

IBM SAN Volume Controller Model 2145-SV1, 2147-SV1,
2145-DH8, 2145-CG8, 2145-CF8

Hardware Maintenance Guide



Note

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

- The general information in “Notices” on page 429
- The information in the “Safety and environmental notices” on page xiii
- The information in the *IBM Environmental Notices and User Guide* (provided on a DVD)

This edition applies to version 7.8.1 of IBM SAN Volume Controller and to all subsequent modifications until otherwise indicated in new editions.

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Safety and environmental notices

Review the safety notices, environmental notices, and electronic emission notices for IBM® SAN Volume Controller 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 the SAN Volume Controller 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 SAN Volume Controller 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 using 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 SAN Volume Controller

Ensure that you understand the caution notices for SAN Volume Controller.

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 SAN Volume Controller

Ensure that you are familiar with the danger notices for SAN Volume Controller.

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

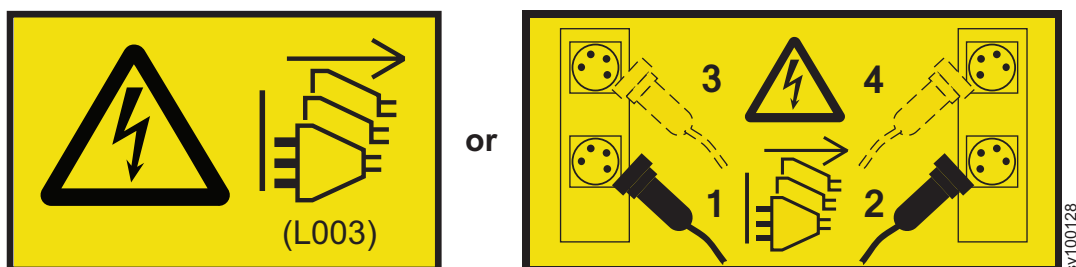
Heavy equipment—personal injury or equipment damage might result if mishandled. (D006)

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

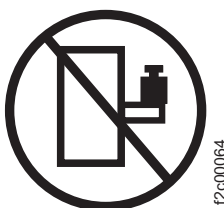
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



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 SAN Volume Controller. These notices are in addition to the standard safety notices supplied and address specific issues 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 SAN Volume Controller 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 IBM service 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 SAN Volume Controller node for unsafe conditions, use the following steps. If necessary, see any suitable safety publications.

Procedure

1. Turn off the SAN Volume Controller 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 SAN Volume Controller 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 SAN Volume Controller system to the storage area network (SAN).

Checking external devices

Ensure that you complete an external device check before you install or service SAN Volume Controller.

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 SAN Volume Controller.

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.

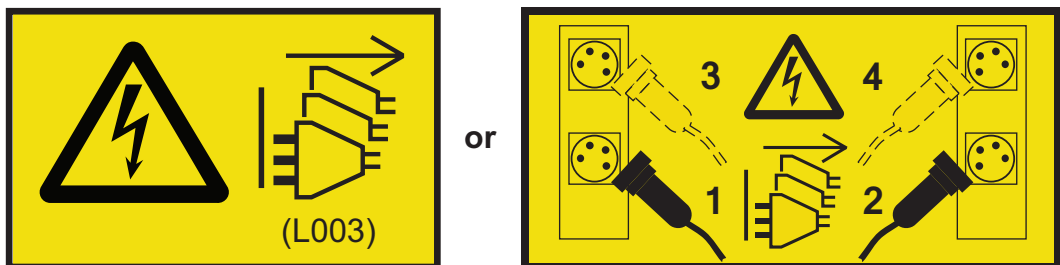
Checking the grounding of the node, uninterruptible power supply, and redundant AC-power switch

Ensure that you understand how to check the grounding of a SAN Volume Controller, the uninterruptible power supply, 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 SAN Volume Controller node, follow the steps for the SAN Volume Controller configuration that you are using. Before you start, confirm that you know the SAN Volume Controller

model type, the uninterruptible power-supply type, and whether you are using redundant AC power. Determine the location of the signal cables that are attached to the SAN Volume Controller.

Note: SAN Volume Controller 2145-DH8 and SAN Volume Controller 2145-SV1 nodes do not have an uninterruptible power supply.

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 SAN Volume Controller while it is undergoing a grounding test.

Procedure

1. Ensure that the SAN Volume Controller node is powered off. See MAP 5350: Powering off a SAN Volume Controller node in the *IBM SAN Volume Controller Troubleshooting Guide*.
2. If the uninterruptible power supply is a 2145 UPS, ensure that other SAN Volume Controller nodes that are powered from the uninterruptible power supply are powered off.
3. Use the power button to power off the uninterruptible power supply.
4. Disconnect all signal cables from the SAN Volume Controller node, which includes the following cables:
 - The Fibre Channel cables
 - The Ethernet cable or cables
 - The serial cable that is connected to the uninterruptible power supply
5. Disconnect all signal cables from the uninterruptible power supply. If the uninterruptible power supply is a 2145 UPS, there might be multiple signal cables.
6. If the uninterruptible power supply is a 2145 UPS, disconnect any power cables that are connected to SAN Volume Controller nodes, except the one that is being tested.
7. If redundant AC power is not used, disconnect the uninterruptible power-supply power cable from the site power-distribution unit.
8. If redundant AC power is used, turn off any SAN Volume Controller that is being supplied from the redundant AC-power switch. Then, remove the power cable to this system from the redundant AC-power switch.
9. Disconnect **both** input power leads from the site power distribution units
10. If redundant AC power is not used, test the grounding continuity between a conductive area on the SAN Volume Controller frame and the ground pin on the plug of the uninterruptible power-supply input-power cable.
11. If redundant AC power is used, test the grounding continuity between a conductive area on the SAN Volume Controller 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 SAN Volume Controller frame and the ground pin on the plug of the backup power cable of the redundant AC-power switch. Both tests must be successful.
12. 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, and power on any uninterruptible power-supply units and SAN Volume Controller nodes that were powered off.
 - 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 SAN Volume Controller node, from the frame to the ground pin of the input power receptacle
- b. The uninterruptible power supply from the ground pin of the input power receptacle to the ground conductor of the output power receptacle
- c. 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
- d. The SAN Volume Controller node to uninterruptible power-supply power-cable assembly, between the two ground conductors of the power cable
- e. The uninterruptible power-supply input-power cable, between the two ground conductors of the power cable
- f. The redundant AC-power switch main input-power cable, if used, between the two ground conductors of the cable
- g. 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 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 has been 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 fifteen days of receipt of the equipment.
 - b. Send a copy of the damage claim within fifteen 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 SAN Volume Controller 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 two 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 SAN Volume Controller, 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 SAN Volume Controller 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

The *IBM Systems Environmental Notices* contains all of the required environmental notices for IBM Systems products in English and other languages.

The *IBM Systems Environmental Notices* (<http://ibm.co/1fBgWFI>) 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:

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.

SAN Volume Controller library and related publications

Product manuals, other publications, and websites contain information that relates to SAN Volume Controller.

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

Unless otherwise noted, the publications in the library are available in Adobe portable document format (PDF) from a website.

ibm.com/shop/publications/order

Click **Search for publications** to find the online publications you are interested in, and then view or download the publication by clicking the appropriate item.

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 also available in the IBM Knowledge Center by clicking the number in the “Order number” column:

Table 2. SAN Volume Controller library

Title	Description	Order number
<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.	GI13-4547
<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.	GC27-2283
<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.	GC27-2284
<i>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).	GC27-2287

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

IBM Publications Center

The IBM Publications Center is a worldwide central repository for IBM product publications and marketing material.

The IBM Publications Center website offers customized search functions to help you find the publications that you need. You can view or download publications at no charge. Access the IBM Publications Center through the following website:

ibm.com/shop/publications/order

Related websites

The following websites provide information about SAN Volume Controller or 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/electronicssupport/

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 starpubs@us.ibm.com. Be sure to include the following information:

- Exact publication title and version
- Publication form number (for example, GA32-1234-00)
- 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 just want more information about IBM products, you will 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.

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 calling 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 calling 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 calling 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 calling IBM for service regarding 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 should 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 24x7 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 have taken steps to try to solve the problem yourself before you call.

Some suggestions for resolving the problem before calling 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 these pages, 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 while deploying 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 SAN Volume Controller nodes, expansion enclosures, the redundant AC-power switch, and the uninterruptible power-supply unit.

SAN Volume Controller supports several different node types. A label on the front of the node indicates the SAN Volume Controller 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 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

The following tables identify part numbers and provide 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
01EJ361	4, 8, 12, or 16	16 GB DDR4 DIMM
01EJ260	2	240GB SATA flash drive asm
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 asm
01EJ370	1	Front right ear asm
01EJ372	1	Operator information panel USB cable
01EJ373	1	Operator information panel LED and power button cable
01EJ374	1	SATA drive backplane

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

FRU part Number	Quantity	Description
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 asm
01EJ380	1	Trusted Platform Module (TPM)
01EJ381	1	Main board with tray
01EJ382	1	Microprocessor heat sink
01EJ383	2	3 slot PCIe riser asm
01EJ384	1	1 slot PCIe riser asm
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
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
01EJ817	0 - 2	Compression accelerator
39M5700	0 - 16	5m fiber cable
39M5701	0 - 16	25m fiber cable
41V2120	0 - 4	10m OM3 fiber cable
39M5068	0 or 2	Power cord, Argentina
39M5080	0 or 2	Power cord, Chicago
39M5081	0 or 2	Power cord, US/group 1
39M5102	0 or 2	Power cord, Australia/NZ
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

