv100115

Figure 159. Securing the adapter to the adapter assembly

5. Press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.
6. Install the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
7. Slide the node into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
8. Reconnect the external cables. Reconnect the power cords to turn on the node; then, turn on the peripheral devices.

Replacing a PCI express adapter: 2145-DH8

You might need to replace a PCI express adapter on a SAN Volume Controller 2145-DH8 node. This procedure is for a Tier 1 customer replaceable unit (CRU). Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you are charged for the installation. Service agreements can be purchased so that you can ask IBM to replace these units.

Before you begin

This service action applies to SAN Volume Controller 2145-DH8 PCI express adapters:

- 10 Gbps Ethernet adapter
- Compression accelerator adapter
- Fibre Channel adapter
- SAS adapter

About this task

This service action assumes that the node was turned off and removed from the rack, and the SAN Volume Controller 2145-DH8 PCI express adapter was removed. The adapter is replaced in the same slot from which the same type of adapter was removed. For details about supported adapter types for each expansion slot, see the information about optional features.

Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a clustered system solution, verify that the latest level of code is supported for the clustered system before you update the code.

Procedure

To replace an adapter that was removed previously, follow these steps:

1. Install the adapter in the expansion slot, as shown in Figure 160 on page 189.
 - a. Align the adapter with the PCI connector on the riser card and the guide on the external end of the riser-card assembly.
 - b. Press the adapter firmly into the PCI connector on the riser card.

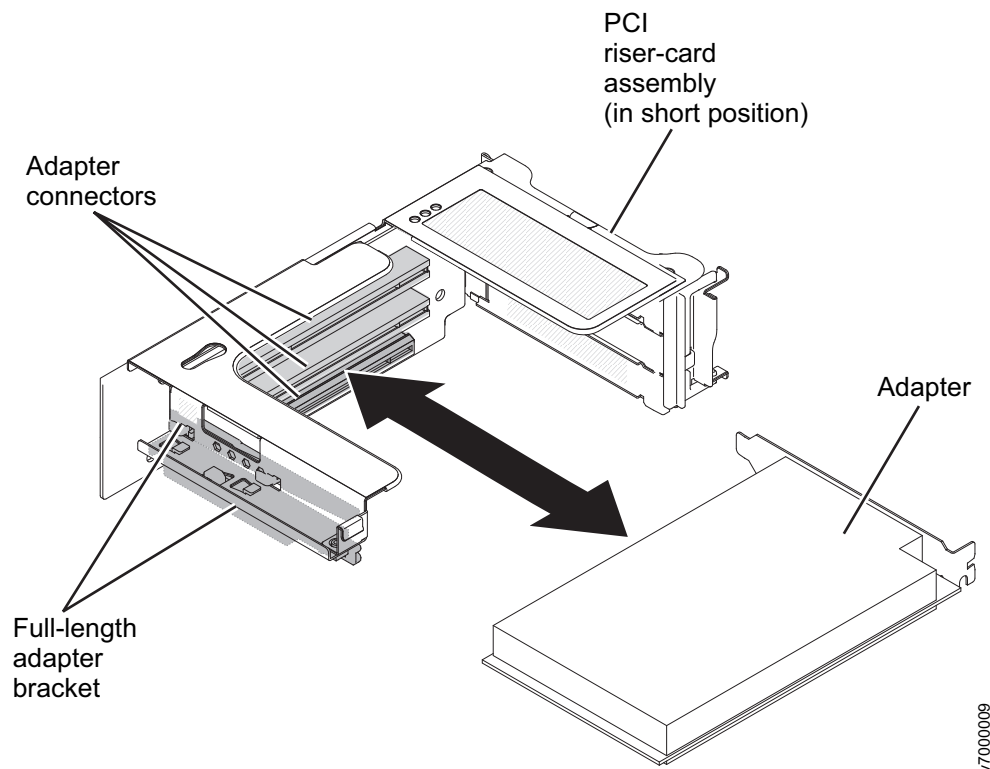


Figure 160. Inserting the adapter into the PCI connector

2. Align the PCI riser-card assembly with the selected PCI connector on the system board:
 - Fit the two alignment slots on the side of the assembly onto the two alignment brackets on the side of the chassis.
 - Align the rear of the assembly with the guides on the rear of the node.
3. Press down on the assembly. Make sure that the riser-card assembly is fully seated in the riser-card connector on the system board.
4. Install the node cover.
5. Slide the node into the rack.
6. Reconnect the external cables, then, reconnect the power cords and turn on the peripheral devices and the node.

Removing the operator-information panel assembly

You might be prompted to remove the operator-information panel from a node.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

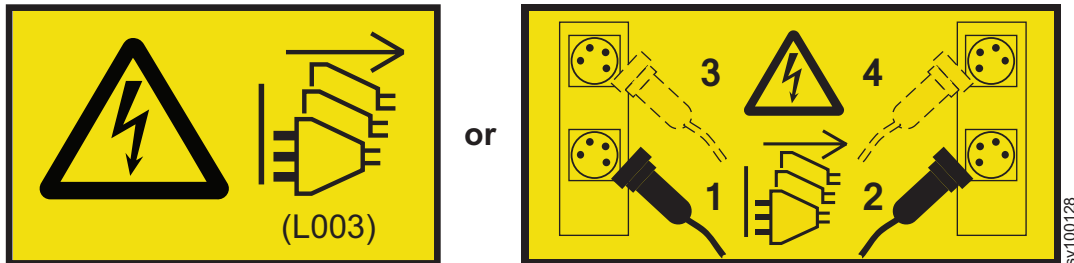
Removing the operator-information panel assembly: 2145-SV1

You can remove the operator-information panel assembly on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off, data is mirrored and synchronized, and there are no dependent volumes, as described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The top covers are removed, as described in “Removing the top covers: 2145-SV1” on page 66.

Procedure

To remove the operator-information panel assembly, complete the following steps:

1. Read the safety information.
2. Remove the two screws from the top of the assembly, as shown in Figure 161 on page 191.

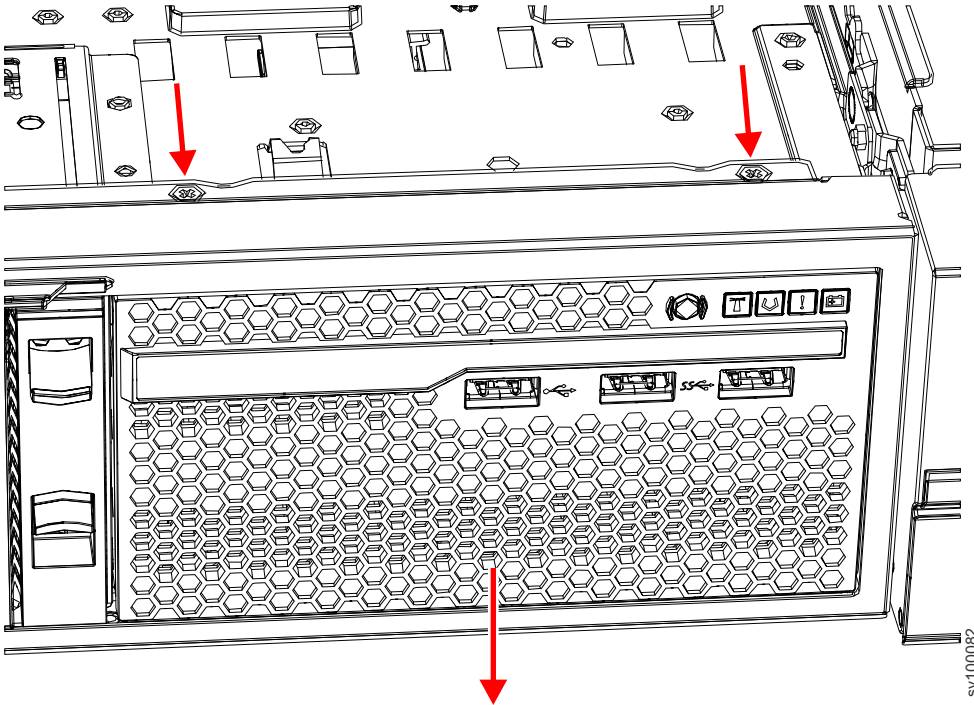


Figure 161. Removing the 2145-SV1 operator-information panel assembly

3. Push the operator-information panel assembly from behind in the direction that is shown in Figure 161 until it protrudes from the front of the node.
4. From the front of the node, slide the operator-information panel assembly out of the node.
5. Disconnect the cables from the rear of the operator information panel assembly.

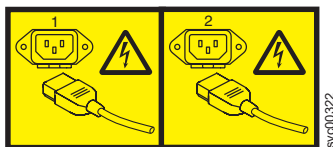
Removing the operator-information panel assembly: 2145-DH8

You can remove the operator-information panel assembly on a SAN Volume Controller 2145-DH8 node.

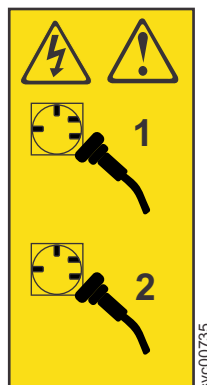
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. Ensure that the data is mirrored and synchronized, and that there are no dependent volumes. See MAP 5350 in the *IBM System Storage SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The top cover is removed.

Procedure

To remove the operator-information panel assembly, complete the following steps:

1. Read the safety information.
2. Inside the node, disconnect the cable from the rear of the operator information panel assembly.
3. To remove the operator-information panel, press the release latch for the light panel diagnostics panel.
4. From the front of the node, slide the operator-information panel assembly out of the node, as shown in Figure 162.

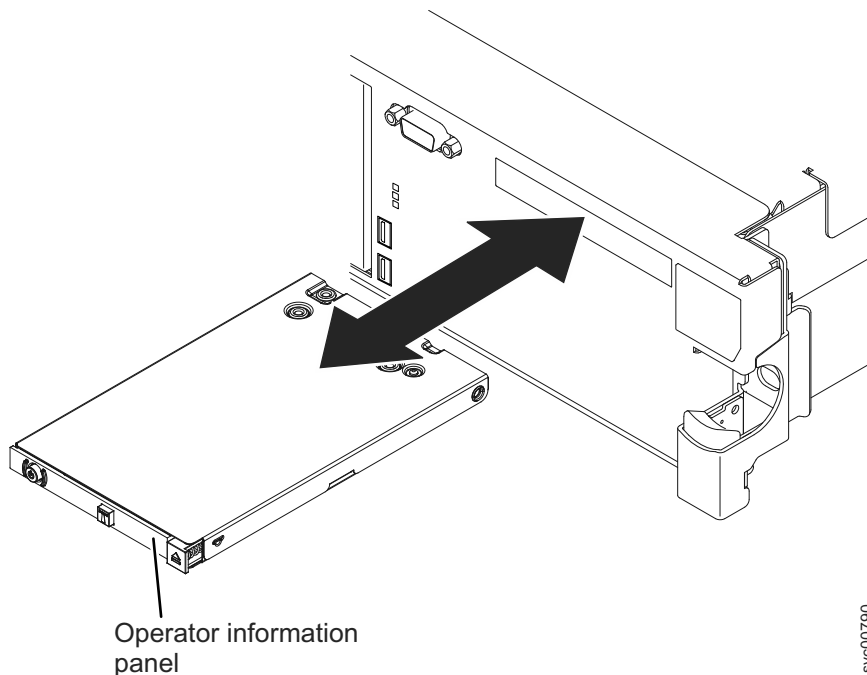


Figure 162. Removing the 2145-DH8 operator-information panel assembly

Replacing the operator-information panel assembly

You might be prompted to replace the operator-information panel assembly.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see "Handling static-sensitive devices" on page xxiv.

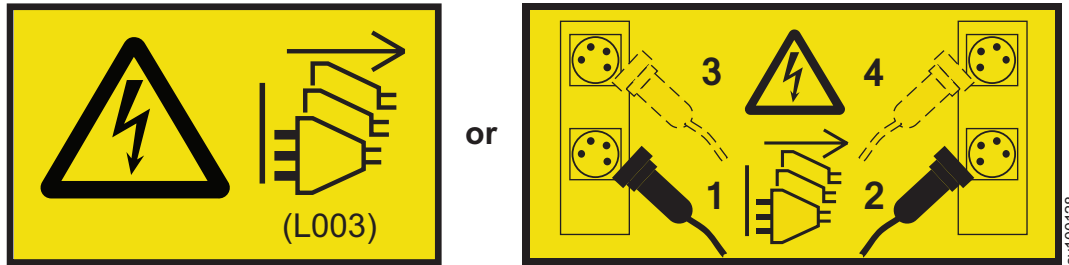
Replacing the operator-information panel assembly: 2145-SV1

You can replace the operator-information panel on a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes that the following conditions are met.

- The node is turned off. Ensure that its data is mirrored and synchronized, and that there are no dependent volumes. For details, see MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The top cover is removed, as described in “Removing the top covers: 2145-SV1” on page 66.

Attention: Failure to install or remove the operator-information panel cable with care can damage the connectors on the system board. Damage to the connectors might require replacing the system board.

Procedure

To replace the operator-information panel, complete the following steps:

1. Read the safety information.
2. From the front of the node, slide the operator-information panel into the node until it clicks into place, as shown in Figure 163 on page 194.

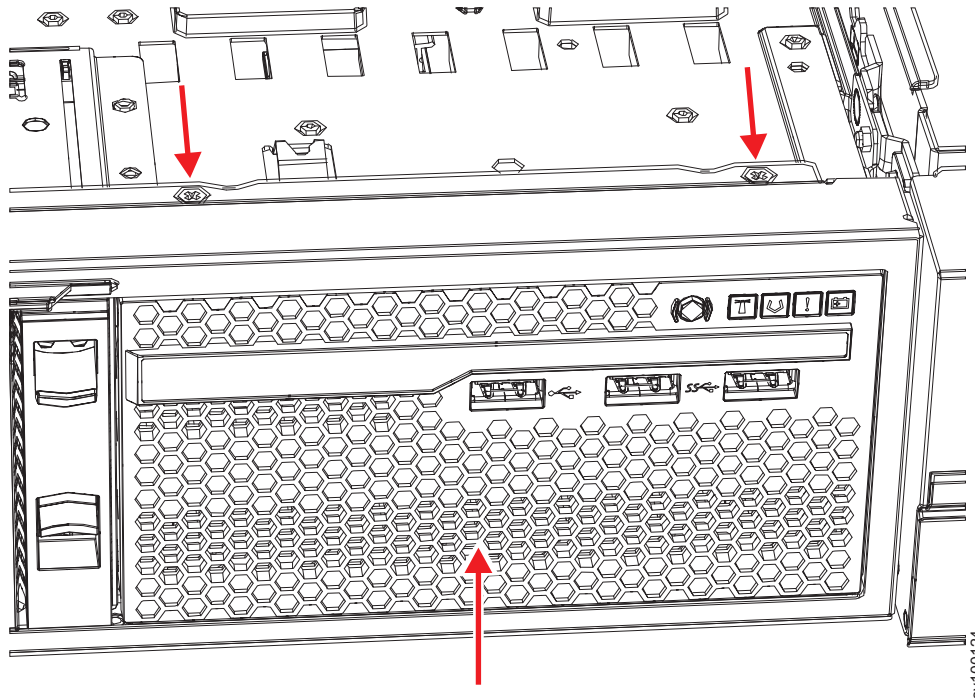


Figure 163. Replacing the 2145-SV1 operator-information panel

3. Use the two screws to reattach the operator-information panel assembly.
4. Inside the node, connect the cable to the rear of the operator-information panel assembly.
5. Replace the top covers, as described in “Replacing the top covers: 2145-SV1” on page 69.
6. If you removed the node from the rack, replace it in the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
7. If you removed any Fibre Channel or Ethernet cables, replace them in the same ports from which they were removed.
8. Replace the power cords. The node turns on when power is restored.

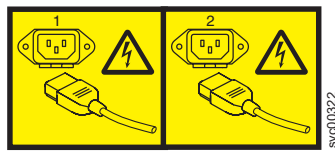
Replacing the operator-information panel assembly: 2145-DH8

You can replace the operator-information panel on a SAN Volume Controller 2145-DH8 node.

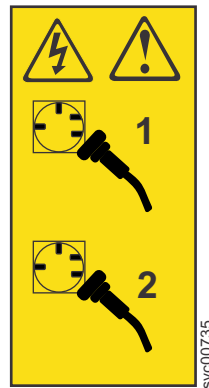
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that its data is mirrored and synchronized, and that there are no dependent volumes, as described in MAP 5350 in the *IBM System Storage SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The top cover is removed.

Attention: Failure to install or remove the operator-information panel cable with care can damage the connectors on the system board. Damage to the connectors might require replacing the system board.

Procedure

To replace the operator-information panel, complete the following steps:

1. Read the safety information.
2. From the front of the node, slide the operator-information panel into the node until it clicks into place, as shown in Figure 164 on page 196.
3. Inside the node, connect the cable to the rear of the operator information panel assembly.

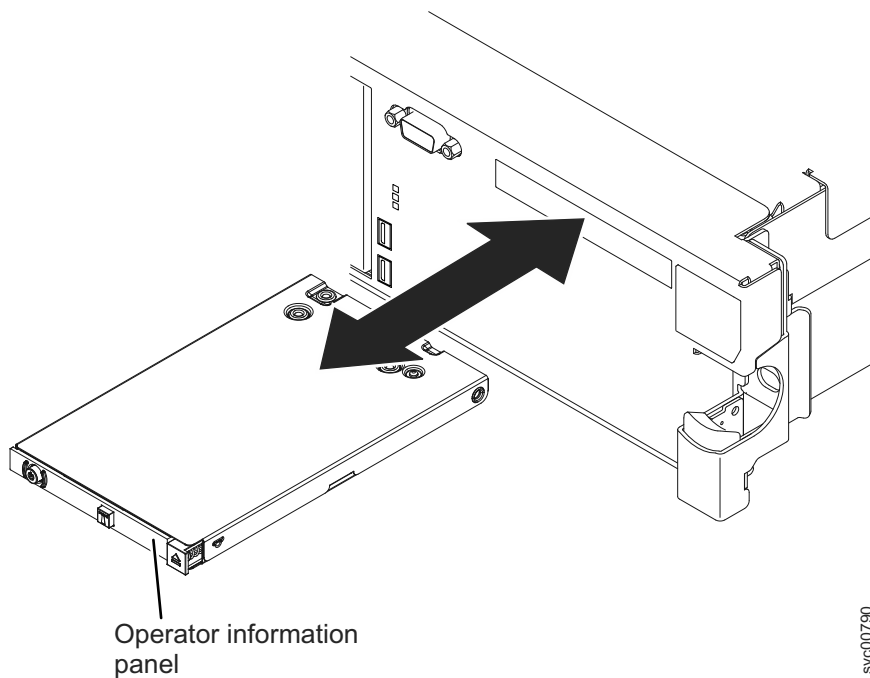


Figure 164. Replacing the 2145-DH8 operator-information panel

4. To connect the operator information panel cable on the system board, press evenly on the cable that is shown in Figure 165 on page 197. Pressing on one side of the cable might damage the cable or connector.

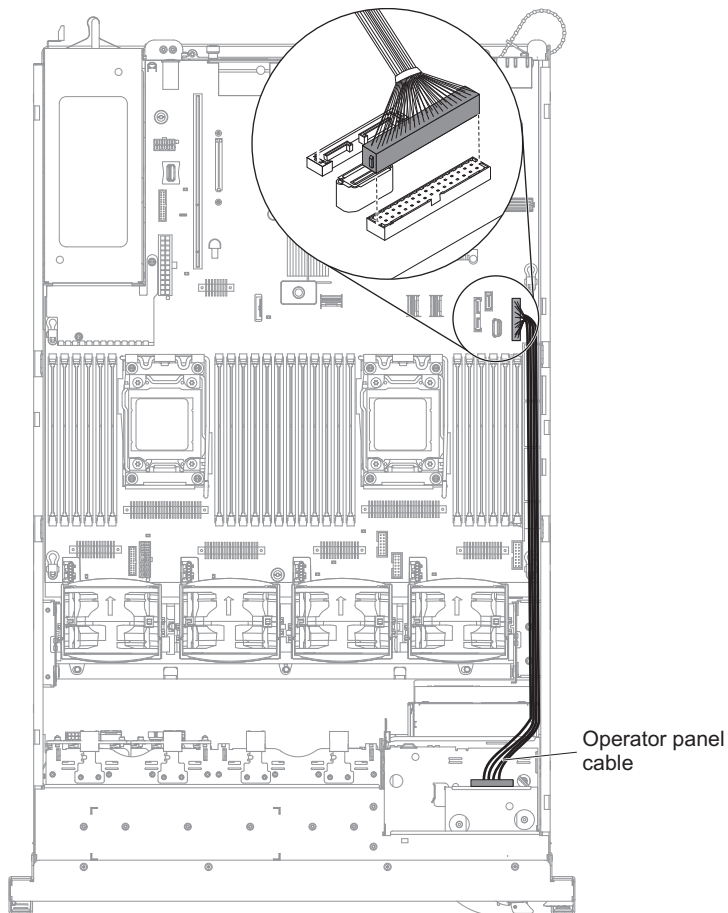


Figure 165. Connecting the 2145-DH8 operator-information panel cable

5. Replace the top cover.
6. If you removed the node from the rack, replace the node in the rack.
7. If you removed any Fibre Channel or Ethernet cables, using the labels that you placed on each cable, replace them in the same ports from which they were removed.
8. If you removed the power cords, replace the power cords and the cable-retention arm.
9. Lift the locking levers (**1** in Figure 166 on page 198) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

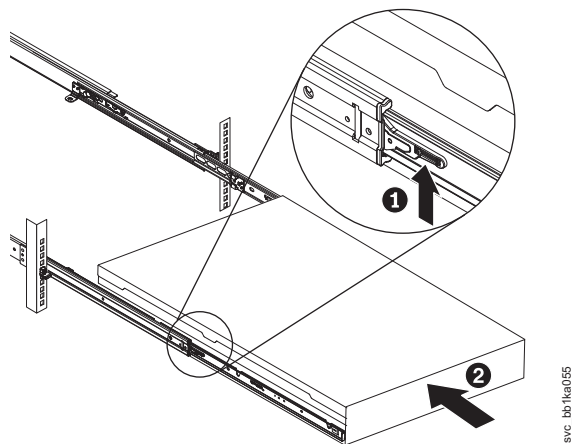


Figure 166. Raising the locking levers of the slide rails of the rack

10. Turn on the node.

Removing the operator-information panel cables

Use these instructions when you are prompted to remove the operator-information panel cables.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

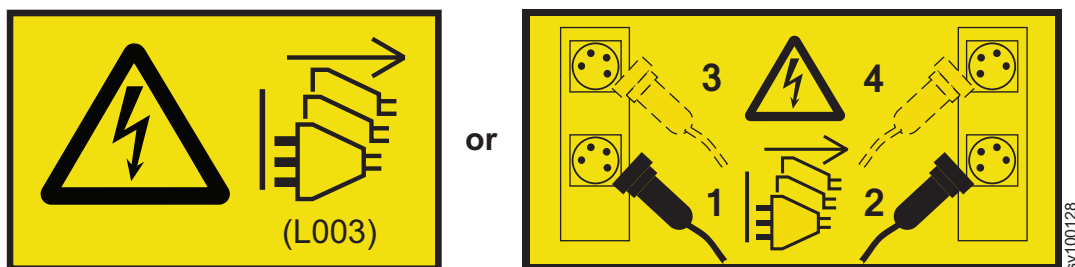
Removing the operator-information panel cables: 2145-SV1

You might need to remove the operator-information panel cables from a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes that the following conditions are met.

- The power cables are disconnected. The node turns off when the power cables are removed.
- Ensure that the node data is mirrored and synchronized, and that there are no dependent volumes. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
- The node is removed from the rack.
- The top covers are removed, as described in “Removing the top covers: 2145-SV1” on page 66.

Procedure

To remove the operator-information panel cables, complete the following steps.

1. Read the safety information.
2. Remove the blue and black cables from the connectors (**A** and **B**) on the main board, as shown in Figure 167 on page 200.

CAUTION:

Gently press the cable towards the fan cage; then, pull to remove the cable from the connector on the main board. Using excessive force might damage the cables or connectors.

- a. Remove the blue USB cable from connector **A**.
- b. Remove the black LED and power button cable from connector **B**.

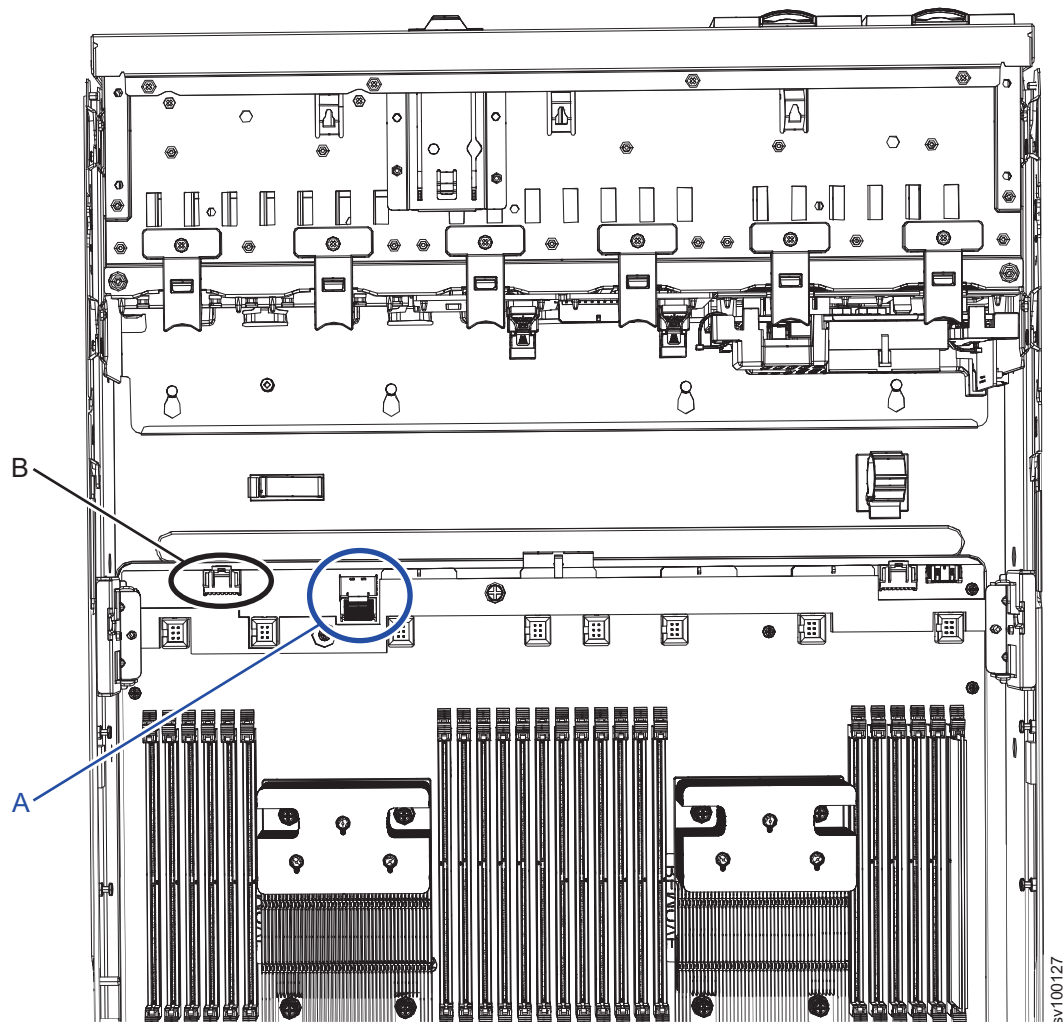


Figure 167. Cable connectors on the main board for the operator-information panel cables

3. Gently remove each cable from the connectors on the rear of the operator-information panel (**A** and **B**), as shown in Figure 168 on page 201.
 - a. Remove the blue USB cable from connector **A** .
 - b. Remove the black LED and power button cable from connector **B** .

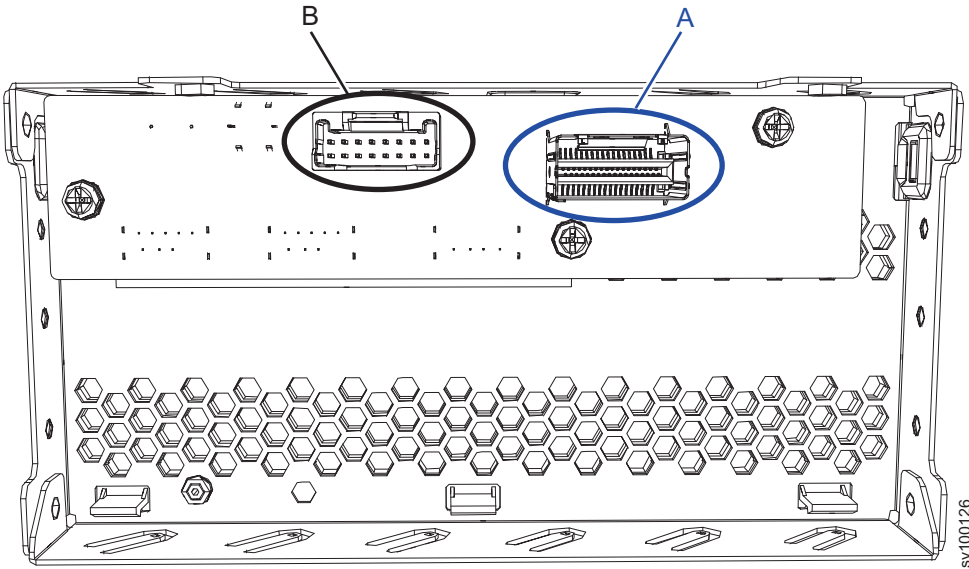


Figure 168. Cable connectors on the back of the operator-information panel

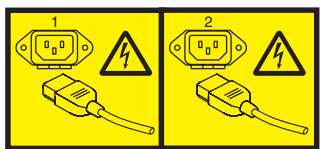
Removing the operator-information panel cable: 2145-DH8

You might need to remove the operator-information panel cable from a SAN Volume Controller 2145-DH8 node.

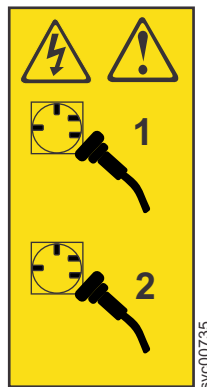
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that its data is mirrored and synchronized, and that there are no dependent volumes, as described in MAP 5350 in the *IBM System Storage SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The node is removed.
- The top cover is removed.