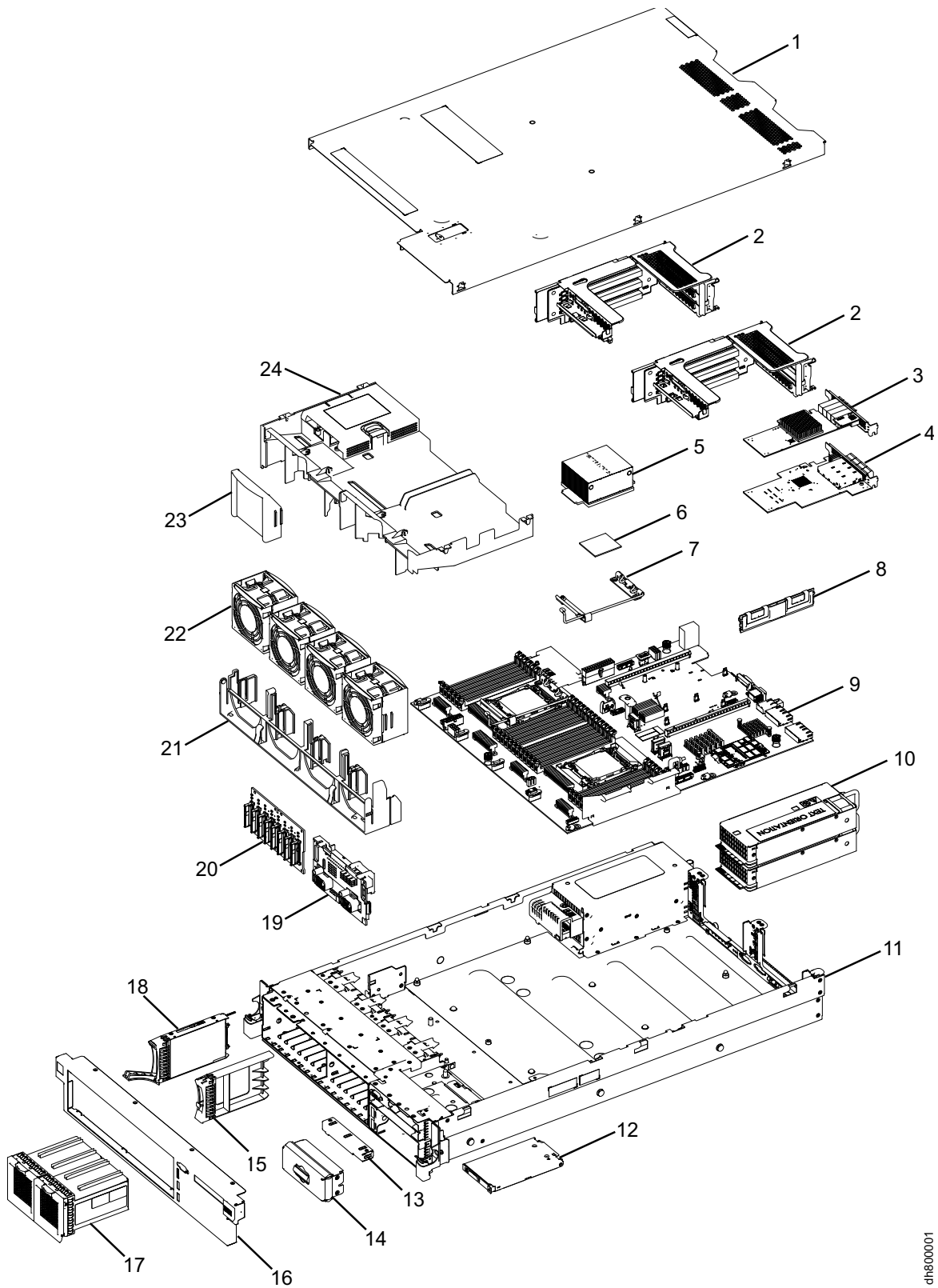
Table 5. FRUs in the SAN Volume Controller 2145-SV1 parts assembly (continued)

FRU part Number	Quantity	Description
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). There are no customer replaceable parts (CRUs).

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 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	4-port 8 Gbps Fibre Channel adapter (optional). Important: If the system is using alternative SFPs, replace the SFPs on the FRU part with the SFPs from the Fibre Channel 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 Fibre Channel adapter. Important: It is possible that SFPs other than those shipped with the product are in use on the Fibre Channel 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 Fibre Channel host bus adapter (optional). Important: If the system is using alternative SFPs, replace the SFPs on the FRU part with the SFPs from the Fibre Channel adapter that is being replaced.
	00WY983	0-4	4-port 16 Gbps Fibre Channel 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 Fibre Channel adapter that is being replaced. • Before adding this adapter, ensure 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 Fibre Channel adapter. Important: It is possible that SFPs other than those shipped with the product are in use on the Fibre Channel 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 that 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 there are two microprocessors.
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 state 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 inch.
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 inch.
	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 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 Fibre Channel cable	39M5700
25 m Fibre Channel 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 Fibre Channel 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 Fibre Channel 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

SAN Volume Controller 2145-CG8 parts

You might have to replace a SAN Volume Controller 2145-CG8 field-replaceable unit (FRU).

Figure 2 Shows how the different parts of the SAN Volume Controller 2145-CG8 are assembled.

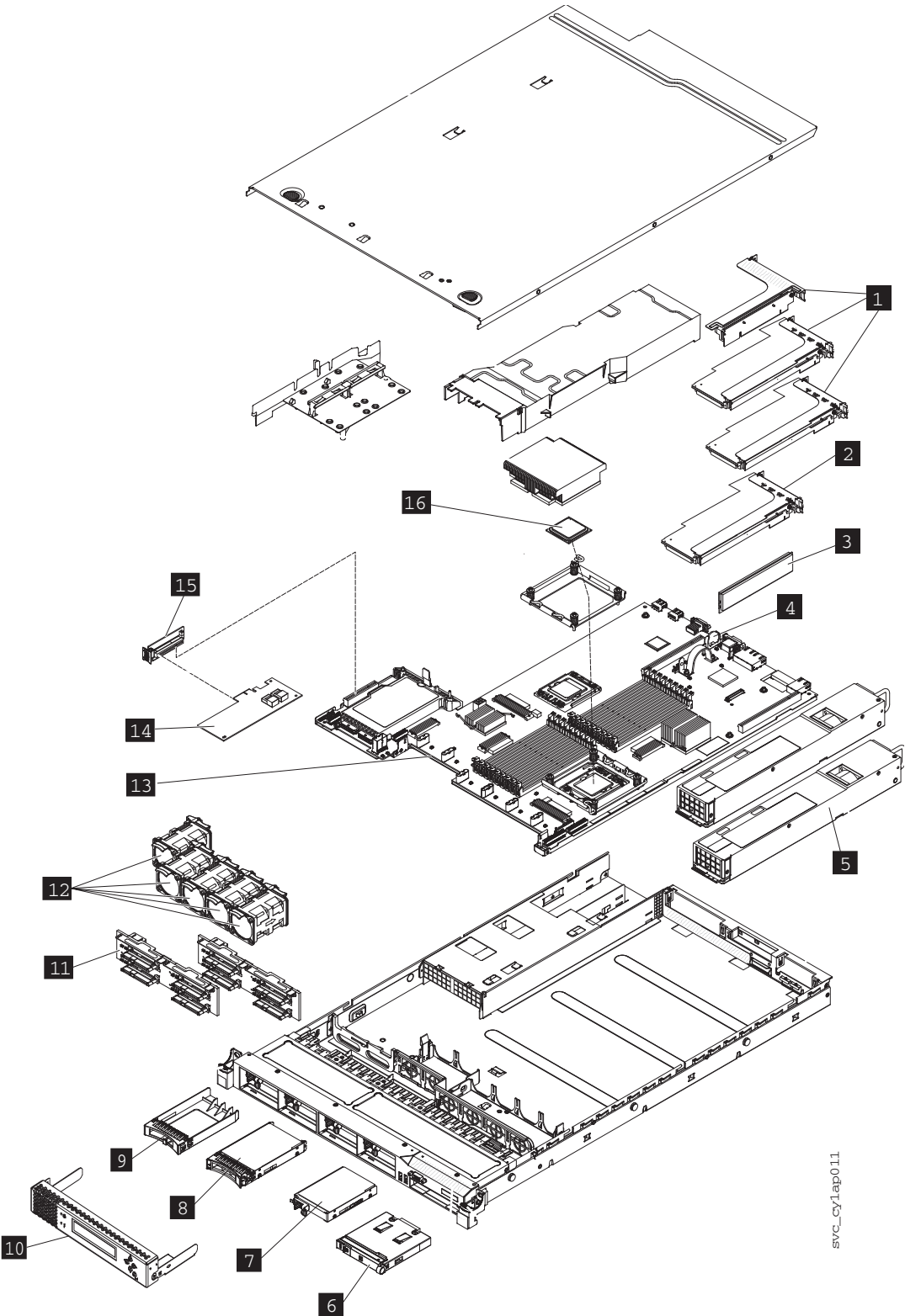


Figure 2. Parts diagram for the SAN Volume Controller 2145-CG8 model

The following tables identify part numbers and provide brief descriptions of the SAN Volume Controller 2145-CG8 parts. Use the assembly index number to locate and identify the parts that are shown in Figure 2 on page 9.

- Table 9 Calls out the FRUs that are referred to in service procedures.
- Table 10 on page 12 Calls out the FRUs that are not referred to by any SAN Volume Controller 2145-CG8 service procedure, but that might be replaced in some circumstances.
- Table 11 on page 13 calls out the FRUs for the solid-state drive (SSD) parts.
- Table 12 on page 13 Calls out the FRU parts that are required by the long-wave small-form factor pluggable (SFP) transceiver feature.

Table 9. FRUs in the SAN Volume Controller 2145-CG8 parts assembly

Assembly index	FRU part	Quantity	Description
- 1	43V7066	0-1	Empty riser card The SAN Volume Controller 2145-CG8 slot 2 connector has one of three adapters, either this one by default, or one of the optional adapters.
- 1	31P1559	0-1	Optional 10 gigabits-per-second (Gbps) Ethernet riser-card assembly An assembly that includes a 10 Gbps Ethernet adapter that provides connectivity for up to two 10 Gbps fiber optic Ethernet cables. The assembly includes a riser card, a blanking plate, and 2 M3 screws.
-	31P1549	0-2	10 Gbps Ethernet Fibre SW SFP
- 2	31P1337	1	4-port Fibre Channel adapter The Fibre Channel host bus adapter (HBA) assembly connects the SAN Volume Controller 2145-CG8 to the Fibre Channel fabric. It is required to be present in PCI slot 1. A second adapter is available as an optional feature for PCI slot 2. The adapter assembly includes the Fibre Channel PCI Express adapter, four shortwave SFPs, the riser card, and the bracket. Important: If the system is using alternative SFPs, replace the SFPs on the FRU part with the SFPs from the Fibre Channel adapter that is being replaced.
-	31P1338	0-4	Shortwave SFP The small form-factor pluggable (SFP) transceiver provides an auto-negotiating 2, 4, or 8 Gbps shortwave optical connection on the 4-port Fibre Channel adapter. Note: This is a non-ROHS compliant part. Use part 31P1338 unless the system is in a country which requires ROHS compliant parts, in which case, use part 31P1630. Important: It is possible that SFPs other than those shipped with the product are in use on the Fibre Channel 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.