Procedure

To remove the operator-information panel cable, complete the following steps:

1. Read the safety information.
2. Remove the cable from the rear of the operator-information panel.
3. Remove the cable from the connector on the right side of the node, as shown in Figure 169 on page 203.

CAUTION:

Gently press the cable towards the fan cage; then, pull to remove the cable from the connector on the system board. Using excessive force might damage the cable or connector.

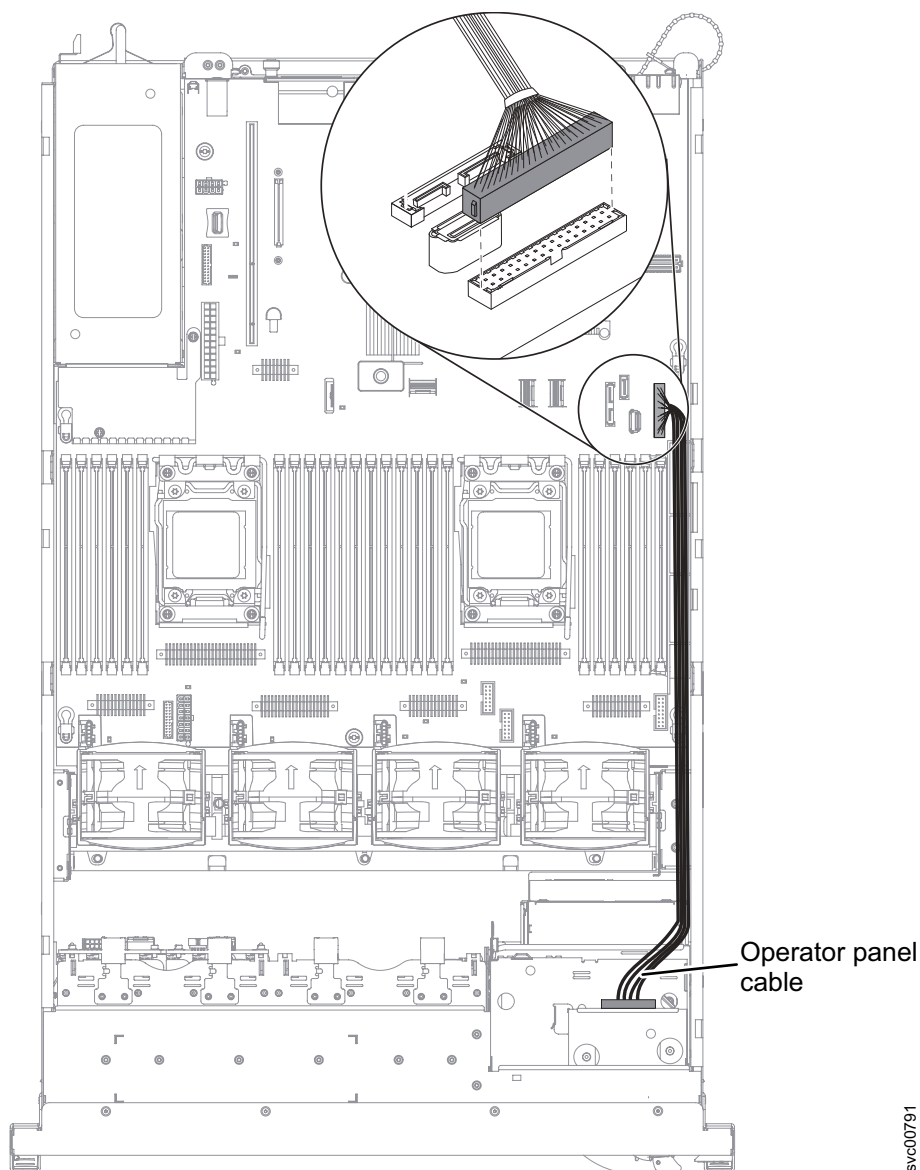


Figure 169. Removing the 2145-DH8 operator-information panel cable

Replacing the operator-information panel cables

Use these instructions when you are prompted to replace the operator-information panel cables.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

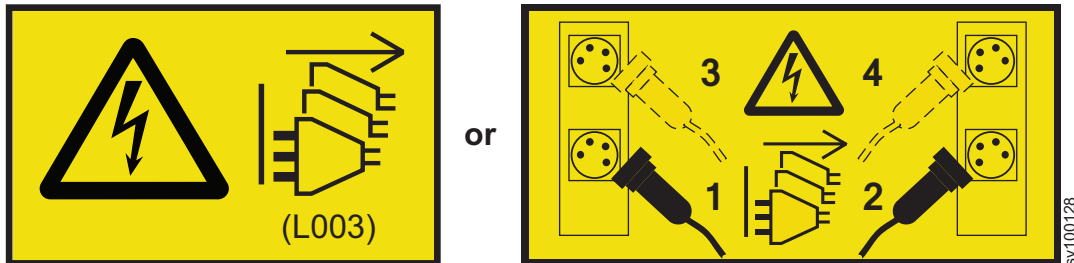
Replacing the operator-information panel cables: 2145-SV1

Use these instructions when you are prompted to replace the operator-information panel cables for the SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes that the following conditions are met.

- The power cables are disconnected and the node is turned off.
- Ensure that the node data is mirrored and synchronized, and that there are no dependent volumes. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
- The top covers are removed, as described in “Removing the top covers: 2145-SV1” on page 66.

Procedure

To replace the operator-information panel cables, complete the following steps.

1. Read the safety information.
2. Connect each cable to the appropriate connector at the rear of the operator-information panel, as shown in Figure 170 on page 205.

CAUTION:

Gently push the end of each cable into the appropriate connector. Using excessive force might damage the cables or connectors.

- a. Connect the blue USB cable to connector **A**.
- b. Connect the black LED and power button cable to connector **B**.

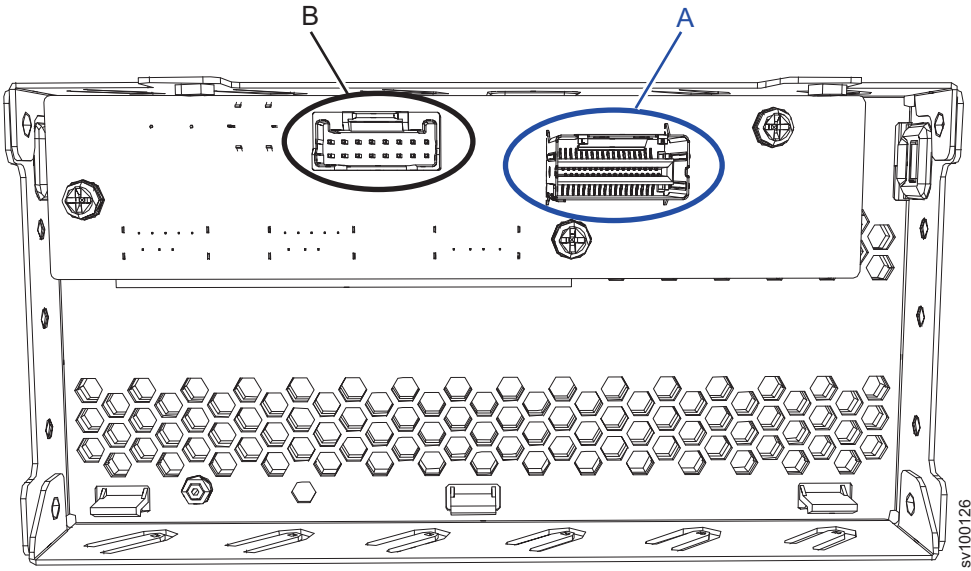


Figure 170. Cable connectors on the back of the 2145-SV1 operator-information panel

3. Connect each cable to the appropriate connector on the main board, as shown in Figure 171 on page 206.
 - a. Connect the blue USB cable to connector **A**.
 - b. Connect the black LED and power button cable to connector **B**.

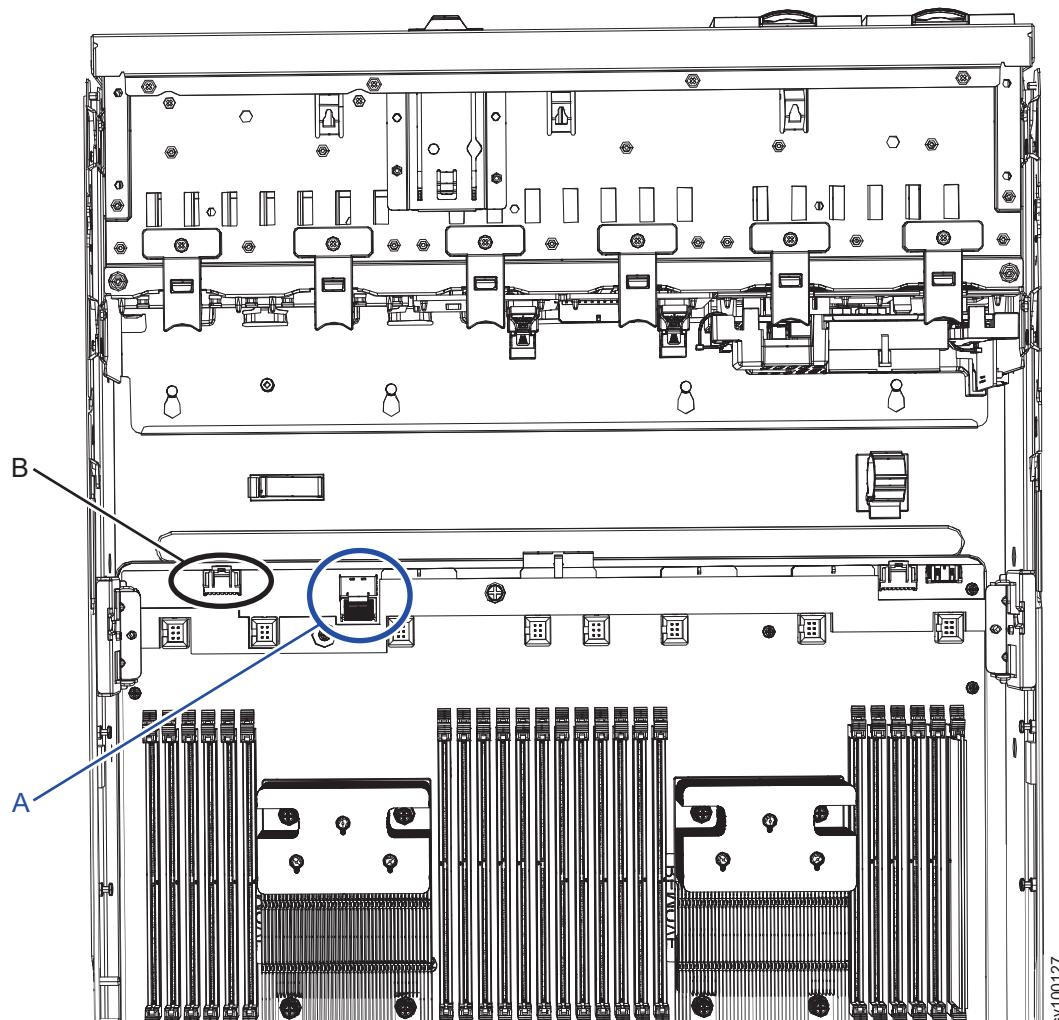


Figure 171. Cable connectors on the 2145-SV1 main board for the operator-information panel cables

4. Replace the top covers, as described in “Replacing the top covers: 2145-SV1” on page 69.
5. If you removed the node from the rack, replace the node in the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
6. If you removed any Fibre Channel or Ethernet cables, use the labels you that placed on each cable to identify the ports from which they were removed.
7. Replace the power cords. When the power cords are plugged in, the node turns on.

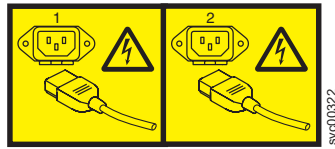
Replacing the operator-information panel cable: 2145-DH8

Use these instructions when you are prompted to replace the operator-information panel cable for the SAN Volume Controller 2145-DH8 node.

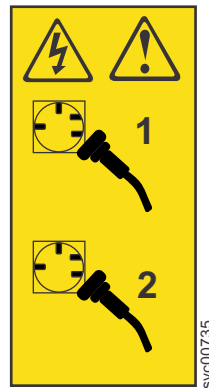
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes that:

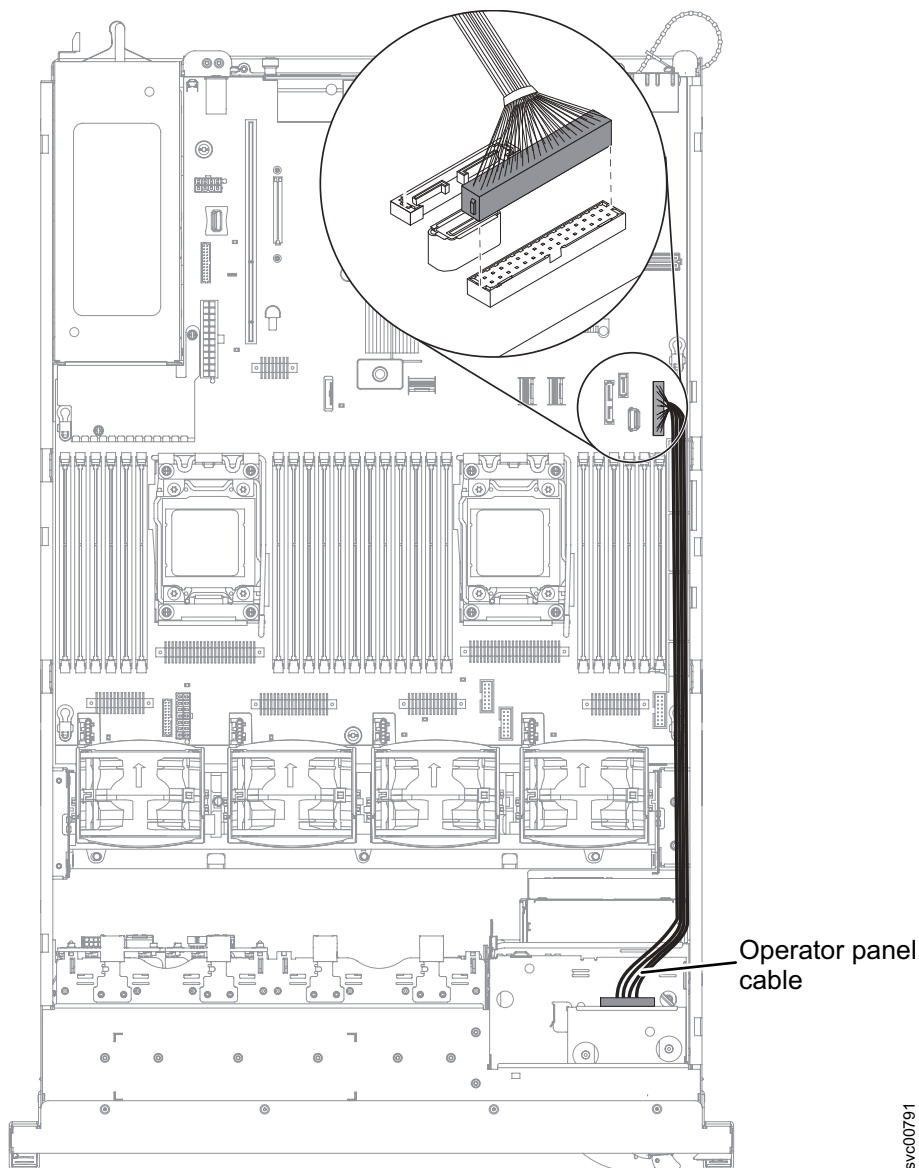
- The node is turned off. If you must turn off the node, ensure that its data is mirrored and synchronized, and that there are no dependent volumes, as described in MAP 5350.
- The power cables are disconnected.
- The top cover is removed.

Procedure

To replace the operator-information panel cable, complete the following steps:

1. Read the safety information.
2. Thread the new cable from the operator-information panel to the connector on the right side of the node, as shown in Figure 172 on page 208.

The following illustration shows the cable routing for the operator-information panel cable.



svc00791

Figure 172. Connecting the 2145-DH8 operator-information panel cable

3. Connect the cable to the connector on the right side of the node, as shown in Figure 172.
4. Connect the cable to the rear of the operator-information panel.
5. Replace the top cover.
6. If you removed the node from the rack, replace the node in the rack.
7. If you removed any Fibre Channel or Ethernet cables, use the labels you that placed on each cable to identify the ports from which they were removed.
8. If you removed the power cords, replace the power cords and the cable-retention brackets.
9. Lift the locking levers (**1** in Figure 173 on page 209) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

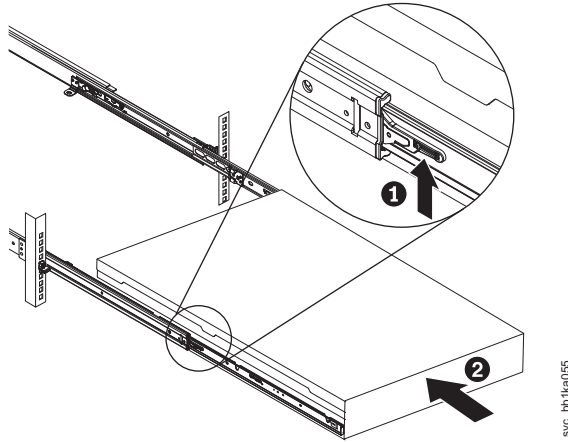


Figure 173. Raising the locking levers of the slide rails of the rack

10. Turn on the node.

Removing the fans

The fans in a system might have to be replaced due to failure.

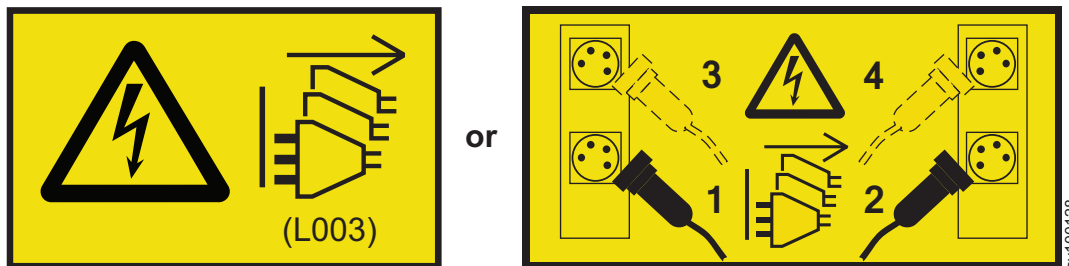
Removing the fans: 2145-SV1

You can remove any of the six fans in a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

Procedure

To remove the fans, complete the following steps:

1. Read the safety information.
2. Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.

Note: MAP 5350 ensures that the partner node in the I/O group can take over all I/O group operations, if necessary, and that there are no dependent volumes on the node. With the partner node available and no dependent volumes on the node, you do not lose access to data when power is turned off.

3. Disconnect both power cords.
4. Pull the node out of the rack on the slide rails, if needed, to reveal the top covers.
5. Remove the top back cover, as described in “Removing the top covers: 2145-SV1” on page 66.
6. Locate the appropriate fan. The node has six fan positions that are numbered from left to right, as shown in Figure 174.

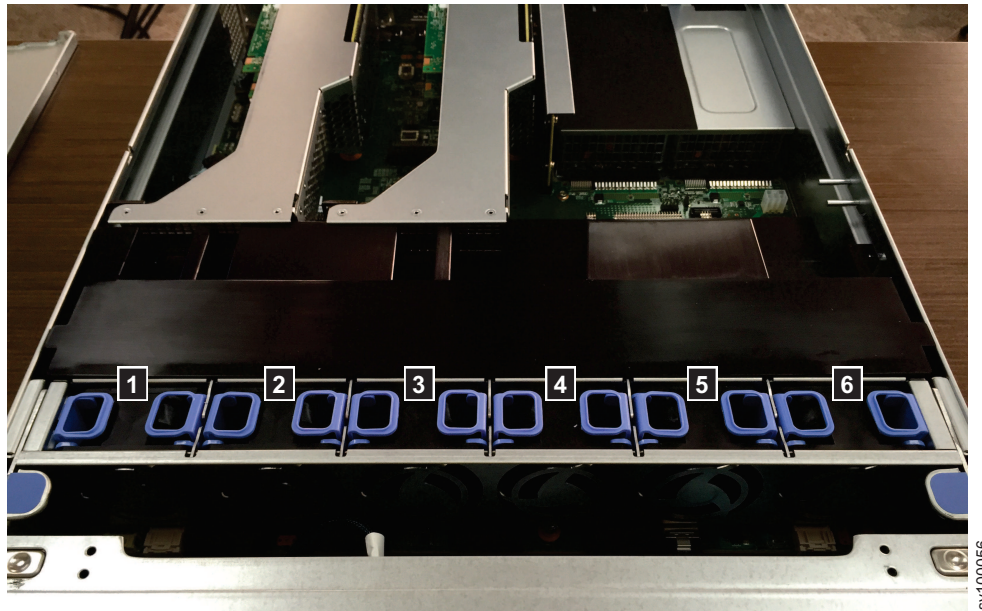
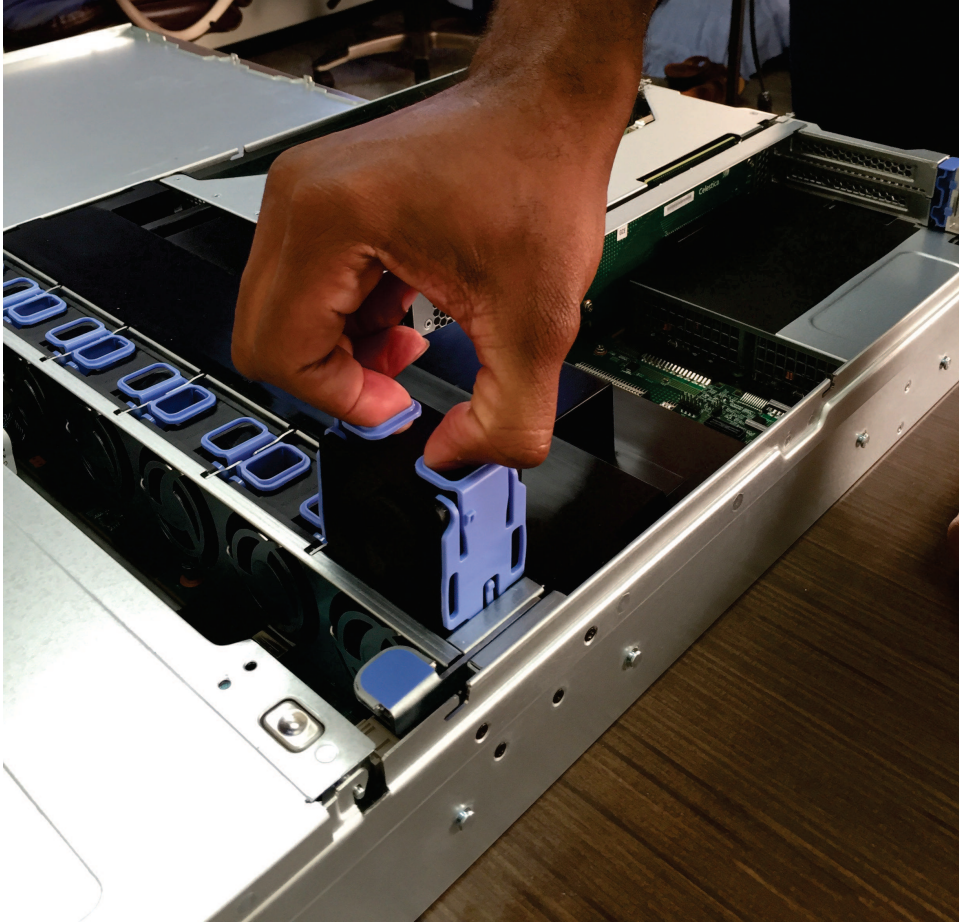


Figure 174. Locating the 2145-SV1 fans

7. Grasp the fan by the finger grips on the sides, as shown in Figure 175 on page 211.



sv100054

Figure 175. Removing a 2145-SV1 fan

8. If you are instructed to return the fan, follow all of the packaging instructions, and use any packaging materials for shipping that are supplied to you.

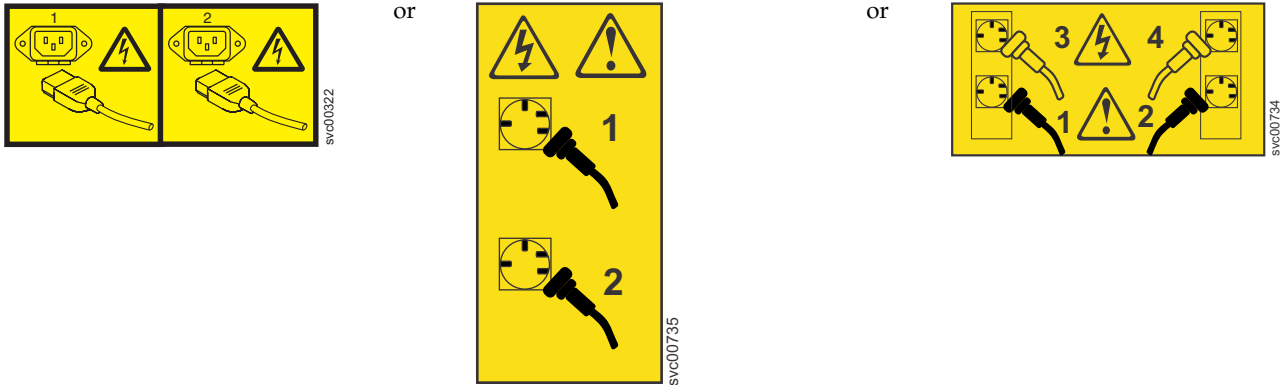
Removing the fans: 2145-DH8

You can remove any of the four fans on a SAN Volume Controller 2145-DH8 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

Important: You are able to hot swap a fan. However, using MAP 5350 to power off the node avoids risking an abrupt power failure on the node, which avoids the possibility of corrupting data. To ensure proper server operation, replace a failed hot-swap fan within 30 seconds.

Procedure

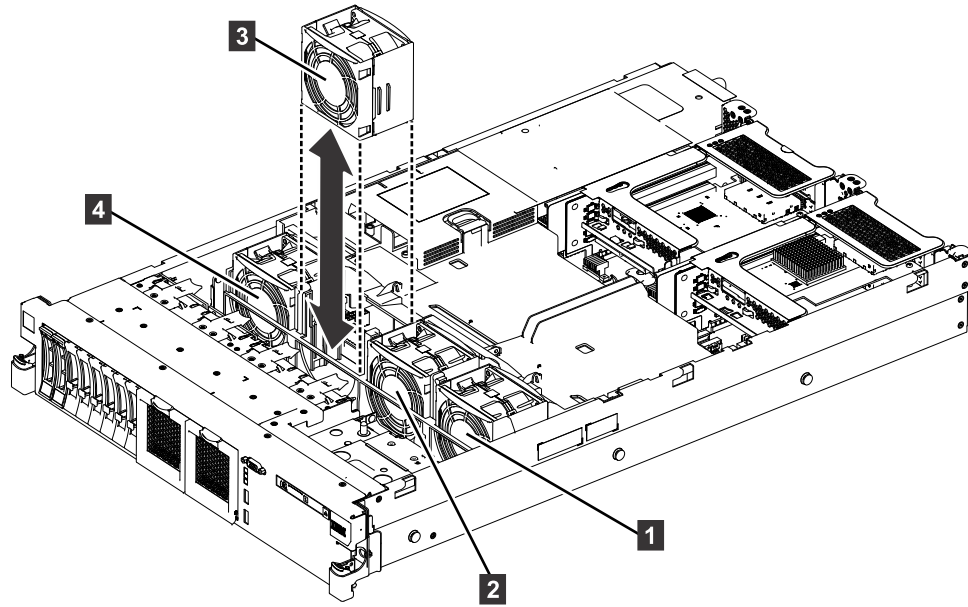
To remove the fans, complete the following steps:

1. Read the safety information.
2. Optional: Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.

Important: If you decide to hot swap the fan, use MAP 5350 to make all of the necessary checks. MAP 5350 ensures that the partner node in the I/O group can take over all I/O group operations, if necessary, and that there are no dependent volumes on the node. With the partner node available and no dependent volumes on the node, you do not lose access to data if this node accidentally powers off.

3. Remove the top cover.

To ensure proper system cooling, do not remove the top cover for more than 30 minutes during this procedure. The node has four fan positions that are numbered from right to left, as shown in Figure 176 on page 213.



svc00897

Figure 176. Removing a SAN Volume Controller 2145-DH8 fan

- 1** Fan 1
- 2** Fan 2
- 3** Fan 3
- 4** Fan 4

4. Grasp the fan by the finger grips (vertical tabs) on the sides.
5. Rotate the air baffle up.
6. Lift the dual-motor hot-swap fan out of the server.
7. If you are instructed to return the fan, follow all of the packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the fans

You might have to replace one or more fans in a node.

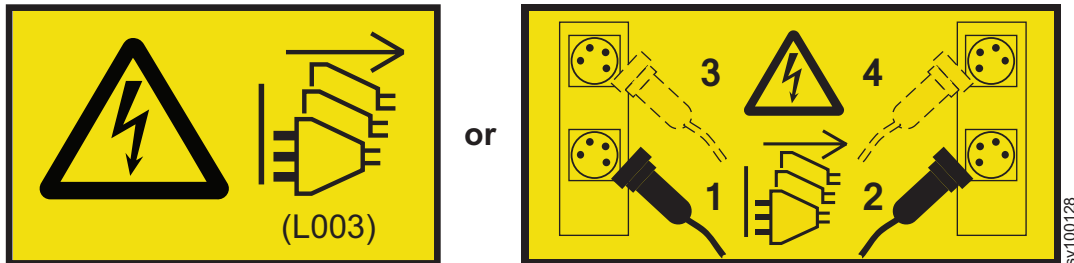
Replacing the fans: 2145-SV1

You can replace any of the six fans in a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

Important: You can hot swap a fan. However, using to power off the node avoids risking an abrupt power failure on the node, which avoids the possibility of corrupting data.

To replace the fans, complete the following steps.

Procedure

1. Read the safety information.
2. Optional: Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.

Important: If you decide to hot swap the fan, use MAP 5350 to make all of the necessary checks. This procedure ensures that the partner node in the I/O group can take over all I/O group operations, if necessary. It also ensures that there are no dependent volumes on the node. With the partner node available and no dependent volumes on the node, you do not lose access to data if this node accidentally powers off.

3. Orient the new fan over the appropriate fan slot in the fan-assembly bracket so that the fan connector aligns with the connector on the system board. This alignment assures that the air-flow indicator arrow on the side of the fan is pointing to the rear of the node.
4. Insert the fan into the fan slot in the fan-assembly bracket, and press it down until it is seated, as shown in Figure 177 on page 215.