Table 9. FRUs in the SAN Volume Controller 2145-CG8 parts assembly (continued)

Assembly index	FRU part	Quantity	Description
-	31P1630	0-4	<p>Shortwave SFP</p> <p>The small form-factor pluggable (SFP) transceiver provides an auto-negotiating 2, 4, or 8 Gbps shortwave optical connection on the 4-port Fibre Channel adapter.</p> <p>Note: This is an ROHS compliant SFP. Use part 31P1338 unless the system is in a country which requires ROHS compliant parts, in which case, use part 31P1630.</p> <p>Important: It is possible that SFPs other than those shipped with the product are in use on the Fibre Channel 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.</p>
- 3	49Y1446	3	<p>Memory module</p> <p>8 GB 2Rx4 2 Gbit DDR3 1333 MHz ECC LP RDIMM</p>
- 4	33F8354	1	<p>CMOS battery</p> <p>3.0 volt battery on the system board that maintains power to back up system BIOS settings.</p>
- 5	39Y7236	2	<p>Power supply unit</p> <p>675 Watt ac</p>
-	31P1294	1	<p>Power cable assembly</p> <p>The cable assembly connects the SAN Volume Controller and the 2145 UPS-1U. The assembly consists of 2 power cables bundled with a serial cable.</p>
- 6	44E4372	1	<p>Operator-information panel</p> <p>This assembly includes the information panel that contains the power-control button and diagnostic LEDs.</p>
- 7	42D0673	1	<p>Disk drive</p> <p>The serial-attached SCSI (SAS) 2.5 inch disk drive, when ordered as a replacement, can be a supported compatible drive of at least the same capacity as the one being replaced.</p>
- 9	44T2248	2-6	Drive bay blank EMC filler assembly
- 10	31P1557	1	<p>Service controller</p> <p>The service controller includes the front-panel display, buttons, and associated electronics.</p>
-	31P1540	1	<p>Service controller cable</p> <p>The USB cable is used to connect the service controller to the system board.</p>
- 11	59Y3915	2	<p>Disk backplane</p> <p>Hot-swap SAS 2.5 inch disk-drive backplane</p>
-	59Y3918	1	<p>Disk signal cable</p> <p>200 mm SAS disk signal cable for the 2.5 inch SAS system disk. This is a Y cable; one end connects to the system board and the other two ends connect to the two drive backplanes.</p>

Table 9. FRUs in the SAN Volume Controller 2145-CG8 parts assembly (continued)

Assembly index	FRU part	Quantity	Description
-	59Y3920	1	Disk power cable Power cable for the 2.5 inch SAS system disk. This is a Y cable; one end connects to system board and the other two ends connect to the two drive backplanes.
-	59Y3461	1	Backplane control cable
- 12	43V6929	6	Fan assembly The fan assembly is used in each of the six fan positions.
- 13	000D3284	1	System board The system board is also called the <i>planar</i> . Important: This part is the system board only. When replaced, you must also have alcohol wipes and thermal grease.
- 14	46M0861	1	Disk controller SAS controller for the SAS 2.5 inch disk drive that does not include the riser card.
- 15	43V7067	1	Disk controller riser card with USB connector Riser card that connects the disk controller to the system board and provides the USB port to which the service controller cable connects.
- 16	49Y7052	0 - 1	Microprocessor E5630 2.53 GHz 4-core microprocessor 80 W Important: This part is the microprocessor only. A 4-core processor must be replaced with a 4-core FRU part. When replaced, you must also have alcohol wipes and thermal grease.
- 16	69Y4714	0 - 1	Microprocessor Intel® Xeon® Processor E5645 6-core 2.4 GHz 12 MB 5.86 GT/s QPI 80 W Important: This part is the microprocessor only. A 6-core processor must be replaced with a 6-core FRU part. When replaced, you must also have alcohol wipes and thermal grease.

Table 10. FRUs to which SAN Volume Controller 2145-CG8 service procedures do not refer

Description	Part number	Quantity
Node cable retention bracket	31P1402	2
Thermal grease	41Y9292	1
Heat sink	49Y4820	1
Alcohol wipes	59P4739	1
Top cover	59Y3790	1
Air baffle kit (microprocessor and memory)	59Y3779	1
Support rails	69Y4391	1
Cable management arm assembly	69Y4392	1

Table 11. FRU parts for the flash drive features

Description	Part number	Quantity	Feature Code
High-speed SAS adapter An assembly that includes a high-speed SAS adapter that provides connectivity for up to four flash drives. The assembly includes a riser card, a blanking plate, and two M3 screws.	31P1340	1	4500
High-speed SAS cable This cable connects the high-speed SAS adapter to the disk backplane.	41Y3884	1	
164 GB Flash drive	31P1342	1 - 4	4601
200 GB Flash drive	31P1611	1 - 4	4602
400 GB Flash drive	31P1609	1 - 4	4604

Table 12. FRU parts for the long-wave small form-factor pluggable (SFP) transceiver feature

Description	Part number	Quantity	Feature Code
Long-wave SFP transceiver FRU Important: It is possible that an SFP transceiver other than those shipped with the product is in use on the Fibre Channel host bus adapter. It is a customer responsibility to obtain replacement parts for such an SFP transceiver. The FRU part number is shown as "Non standard - supplied by customer" in the vital product data.	31P1658	1 - 4	5608

SAN Volume Controller 2145-CF8 parts

You might have to replace a SAN Volume Controller 2145-CF8 field-replaceable unit (FRU).

Figure 3 on page 14 shows how the different parts of the SAN Volume Controller 2145-CF8 are assembled.

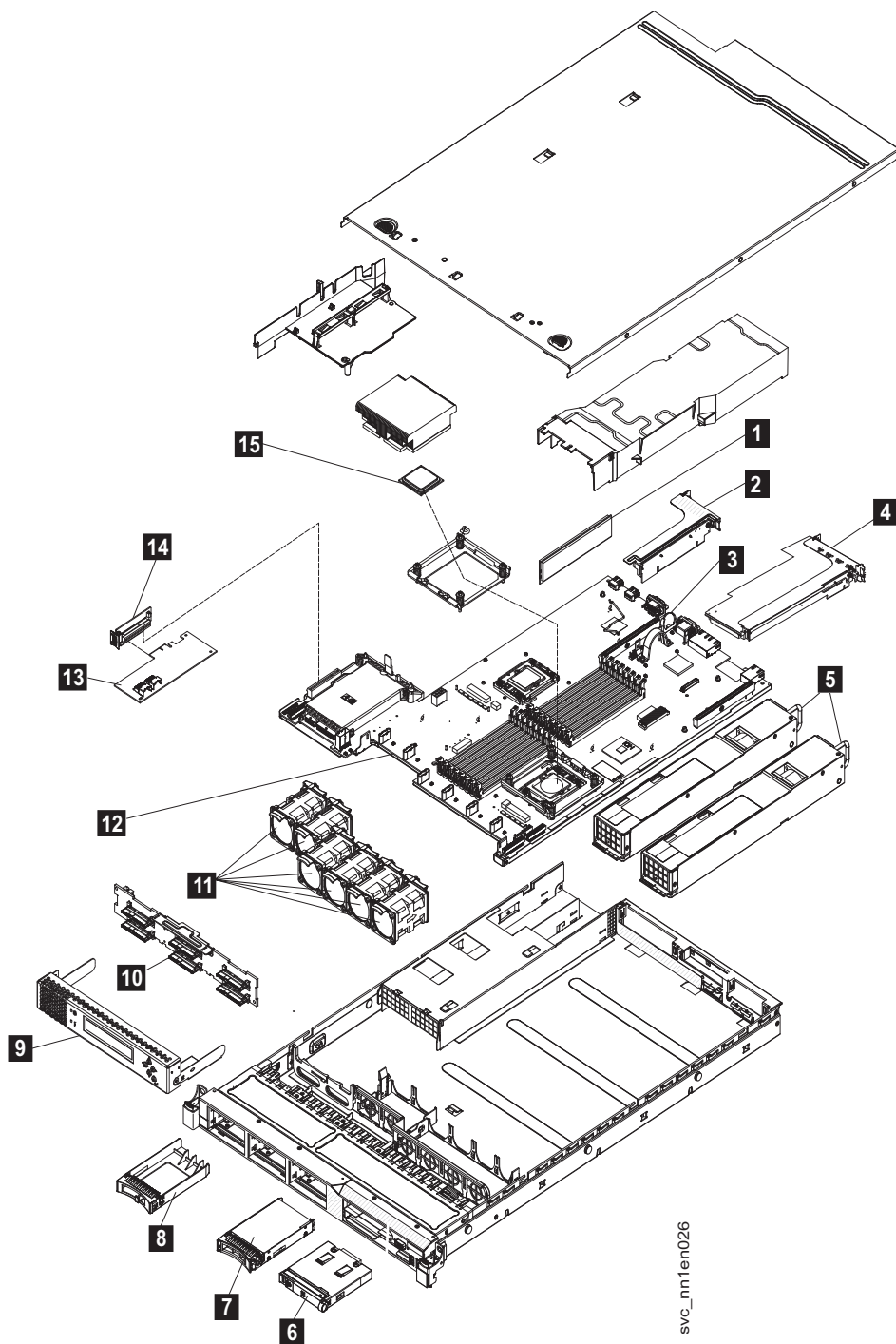


Figure 3. Exploded view of the SAN Volume Controller 2145-CF8 node

The following tables identify part numbers and provide brief descriptions of the SAN Volume Controller 2145-CF8 parts. Use the assembly index number to locate and identify the parts that are shown in Figure 3.

- Table 13 on page 15 calls out the FRUs that are referred to in service procedures.
- Table 14 on page 17 calls out the FRUs that are not referred to by any SAN Volume Controller 2145-CF8 service procedure, but that might be replaced in some circumstances.
- Table 15 on page 17 lists the FRUs that are related to the optional flash drive features.

- Table 16 on page 17 calls out the FRU parts that are required by the long-wave small-form factor pluggable (SFP) transceiver feature.

Table 13. FRUs in the SAN Volume Controller 2145-CF8 parts assembly

Assembly index	Part number	Units	Description
-1	44T1493	6	Memory module 4 GB memory module, DDR3-1333 2RX4 LP RDIMM
-2	31P1340	1	Optional: high-speed SAS adapter An assembly that includes a high-speed SAS adapter that provides connectivity for up to four flash drives, a riser card, a blanking plate, and screws.
-3	33F8354	1	CMOS battery 3.0 volt battery on the system board that maintains power to back up system BIOS settings.
-4	31P1337	1	4-port Fibre Channel adapter A Fibre Channel host bus adapter (HBA) assembly that connects the SVC CF8 to the Fibre Channel fabric. It is located in PCI slot 1. The adapter assembly includes the Fibre Channel PCI Express adapter, four short-wave small form-factor pluggable (SFP) transceivers, the riser card, and the bracket. Note: If the system is using alternative SFP transceivers, replace the SFP transceivers on the FRU part with the SFP transceivers from the Fibre Channel adapter that is being replaced.
-5	39Y7201	2	Power supply unit Ac power supply, 675 Watt
-6	44E4372	1	Operator-information panel This assembly includes the information panel that contains the power-control button and diagnostics LEDs.
-7	42D0673	1	Disk drive The serial-attached SCSI (SAS) 2.5 inch disk drive, which, when ordered as a replacement, might be a supported compatible drive of at least the same capacity as the one being replaced.
-8	44T2248	4	Drive bay blank EMC filler assembly
-9	31P1339	1	Service controller The service controller includes the front-panel display, buttons, and associated electronics.
-10	43V7071	1	Disk backplane Hot-swap SAS 2.5" disk-drive backplane
-11	43V6929	6	Fan assembly The fan assembly is used in each of the six fan positions.
-12	43V7072	1	System board The system board is also called the <i>planar</i> . Note: This part is the system board only. When replaced, you must also have alcohol wipes and thermal grease.

Table 13. FRUs in the SAN Volume Controller 2145-CF8 parts assembly (continued)

Assembly index	Part number	Units	Description
-13	44E8690	1	Disk controller SAS controller for the SAS 2.5 inch disk drive that also includes the riser card.
-14	43V7067	1	Disk controller / USB riser card Riser card that connects the disk controller to the system board and provides the USB port to which the service controller cable connects.
-15	46D1266	1	Microprocessor 2.40 GHz Quad-core microprocessor Note: This part is the microprocessor only. When replaced, you must also have alcohol wipes and thermal grease.
-	31P1338	4	Short-wave SFP transceivers Small form-factor pluggable (SFP) Fibre Channel transceiver that provides an auto-negotiating 2, 4, or 8 gigabits-per-second short-wave optical connection on the 4-port Fibre Channel adapter. Note: It is possible that SFP transceivers other than those shipped with the product are in use on the Fibre Channel host bus adapter. It is a customer responsibility to obtain replacement parts for such SFP transceivers. The FRU part number is shown as "Non standard - supplied by customer" in the vital product data.
-	31P1206	1	Service controller cable The USB cable used to connect the service controller to the system board.
-	43V6922	1	Disk signal cable 200 mm SAS disk signal cable
-	46C4148	1	Disk power cable SAS disk power cable
-	31P1294	1	Power cable assembly The cable assembly that connects the SAN Volume Controller and the 2145 UPS-1U. The assembly consists of two power cables bundled with a serial cable.
-	49Y4817	1	Cable-management arm
-	46C4139	1	Operator information panel cable Cable that connects the operator information panel to the system board
-	41Y9292	-	Thermal grease Grease that helps provide a thermal seal between the processor and the heat sink
-	59P4739	-	Alcohol wipe Cleaning wipe

Table 14. FRUs to which SAN Volume Controller 2145-CF8 service procedures do not refer

Description	Part number	Quantity
Top cover	43V6933	1
Front panel moulding that surrounds the operator information panel	49Y4818	1
Air baffle kit (microprocessor and memory)	43V6931	1
Heat sink	49Y4820	1
Base chassis	49Y4813	1
Rail kit used to install the node in a rack	49Y4816	1
Cable management arm assembly	49Y4817	1
Cable retention bracket	31P1243	1
Front panel USB cable	43V6920	1
Front bezel assembly	49Y4818	1
DVD drive bay filler	49Y4824	1
240VA safety cover	49Y4823	1
HDD I2C signal cable	43V7023	1

Table 15. FRU parts for the flash drive features

Description	Part number	Quantity	Feature Code
High-speed SAS adapter An assembly that includes a high-speed SAS adapter that provides connectivity for up to four flash drive. The assembly includes a riser card, a blanking plate, and two M3 screws.	31P1340	1	4500
High-speed SAS cable This cable connects the high-speed SAS adapter to the disk backplane.	41Y3884	1	
146 GB Flash drive	31P1342	1 to 4	4601

Table 16. FRU parts for the long-wave small form-factor pluggable (SFP) transceiver feature

Description	Part number	Quantity	Feature Code
Long-wave SFP transceiver FRU Long-wave SFP transceiver that provides an auto-negotiating 2, 4, or 8 gigabits-per-second 10 kilometer (km) long-wave optical connection on the 4-port Fibre Channel adapter. Note: It is possible that SFP transceiver other than those shipped with the product are in use on the Fibre Channel host bus adapter. It is a customer responsibility to obtain replacement parts for such SFP transceiver. The FRU part number is shown as “Non standard - supplied by customer” in the vital product data.	31P1345	1 to 4	5608

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 SAN Volume Controller 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 4 shows the redundant AC-power switch.

Table 17 lists the part numbers for the redundant AC-power switch.



Figure 4. View of the redundant AC-power switch FRU

Table 17. 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 SAN Volume Controller nodes, expansion controllers, redundant AC-power switch, and uninterruptible power supply.

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.

Remove or replace parts only when you are directed to do so by the *IBM SAN Volume Controller Troubleshooting Guide*.

Start all problem determination and repair procedures with MAP 5000.

Enabling concurrent maintenance

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

While one SAN Volume Controller 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 SAN Volume Controller node while the SAN and host systems are powered on and doing productive work.

Attention: Do not remove the power from both SAN Volume Controller 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 node that you might need to shut down or delete from the system 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 shutting 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 will help 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 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 SAN Volume Controller, redundant AC-power switch, and uninterruptible power supply.

Working inside the node with the power on

When you are servicing the SAN Volume Controller 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 SAN Volume Controller parts

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

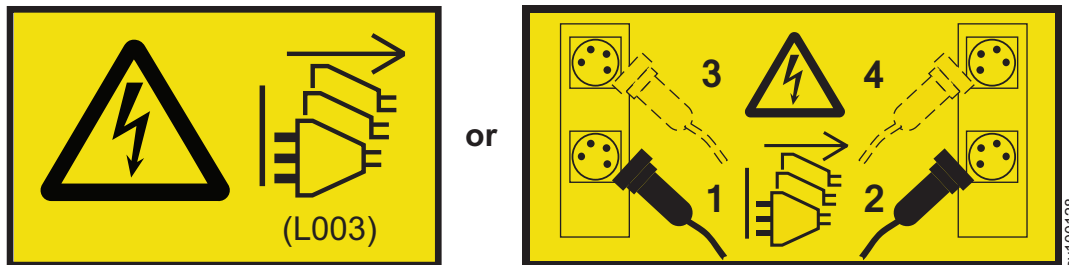
Turning off the SAN Volume Controller node

When instructed to do so, shut down and turn off the SAN Volume Controller 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 SAN Volume Controller 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 SAN Volume Controller.
- Shut down the SAN Volume Controller 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.

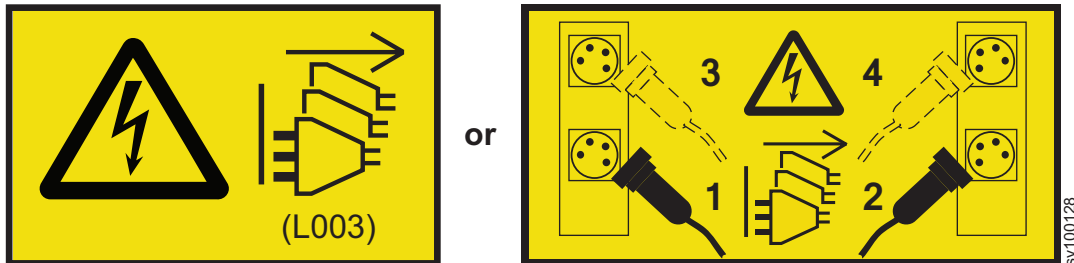
Removing the cable-management arm: 2145-SV1

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 5.
 - 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**).

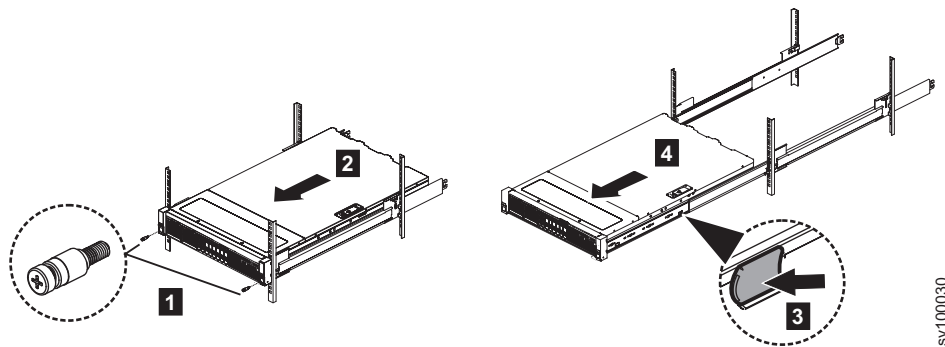


Figure 5. Sliding the node out of the rack and removing the front screws

3. Release the outer member, as shown in Figure 6 on page 23.
 - a. Press the “Push” button (**1**).
 - b. Pull out the plug-in part of the cable-management arm to draw it out (**2**).

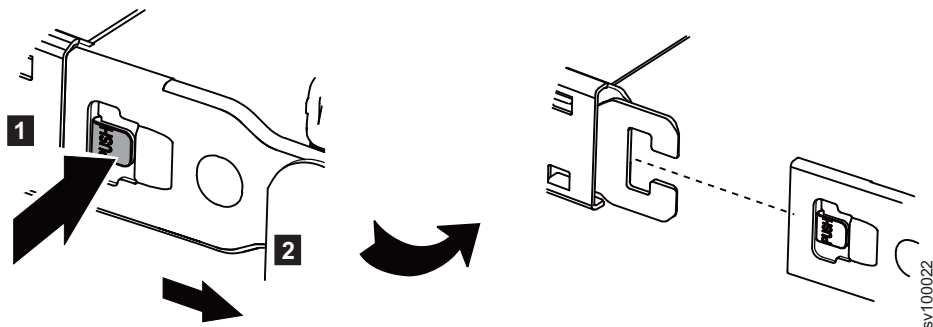


Figure 6. Releasing the outer member of the cable-management arm

4. Release the outer member, as shown in Figure 7.
 - 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**).

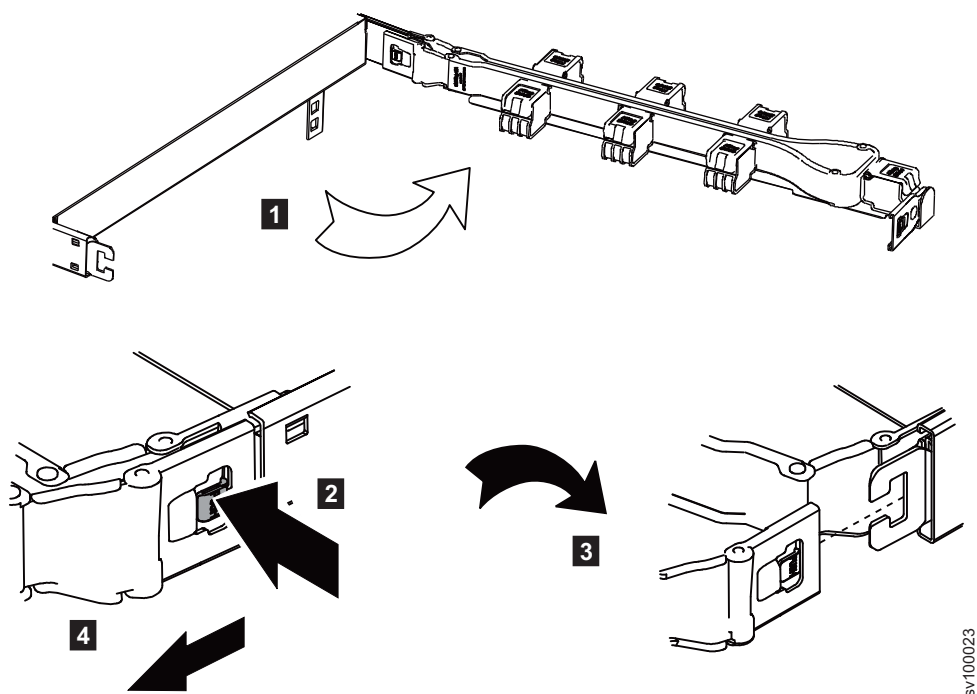


Figure 7. Removing the outer member of the cable-management arm

5. Release the inner member, as shown in Figure 8 on page 24.
 - a. Press the “Push” button (**1**).
 - b. Draw out the plug-in part of the cable-management arm (**2**).