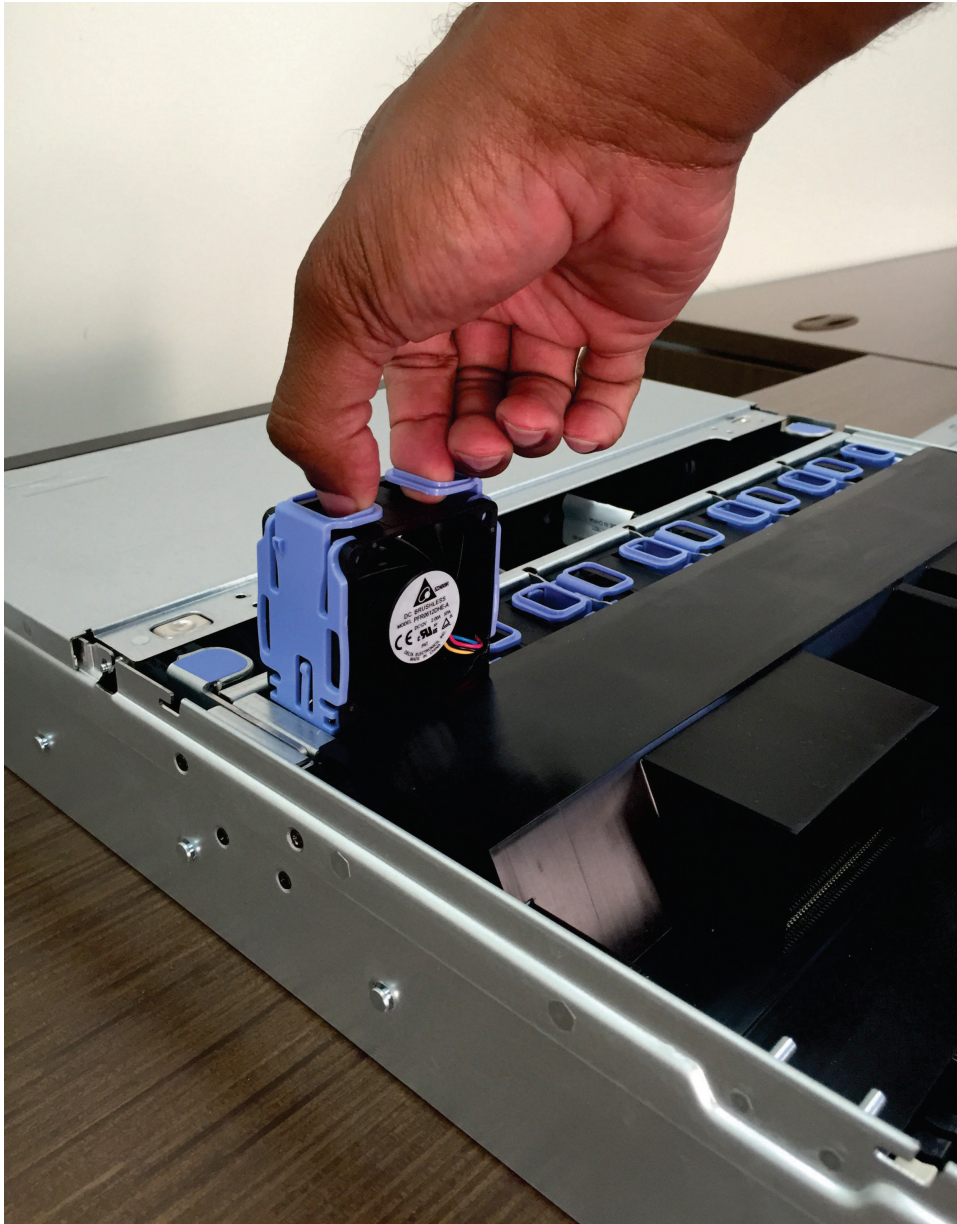


Figure 177. Replacing a 2145-SV1 fan

5. Make sure that all cables, adapters, and other components are installed and seated correctly, and that all internal cables are correctly routed.
6. Replace the top cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
7. If you removed the node from the rack, replace the node in the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
8. If you removed any Fibre Channel or Ethernet cables, replace them in the same ports from which they were removed.
9. If you removed the power cords, replace the power cords and the cable-retention brackets. The node powers on automatically when the power cords are replaced.

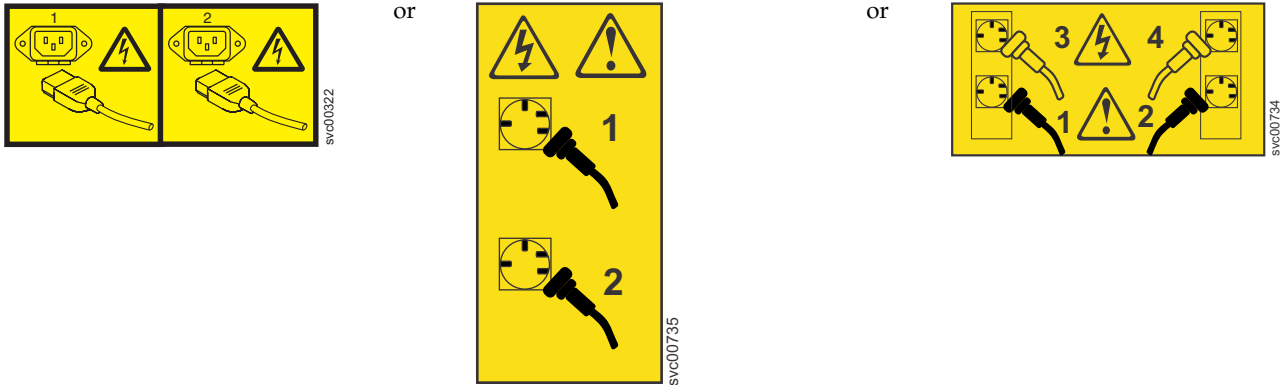
Replacing the fans: 2145-DH8

You can replace any of the four fans on a SAN Volume Controller 2145-DH8 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

Important: You can hot swap a fan. However, using to power off the node avoids risking an abrupt power failure on the node, which avoids the possibility of corrupting data.

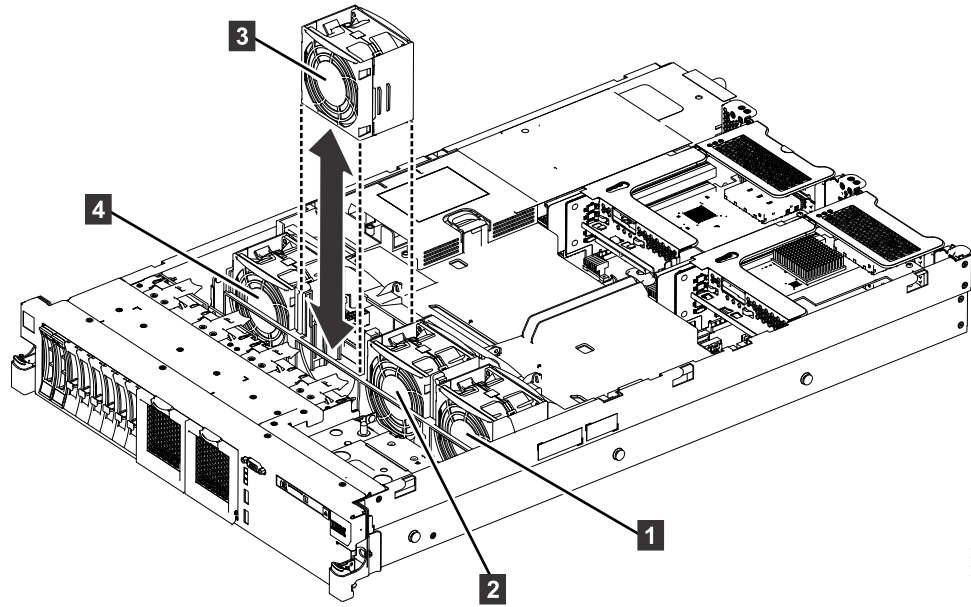
To replace the fans, complete the following steps.

Procedure

1. Read the safety information.
2. Optional: Follow the procedure in MAP 5350 in the troubleshooting guide for your system to verify that hosts will not lose access to data in volumes before you power off the node.

Important: If you decide to hot swap the fan, use MAP 5350 to make all of the necessary checks. The checks in this procedure ensure that the partner node in the I/O group can take over all I/O group operations, if necessary, and that there are no dependent volumes on the node. With the partner node available and no dependent volumes on the node, you do not lose access to data if this node accidentally powers off.

3. Remove the top cover. The node has four fan positions that are numbered from right to left, as shown in Figure 178 on page 217.



- 1** Fan 1
- 2** Fan 2
- 3** Fan 3
- 4** Fan 4

Figure 178. Replacing a SAN Volume Controller 2145-DH8 fan

4. Orient the new fan over the appropriate fan slot in the fan-assembly bracket so that the fan connector aligns with the connector on the system board. This alignment assures that the air-flow indicator arrow on the side of the fan is pointing to the rear of the node.
5. Insert the fan into the fan slot in the fan-assembly bracket, and press it down until it is seated.
6. Make sure that all cables, adapters, and other components are installed and seated correctly, and that all internal cables are correctly routed.
7. Replace the top cover.
8. If you removed the node from the rack, replace the node in the rack.
9. If you removed any Fibre Channel or Ethernet cables, replace them in the same ports from which they were removed.
10. If you removed the power cords, replace the power cords and the cable-retention brackets.
11. Lift the locking levers (**1** in Figure 179 on page 218) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

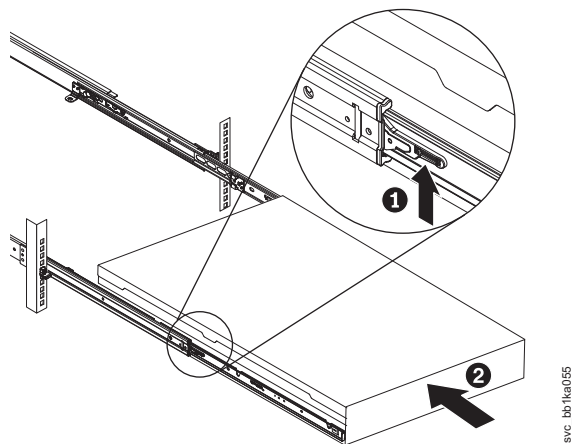


Figure 179. Raising the locking levers of the slide rails of the rack

12. Turn on the node.

Removing the fan bracket

You might need to remove the fan bracket on a node.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

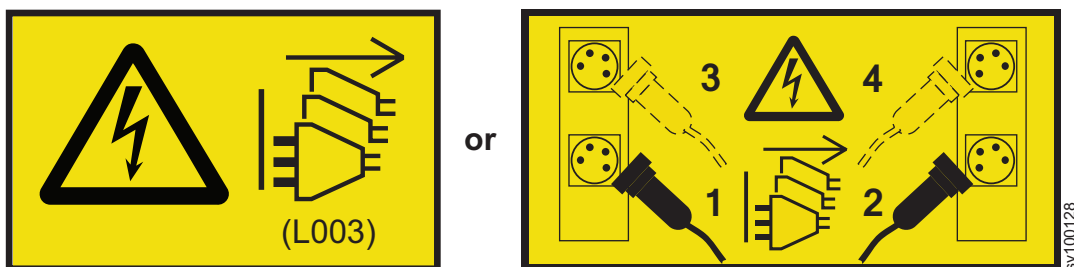
Removing the fan bracket: 2145-SV1

You can remove the fan bracket on a SAN Volume Controller 2145-SV1 node. The fan bracket is also referred to as a fan cage.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top back cover is removed.
- The air baffle is removed.
- The PCI express rise-card assemblies are removed.

Procedure

1. Remove the cables that are routed over the fan bracket.
2. Press the fan-bracket release latches toward each other and lift the fan bracket out of the server, as shown in Figure 180.

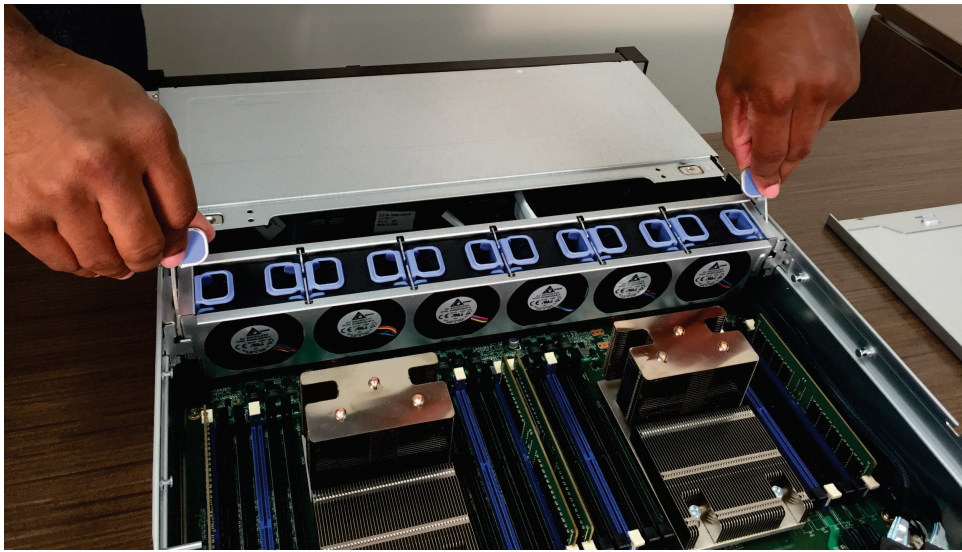


Figure 180. Removing the fan bracket

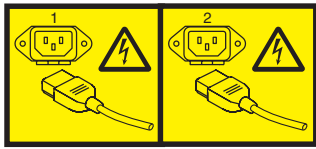
Removing the fan bracket: 2145-DH8

You can remove the fan bracket on a SAN Volume Controller 2145-DH8 node.

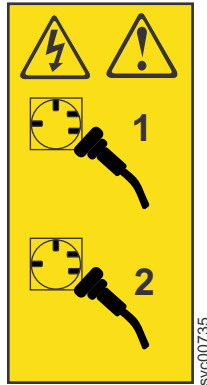
Before you begin

DANGER

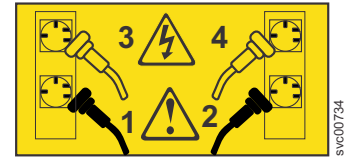
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top cover is removed.
- The air baffle is removed.
- The PCI express rise-card assemblies are removed.
- The fans are removed.

Procedure

1. Remove the cables that are routed over the fan bracket.
2. Press the fan-bracket release latches toward each other and lift the fan bracket out of the server, as shown in Figure 181 on page 221.

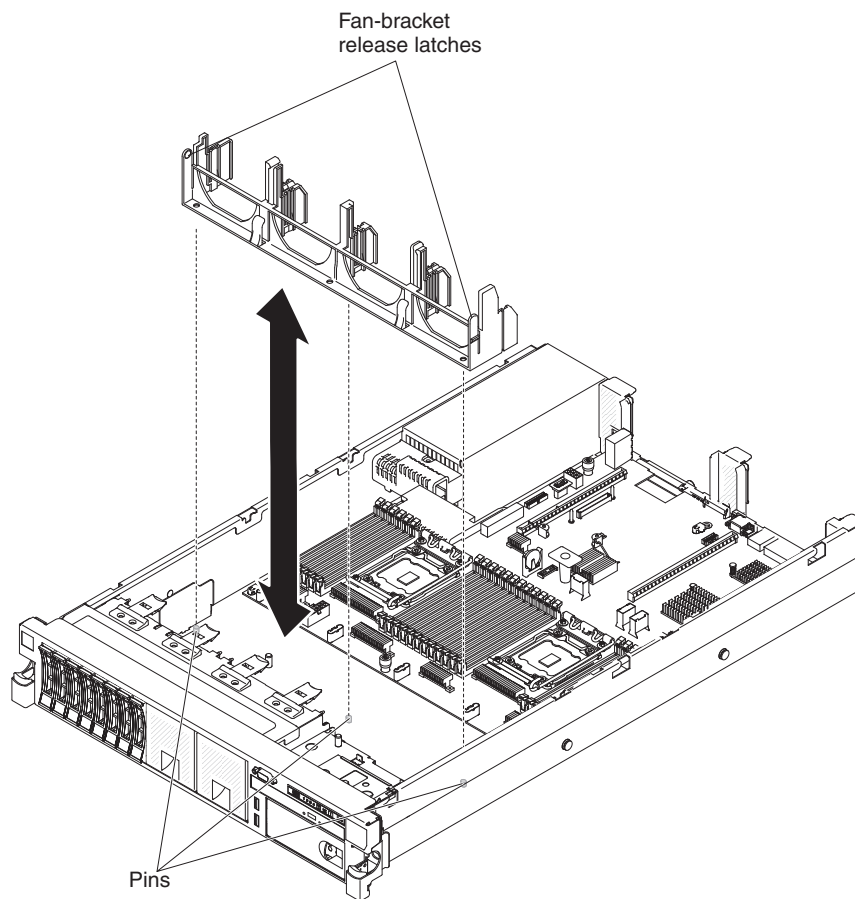


Figure 181. Removing the fan bracket

Replacing the fan bracket

You might need to replace the fan bracket on a node.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.

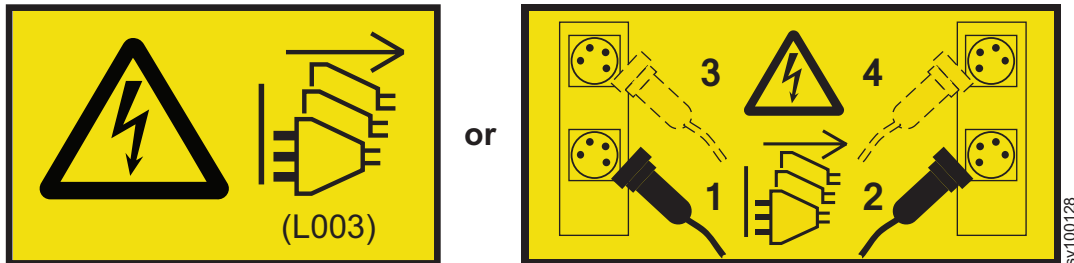
Replacing the fan bracket: 2145-SV1

You can replace the fan bracket on a SAN Volume Controller 2145-SV1 node. The fan bracket is also referred to as a fan cage.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top cover is removed.
- The air baffle is removed.
- The PCI express rise-card assemblies are removed.
- The cables that are routed over the fan bracket are removed.

To replace the fan bracket, complete the following steps.

Procedure

1. Lower the fan bracket into the chassis, as shown in Figure 182 on page 223.

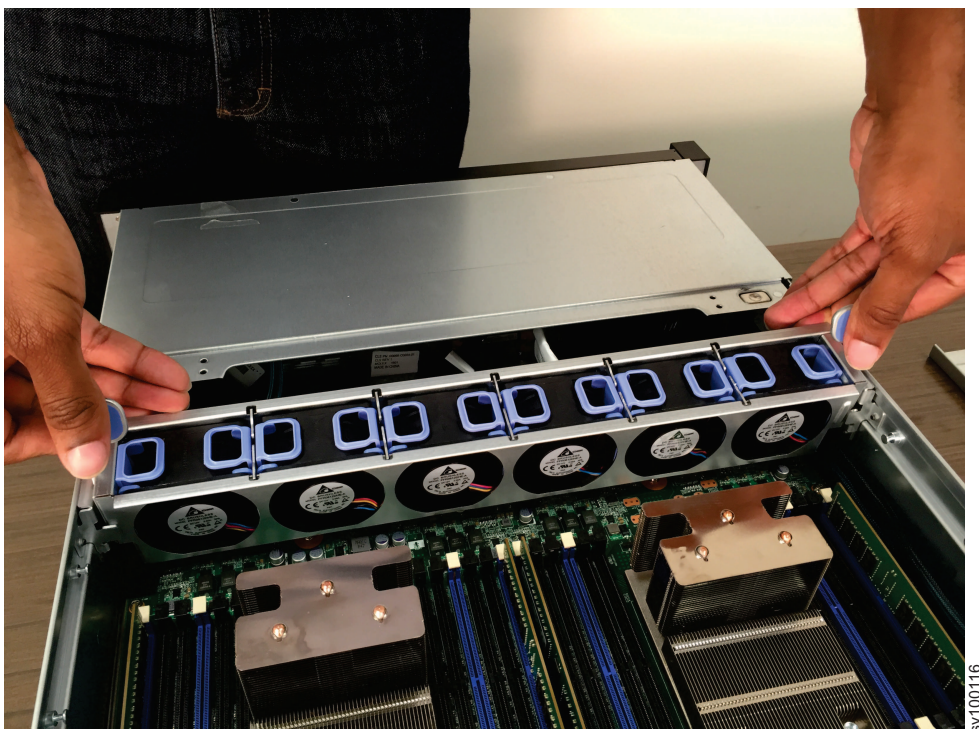


Figure 182. Replacing the fan bracket

2. Align the holes in the bottom of the bracket with the pins in the bottom of the chassis.
3. Press the bracket into position until the fan-bracket release levers click into place, as shown in Figure 183 on page 224.

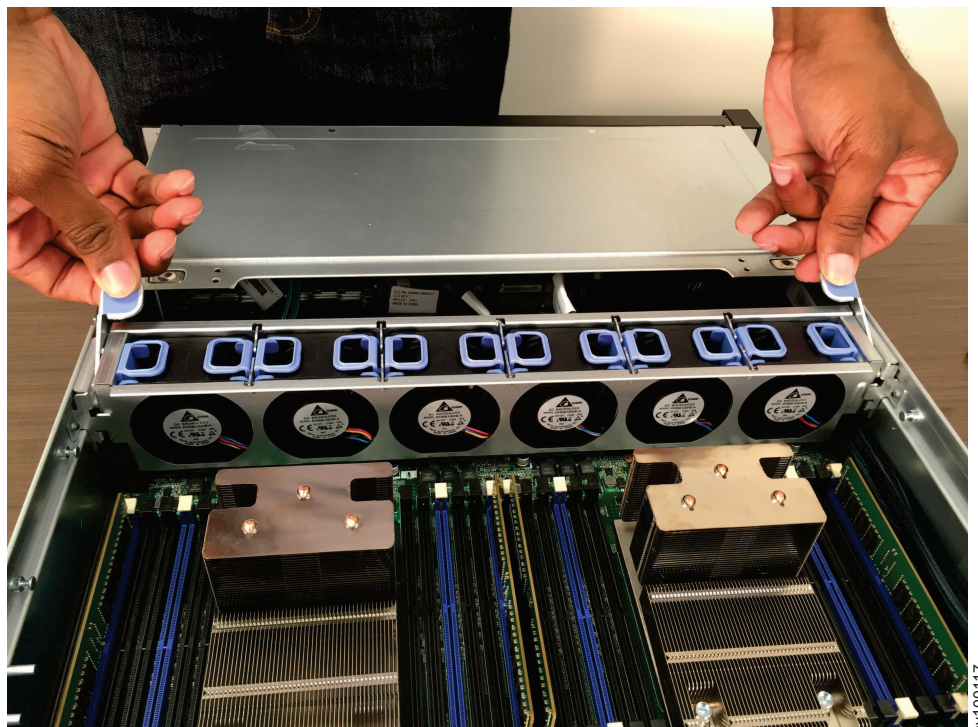


Figure 183. Pressing the fan bracket into position

4. Replace the PCI express rise-card assemblies, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 177.
5. Replace the air baffle, as described in “Replacing the air baffle: 2145-SV1” on page 75.
6. Replace the top cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
7. If you removed the node from the rack, replace it, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
8. If you removed any Fibre Channel, SAS or Ethernet cables, use the labels that you placed on each cable to replace them in the same ports from which they were removed.
9. Replace the power cords to power on the node.

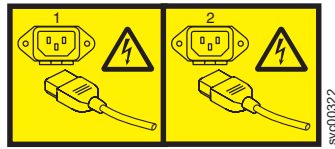
Replacing the fan bracket: 2145-DH8

You can replace the fan bracket on a SAN Volume Controller 2145-DH8 node.

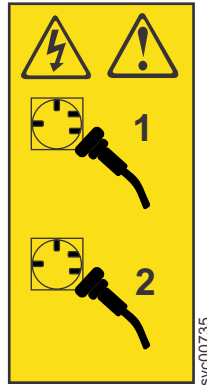
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface.

About this task

This service action assumes:

- The node is turned off. If you must turn off the node, ensure that hosts will not lose access to data in volumes, as described in MAP 5350 in the troubleshooting guide for your system.
- The power cables are disconnected.
- The top cover is removed.
- The air baffle is removed.
- The PCI express rise-card assemblies are removed.
- The cables that are routed over the fan bracket are removed.

To replace the fan bracket, complete the following steps.

Procedure

1. Lower the fan bracket into the chassis, as shown in Figure 184 on page 226.

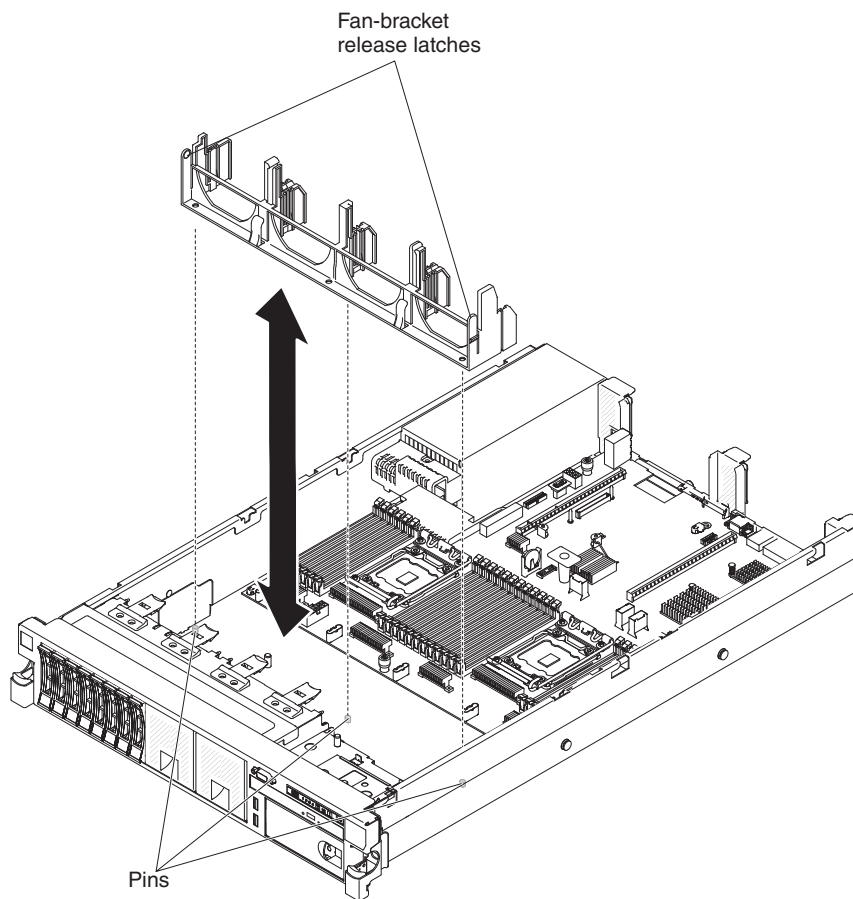


Figure 184. Replacing the fan bracket

2. Align the holes in the bottom of the bracket with the pins in the bottom of the chassis.
3. Press the bracket into position until the fan-bracket release levers click into place.
4. Replace the fans.
5. Replace the cables that are routed over the fan bracket.
6. Replace the PCI express rise-card assemblies.
7. Replace the air baffle.
8. Replace the top cover.
9. If you removed the node from the rack, replace the node in the rack.
10. If you removed any Fibre Channel, SAS or Ethernet cables, using the labels that you placed on each cable, replace them in the same ports from which they were removed.
11. If you removed the power cords, replace the power cords and the cable-retention brackets.
12. Lift the locking levers (**1** in Figure 185 on page 227) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

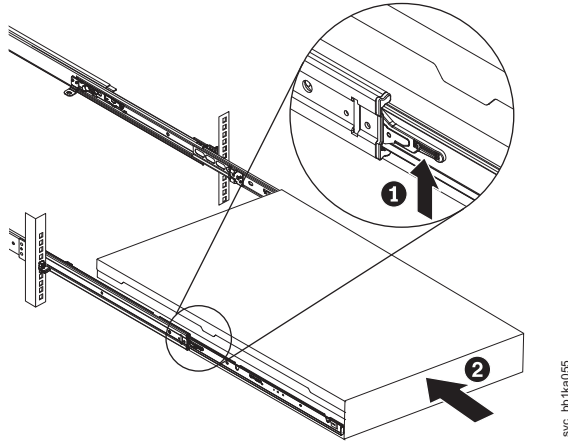


Figure 185. Raising the locking levers of the slide rails of the rack

13. Turn on the node.

Removing the microprocessor

You can remove the microprocessor that is used in the system node.

Before you begin

Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see "Handling static-sensitive devices" on page xxiv.

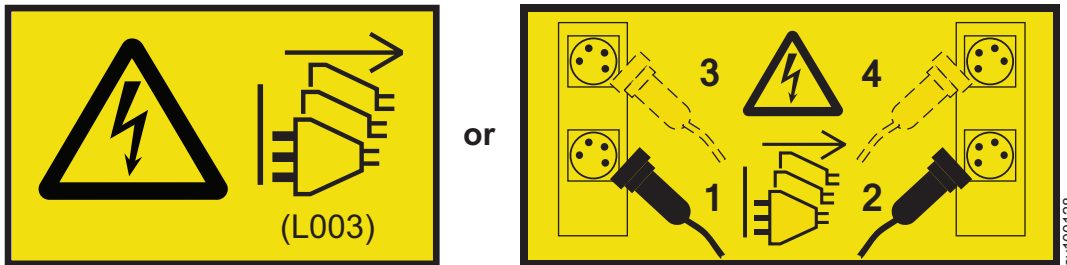
Removing the microprocessor: 2145-SV1

You need to remove a microprocessor before you replace it or move it to a replacement main board.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



About this task

This procedure is based on the following assumptions.

- You are a trained IBM service support representative (SSR).
- You removed all power from the node.

- You removed the node from the rack.
- You removed the top covers from the node.
- You removed PCI express riser assemblies 1 and 2.
- You removed the air baffle.

Attention: Removing the heat sink from the microprocessor also removes the even distribution of the thermal grease and requires removing the thermal grease.

Procedure

1. Undo the heat sink retention screws, as shown in Figure 186.

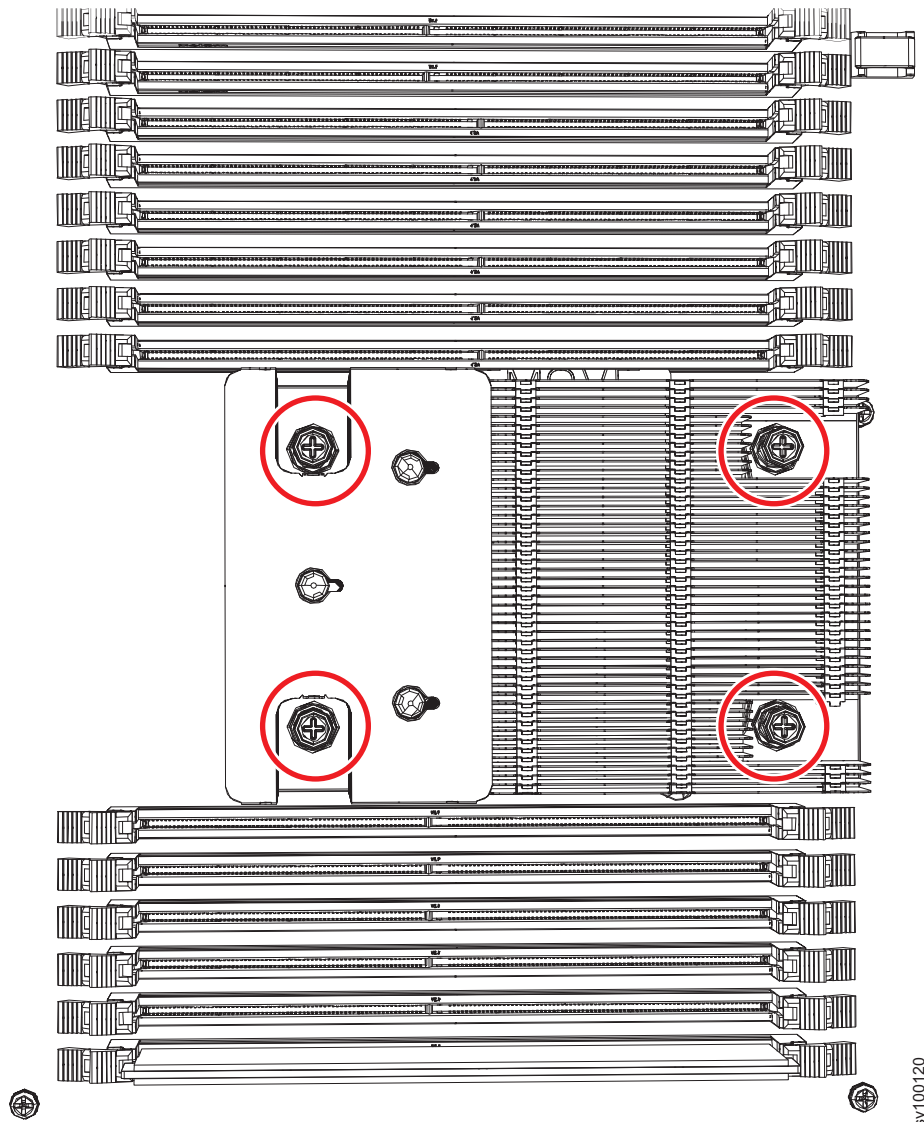


Figure 186. Removing the heat sink

2. Lift the heat sink out of the chassis. Place the heat sink (with the thermal grease side up) on a clean, flat surface.
3. Use an alcohol wipe to remove most of the grease from the top of the microprocessor.

4. Open the microprocessor socket release levers and retainer, as shown in Figure 187.

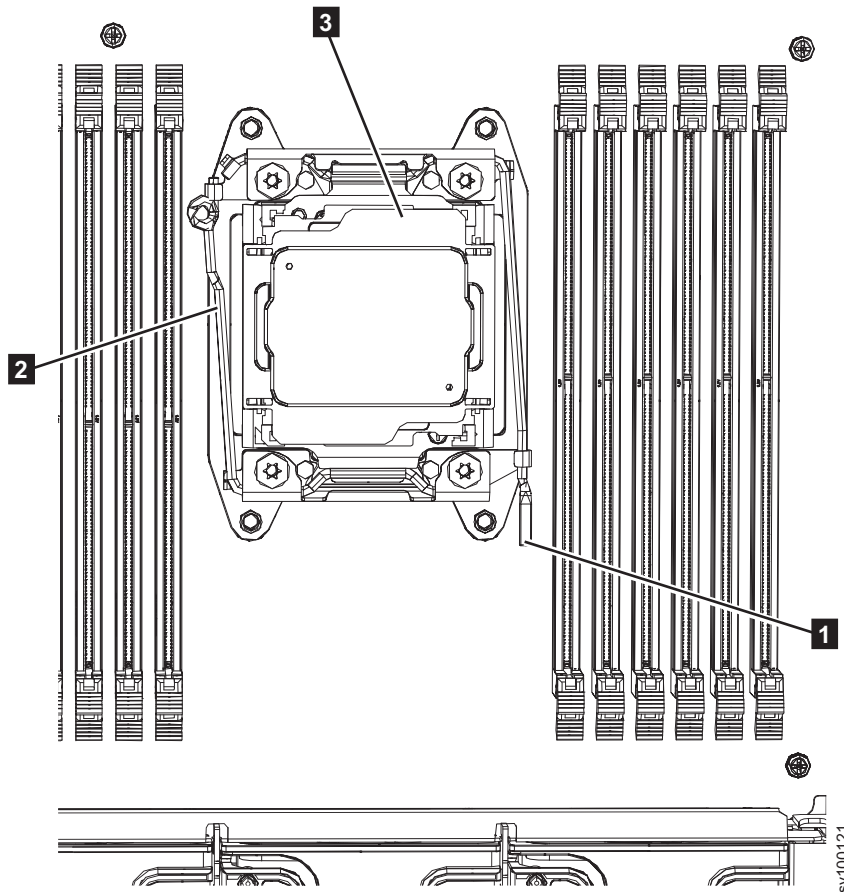


Figure 187. Opening the release levers

- 1** Microprocessor release lever
- 2** Microprocessor release lever
- 3** Microprocessor retainer

5. Open the first release lever (**1**) on the microprocessor socket.
6. Open the second release lever (**2**) on the microprocessor socket.
7. Open the microprocessor retainer (**3**).

Attention: Do not touch the microprocessor contacts. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.

8. Hold the microprocessor by the edge and carefully lift it out of the socket.

Note: The pins on the socket are fragile. Any damage to the pins might require replacing the system board.

9. If you are instructed to return the microprocessor, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

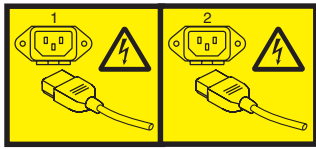
Removing the microprocessor: 2145-DH8

You need to remove the microprocessor before you replace it.

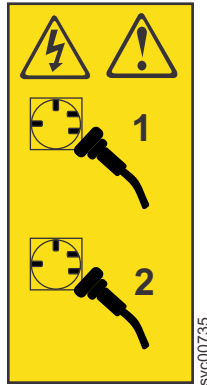
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



About this task

This procedure is based on the following assumptions:

- You are a trained IBM service technician.
- You removed all power from the node.
- You removed the node from the rack.
- You removed the top cover of the node.

Attention: Removing the heat sink from the microprocessor also removes the even distribution of the thermal grease and requires removing the thermal grease.

If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink.

Procedure

Remove the heat sink, as shown in Figure 188 on page 231.

1. Open the heat sink retention module release lever to the fully open position.

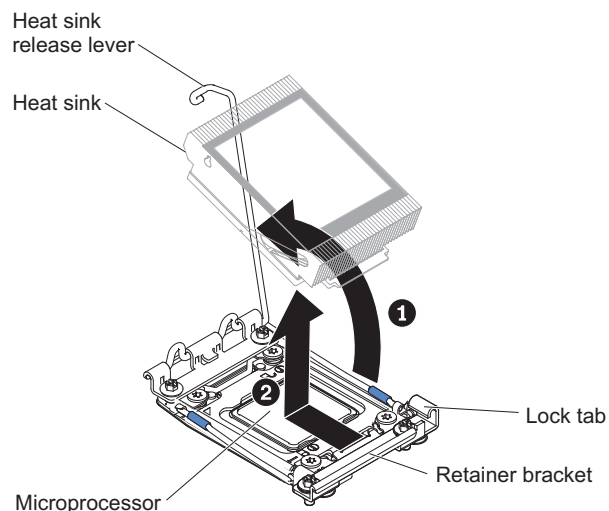


Figure 188. Removing the heat sink

2. Lift the heat sink out of the server. After removal, place the heat sink (with the thermal grease side up) on a clean, flat surface.
- Open the microprocessor socket release levers and retainer, as shown in Figure 189.

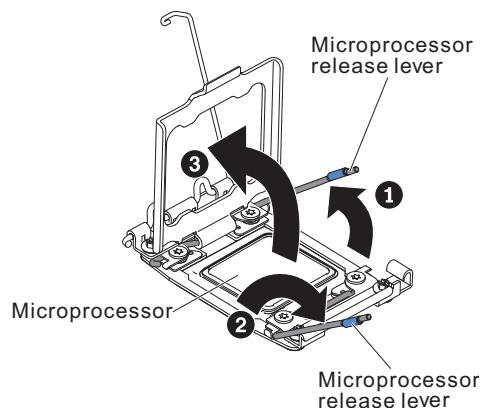


Figure 189. Opening the release levers

- 1** microprocessor release lever
- 2** microprocessor release lever
- 3** microprocessor retainer

3. Open the first release lever (**1**) on the microprocessor socket.
4. Open the second release lever (**2**) on the microprocessor socket.
5. Open the microprocessor retainer (**3**).

Attention: Do not touch the microprocessor contacts. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket. Remove the microprocessor from the socket, as shown in Figure 190 on page 232.

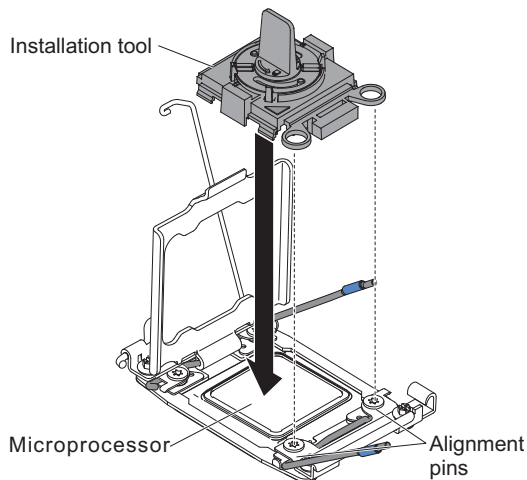


Figure 190. Removing the microprocessor with the installation tool

6. Twist the microprocessor installation tool handle counterclockwise to the open position.
7. Align the installation tool with the alignment pins on the microprocessor, and lower the installation tool on the microprocessor. The installation tool rests flush on the socket only when it is aligned correctly.
8. Gently twist the handle clockwise to the closed position and lift the microprocessor out of the socket.

Note: The pins on the socket are fragile. Any damage to the pins might require replacing the system board.

9. If you are instructed to return the microprocessor, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the microprocessor

Use this topic when you are required to replace a microprocessor.

Before you begin

- Take precautions to avoid damage from static electricity. Wear an anti-static wrist strap and use a static-protected mat or surface. For more information, see “Handling static-sensitive devices” on page xxiv.
- You need one alcohol wipe and one thermal grease syringe to replace the microprocessor. If you do not already have these items, order them before you begin to replace the part.

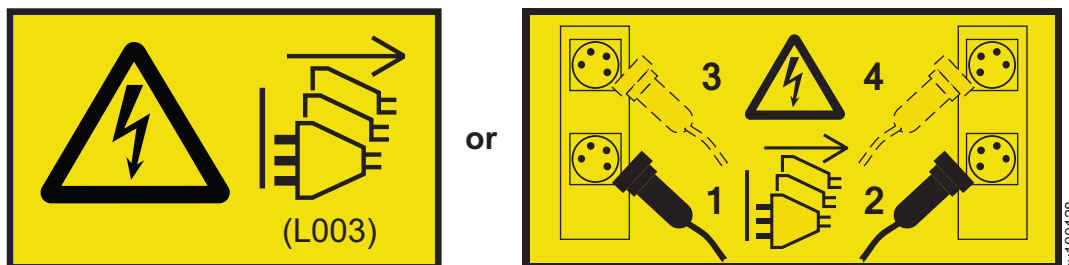
Replacing the microprocessor: 2145-SV1

You can replace a microprocessor in a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



To correctly perform this task, you must have one alcohol wipe and the new heat sink that came with the microprocessor FRU or one thermal grease syringe. If you do not already have these items, order them before you begin to replace the part.

About this task

This procedure is based on the following assumptions:

- You are a trained IBM service support representative (SSR).
- You removed all power from the node.
- You removed the node from the rack.
- You removed the top cover of the node.
- You removed the PCI express riser 1 and 2.
- You removed the air baffle
- You removed the microprocessor that is being replaced.

Attention: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease. If the thermal-grease protective cover (plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink.

Procedure

1. Open the socket in preparation for inserting the microprocessor. Press down and in on the release lever (**1** in Figure 191 on page 234) as you did to remove the microprocessor. Then, lift the microprocessor-release lever 2 (**2**).

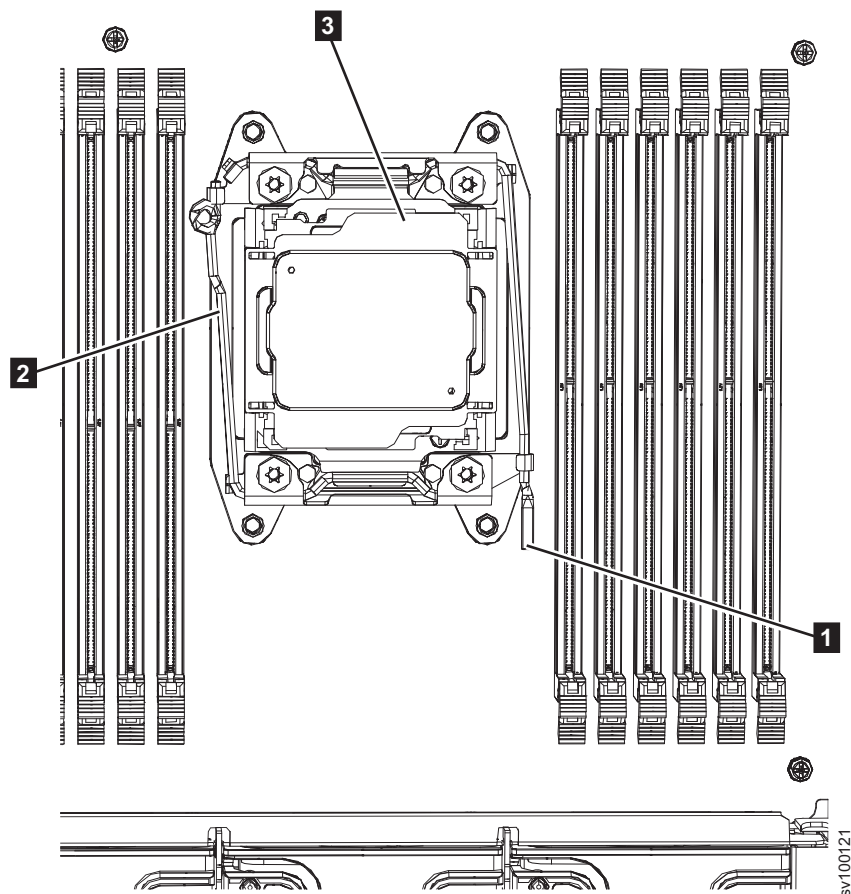


Figure 191. Opening the 2145-SV1 microprocessor bracket frame

- 1** Microprocessor
 - 2** Microprocessor-release lever
 - 3** Microprocessor-bracket frame
2. Lift the hinged microprocessor-bracket frame (**3**) into an open position. Remove the microprocessor dust cover, tape, or label from the surface of the microprocessor socket, if one is present. Store the dust cover in a safe place.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity.
 3. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the node; then, remove the microprocessor from the package.
 - a. Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
 - b. Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
 - c. Do not use excessive force when you press the microprocessor into the socket.
 - d. Verify that the microprocessor is oriented, aligned, and positioned in the socket before you try to close the lever.
 - e. If a plastic protective cover is on the bottom of the microprocessor, carefully remove it.
 - f. Carefully align the replacement microprocessor over the microprocessor socket.

Attention: The microprocessor fits only one way on the socket. You must place a microprocessor straight down on the socket to avoid damaging the pins on the socket. The pins on the socket are fragile. Any damage to the pins might require replacing the system board.

4. After alignment, carefully place the microprocessor onto the socket. Close the microprocessor-bracket frame (**3**).

Tip: Do not force the microprocessor. The microprocessor fits only one way on the socket.

5. Carefully close the microprocessor-release lever (**2**) to the closed position to secure the microprocessor in the socket.
6. Carefully close the microprocessor-release lever (**1**).
7. Clean the grease from the heat sink and apply new grease on the microprocessor.

When you are installing the heat sink on the same microprocessor that it was removed from, make sure that the following requirements are met:

- The thermal grease on the heat sink and microprocessor is not contaminated.
- Extra thermal grease is not added to the existing thermal grease on the heat sink and microprocessor.

To replace damaged or contaminated thermal grease on the microprocessor and heat sink, complete the following steps.

- a. If it must be reused, place the heat sink on a clean work surface.
- b. Remove the cleaning pad from its package and unfold it completely.
- c. If the heat sink must be reused, use the cleaning pad to wipe the thermal grease from the bottom.

Note: Make sure that all of the thermal grease is removed.

- d. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.
- e. If you have a new heat sink, use the thermal-grease syringe to paint an X on the top of the microprocessor, as shown in Figure 192.



Figure 192. Applying thermal grease to the 2145-SV1 microprocessor

8. Align the heat sink on top of the microprocessor, as shown in Figure 193 on page 236. If you are installing a new heat sink, remove the grease cover.

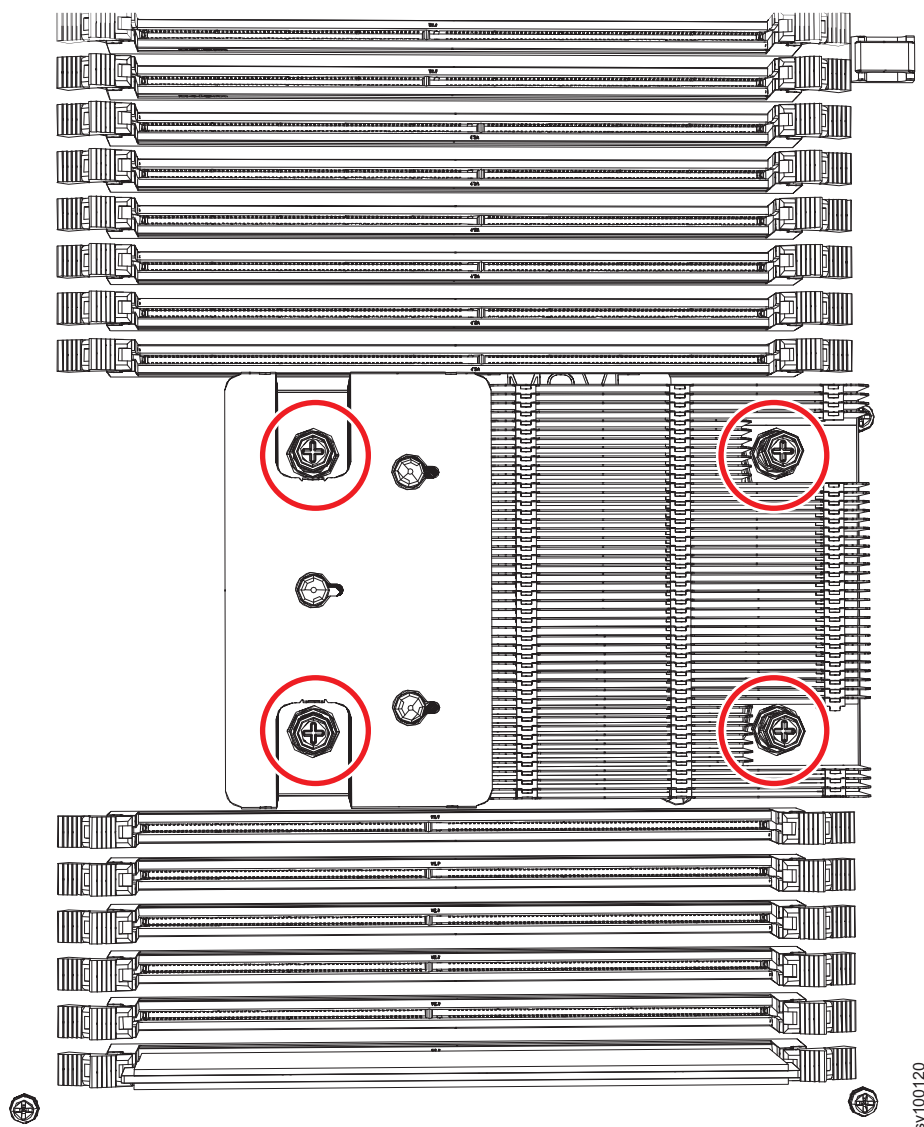


Figure 193. Installing the heat sink on the 2145-SV1 microprocessor

9. Use the retention screws to attach the heat sink.
10. Replace the air baffle, as described in “Replacing the air baffle: 2145-SV1” on page 75.
11. Replace the PCI express riser assemblies, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 177.
12. Replace the top covers. See “Replacing the top covers: 2145-SV1” on page 69.
13. If you removed the node from the rack, replace the node in the rack, as described in “Replacing a node in a rack” on page 44.
14. Turn on the node by reconnecting the power cords.

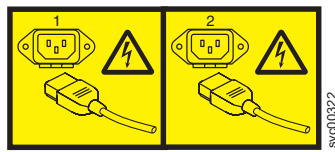
Replacing the microprocessor: 2145-DH8

You can replace the microprocessor on a SAN Volume Controller 2145-DH8 node.

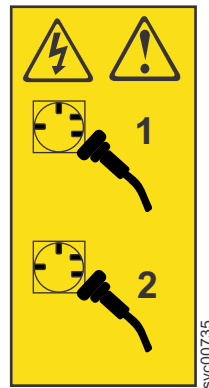
Before you begin

DANGER

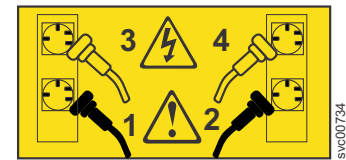
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



To correctly perform this task, you need one alcohol wipe and one thermal grease syringe to replace the microprocessor. If you do not already have these items, order them before you begin to replace the part.

About this task

This procedure is based on the following assumptions:

- You are a trained IBM service technician.
- You removed all power from the node.
- You removed the node from the rack.
- You removed the top cover of the node.
- You removed the microprocessor that is being replaced.

Attention: Removing the heat sink from the microprocessor destroys the even distribution of the thermal grease and requires replacing the thermal grease.

If the thermal-grease protective cover (for example, a plastic cap or tape liner) is removed from the heat sink, do not touch the thermal grease on the bottom of the heat sink or set down the heat sink.

Perform the following steps to replace the microprocessor and heat sink:

Procedure

1. To open the socket in preparation for inserting the microprocessor, press down and out on the release lever (**2** in Figure 194 on page 238 as you did to remove the microprocessor, and lift the microprocessor-release lever until it stops in the fully open position.

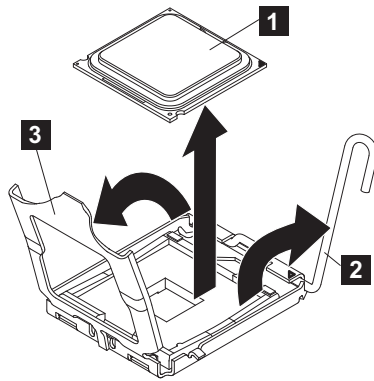


Figure 194. Opening the SAN Volume Controller 2145-DH8 microprocessor bracket frame

- 1** Microprocessor
- 2** Microprocessor-release lever
- 3** Microprocessor-bracket frame

2. Lift the hinged microprocessor-bracket frame into an open position and remove the microprocessor dust cover, tape, or label from the surface of the microprocessor socket, if one is present. Store the dust cover in a safe place.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity.

3. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the node; then, remove the microprocessor from the package.
 - a. Do not touch the microprocessor contacts; handle the microprocessor by the edges only. Contaminants on the microprocessor contacts, such as oil from your skin, can cause connection failures between the contacts and the socket.
 - b. Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
 - c. Do not use excessive force when you press the microprocessor into the socket.
 - d. Verify that the microprocessor is oriented, aligned, and positioned in the socket before you try to close the lever.
 - e. If a plastic protective cover is on the bottom of the microprocessor, carefully remove it, as shown in Figure 195.

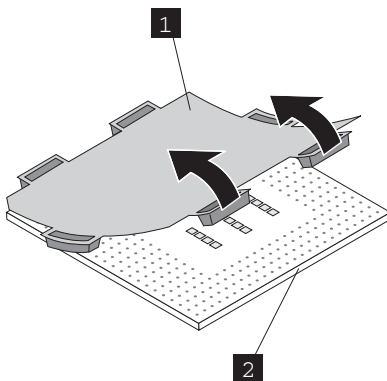


Figure 195. Removing the plastic protective cover from a microprocessor

- 1** Protective cover
- 2** Microprocessor

- f. Locate the microprocessor installation tool that comes with the new microprocessor.
- g. Twist the handle of the installation tool counterclockwise so that it is in the open position.
- h. Align the triangular alignment mark (**4** in Figure 196) on the microprocessor installation tool with the triangle alignment mark on the microprocessor. Then, place the microprocessor on the underside of the tool so that the tool can grasp the microprocessor correctly onto the bottom of the installation tool.

To align the microprocessor with the socket, use the triangular alignment cutout on the microprocessor socket and the triangular alignment mark (**4** in Figure 197 on page 240) on the microprocessor. Also, use the position of the notches to align the microprocessor.

- i. Twist the handle of the installation tool clockwise to secure the microprocessor in the tool.

Note: You can pick up or release the microprocessor by twisting the microprocessor installation tool handle.

- j. Carefully align the microprocessor installation tool over the microprocessor socket. Twist the handle of the microprocessor tool counterclockwise to insert the microprocessor into the socket.

Attention: The microprocessor fits only one way on the socket. You must place a microprocessor straight down on the socket to avoid damaging the pins on the socket. The pins on the socket are fragile. Any damage to the pins might require replacing the system board.

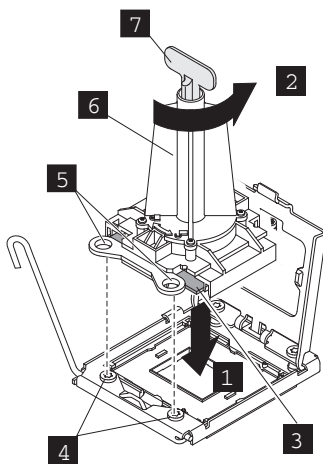


Figure 196. Inserting the microprocessor into the socket

- 1** Downward motion to seat the microprocessor
- 2** Twisting motion to insert the microprocessor into the socket
- 3** Microprocessor
- 4** Screws
- 5** Alignment holes
- 6** Installation tool
- 7** Handle

- k. Close the microprocessor bracket frame.
 - l. Carefully close the microprocessor release lever to the closed position to secure the microprocessor in the socket.
4. After alignment, carefully place the microprocessor onto the socket. Close the microprocessor-bracket frame (**3**).

Tip: Do not force the microprocessor. The microprocessor fits only one way on the socket.

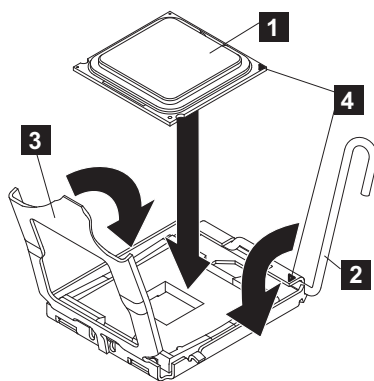


Figure 197. Closing the SAN Volume Controller 2145-DH8 microprocessor-bracket frame

- 1** Microprocessor
- 2** Microprocessor-release lever
- 3** Microprocessor-bracket frame

5. Carefully close the microprocessor-release lever (**2**) to the closed position to secure the microprocessor in the socket.
6. Clean the grease from the heat sink and apply new grease on the microprocessor.
When you are installing the heat sink on the same microprocessor that it was removed from, make sure that the following requirements are met:
 - The thermal grease on the heat sink and microprocessor is not contaminated.
 - Additional thermal grease is not added to the existing thermal grease on the heat sink and microprocessor.

To replace damaged or contaminated thermal grease on the microprocessor and heat sink, complete the following steps:

- a. Place the heat sink on a clean work surface.
- b. Remove the cleaning pad from its package and unfold it completely.
- c. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

Note: Make sure that all of the thermal grease is removed.

- d. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.
- e. Use the thermal-grease syringe to place nine uniformly spaced dots of 0.02 mL each on the top of the microprocessor, as shown in Figure 198. The outermost dots must be within approximately 5 mm of the edge of the microprocessor to ensure uniform distribution of the grease.

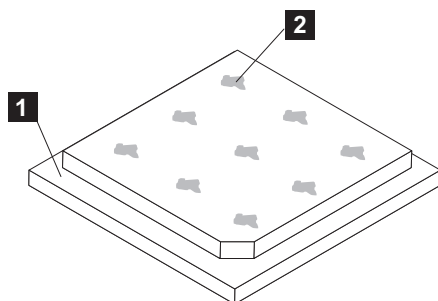


Figure 198. Applying thermal grease to the SAN Volume Controller 2145-DH8 microprocessor

- 1** Microprocessor

2 0.02 mL of thermal grease

Note: If properly applied, approximately half of the grease remains in the syringe when you are done.