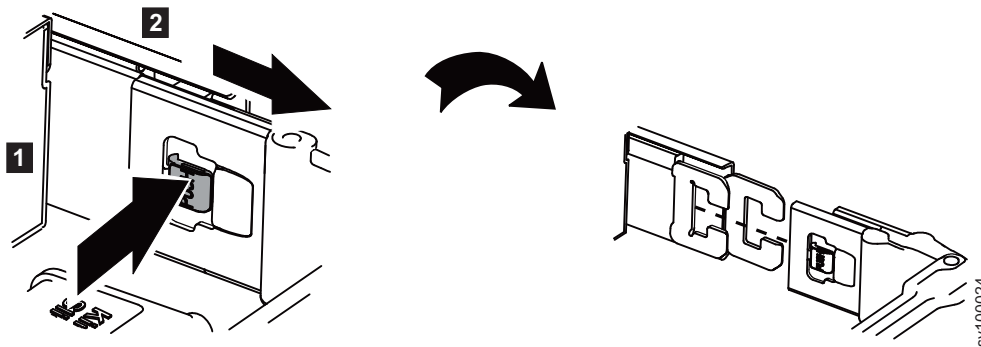


Figure 8. Releasing the inner member of the cable-management arm

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 9 on page 25.
 - a. Loosen and remove the front M6 screws. **2**
 - b. Press the release latches **1**.

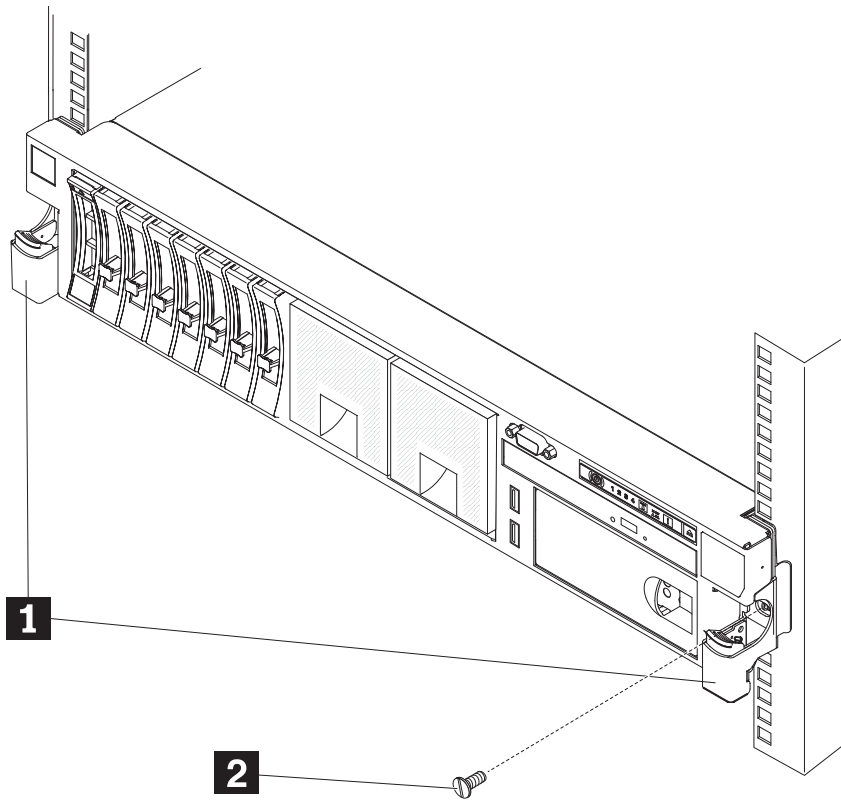


Figure 9. Sliding the node out of the rack and removing the front screws

3. Detach the hook-and-loop fastener strap, as shown in Figure 10.

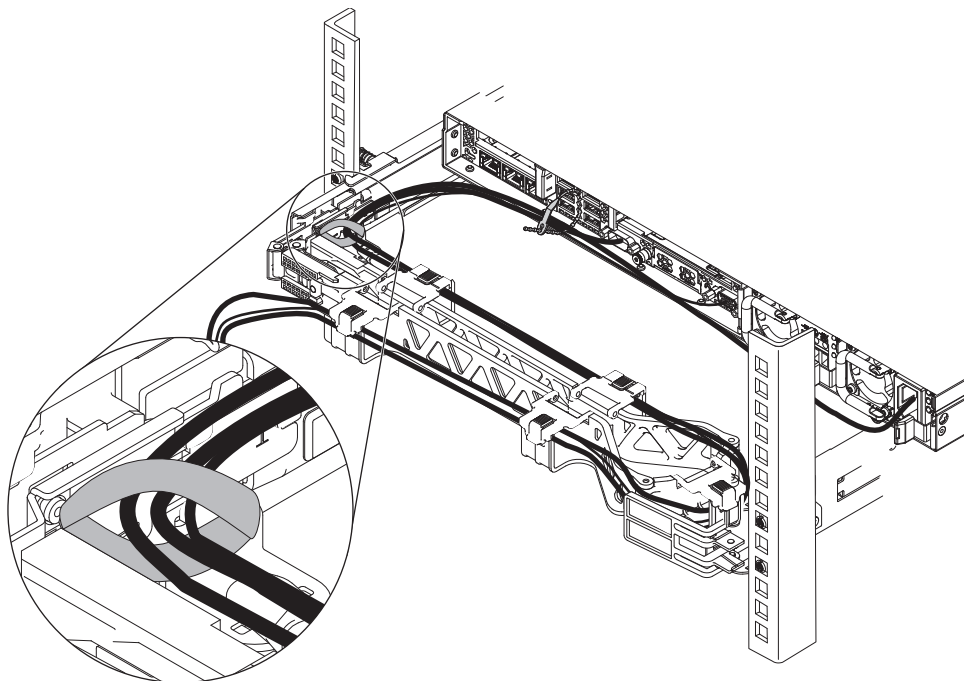


Figure 10. Detaching the hook-and-loop fastener strap

4. Disconnect the routed cables, as shown in Figure 11 on page 26.

- 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.

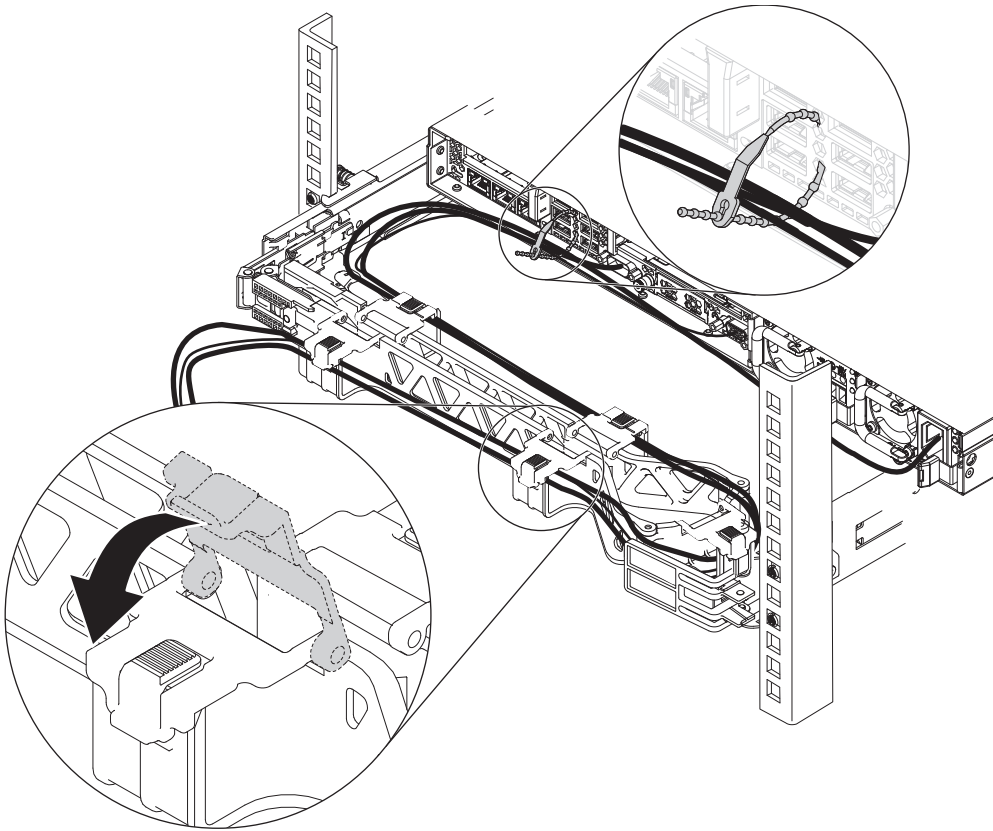


Figure 11. Disconnecting the cables and ties

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

5. Open the cable-management support stop, as shown in Figure 12 on page 27.
 - a. Push the tabs above and below the cable-management support stop bracket to open it.
 - b. Close the stop bracket.