7. Align the heat sink on top of the microprocessor, as shown in Figure 199.

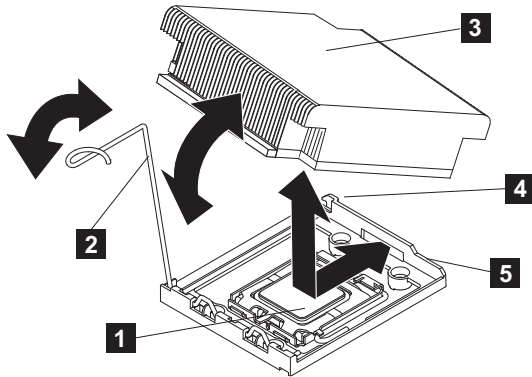


Figure 199. Installing the heat sink on the SAN Volume Controller 2145-DH8 microprocessor

- 1** Microprocessor
- 2** Heat sink release lever
- 3** Heat sink
- 4** Lock tab
- 5** Retainer bracket

8. Lower the rear flange of the heat sink into the opening in the retainer bracket (**5**) and press down firmly on the front of the heat sink until it is seated securely.
9. Rotate the heat release lever (**2**) to the closed position and hook the lever underneath the lock tab (**4**).
10. Replace the top cover. See “Replacing the cover” on page 69.
11. If you removed the node from the rack, replace the node in the rack, as described in “Replacing a node in a rack” on page 44.
12. If you removed any Fibre Channel or Ethernet cables, use the labels you that placed on each cable to identify the ports from which they were removed.
13. Lift the locking levers (**1** in Figure 200 on page 242) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

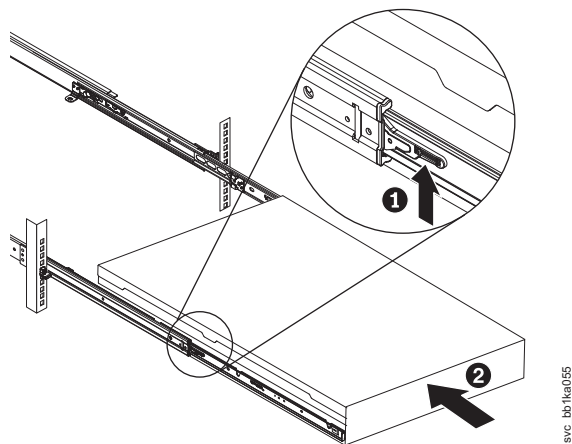


Figure 200. Raising the locking levers of the SAN Volume Controller 2145-DH8 slide rails of the rack

14. Turn on the node.

Removing the system board

You must remove the system or main board from a node, if you are instructed to replace it with a new field replaceable unit (FRU).

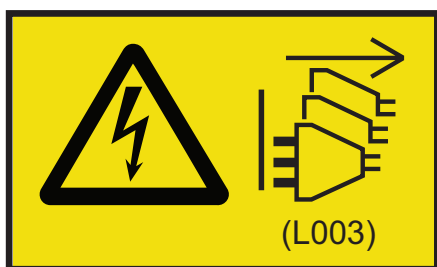
Removing the main board: 2145-SV1

You might need to remove the main board from a SAN Volume Controller 2145-SV1 node.

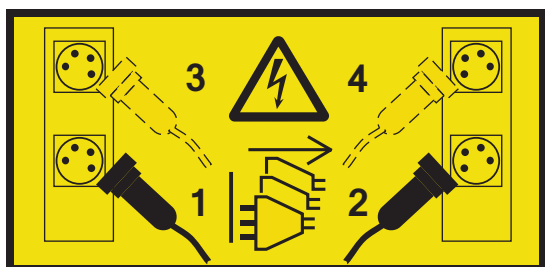
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



Procedure

Perform the following steps to remove the main board.

1. Read all of the safety information.
2. Before you power off the node, verify that hosts will not lose access to data in volumes. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
3. Disconnect all power cords.
4. Disconnect all SAS cords from the back of the enclosure.

5. Pull the power supplies out of the rear of the node to disengage them from the node. Follow the procedure that is described in “Removing a power supply: 2145-SV1” on page 160.
6. Remove the top covers, as described in “Removing the top covers: 2145-SV1” on page 66.
7. Remove the Trusted Platform Module (TPM), as described in “Removing and replacing a Trusted Platform Module: 2145-SV1” on page 257.
8. Remove all PCI riser-card assemblies, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.
9. Remove the air baffle, as described in “Removing the air baffle: 2145-SV1” on page 71.
10. Remove the Ethernet edge board, as described in “Removing and replacing the Ethernet edge board: 2145-SV1” on page 260.
11. Remove the memory modules, as described in “Removing the memory modules: 2145-SV1” on page 89. Then, set them aside on a static-protective surface for reinstallation.

Note: Make a note of the location of each DIMM as you remove it so that you can reinstall it in the same connector.

12. Remove all heat sinks and microprocessors, as described in “Removing the microprocessor: 2145-SV1” on page 227. Set them aside on a static-protective surface for reinstallation.

Note: Do not allow the thermal grease to come in contact with anything. Contact with any surface can compromise the thermal grease and the microprocessor socket.

13. Remove the CMOS battery, as described in “Removing the CMOS battery: 2145-SV1” on page 149.
14. Disconnect all cables from the main board. Label each cable, and then make a list of each cable as you disconnect it, so you can use it as a checklist when you install the new main board. Figure 201 shows the location of the SATA drive backplane and connectors.

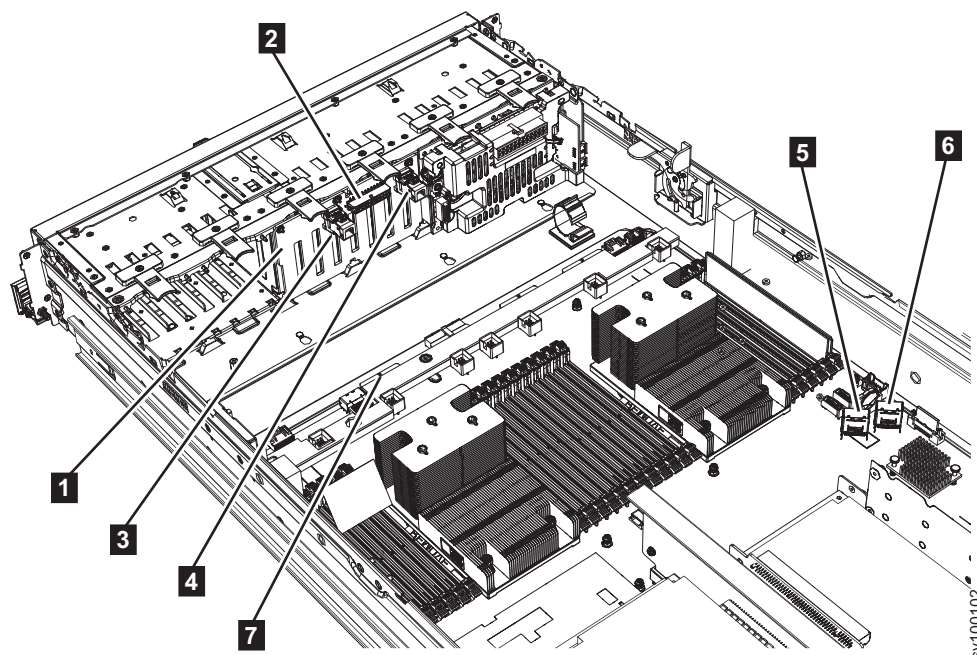


Figure 201. The 2145-SV1 SATA drive backplane and connectors

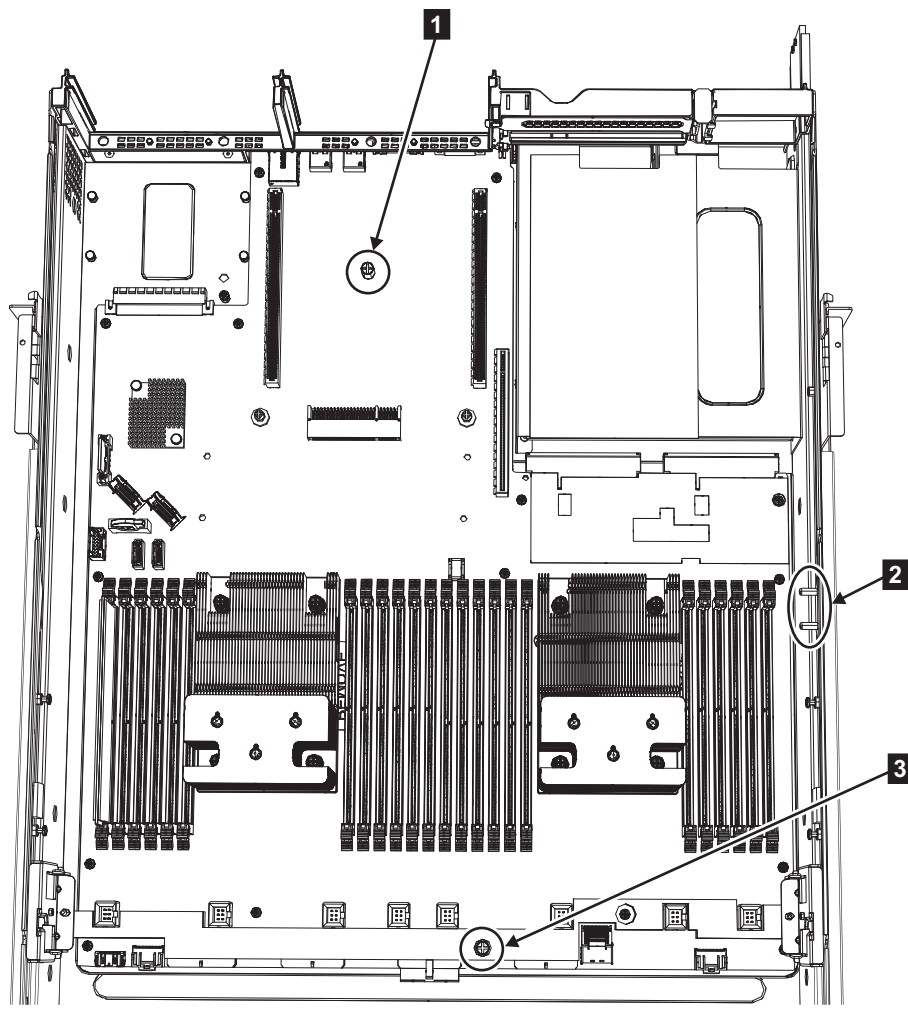
- 1 SATA drive backplane
- 2 SATA drive backplane power cable connector on the SATA drive backplane
- 3 SATA drive backplane SATA cable connector 2
- 4 SATA drive backplane SATA cable connector 1

- 5** SATA cable connector 2 on the main board
- 6** SATA cable connector 1 on the main board
- 7** SATA drive backplane power cable connector on the main board

Note: The main board FRU was cost-reduced and unused connectors were removed. You might find that only one SATA cable is needed to connect the SATA drive backplane to the main board. Previously, a second SATA cable was provided to allow for a 5th and 6th boot drive, which the system did not need.

Attention: Disengage all latches, release tabs, or locks on cable connectors when you disconnect all cables from the main board. Failing to release them before you remove the cables damages the cable sockets on the main board. The cable sockets on the main board are fragile. Any damage to the cable sockets might require replacing the main board.

15. Remove the fan cage, as described in “Removing the fan bracket: 2145-SV1” on page 218.
16. Release the two screws (**1** and **3** in Figure 202) on the main board.



- 1** Attachment screw 1
- 2** Support pegs for top cover
- 3** Attachment screw 2

Figure 202. Locating the attachment screws on the 2145-SV1 main board

17. Carefully push the main board forward a little to release it. Then, raise the main board at a slight angle, as shown in Figure 203.

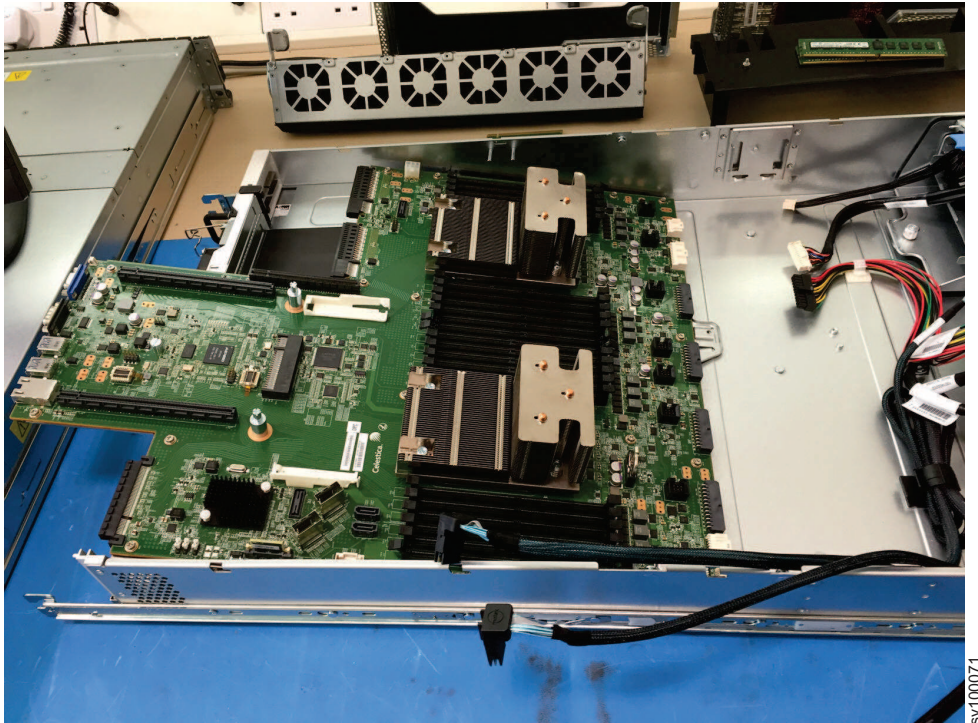


Figure 203. Removing the 2145-SV1 main board

Attention: The previous figure shows four cables. As noted in step 14 on page 243, label each cable, and make a list of the corresponding connectors so that you can reconnect the cables to a new system board correctly. If the cables are reconnected incorrectly, problems can occur when the system starts.

18. Slide the main board from the rear of the chassis. Be careful to avoid the two pegs that hold the top cover (**2** in Figure 202 on page 244).
19. If you are instructed to return the main board, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

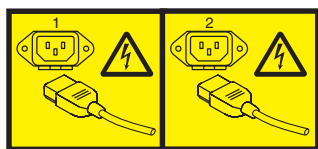
Removing the system board: 2145-DH8

You might need to remove the system board from a 2145-DH8 node.

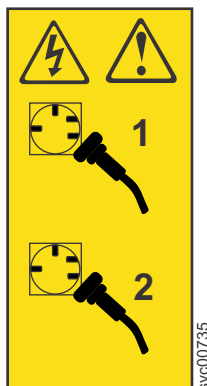
Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



Procedure

Perform the following steps to install the system board:

1. Read the safety information.
2. Turn off the node and any attached devices.
3. Turn off the peripheral devices and disconnect all power cords.
4. Pull the power supplies out of the rear of the node, enough to disengage them from the node.
5. Remove the cover.
6. Remove all PCI riser-card assemblies and adapters.
7. Remove the air baffle.
8. Remove the ServeRAID SAS/SATA controller.
9. Remove the dual-port network adapter.
10. Remove the memory modules and set them aside on a static-protective surface for reinstallation.

Note: Make a note of the location of each DIMM as you remove it so that you can reinstall it in the same connector.

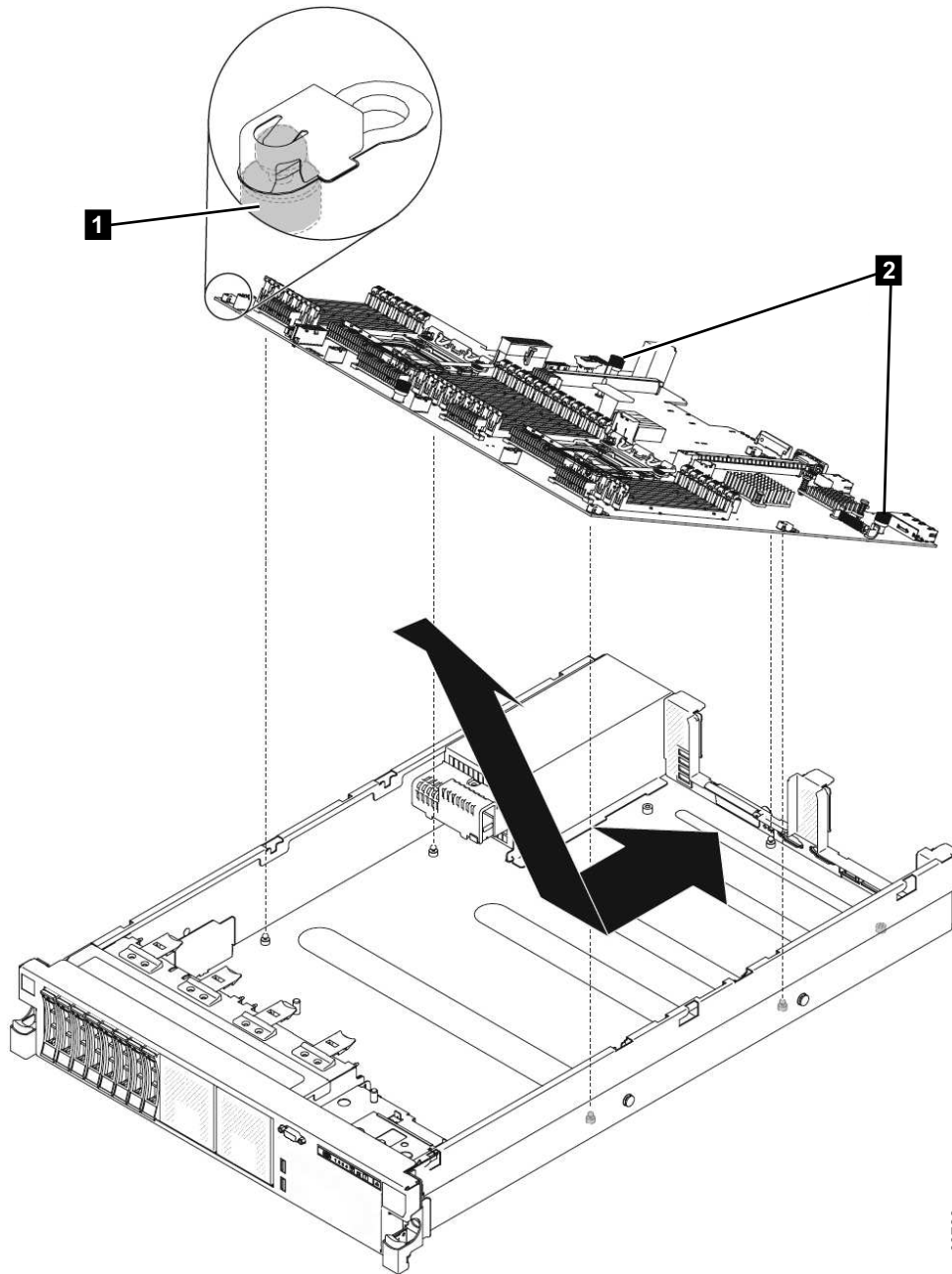
11. (Trained technician only) Remove all heat sinks and microprocessors, and set them aside on a static-protective surface for reinstallation.

Notes:

- Remove the socket covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the system board you are removing.
 - Do not allow the thermal grease to come in contact with anything, and keep each heat sink paired with its microprocessor for reinstallation. Contact with any surface can compromise the thermal grease and the microprocessor socket. A mismatch between the microprocessor and its original heat sink can require the installation of a new heat sink.
12. Remove the system battery.
 13. Disconnect all cables from the system board. Make a list of each cable as you disconnect it. You can then use this list as a checklist when you install the new system board.

Attention: Disengage all latches, release tabs, or locks on cable connectors when you disconnect all cables from the system board. Failing to release them before you remove the cables damages the cable sockets on the system board. The cable sockets on the system board are fragile. Any damage to the cable sockets might require replacing the system board.

14. Remove the hot-swap fans.
15. Pull out and lift the pin and the thumbscrews on each side of the system board, as shown in Figure 204.



svc00783

Figure 204. Removing the SAN Volume Controller 2145-DH8 system board

- 1 Pin
- 2 Thumbscrew

16. Remove the socket covers from the microprocessor sockets on the new system board and place them on the microprocessor sockets of the old system board that you are removing.
17. If you are instructed to return the system board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Attention: Make sure to place the socket covers for the microprocessor sockets on the system board before you return the system board.

Replacing the system board

You can reuse all of the components from the system board that you are replacing with a new system board field-replaceable unit (FRU).

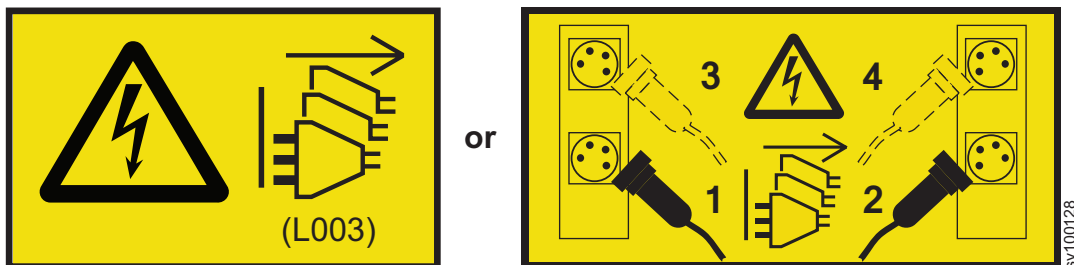
Replacing the main board: 2145-SV1

You can replace the main board on a 2145-SV1 node. All the components that were removed when you removed the main board are reused during the installation of the new main board.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



The machine serial number or node serial number is on the MT-M S/N label on the front of the 2145-SV1 node. It was also written to the main board and to each of the boot drives when the node was manufactured. When the system software starts, it reads the node serial number from the main board and uses the serial number as the panel ID for this node. The panel ID can be found in the service assistant GUI, management GUI, and the output of many command-line interface (CLI) commands.

If the main board is replaced with a FRU part, it has a machine serial number of 0000000. The 2145-SV1 node has a **panel_id** of 0000000. This value will not match the node serial number that is stored on each of the boot drives, causing node error 545. If copies of the node serial number on each boot drive do not match, the node error is 543. Use the following procedure to fix these node errors.

Ensure that the following items are available:

- A VGA monitor and a USB keyboard.
- Power cables for the node so that it can be turned on while out of the rack.
- A computer with an Ethernet port and browser that can be directly connected to the technician port and provide access to the service assistant GUI. SSH-capable software is required to access the CLI (PuTTY).
- Alcohol wipes and thermal grease are required to correctly replace the microprocessors. You must remove the microprocessors when you replace the main board.

Notes:

- When you reassemble the components in the node, be sure to route all cables carefully so that they are not exposed to excessive pressure.
- The SATA drive backplane and system board were “cost-reduced” and unused connectors were removed. You might find that only one SATA cable is needed to connect the backplane to the system board. Previously, a second SATA cable was provided to allow for a 5th and 6th boot drive, which the system did not need.

After you replace the SATA drive backplane, the yellow LEDs on the backplane might blink if a “cost-reduced” version of the system board is installed in the 2145-SV1 system. However, the system board will continue to work properly. To prevent the LEDs from blinking, you can replace the backplane at a convenient time with the latest version of the FRU.

About this task

This service action assumes that the following conditions were met.

- The node is turned off.
- The power cables are disconnected.
- The node is removed from the rack, as described in “Removing a node from a rack: 2145-SV1” on page 35.
- The top back cover is removed, as described in “Removing the top covers: 2145-SV1” on page 66.
- The Trusted Platform Module (TPM) is removed, as described in “Removing and replacing a Trusted Platform Module: 2145-SV1” on page 257.
- The PCI express riser-card assemblies are removed, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 173.
- The air baffle is removed, as described in “Removing the air baffle: 2145-SV1” on page 71.
- The cables that connect to the battery backplane are removed, as described in “Removing the battery backplane and cables: 2145-SV1” on page 116.
- The main board is removed, as described in “Removing the main board: 2145-SV1” on page 242.
- The new main board is from FRU stock. It must not come from another 2145-SV1 node.

Perform the following steps to install the main board.

Procedure

1. Align the main board at an angle, as shown in Figure 205 on page 250.

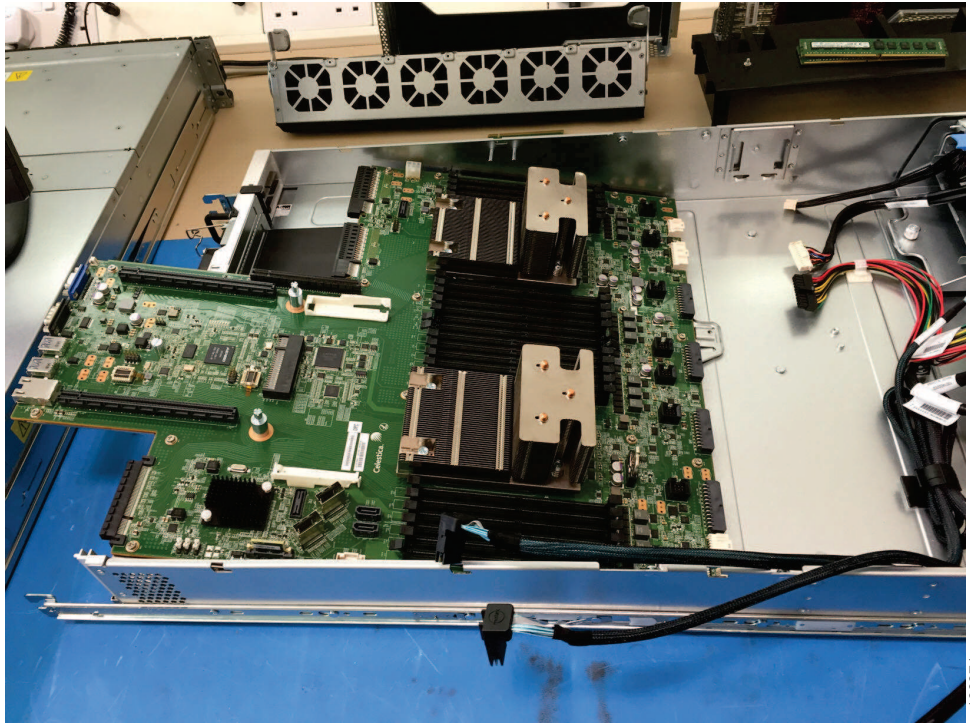
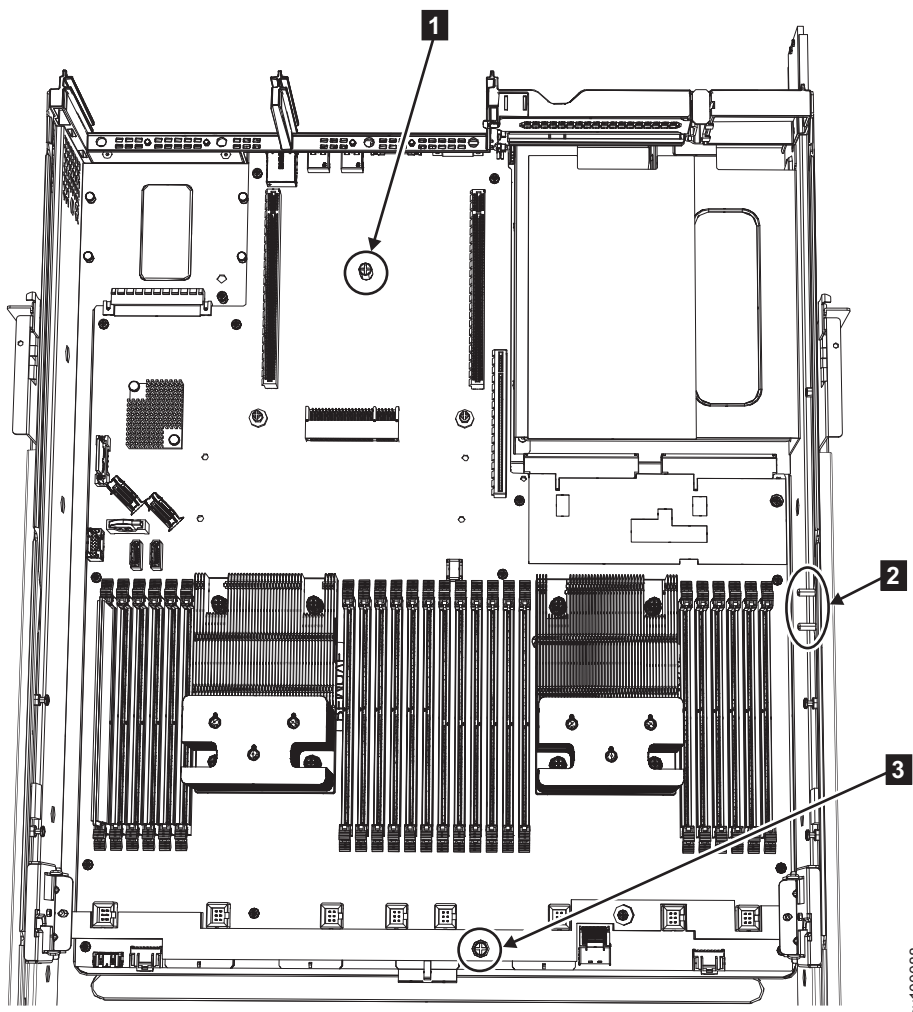


Figure 205. Replacing the 2145-SV1 main board

2. Carefully slide the main board forward until it can lay flat. Be careful to avoid the pegs (**2** shown in Figure 206 on page 251). Slide the main board back toward the rear of the server. Make sure that the rear connectors extend through the rear of the chassis.
3. Reconnect the main board cables that you disconnected.
4. Use the two screws (**1** and **3** in Figure 206 on page 251) to reattach the main board.



- 1** Attachment screw 1
- 2** Support pegs for back cover
- 3** Attachment screw 2

Figure 206. Reattaching the main board on a 2145-SV1 node

5. Reinstall the microprocessor and heat sink, as described in “Replacing the microprocessor: 2145-SV1” on page 232.
6. Reinstall the DIMMs, as described in “Replacing the memory modules: 2145-SV1” on page 94.
7. Reinstall the fan cage, as described in “Replacing the fan bracket: 2145-SV1” on page 221.
8. Reinstall the air baffle, as described in “Replacing the air baffle: 2145-SV1” on page 75.
9. Reinstall the power supply units, as described in “Replacing a power supply: 2145-SV1” on page 164.
10. Reinstall the TPM, as described in “Removing and replacing a Trusted Platform Module: 2145-SV1” on page 257.
11. Replace the PCI express riser-card assemblies, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 177.
12. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the node. Make sure that all internal cables are correctly routed. If you disconnected the Fibre Channel and Ethernet cables, make sure that each cable is reconnected to the same port from which it was removed.

13. Replace the top covers, as described in “Replacing the top covers: 2145-SV1” on page 69.
14. If you removed the node from the rack, replace it in the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
15. If you removed any Fibre Channel, SAS, or Ethernet cables, use the labels that you placed on each cable to connect the cables to the same ports from which they were removed.
16. Replace the power cords. The node powers on when the cords are reconnected.
17. Wait for the node status LEDs to remain stable for at least 5 minutes before you take any further action.

This procedure might take up to 2 hours to complete.

Notes:

- If the node status, node fault, and battery status LEDs remain off for more than 5 minutes, attach a monitor and a USB keyboard to change the default boot order.
- If the repair was successful, the node fault LED is on and node error 545 is seen in the service assistant GUI.
 - Node error 545 means that the node serial number on the main board, which is used for the **panel_id**, does not match the node serial number of each of the two boot drives.
 - Use the service assistant GUI or the **sainfo lsbootdrive** CLI command to confirm that.
 - The node serial number on the main board is 0000000 (that is, seven zeros) shown as the **panel_id**.
 - The node serial number for each boot drive slot is the same as the number that is on the MT-M S/N label on the front of this node.
 - If the previous two conditions were met, use the service assistant GUI or the following CLI command to change the node serial number on the main board:


```
satask chvpd -type 2145-SV1 -serial <the S/N value on the MT-M S/N label>
```
 - The node reboots.
 - If there are no node errors, the node starts and rejoins the system if it was previously in the system. If the node rejoined the system, the node status LED is on.
- If node error 543 is displayed, check the following items:
 - When the machine serial number on the main board is 0000000, node error 543 means that the copies of the node serial number on each boot drive do not match. This error might occur when the node serial number cannot be read from the boot drives because it is missing.
 - Use the service assistant GUI or the **sainfo lsbootdrive** CLI command to see the state of each boot drive slot.

For example, if the output from the **sainfo lsbootdrive** shows:

 - The node number on the main board is 0000000 (that is, seven zeros) shown as the **panel_ID**.
 - The node serial number for one boot drive slot is the same as that found on the MT-M S/N label on the front of this node.
 - The status of the other boot drive slot is uninitialized.

Use the service assistant GUI or the following CLI command to initialize the uninitialized boot drive only if the three previous conditions were met.

```
satask rescuenode
```

 - The node reboots.
 - Node error 545 is displayed for this node in the service assistant GUI.
 - Write the node serial number.
- If the repair was successful but the node was not able to save its state data before it shuts down, the node displays node error 578. Follow the procedures in "Deleting a node from a cluster" in the

IBM SAN Volume Controller Troubleshooting Guide to delete the node from the cluster. Then, add it back into the cluster. If more than one node has failed, ensure that each node is added back into its original I/O group.

Replacing the system board: 2145-DH8

All the components that were removed when you removed the system board are reused during the installation of the new system board.

Before you begin

The machine serial number or node serial number is on the MT-M SN label on the front of the SAN Volume Controller 2145-DH8. It was also written to the system board and to each of the boot drives when the node was manufactured. When the system software starts, it reads the node serial number from the system board and uses the serial number as the panel ID for this node. The panel ID can be seen in many places such as in the service assistant GUI, the management GUI, and the output of many CLI commands.

If the system board is replaced with a FRU part, then it has a machine serial number of 0000000, and the SAN Volume Controller 2145-DH8 node has a panel_id of 0000000. This will not match with the node serial number stored on each of the boot drives, causing node error 545. If copies of the node serial number on each boot drive do not match, the node error is 543. The procedure for fixing node errors is described below.

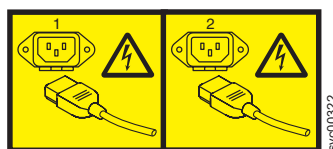
Ensure that the following items available:

- A VGA monitor and a USB keyboard might be needed.
- Power cables for the node so that it may be turned on while out of the rack.
- A computer with an Ethernet port and web browser that can be directly connected to the technician port, providing access to the service assistant GUI. Ssh capable software is required to access the CLI (PuTTY).
- Alcohol wipes and thermal grease are required to correctly replace the microprocessors. You must remove the microprocessors when you replace the system board.

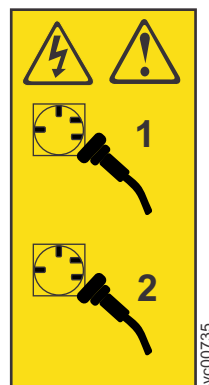
Note: When you reassemble the components in the node, be sure to route all cables carefully so that they are not exposed to excessive pressure.

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



or



or



About this task

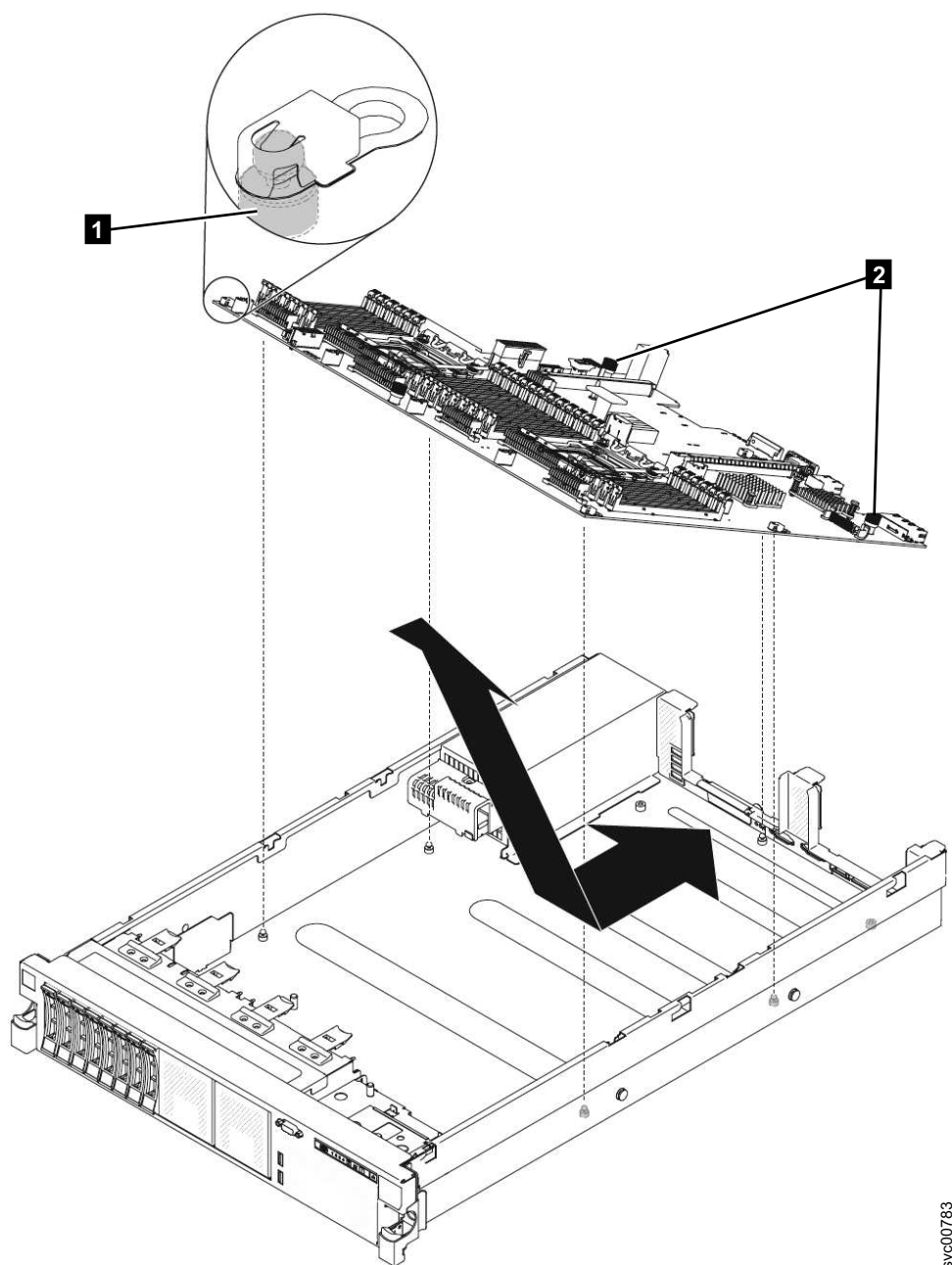
This service action assumes that:

- The node is turned off.
- The power cables are disconnected.
- The node is removed from the rack.
- The top cover is removed.
- The air baffle is removed.
- The PCI express riser-card assemblies are removed.
- The cables that connect to the battery backplane are removed.
- The system board is removed.
- The new system board is from FRU stock and must not come from another SAN Volume Controller 2145-DH8 or from any other machine.
- Avoid replacing both of the boot drives at the same time, otherwise it is not possible to recover without help from IBM remote technical support.

Perform the following steps to install the system board:

Procedure

1. Align the system board at an angle, as shown in Figure 207 on page 255.
2. Rotate and lower the system board so that it is flat and slide it back toward the rear of the server. Make sure that the rear connectors extend through the rear of the chassis.



svc00783

Figure 207. Replacing the SAN Volume Controller 2145-DH8 system board

- 1** Pin
- 2** Thumbscrew

3. Reconnect the system board cables that you disconnected.
4. Rotate the system board thumbscrews toward the rear of the server until the latch clicks.
5. Reinstall the microprocessor and heat sink, as described in “Replacing the microprocessor: 2145-DH8” on page 236.
6. Reinstall the DIMMs, as described in “Replacing the memory modules: 2145-DH8” on page 97.
7. Reinstall the fan bracket, as described in Replacing the SAN Volume Controller 2145-DH8 fan bracket.
8. Reinstall the hot-swap fans, as described in Replacing the SAN Volume Controller 2145-DH8 fans.

9. Reinstall the air baffle.
10. Reinstall the power supply units.
11. Replace the PCI express riser-card assemblies.
12. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the node. Make sure that all internal cables are correctly routed. If you disconnected the Fibre Channel and Ethernet cables, make sure that each cable is reconnected to the same port from which it was removed.
13. Replace the top cover. See "Replacing the cover" on page 69.
14. If you removed the node from the rack, replace the node in the rack, as described in "Replacing a node in a rack" on page 44.
15. If you removed any Fibre Channel, SAS cable, or Ethernet cables, use the labels that you placed on each cable to connect the cables to the same ports from which they were removed.
16. Replace the power cords and the cable-retention brackets.
17. Lift the locking levers (**1** in Figure 208) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

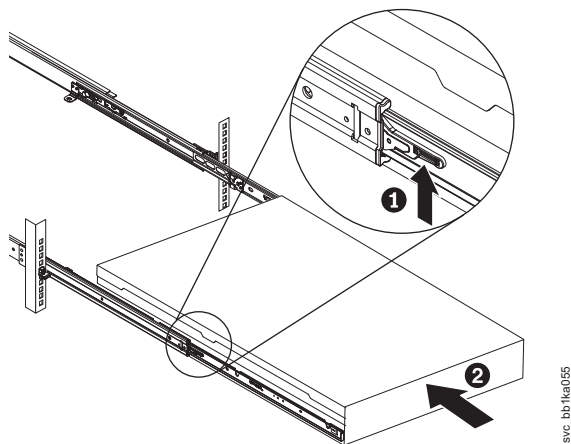


Figure 208. Raising the SAN Volume Controller 2145-DH8 locking levers of the slide rails of the rack

18. Turn on the node. Wait for the node status LEDs to remain stable for at least 5 minutes before taking any further action.

If you are a service representative completing this procedure, this procedure might take up to 2 hours to complete.

Notes:

- If the node status, node fault, and battery status LEDs remain off for more than 5 minutes, attach a monitor and a USB keyboard to change the default boot order.
- If the repair was successful the node fault LED is on and node error 545 is seen, for this node, in the service assistant GUI:

Notes:

- Node error 545 means that the node serial number on the system board, used for the `panel_id`, does not match with the node serial number held on each of the two boot drives.
- Use the service assistant GUI or the **sainfo lsbootdrive** CLI command to confirm that.
 - The node serial number on the system board is 0000000 (that is, seven zeros) shown as the `panel_id`.
 - The node serial number for each boot drive slot is exactly the same as that found on the MT-M SN label on the front of this node.

- If the previous two conditions were met, then use the service assistant GUI or the following CLI command to change the node serial number on the system board:
satask chvpd -type 2145-DH8 -serial <the SN value on the MT-M SN label>
- The node reboots.
- If there are no node errors, the node starts and rejoins the system if it was previously in the system. The node status LED is on if the node has rejoined the system.
- If node error 543 is displayed instead of node error 545, check the following:

Notes:

- When the machine serial number on the system board is 0000000, node error 543 means that the copies of the node serial number on each boot drive do not match. For example, when the node serial number could not be read from off the boot drives because it is missing.
- Use the service assistant GUI or the **sainfo lsbootdrive** CLI command to see the state of each boot drive slot. Refer to Boot drive problems to decide what to do next.
- For example, if the output from the **sainfo lsbootdrive** shows:
 - The node number on the system board is 0000000 (that is seven zeros) shown as the `panel_id`.
 - The node serial number for one boot drive slot is exactly the same as that found on the MT-M SN label on the front of this node.
 - The status of the other boot drive slot is **uninitialized**.
- Only use the service assistant GUI or the following CLI command to initialize the uninitialized boot drive if the three previous conditions above have been met:
satask rescuenode
- The node reboots
- Node error 545 is displayed for this node in the service assistant GUI
- Write the node serial number as stated above.
- If the repair was successful but the node was not able to save its state data before shutting down, the node displays node error 578. Follow the procedures in "Deleting a node from a cluster" in the *IBM SAN Volume Controller Troubleshooting Guide* to delete the node from the cluster and then add it back into the cluster. If more than one node failed, ensure that the node is added back into its original I/O group.

Removing and replacing the Trusted Platform Module

You might need to remove and replace the Trusted Platform Module (TPM) in a node.

About this task

CAUTION:

The system might not recover properly if all of the TPMs are changed at the same while there are no active nodes in the system. Only change the TPM in one node at a time and make sure that node status is active again before you attempt to change the TPM in another node.

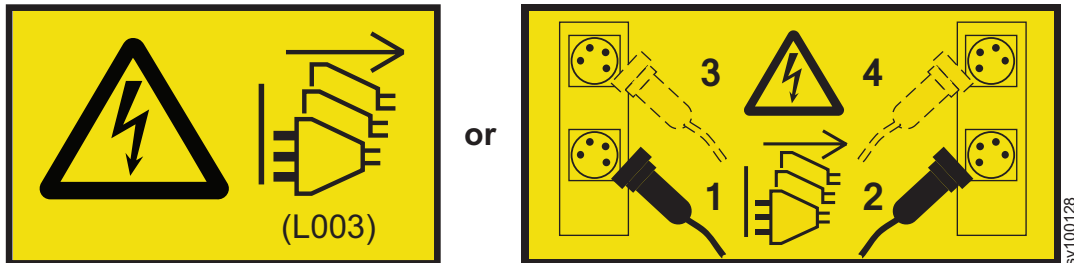
Removing and replacing a Trusted Platform Module: 2145-SV1

You might need to replace the Trusted Platform Module (TPM) in a SAN Volume Controller 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



- Read the safety information in Preparing to remove and replace parts.
- Use the management GUI to see whether this node has dependent volumes or enter the following **lsdependentvdisks** command:

```
lsdependentvdisks -node node_id
```

Ensure that each host has an active path to the volume through the node that is not that is powered off.

CAUTION:

If all of the TPMs are changed at the same while no active nodes are in the system, the system might not recover properly. Change the TPM in only one node at a time. Then, ensure that the node status is active again before you attempt to change the TPM in another node.

About this task

To replace a faulty Trusted Platform Module (TPM) with a new one received from FRU stock, use this procedure.

Procedure

1. Follow the procedure in MAP 5350: Powering off a node to verify that hosts do not lose access to data in volumes before you power off the node.

Attention: To prevent loss of access to data, make sure that powering off this node does not cause volumes to go offline.

Removing the TPM

2. Disconnect each power supply unit in the node from its power outlet so that the node is powered off.
3. Confirm that all the LEDs on the rear of the enclosure are off.
4. Disconnect all SAS cords from the back of the enclosure.
5. Slide the node out on its slide rails to the fully extended position.
6. Remove the top back cover, as described in “Removing the top covers: 2145-SV1” on page 66.
7. Locate the TPM on the main board, as shown in Figure 1 .

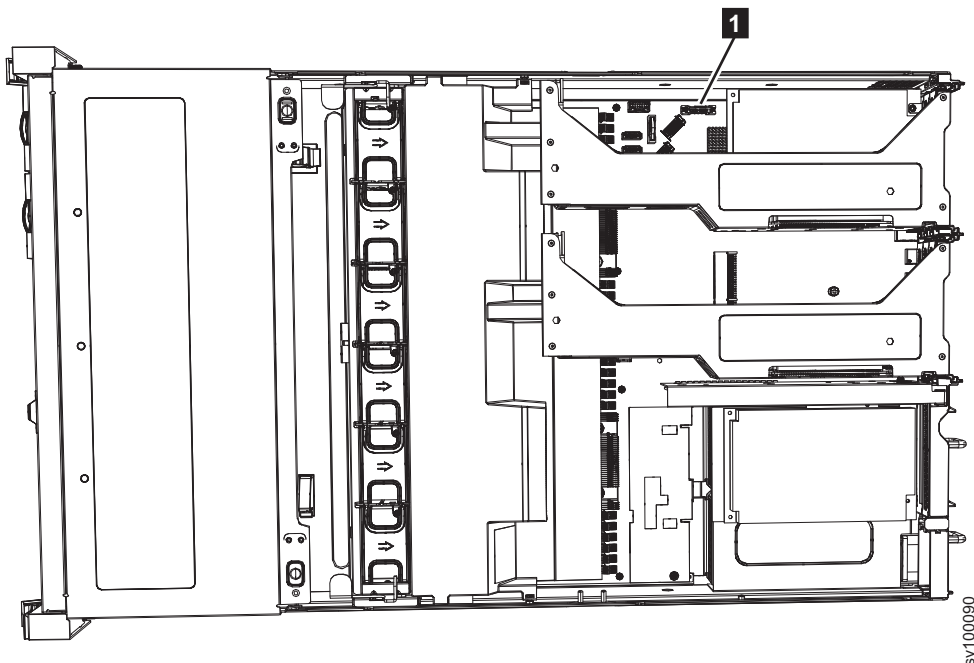


Figure 209. Locating the TPM on the main board of a 2145-SV1 node

8. Push out the locking clips on the side of the TPM to free it, as shown in Figure 210.

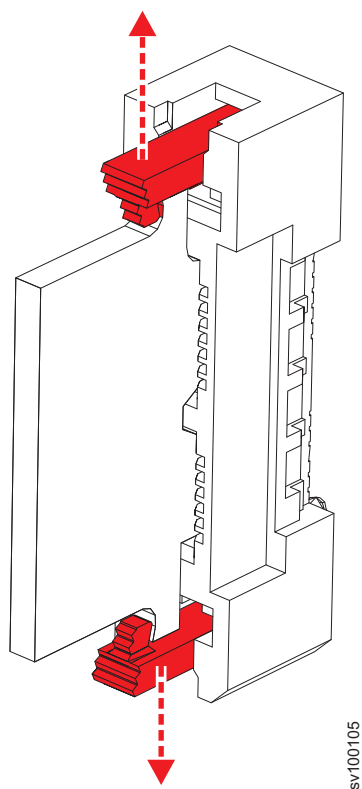


Figure 210. Removing the TPM from the main board of a 2145-SV1 node

9. Lift the TPM up and out of the slot.

Replacing the TPM

10. Insert the new TPM.
11. Push the locking clips in on each side of the TPM socket.
12. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
13. Slide the node back into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
14. Reconnect the SAS cables to the rear of the enclosure.
15. Reattach the power cables and reconnect each power supply unit to the power source.
16. Confirm that the enclosure is powered on by checking that the LEDs on the rear of the enclosure are on.

Removing and replacing the Ethernet edge board

You might need to remove and replace the Ethernet edge board in a node.

Use these instructions when you need to apply service to a node that is fitted with an Ethernet edge board.

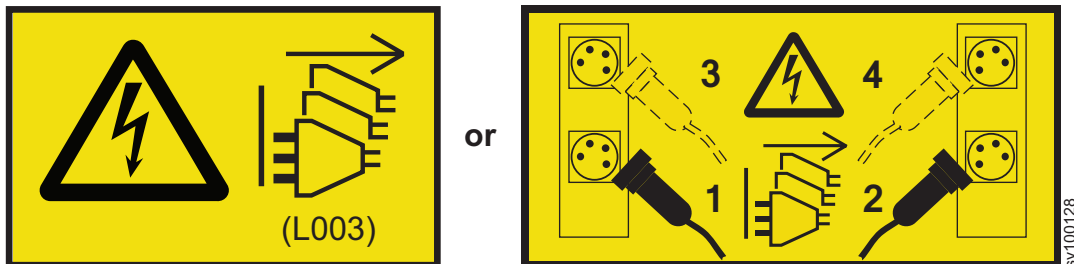
Removing and replacing the Ethernet edge board: 2145-SV1

You might need to remove and replace the Ethernet edge board in a 2145-SV1 node.

Before you begin

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors closed at the conclusion of the service operation. (C013)

Read the safety information in “Preparing to remove and replace parts” on page 12.

About this task

Use these instructions when you need to replace the Ethernet edge board in a SAN Volume Controller 2145-SV1 node. The Ethernet edge board contains 10 Gbps electrical Ethernet ports.

Procedure

1. Before you power off the node, verify that hosts will not lose access to data in volumes. Follow the procedure that is described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.

2. Remove and label the Ethernet cables that are attached to Ethernet ports 1-3 (**8** , **9** , and **10**), as shown in Figure 211.

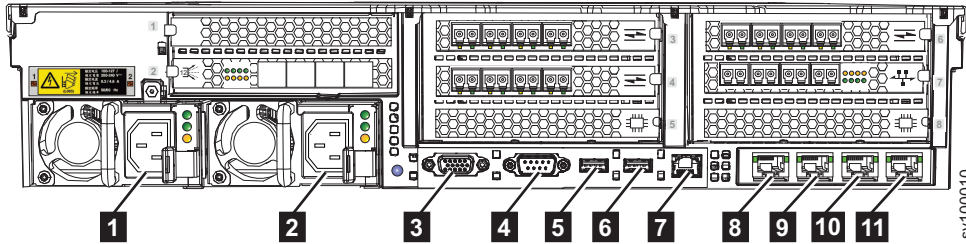


Figure 211. Connectors on the rear of the 2145-SV1 node

- 1** Power supply 1
- 2** Power supply 2
- 3** Video port
- 4** Serial port (not used)
- 5** Rear USB port 1
- 6** Rear USB port 2
- 7** Unused Ethernet port
- 8** 10 Gbps Ethernet port 1
- 9** 10 Gbps Ethernet port 2
- 10** 10 Gbps Ethernet port 3
- 11** Technician port (Ethernet)

Removing the Ethernet edge board

3. Disconnect each power supply unit in the node from its power outlet so that the node is powered off.
4. Confirm that all of the LEDs on the rear of the enclosure are off.
5. Slide the node out on its slide rails to the fully extended position.
6. Remove the top back cover, as described in “Removing the top covers: 2145-SV1” on page 66.
7. Remove PCI express rise assembly 1 without disconnecting any of the fabric cables that are attached to it.
8. Locate the Ethernet edge board (**1**), as shown in Figure 212 on page 262.

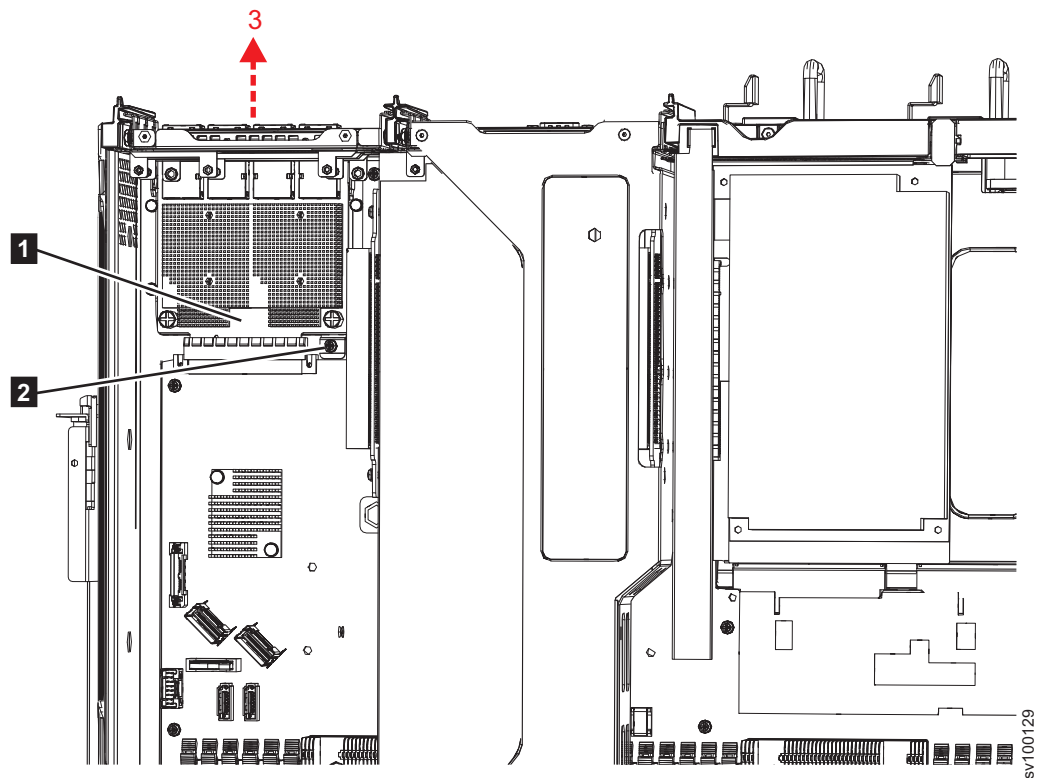


Figure 212. Removing the 2145-SV1 Ethernet edge board

- 1** Ethernet edge board
- 2** Screw
- 3** Location of the port hole

9. Remove the screw that attaches the Ethernet edge board to the chassis (**2** in Figure 212).
10. Push the Ethernet edge board out of the port hole at the back of the node in the direction (**3**) that is shown in Figure 212.

Replacing the Ethernet edge board

11. Insert the new Ethernet edge board through the port hole (**3**) at the back of the node, as shown in Figure 213 on page 263.

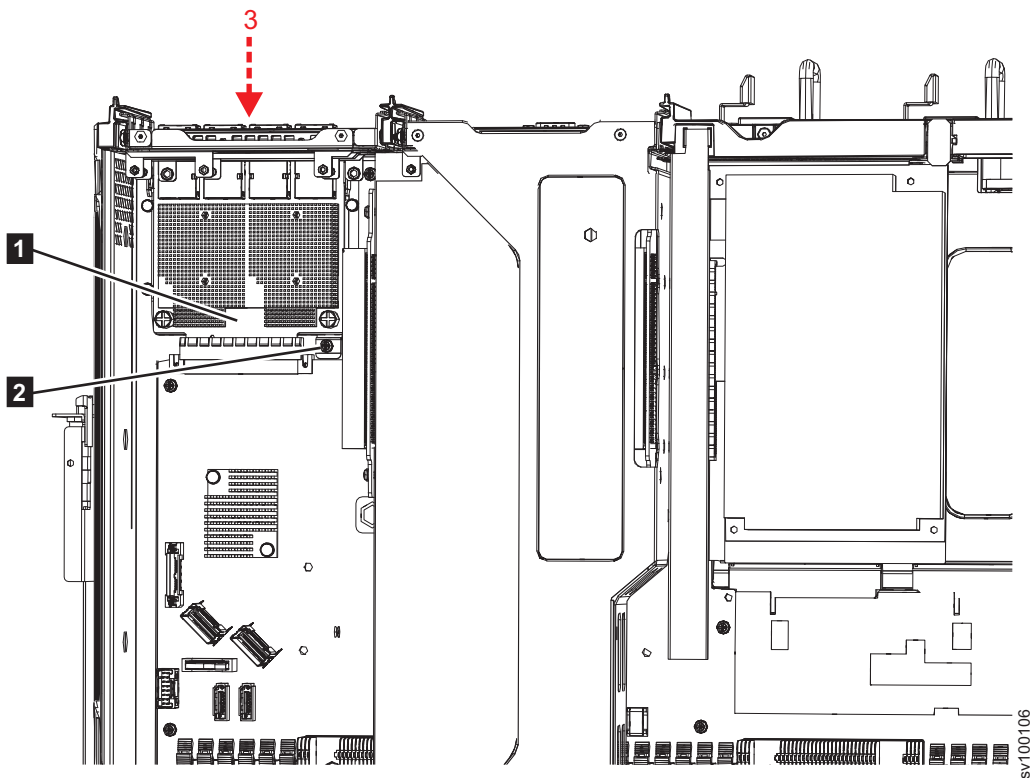


Figure 213. Replacing the 2145-SV1 Ethernet edge board

- 1** Ethernet edge board
 - 2** Screw
 - 3** Location of the port hole
12. Push the Ethernet edge board into the edge connector until it clicks. The face of the Ethernet edge board must be level with the back of the node.
 13. Replace the screw (shown in Figure 214 on page 264) to secure the Ethernet edge board to the chassis.

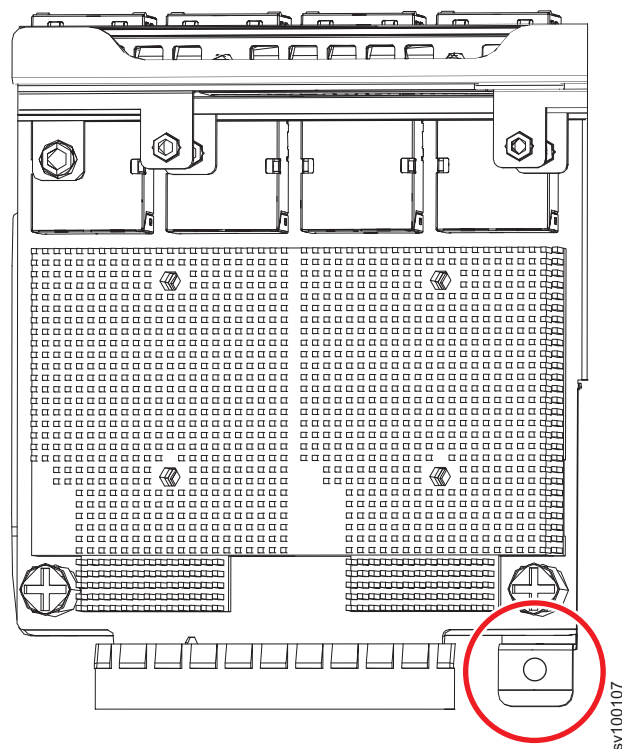


Figure 214. Location of the screw on the 2145-SV1 Ethernet chassis

Figure 212 on page 262 shows where the Ethernet edge board is attached to the chassis (**2**).