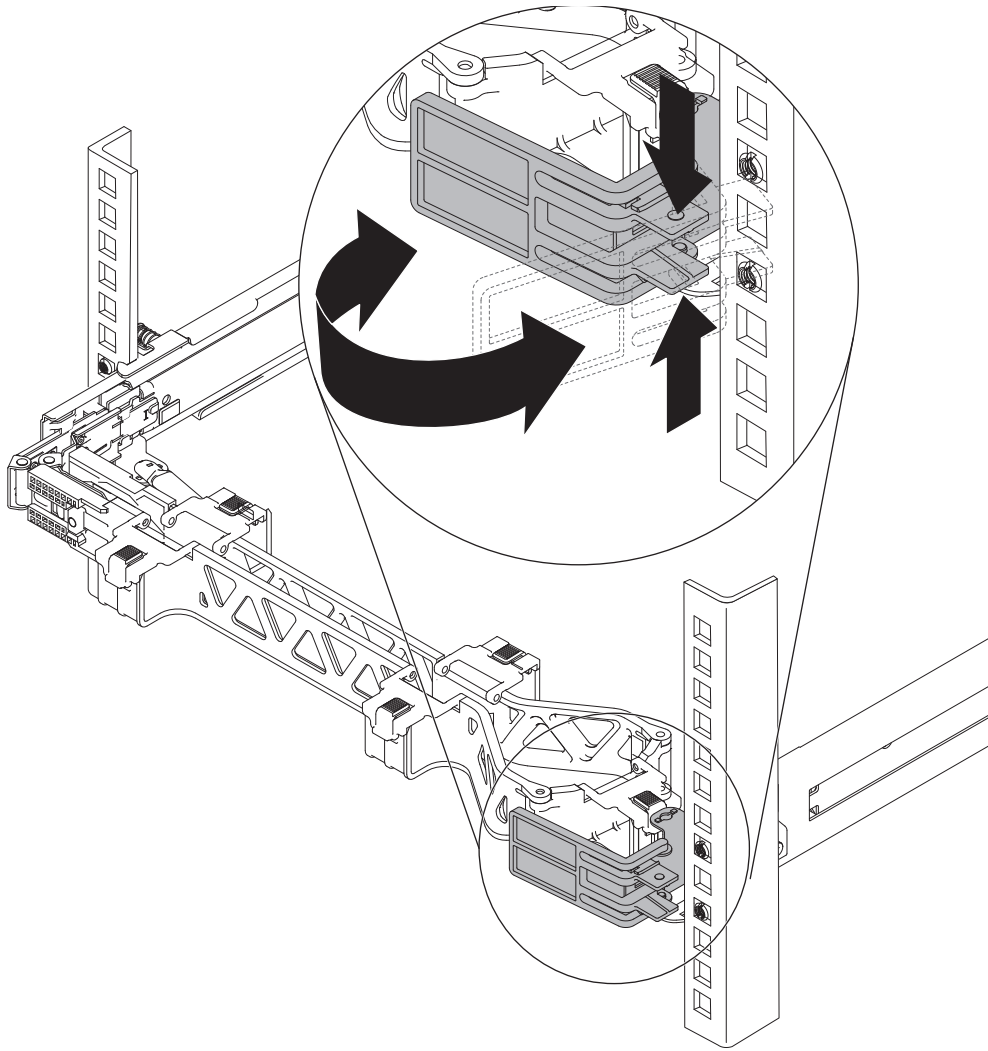


Figure 12. Opening the cable-management support stop

6. Remove the cable-management arm stop bracket, as shown by Figure 13 on page 28.
 - 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.

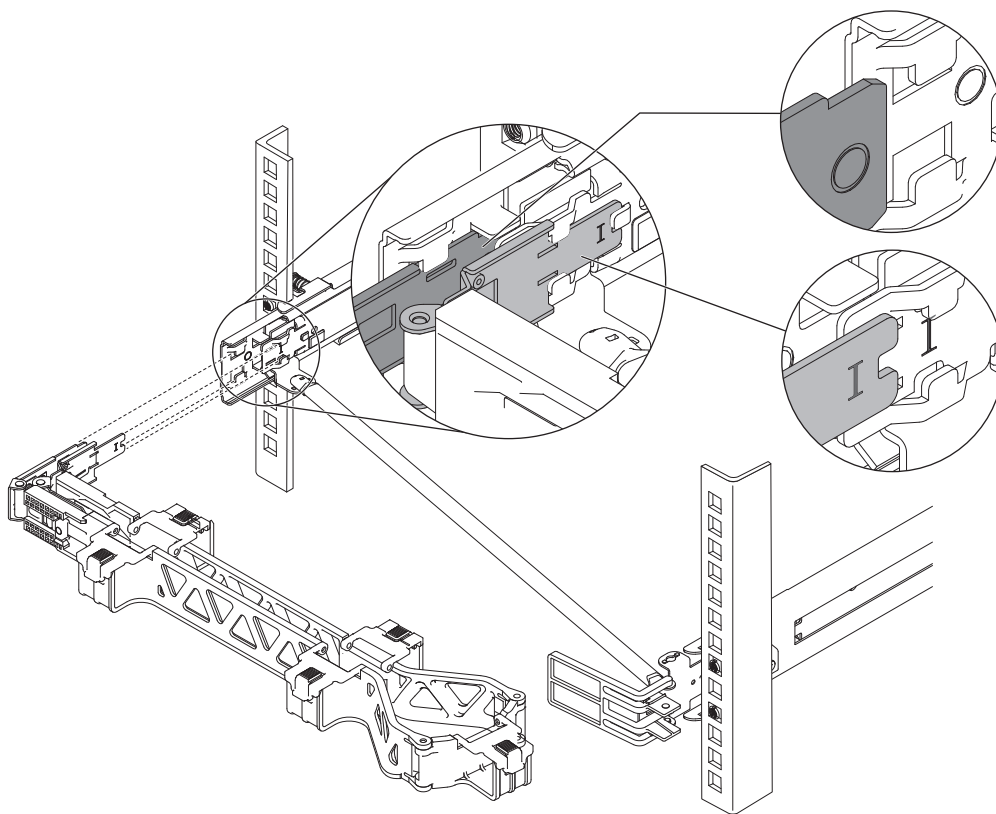


Figure 13. Removing the cable-management arm stop bracket

7. Disconnect the stop bracket from the slide rail, as shown in Figure 14 on page 29 and remove the cable-management stop bracket.

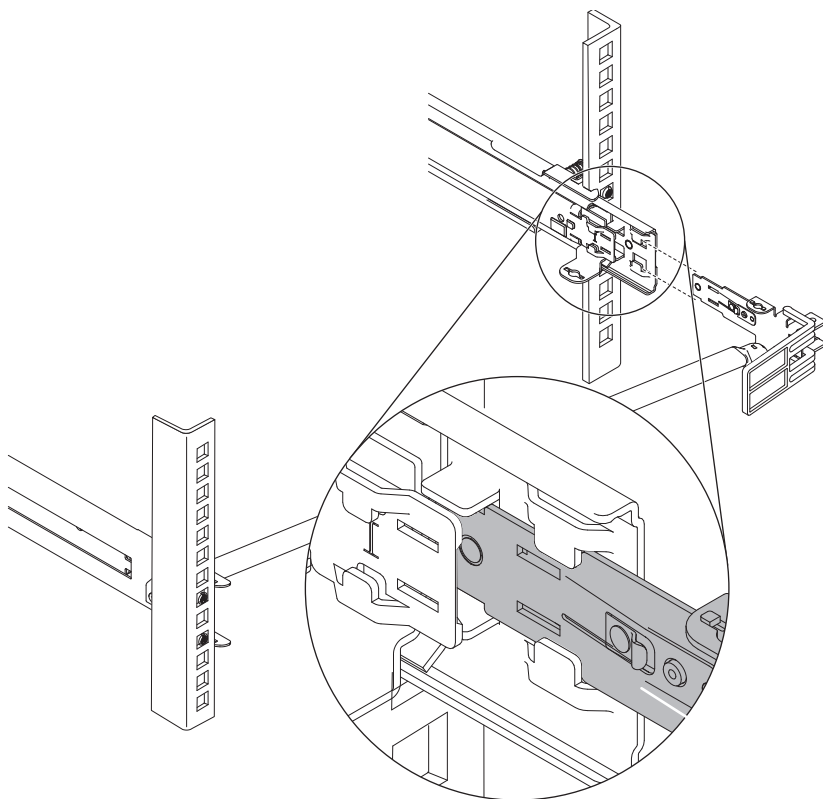


Figure 14. Disconnecting the stop bracket from the slide rail

8. Disconnect the other end of the support arm from the stop bracket, as shown in Figure 15.

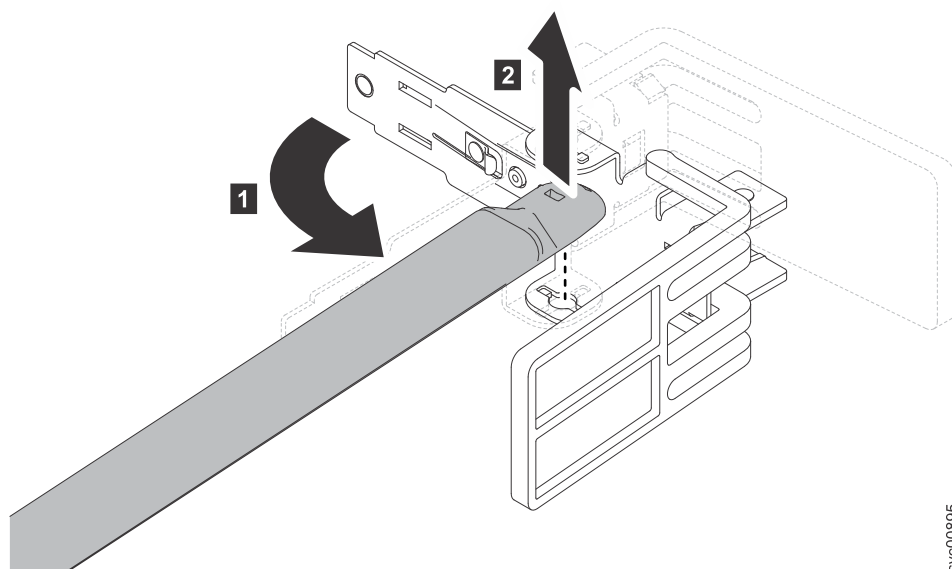
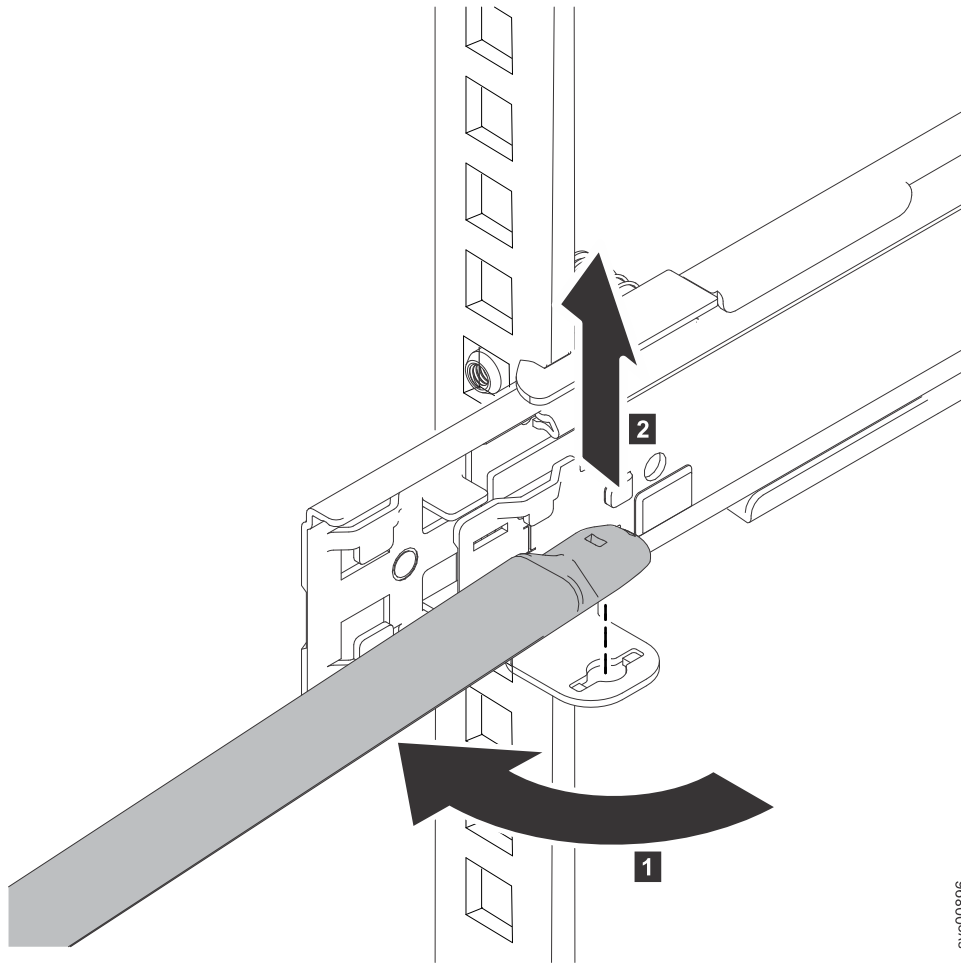