14. Replace PCI express riser assembly 1, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 177.
15. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 69.
16. Slide the node back into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 47.
17. Reconnect the Ethernet cables to the appropriate ports, as noted in step 2 on page 261.
18. Reconnect each power supply unit cable. The node turns on when the power is restored.

Chapter 3. Removing and replacing 2145 UPS-1U parts

The remove and replace procedures for the 2145 UPS-1U field replaceable units are described in the topics which follow.

About this task

Note: The 2145 UPS-1U is not supported on SAN Volume Controller 2145-SV1 nodes.

Removing and replacing the power cable-retention bracket: 2145 UPS-1U

The 2145 UPS-1U power cable-retention bracket prevents accidental removal of the power cable that connects the 2145 UPS-1U to the SAN Volume Controller node.

Before you begin

Note: The 2145 UPS-1U power cable-retention bracket (shown in Figure 215) can be attached only to the most recent versions of the 2145 UPS-1U. Older versions do not have the correct mounting holes.

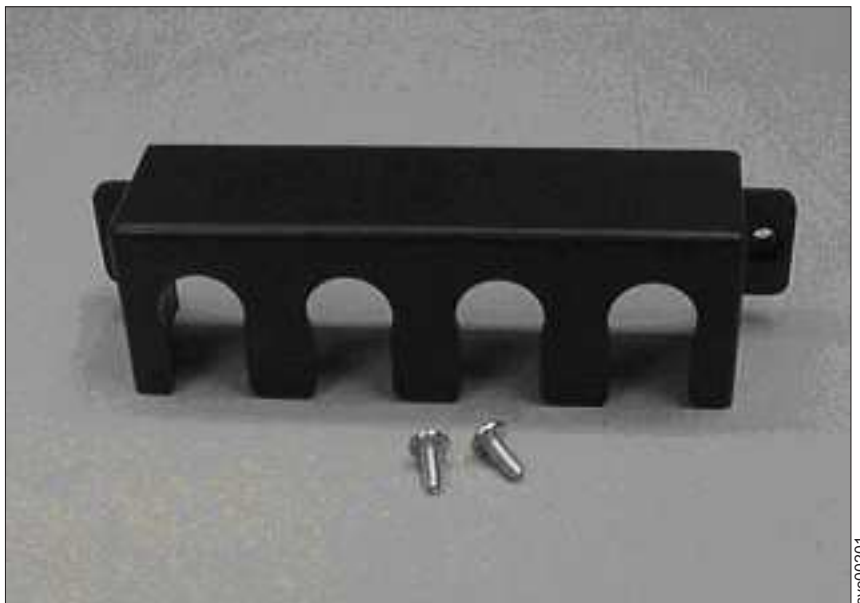


Figure 215. 2145 UPS-1U power cable-retention bracket hardware

Removing the 2145 UPS-1U power cable-retention bracket

About this task

Perform the following steps to remove the 2145 UPS-1U power cable-retention bracket:

Procedure

1. Remove the retaining screw from each side of the bracket.



Figure 216. 2145 UPS-1U power cable-retention bracket

2. Lift the bracket off the cable.

Replacing the 2145 UPS-1U power cable-retention bracket

About this task

Perform the following steps to replace the 2145 UPS-1U power cable-retention bracket:

Procedure

1. Ensure that the output power cable is securely in place.
2. Place the bracket over the power supply inlets on the right rear of the 2145 UPS-1U so that the two screw holes line up.
3. Ensure that the power cable runs through the rightmost slot in the bracket.
4. Secure the bracket in place with one screw on each side, as shown in Figure 217.



Figure 217. 2145 UPS-1U power cable-retention bracket

Removing the 2145 UPS-1U

Before you remove the 2145 UPS-1U, read all safety notices.

Before you begin

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

DANGER

Uninterruptible power supply (UPS) units contain specific hazardous materials. Observe the following precautions if your product contains a UPS:

- The UPS contains lethal voltages. All repairs and service must be performed only by an authorized service support representative. There are no user serviceable parts inside the UPS.
- The UPS contains its own energy source (batteries). The output receptacles might carry live voltage even when the UPS is not connected to an AC supply.
- Do not remove or unplug the input cord when the UPS is turned on. This removes the safety ground from the UPS and the equipment connected to the UPS.
- The UPS is heavy because of the electronics and batteries that are required. To avoid injury, observe the following precautions:
 - Do not attempt to lift the UPS by yourself. Ask another service representative for assistance.
 - Remove the battery, electronics assembly, or both from the UPS before removing the UPS from the shipping carton or installing or removing the UPS in the rack. (D007)

CAUTION:

This part or unit is heavy but has a weight smaller than 18 kg (39.7 lb). Use care when lifting, removing, or installing this part or unit. (C008)

About this task

Perform the following steps to remove the 2145 UPS-1U.

Attention: Check to make sure that the SAN Volume Controller that is powered by this 2145 UPS-1U is shut down and turned off, prior to step 1. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.

Procedure

1. At the front of the 2145 UPS-1U, press and hold the on/off button (**1** in Figure 218) until the power light is extinguished (approximately 5 seconds). On some versions of the 2145 UPS-1U, you need a pointed device, such as a screwdriver, to press the on/off button. The 2145 UPS-1U enters standby mode.

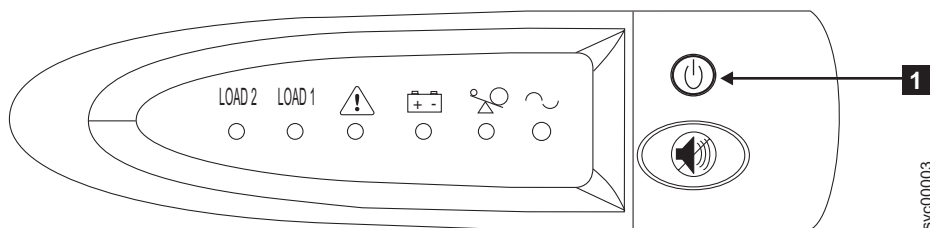


Figure 218. The 2145 UPS-1U front-panel assembly

2. At the back of the 2145 UPS-1U, remove the power cable retainer before disconnecting the SAN Volume Controller power cable from load segment receptacle 2 (**3** in Figure 219 on page 268).
3. Disconnect the signal cable from the communication port (**2** in Figure 219 on page 268).
4. Disconnect the main power cable from the main power source (**1** in Figure 219 on page 268).

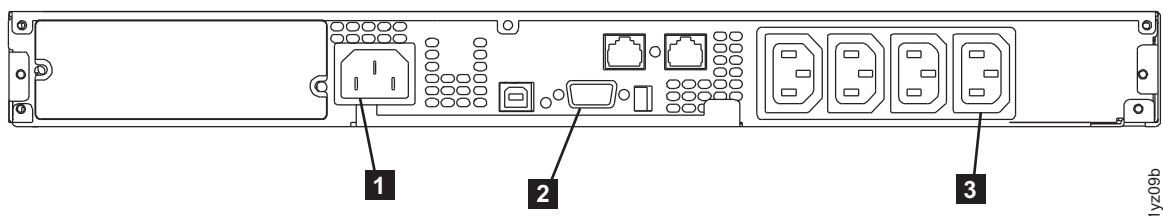


Figure 219. 2145 UPS-1U (rear view)

Some SAN Volume Controller node types have two power supply units. Both power supplies must be connected to the same 2145 UPS-1U. The SAN Volume Controller 2145-CF8 is an example of a node that has two power supplies.

5. Remove the 2145 UPS-1U front panel, as shown in Figure 220.

Note: If you are having difficulty pulling the right side of the panel free from the 2145 UPS-1U, insert a flat-blade screwdriver between the right side of the cover and the frame and gently pry it free.

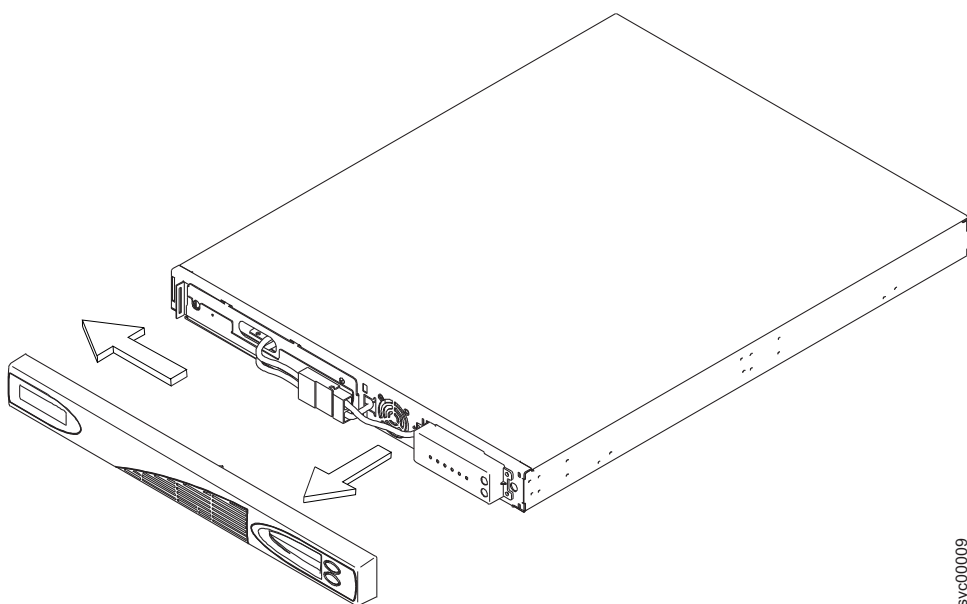
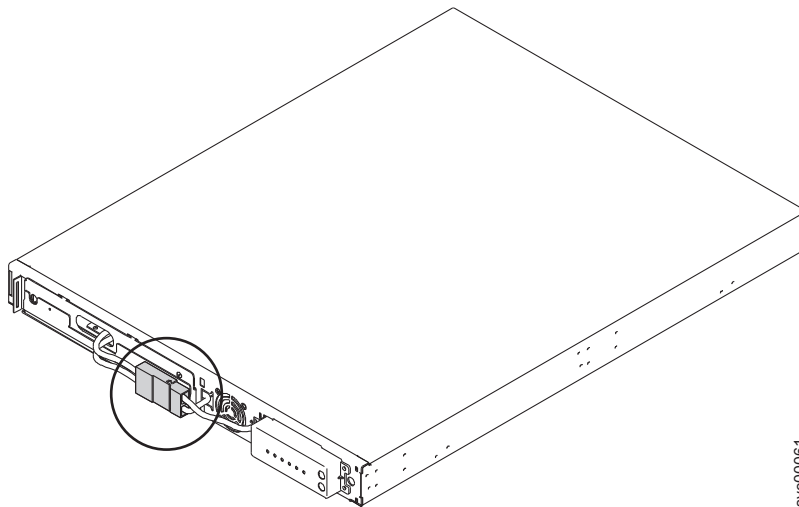


Figure 220. Removing the 2145 UPS-1U front panel

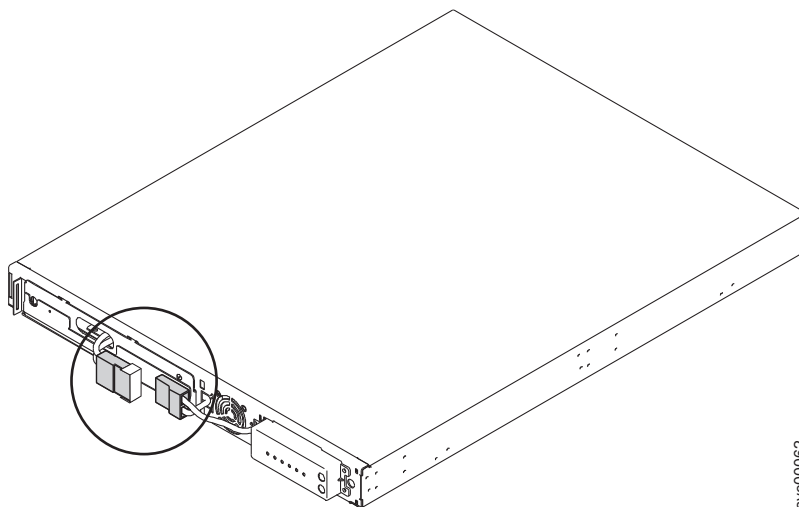
6. Disconnect the internal battery connector, which is circled in Figure 221 on page 269.



svc00061

Figure 221. The 2145 UPS-1U internal-battery connector

7. After pulling the two connectors apart, cover the exposed battery connector (shown in Figure 222) with adhesive tape.



svc00062

Figure 222. The 2145 UPS-1U internal battery connector with protective tape

8. Reinstall the front panel.
9. At the front of the 2145 UPS-1U, unscrew the two mounting screws **1**, as shown in Figure 223 on page 270.

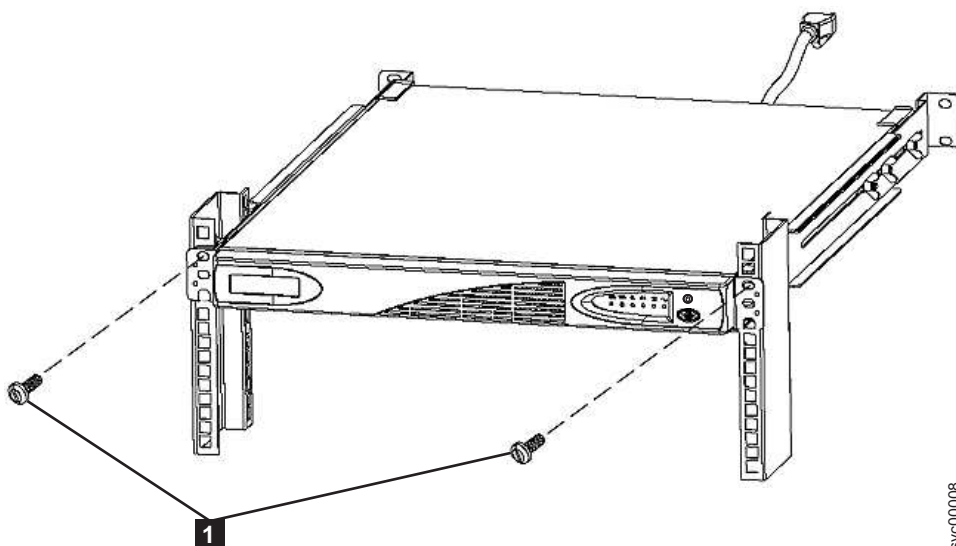


Figure 223. Mounting screws for the 2145 UPS-1U

10. From the back of the rack, push the 2145 UPS-1U forward approximately 5 cm (2 in) to enable you to pull it from the rack.
11. Go to the front of the rack.
12. Pull the 2145 UPS-1U forward and remove it from the rack.

Replacing the 2145 UPS-1U

You can replace the 2145 UPS-1U only after you remove the previous uninterruptible power supply.

Before you begin

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

DANGER

Uninterruptible power supply (UPS) units contain specific hazardous materials. Observe the following precautions if your product contains a UPS:

- The UPS contains lethal voltages. All repairs and service must be performed only by an authorized service support representative. There are no user serviceable parts inside the UPS.
- The UPS contains its own energy source (batteries). The output receptacles might carry live voltage even when the UPS is not connected to an AC supply.
- Do not remove or unplug the input cord when the UPS is turned on. This removes the safety ground from the UPS and the equipment connected to the UPS.
- The UPS is heavy because of the electronics and batteries that are required. To avoid injury, observe the following precautions:
 - Do not attempt to lift the UPS by yourself. Ask another service representative for assistance.
 - Remove the battery, electronics assembly, or both from the UPS before removing the UPS from the shipping carton or installing or removing the UPS in the rack. (D007)

CAUTION:

This part or unit is heavy but has a weight smaller than 18 kg (39.7 lb). Use care when lifting, removing, or installing this part or unit. (C008)

About this task

Perform the following steps to replace the 2145 UPS-1U:

Procedure

1. Place the 2145 UPS-1U on a flat, stable surface with the front of the 2145 UPS-1U facing toward you.
2. On each side of the 2145 UPS-1U, attach the long end of a mounting bracket to the 2145 UPS-1U using four of the supplied M3 × 6 screws (**2** in Figure 224).

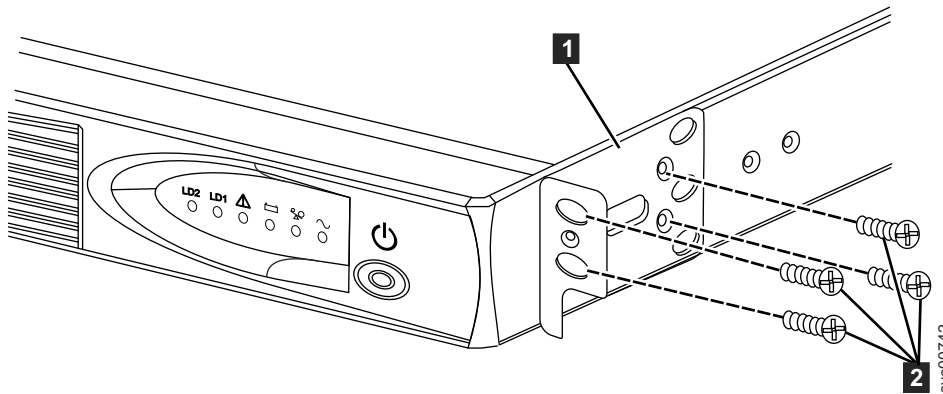


Figure 224. Installing the UPS mounting brackets for the 2145 UPS-1U

3. Stand at the front of the rack and place the back of the 2145 UPS-1U onto the support rails, and then slide the 2145 UPS-1U into the rack.
4. At the front of the 2145 UPS-1U, install the two mounting screws (**1** in Figure 225).

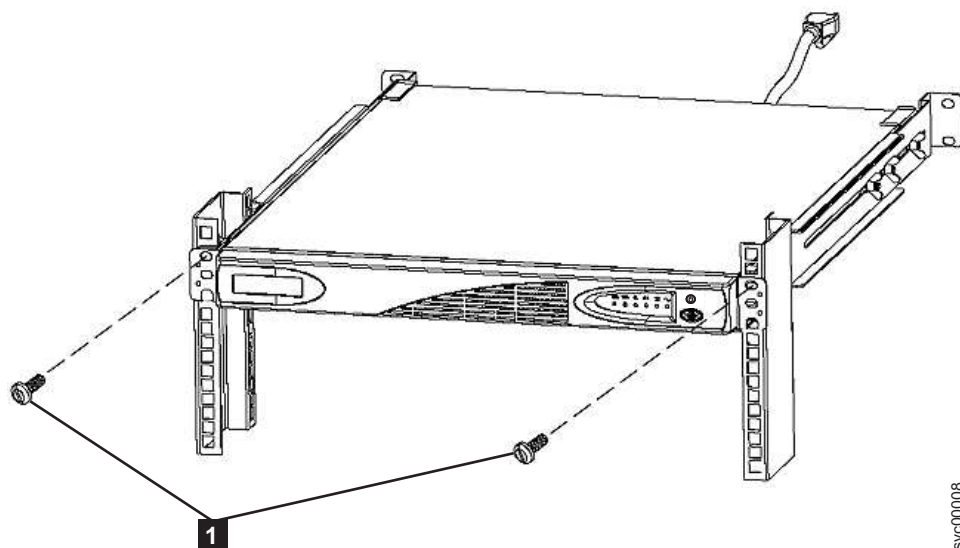
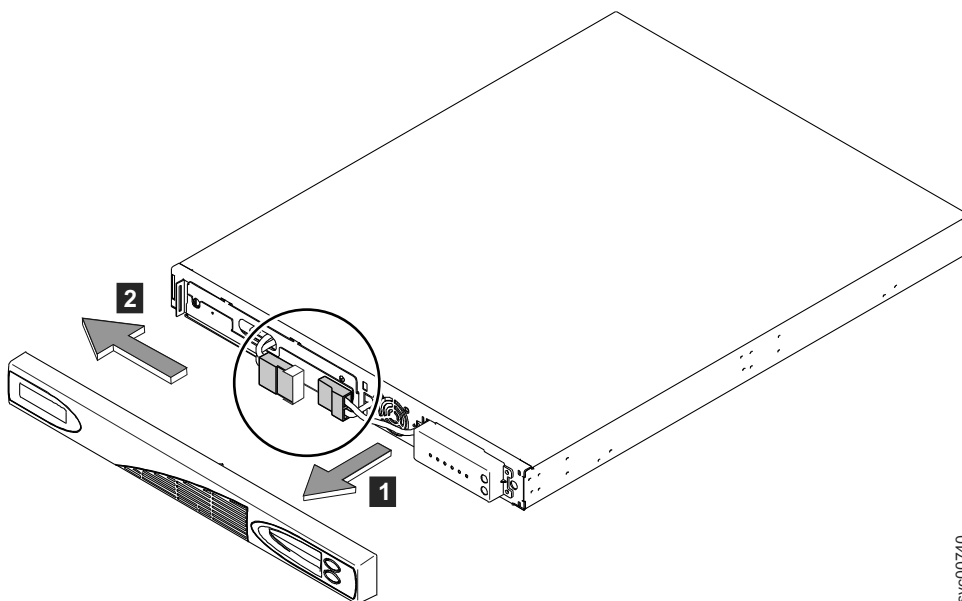


Figure 225. Mounting screws for the 2145 UPS-1U

5. Remove the 2145 UPS-1U front panel by pulling it towards you and to the left, as shown in Figure 226 on page 272.

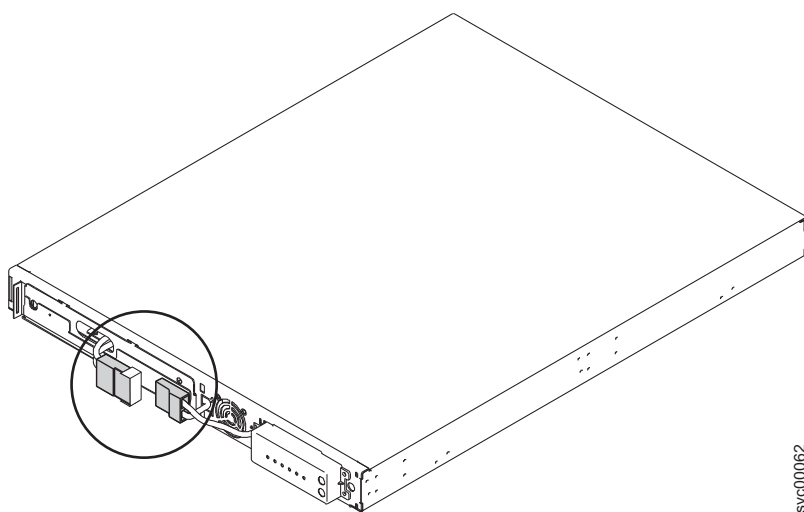
Note: If you are having difficulty pulling the right side of the panel free from the 2145 UPS-1U, insert a flat-blade screwdriver between the right side of the cover and the frame and gently pry it free.



svc00740

Figure 226. Removing the 2145 UPS-1U front panel

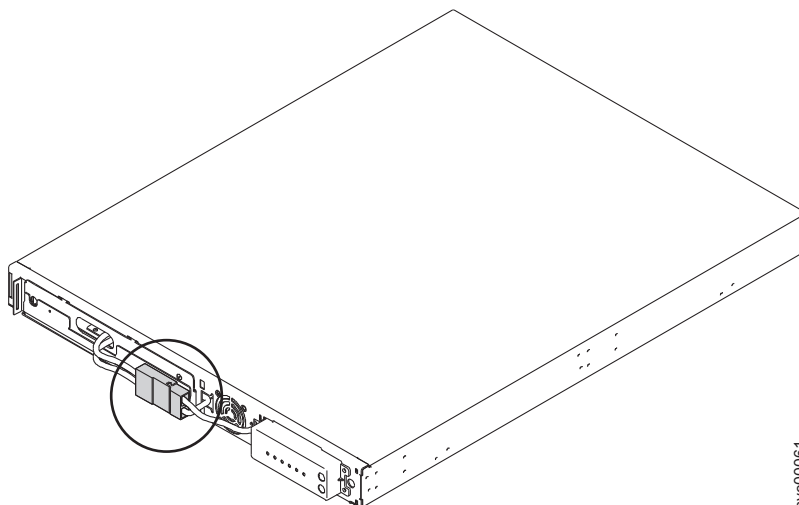
6. Remove the protective tape from the internal battery connector (circled in Figure 227).



svc00062

Figure 227. The 2145 UPS-1U internal battery connector with protective tape

7. Connect the internal battery connector (circled in Figure 228 on page 273).



svc00061

Figure 228. The 2145 UPS-1U with internal battery connectors in place

Note: A small amount of arcing might occur when connecting the batteries. This is normal and does not damage the unit or present any safety concerns.

8. Reinstall the front panel.
9. At the back of the 2145 UPS-1U, connect the SAN Volume Controller power cable to load segment 2 receptacle (**3** in Figure 230 on page 274). If applicable, install the power cable-retention bracket (shown in Figure 229).

Note: The 2145 UPS-1U is intended to maintain power on a single SAN Volume Controller node until data can be saved to the local hard disk drive. Only SAN Volume Controller nodes can be plugged in to the 2145 UPS-1U or else the SAN Volume Controller cluster malfunctions. You must attach only one SAN Volume Controller to the 2145 UPS-1U, and nothing else.



svc00200

Figure 229. The 2145 UPS-1U cable retention bracket connected to the 2145 UPS-1U

10. Reconnect the SAN Volume Controller signal cable to the communication port (**2** in Figure 230 on page 274).
11. Reconnect the 2145 UPS-1U main power cable, from either the power distribution unit or from the redundant AC-power switch, into the input connector (**1** in Figure 230 on page 274).

Note: If the 2145 UPS-1U does not seem to work, ensure that the power cable is connected properly or reconnect the power cable.

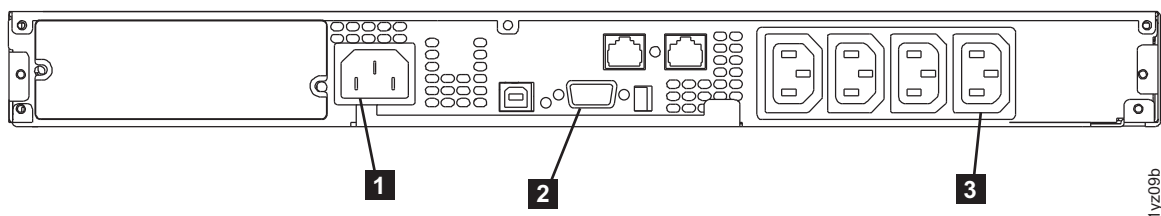


Figure 230. 2145 UPS-1U (rear view)

The 2145 UPS-1U is now in standby mode with the SAN Volume Controller offline. All indicators that are shown in Figure 230 are off.

12. To turn on the 2145 UPS-1U, press and hold the on/off button (**7** in Figure 231). On some versions of the 2145 UPS-1U, you need a pointed device, such as a screwdriver, to press the on/off button. The 2145 UPS-1U undergoes a self-test, taking approximately five seconds, before the power-on indicator **6** and the load indicators (**1** and **2**) light up permanently to indicate that the 2145 UPS-1U is supplying power to the SAN Volume Controller . The 2145 UPS-1U begins to charge its battery while in normal mode.

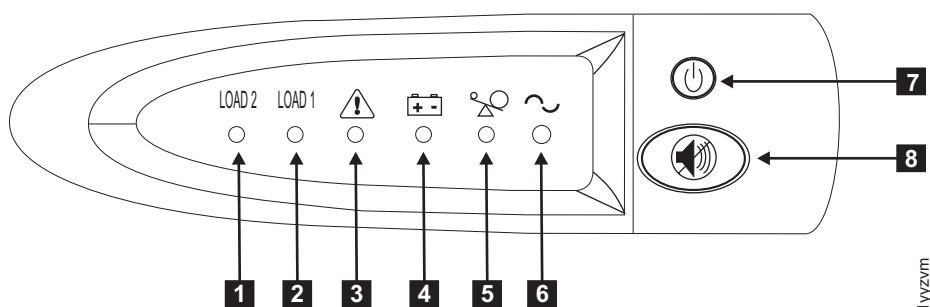


Figure 231. 2145 UPS-1U front-panel assembly

Note: If the 2145 UPS-1U battery is not sufficiently charged, the SAN Volume Controller node is not able to join the cluster. The node displays Charging on its front panel until the 2145 UPS-1U battery reaches sufficient charge, which could take an hour. When the SAN Volume Controller node rejoins the cluster, it might display Recovering on its front panel while the 2145 UPS-1U battery finalizes its charge.

Removing the support rails: 2145 UPS-1U

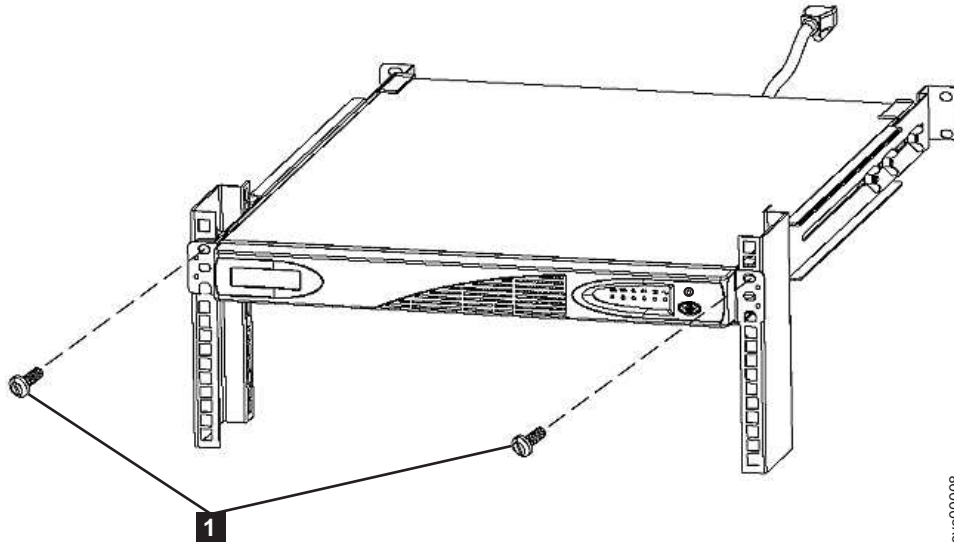
You can remove the support rails for the 2145 UPS-1U.

About this task

Perform the following steps to remove the support rails.

Procedure

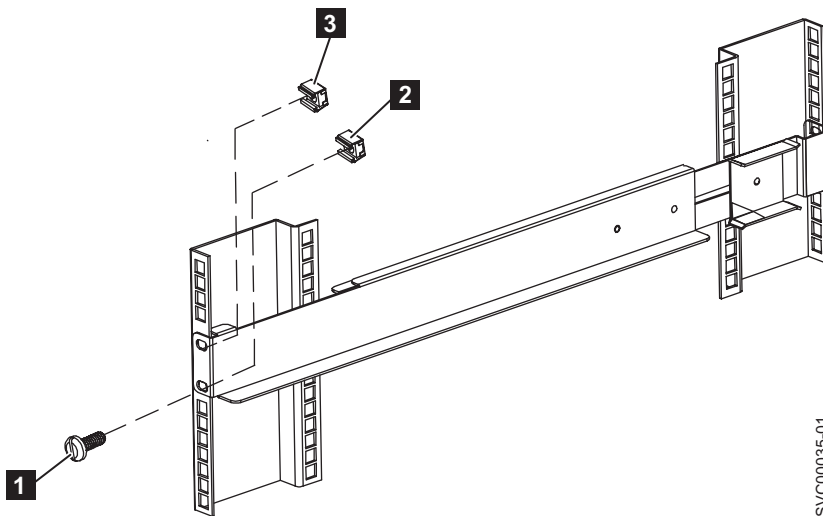
1. Loosen and remove the two M6 × 10 screws from each side of the 2145 UPS-1U (**1** in Figure 232 on page 275).



svc00008

Figure 232. Removing the front screws from the 2145 UPS-1U

2. Remove the 2145 UPS-1U from the rack.
3. Remove the clip nut from the top hole of the rail (**3** in Figure 233).



SVC00035-01

Figure 233. Removing the front rail on the 2145 UPS-1U

4. Detach the M6 × 10 screw (**1**) from the clip nut (**2**) in the bottom hole of the rail.
5. Remove the two M6 × 10 screws from the rear side of the rail (**1** in Figure 234 on page 276) and the two clip nuts (**2**).

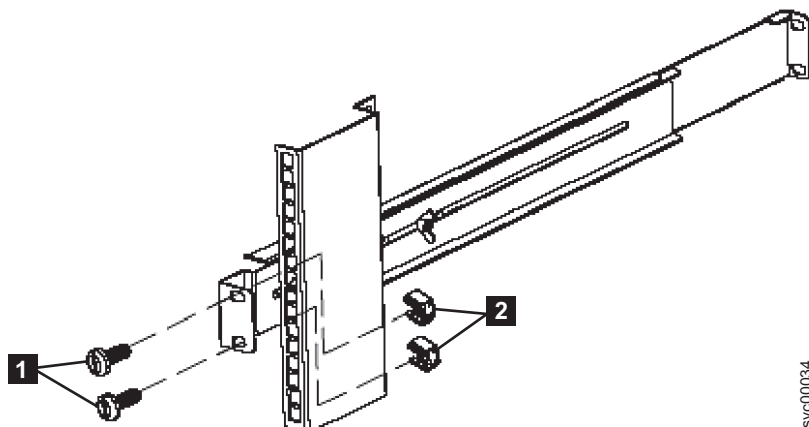


Figure 234. Removing the rear rail on the 2145 UPS-1U

6. Remove the rail from the rack.
7. Repeat steps 3 on page 275 through 6 to remove the other rail from the rack.

Installing the support rails: 2145 UPS-1U

You must install the support rails in the rack before installing the 2145 UPS-1U.

Before you begin

Complete these prerequisites before installing the support rails:

1. Use the customer's hardware-location chart to determine where in the rack to install the 2145 UPS-1U.
2. At the back of the rack, observe the Electronic Industries Alliance (EIA) positions and determine where you are going to install the 2145 UPS-1U. Because of its weight, position the 2145 UPS-1U where it is easy to handle in one of the lower positions in the rack.

About this task

Complete the following steps to install the support rails for the 2145 UPS-1U.

Procedure

1. Open the top of the 2145 UPS-1U shipping carton. Grip the flaps on either side of the 2145 UPS-1U.
2. Lift the 2145 UPS-1U clear of the shipping carton and place it on a flat, stable surface with the front facing you.
3. Attach the long side of a mounting bracket **1** to each side of the 2145 UPS-1U using four M3 × 6 screws **2** for each bracket, as shown in Figure 235 on page 277.

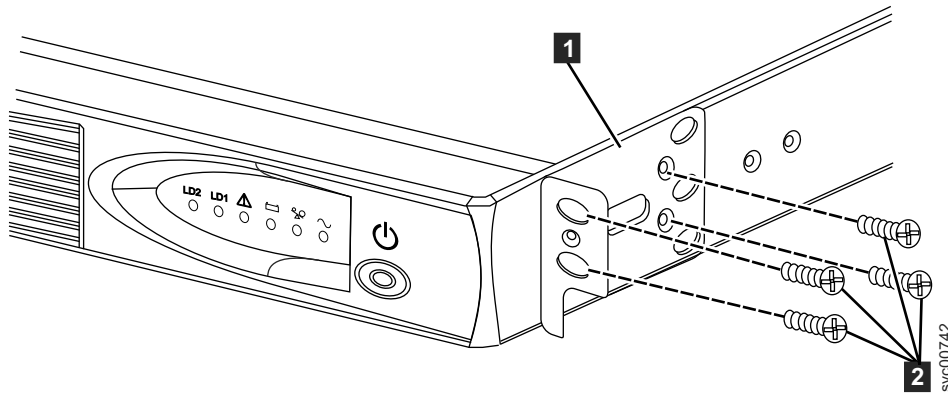


Figure 235. Installing the 2145 UPS-1U mounting brackets for the 2145 UPS-1U

4. Loosen the wing nuts (**1** and **2**) on both rail assemblies and adjust the rail size to the depth of your rack. After you adjust the depth, tighten the wing nuts as much as possible while still allowing some movement.

Refer to Figure 236 for information about how to tighten or loosen wing nuts and achieve a desired rail depth.

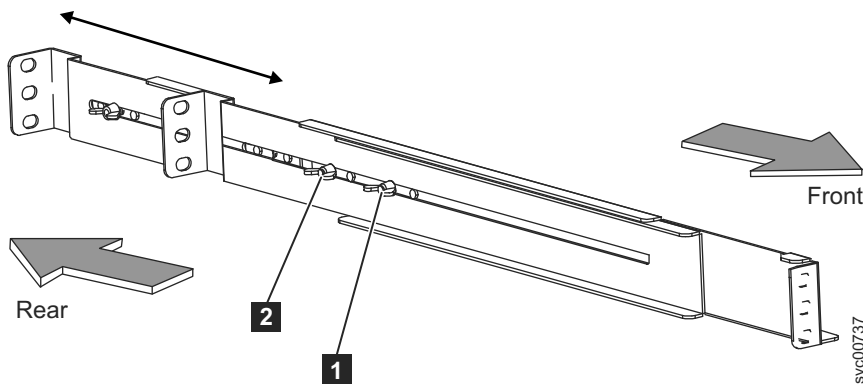


Figure 236. Adjusting the rail depth on the 2145 UPS-1U

Wing nut **1**

Wing nut **2**

5. Select the holes in the rail where you want to position the uninterruptible power supply. The figure shows the rear rail where the 2145 UPS-1U attaches to the rack. See Figure 237 on page 278.

Note: The bottom flange of the support rail must align with the EIA mark on the rack.

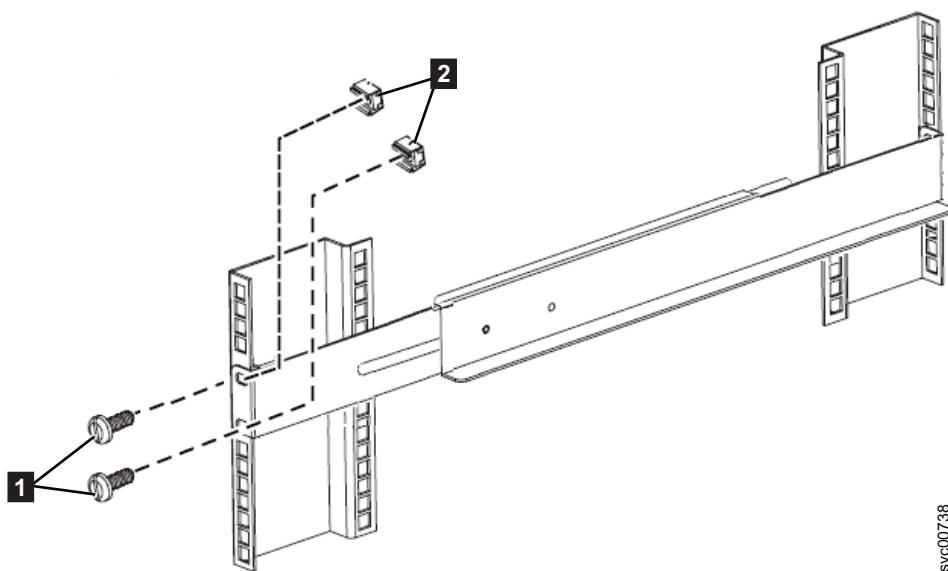


Figure 237. Attaching the rear of the 2145 UPS-1U rail to the rack

6. Install 2 clip nuts **2** and 2 M6 x 10 screws **1**, to attach the rail to the rear of the rack.
7. Install 2 clip nuts **2** and **3** to the front of the rack. Then, attach the rail using just 1 M6 x 10 screw **1** in the bottom mounting hole as shown in Figure 238.

Note:

- a. The extra clip nut **3** is reserved for later installation of the 2145 UPS-1U when the mounting brackets must be attached to the vertical rail on the rack.
- b. The rack might be different from the one shown here, and if so, might require different clip nuts or fasteners.

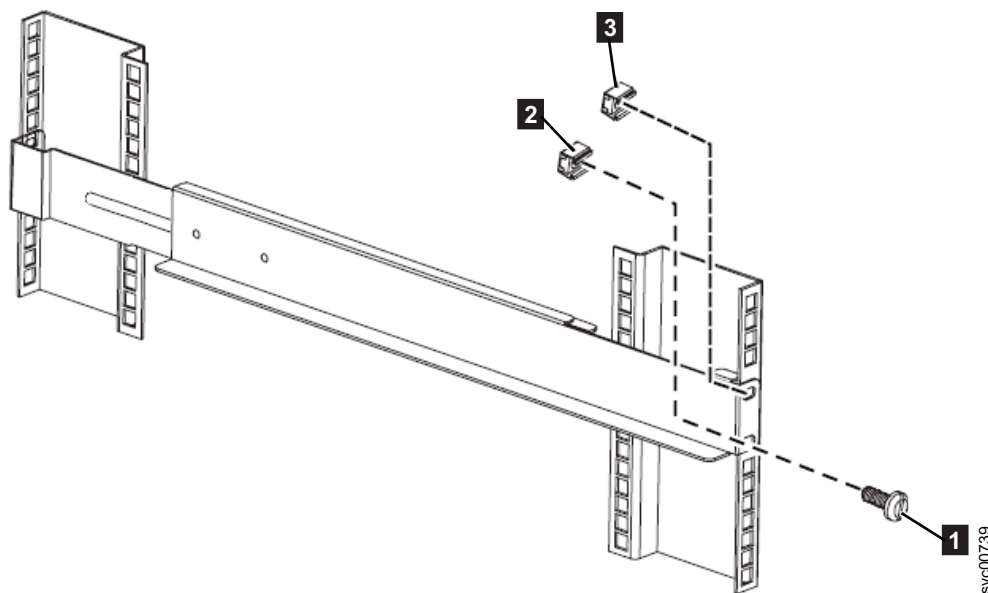


Figure 238. Attaching the front of the 2145 UPS-1U rail to the rack.

8. Repeat steps 6 and 7 for the other rail.
9. Tighten the wing nuts on both rail assemblies.

Removing the power cable: 2145 UPS-1U

You can remove the power cable from the 2145 UPS-1U if you are having problems with the power supply and suspect that the power cable is defective.

About this task

Perform the following steps to remove the power cable.

Procedure

1. Remove the power from each SAN Volume Controller node. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* for information about removing the power cable from the SAN Volume Controller .
2. Press and hold the on/off button (**2**) until the power light (**1**) is extinguished (approximately 5 seconds). On some versions of the 2145 UPS-1U, you need a pointed device, such as a screwdriver, to press the on/off button. The 2145 UPS-1U enters standby mode, with all indicators off. Figure 239 illustrates the front and rear views of the 2145 UPS-1U.

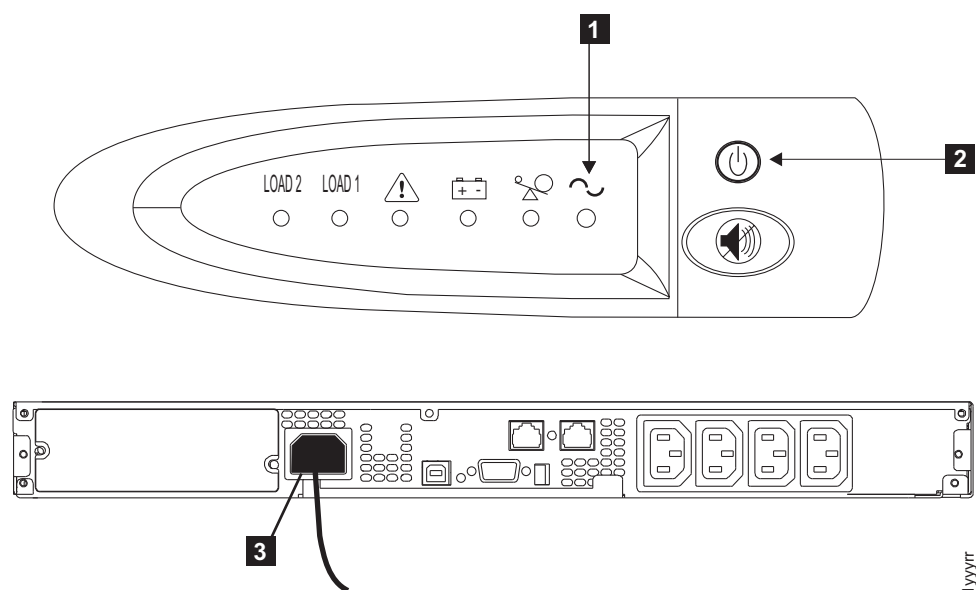


Figure 239. Front and back panels for the 2145 UPS-1U

- 1** Power on indicator
- 2** On/off button
- 3** Power cable

3. Disconnect the power cable (**3**) from the main power source.
4. Replace the power cable and make sure it is seated. The 2145 UPS-1U enters standby mode. All indicators are off and power is not available to the SAN Volume Controller . The battery recharges when necessary.
5. To turn on the 2145 UPS-1U, press and hold the on/off button (**2**) until the 2145 UPS-1U power button (**1**) is illuminated (approximately 5 seconds).

On some versions of the 2145 UPS-1U, you need a pointed device, such as a screwdriver, to press the on/off button. The front panel indicators then cycle through a startup sequence while the 2145 UPS-1U conducts a self-test. When the self-test completes, the power-on indicator and the load indicators illuminate to show that the 2145 UPS-1U is supplying power. The 2145 UPS-1U resumes service in normal mode.

Removing the battery: 2145 UPS-1U

Follow all safety notices when you are removing the 2145 UPS-1U battery.

Before you begin

CAUTION:

Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn. (C004)

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

About this task

Perform the following steps to remove the 2145 UPS-1U battery:

Procedure

1. Ensure the SAN Volume Controller that is connected to the 2145 UPS-1U is turned off. Use the instructions in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to turn off the node if it is not already off.

Note: There is no need to turn off the 2145 UPS-1U or remove it from the rack.

2. Pull the front panel from the right side until the panel is released from the right and middle sections of the 2145 UPS-1U. Push the front panel to the left to release the catch on the left end of the panel, as shown in Figure 240.

Note: If you are having difficulty pulling the right side of the panel free from the 2145 UPS-1U, insert a flat-blade screwdriver between the right side of the cover and the frame and gently pry it free.

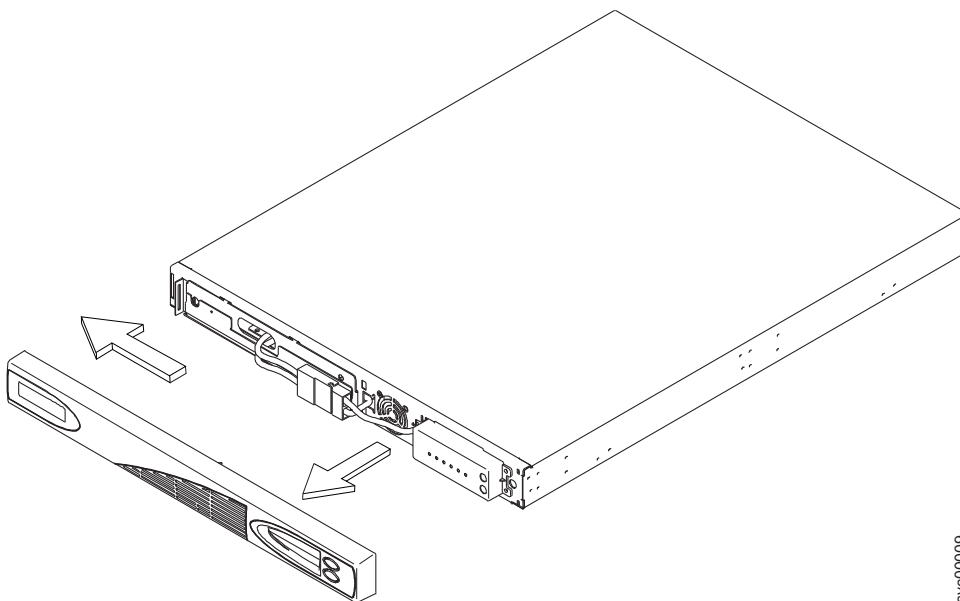
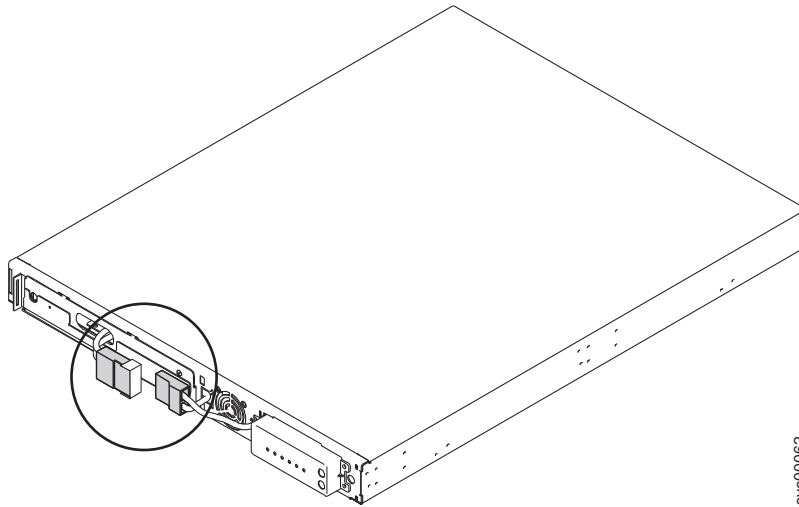


Figure 240. Removing the 2145 UPS-1U front panel

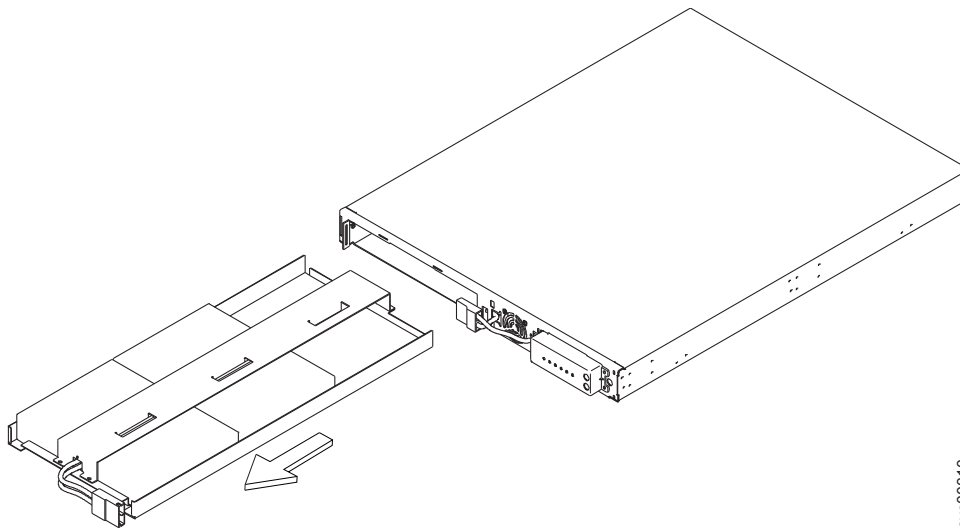
3. Disconnect the internal battery connector, circled in Figure 241 on page 281.



svc00062

Figure 241. The 2145 UPS-1U internal battery connector with protective tape

4. Slide the battery cover to the right and remove it.
5. Slide the battery out of the 2145 UPS-1U, as shown in Figure 242, and remove it, laying it on a flat surface.



svc00010

Figure 242. Removing the 2145 UPS-1U battery

Replacing the battery: 2145 UPS-1U

Follow all safety notices when you are replacing the 2145 UPS-1U battery.

Before you begin

CAUTION:

Lead-acid batteries can present a risk of electrical burn from high, short-circuit current. Avoid battery contact with metal materials; remove watches, rings, or other metal objects, and use tools with insulated handles. To avoid possible explosion, do not burn. (C004)

Use the reference numbers in parentheses at the end of each notice (for example, D005) to find the matching translated notice in *IBM System Storage SAN Volume Controller Safety Notices*.

About this task

This task assumes that you disconnected the 2145 UPS-1U battery and turned off the SAN Volume Controller . Perform the following steps to replace the 2145 UPS-1U battery:

Procedure

1. Slide the battery into the 2145 UPS-1U, as shown in Figure 243.

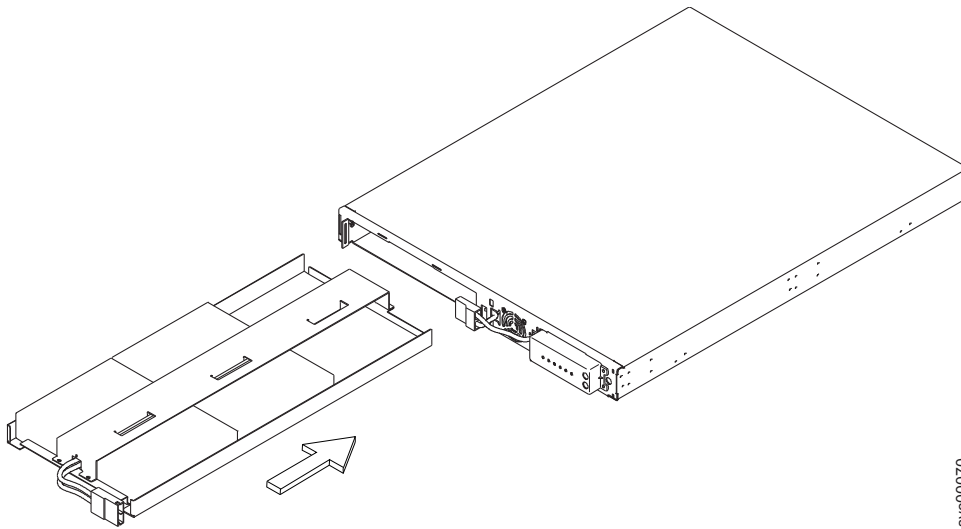


Figure 243. Replacing the 2145 UPS-1U battery

2. Thread the battery connector through the battery cover. Position the battery cover in place and slide it to the left to secure it.
3. Connect the internal battery connector, as shown in Figure 245 on page 283. Each end of the keyed connector has two wires: one red (+) and one black (-). Join the black wires and the red wires together.

Note: A small amount of arcing might occur when connecting the batteries. This is normal and does not damage the unit or present any safety concerns.

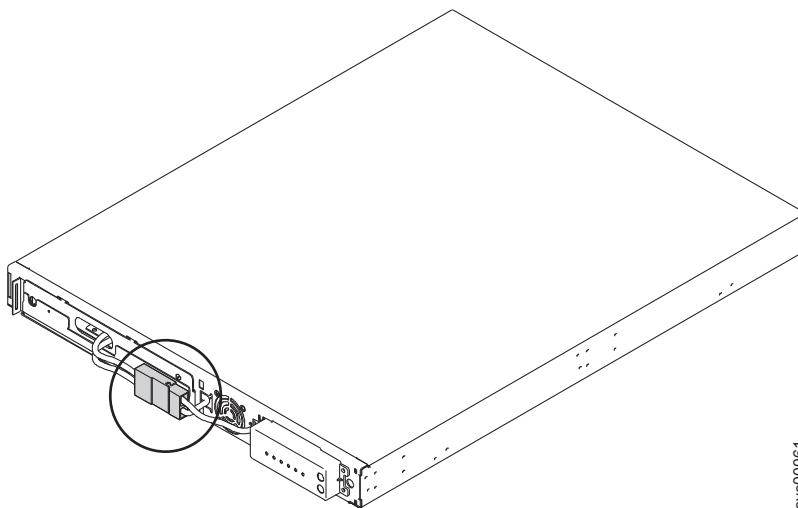


Figure 244. The 2145 UPS-1U internal-battery connector

4. Push the front panel to the right to catch on the left end of the panel. Push the front panel forward until the panel snaps into the right and middle sections of the 2145 UPS-1U, as shown in Figure 245.

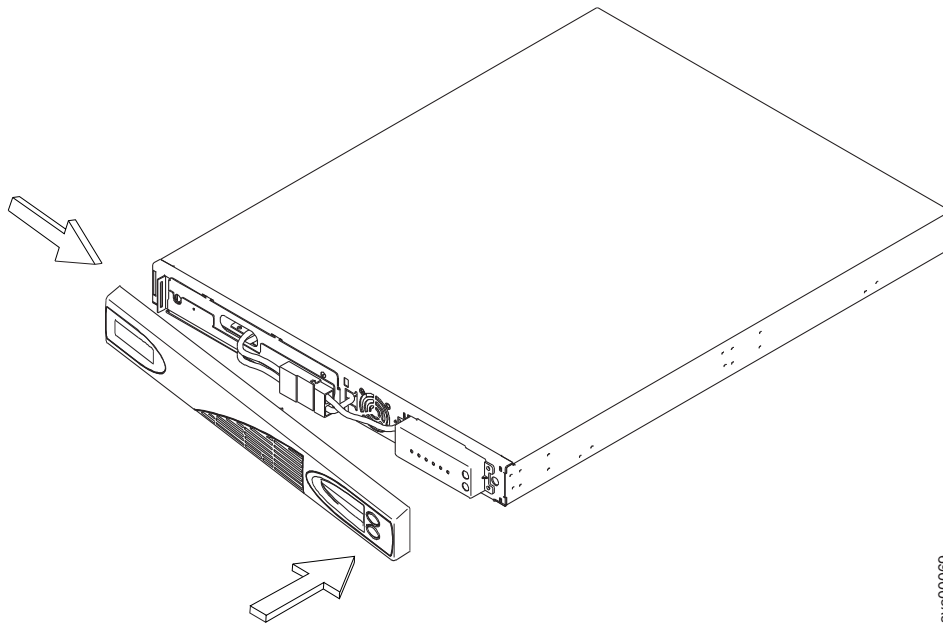


Figure 245. Replacing the 2145 UPS-1U front panel

5. Ensure that the 2145 UPS-1U is turned on. Press and hold the 2145 UPS-1U test button for 3 seconds to start the self-test. If any of the Alarm, Battery, or Overload indicators are on or the buzzer is sounding, go to MAP 5150 in the *IBM SAN Volume Controller Troubleshooting Guide* to resolve the problem.

Note: Ignore all error indicators until the self-test has been run.

6. Turn on the SAN Volume Controller .

Note: If the new battery does not have enough charge to support the actions that are required during a power failure, the SAN Volume Controller node pauses with Charging displayed on its front panel until a sufficient charge is available. If there is a sufficient charge to support the actions that are required during a single power failure but not sufficient charge to support two power failures, the node starts and joins the cluster but displays Recovering on its front panel.

Appendix. Accessibility features for the system

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

These are the major accessibility features for the system:

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen. HTML documents are tested by using JAWS version 15.0.
- This product uses standard Windows navigation keys.
- Interfaces are commonly used by screen readers.
- Keys are discernible by touch, but do not activate just by touching them.
- Industry-standard devices, ports, and connectors.
- You can attach alternative input and output devices.

The system online documentation and its related publications are accessibility-enabled. The accessibility features of the online documentation are described in [Viewing information in the information center](#)

Keyboard navigation

You can use keys or key combinations for operations and to initiate menu actions that can also be done through mouse actions. You can go to the system online documentation from the keyboard by using the keyboard shortcuts for your browser or screen-reader software. See your browser or screen-reader software Help for a list of keyboard shortcuts that it supports.

IBM and accessibility

See the IBM Human Ability and Accessibility Center for more information about the commitment that IBM has to accessibility.

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

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CAN ICES-3 (A)/NMB-3(A)

European Community and Morocco Notice

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This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

Warning: This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

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Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55032 Klasse A.

Japan Electronics and Information Technology Industries Association (JEITA) Notice

(一社) 電子情報技術産業協会 高調波電流抑制対策実施
要領に基づく定格入力電力値： Knowledge Centerの各製品の
仕様ページ参照

This statement applies to products less than or equal to 20 A per phase.

高調波電流規格 JIS C 61000-3-2 適合品

This statement applies to products greater than 20 A, single phase.

高調波電流規格 JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」対象機器（高調波発生機器）です。

- 回路分類：6（単相、P F C回路付）
- 換算係数：0

This statement applies to products greater than 20 A per phase, three-phase.

高調波電流規格 JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」対象機器（高調波発生機器）です。

- 回路分類：5（3相、P F C回路付）
- 換算係数：0

Japan Voluntary Control Council for Interference (VCCI) Notice

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磁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

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People's Republic of China Notice

声 明

此为 A 级产品,在生活环境中,
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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。

Russia Notice

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

Taiwan Notice

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。

tailemi

IBM Taiwan Contact Information:

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台北市松仁路7號3樓
電話：0800-016-888

12c00790

United States Federal Communications Commission (FCC) Notice

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 might not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.



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