Figure 15. Disconnecting the cable-management support arm from the stop bracket

9. Remove the cable-management arm on the left-rear side of the node, as shown in Figure 16 on page 30.
 - 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.



svc00896

Figure 16. Removing the cable-management arm

Removing the cable-management arm: 2145-CG8 or 2145-CF8

You can remove the cable-management arm that routes and secures the power cables and other cables.

About this task

Figure 17 on page 31 shows the items that you need to install the SAN Volume Controller 2145-CG8 or 2145-CF8 node in a rack.

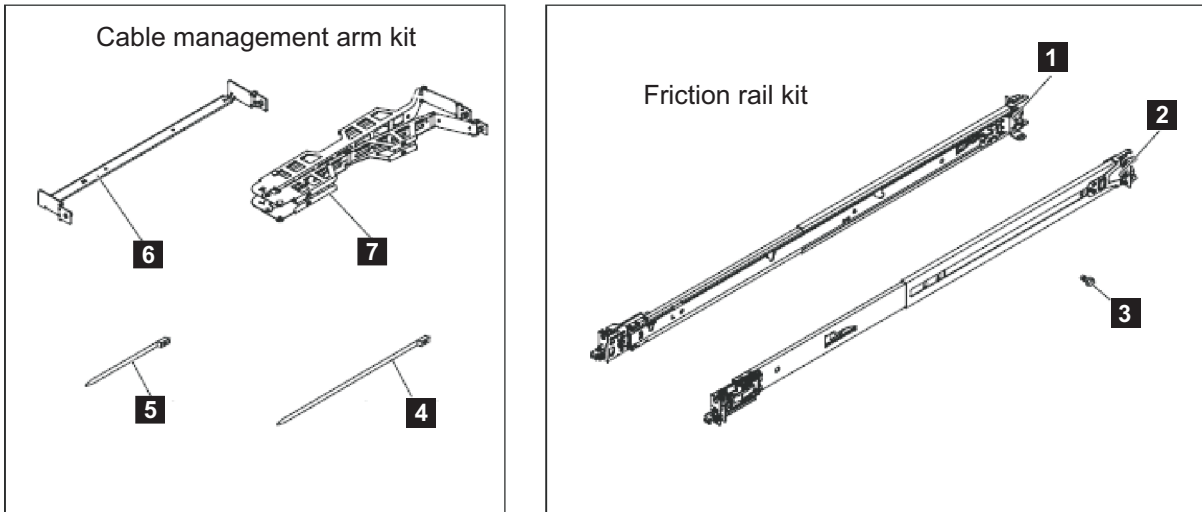


Figure 17. The cable-management arm, support rails, and associated parts of the 2145-CG8 or 2145-CF8

Table 18 shows the items as marked in Figure 17 and the quantities.

Table 18. Cable-management arm and associated parts descriptions and quantities

Reference	Description	Quantity
1	Slide rail (left)	1
2	Slide rail (right)	1
3	M6 screws	4
4	Large cable tie	1
5	Cable ties	5
6	Cable-management support arm	1
7	Cable-management arm assembly	1

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

Procedure

1. Remove all power from the node, as described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
2. Disconnect all cables from the back of the node.
3. Slide the node away from the back of the rack.
 - a. Remove any optional M6 screws, as shown by **1** in Figure 18 on page 32, from the front of the node.
 - b. To release the node from the rack, press the orange release latches **2** and slide the node forward until it latches in the service position.

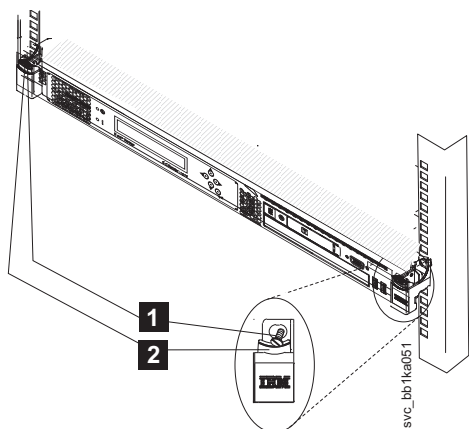


Figure 18. Release latches and mounting screws of the SAN Volume Controller 2145-CG8 or 2145-CF8

4. Disconnect the power cords and other cables from the cable-management arm.
 - a. Remove the cable ties or hook-and-loop fasteners.
 - b. Free the cables and power cords from the cable-management arm, as shown by **1** in Figure 19.

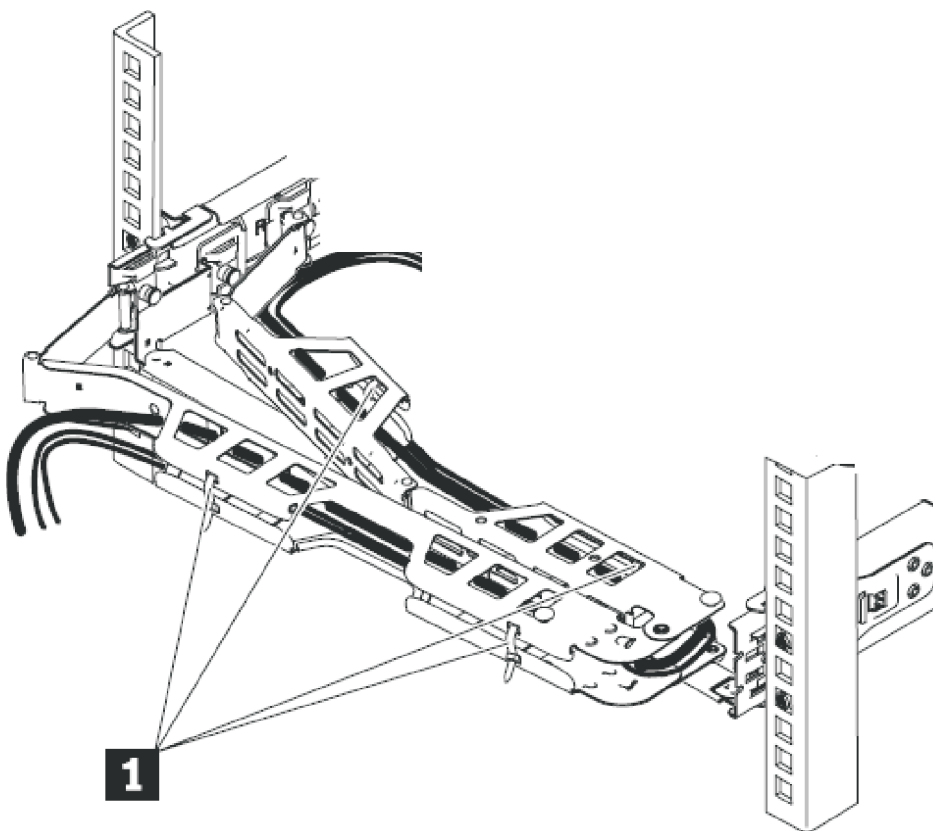


Figure 19. Removing the cables from the cable-management arm

5. Remove the cable-management arm from the support arm.
 - a. Remove the cable-management arm by pulling out both cable-management-arm pins while sliding the tabs out of the mounting location, as shown in Figure 20 on page 33.
 - b. Pull each cable-management-arm tab until it is free from the slide rail.

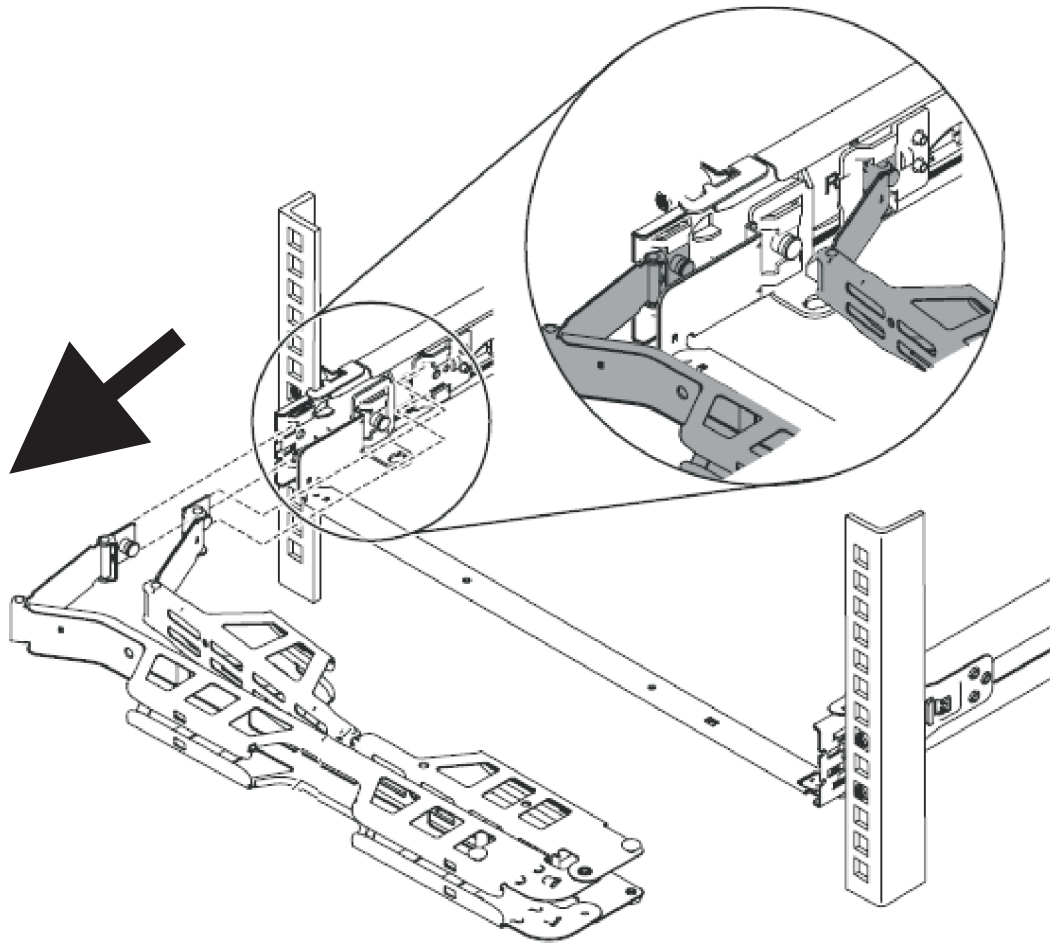


Figure 20. Removing the cable-management arm

6. At the rear of the rack, remove the cable-management-support arm.
Pull the pin and remove each end of the cable-management-support arm from the slide rail, as shown by Figure 21 on page 34.

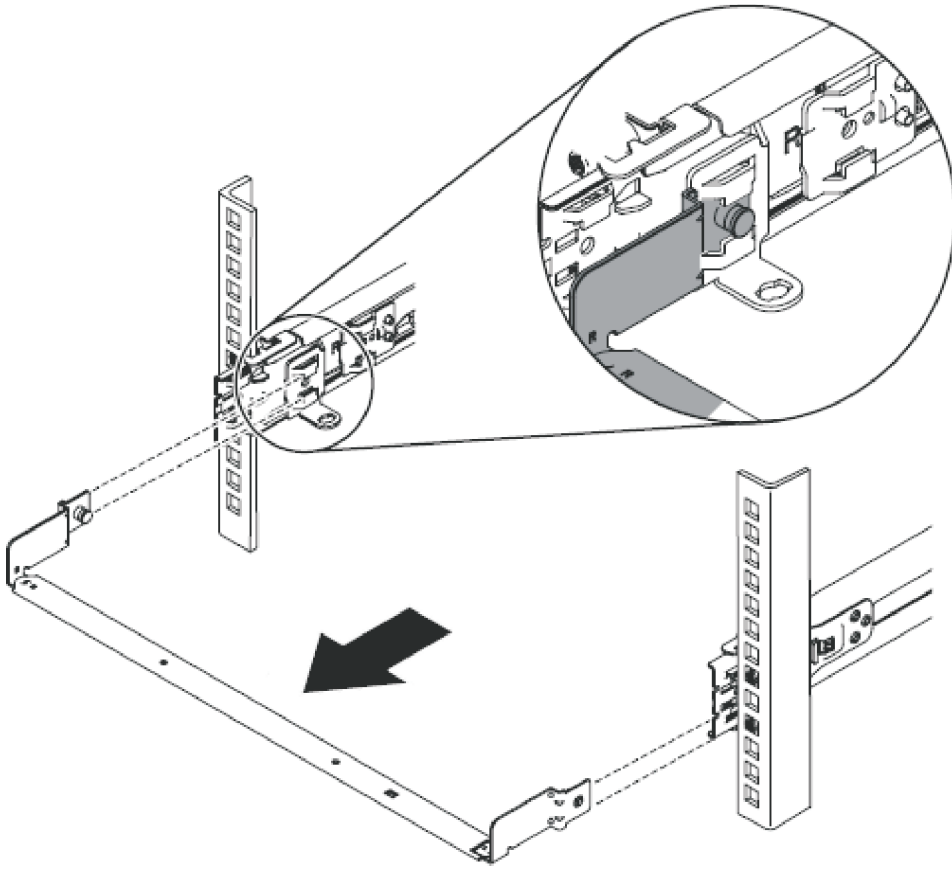


Figure 21. Removing the cable-management-support arm

Replacing the cable-management arm

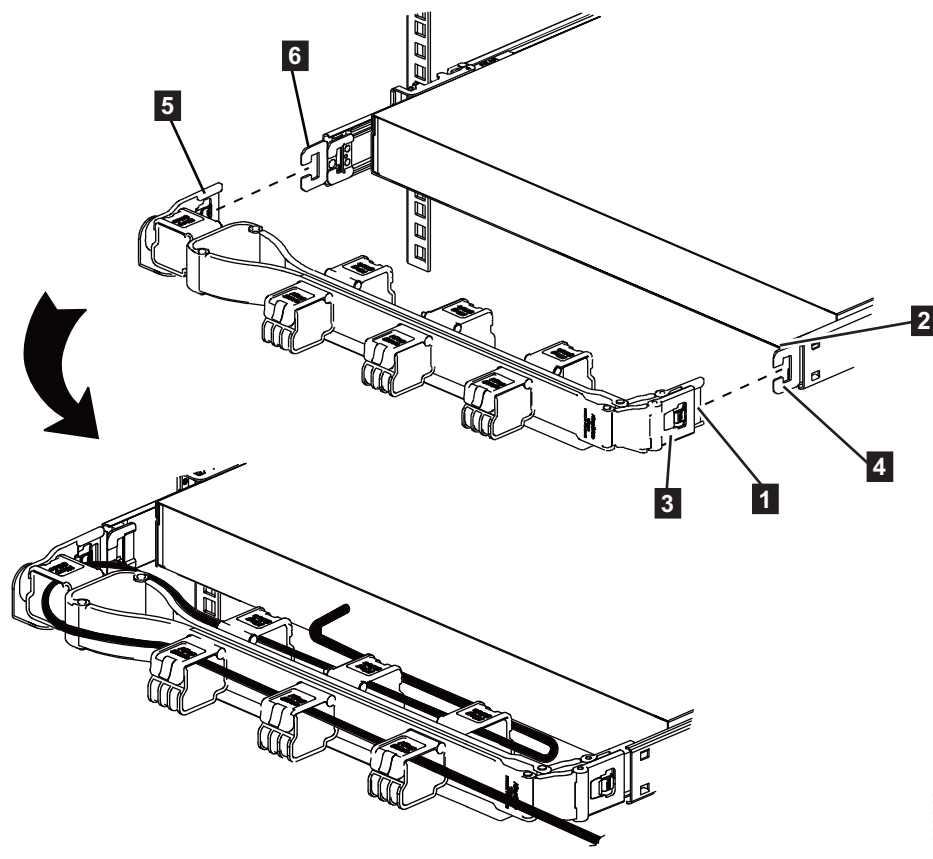
Replace the cable-management arm after you install the node into the rack.

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 22 on page 35 shows the parts that are used to install the CMA assembly.



sv100018

Figure 22. 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 23 on page 36.

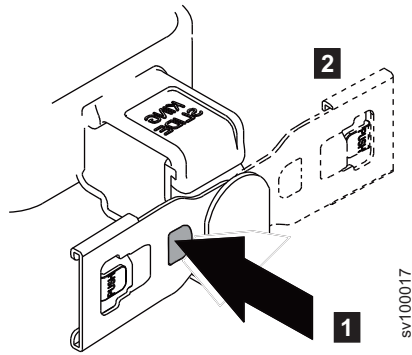


Figure 23. Reversing the orientation of the assembly

- 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 24.

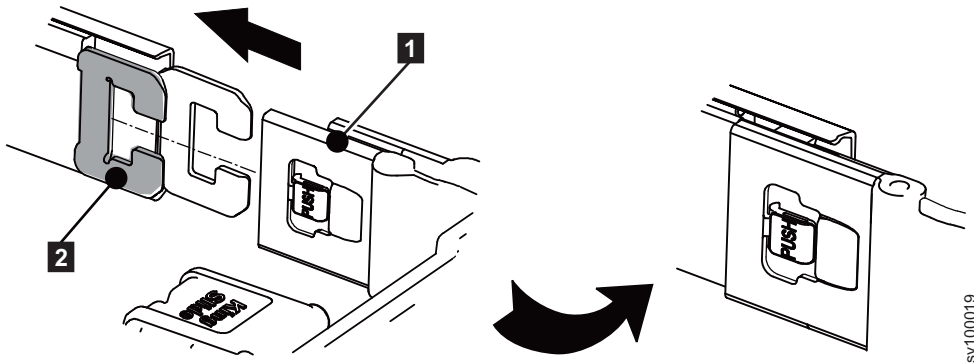


Figure 24. Install the inner member

3. Install the cable-management arm outer connector (3) onto the cable-management arm connector base on the outer member (4). Refer to Figure 25.

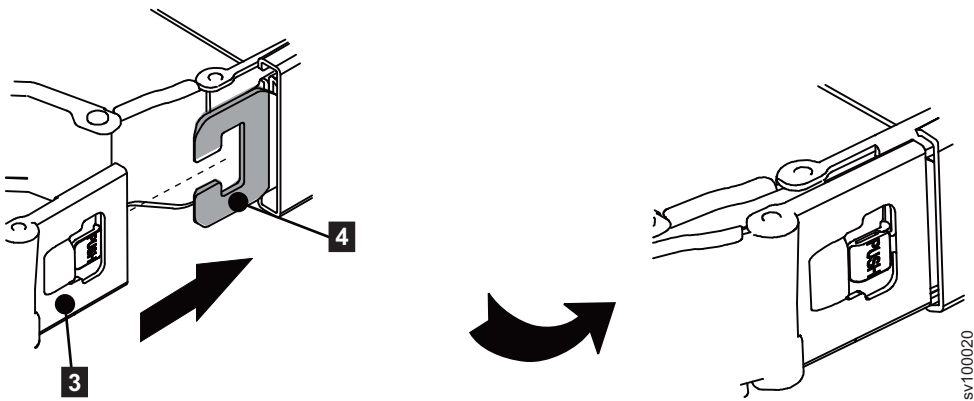


Figure 25. Install the outer member

4. Install the opposite cable-management arm connector (**5**) to the opposite outer cable-management arm connector base (**6**). Refer to Figure 26.

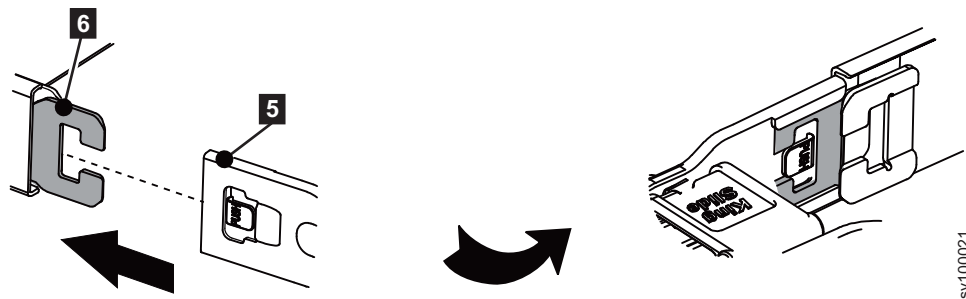


Figure 26. Install the other outer member

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:

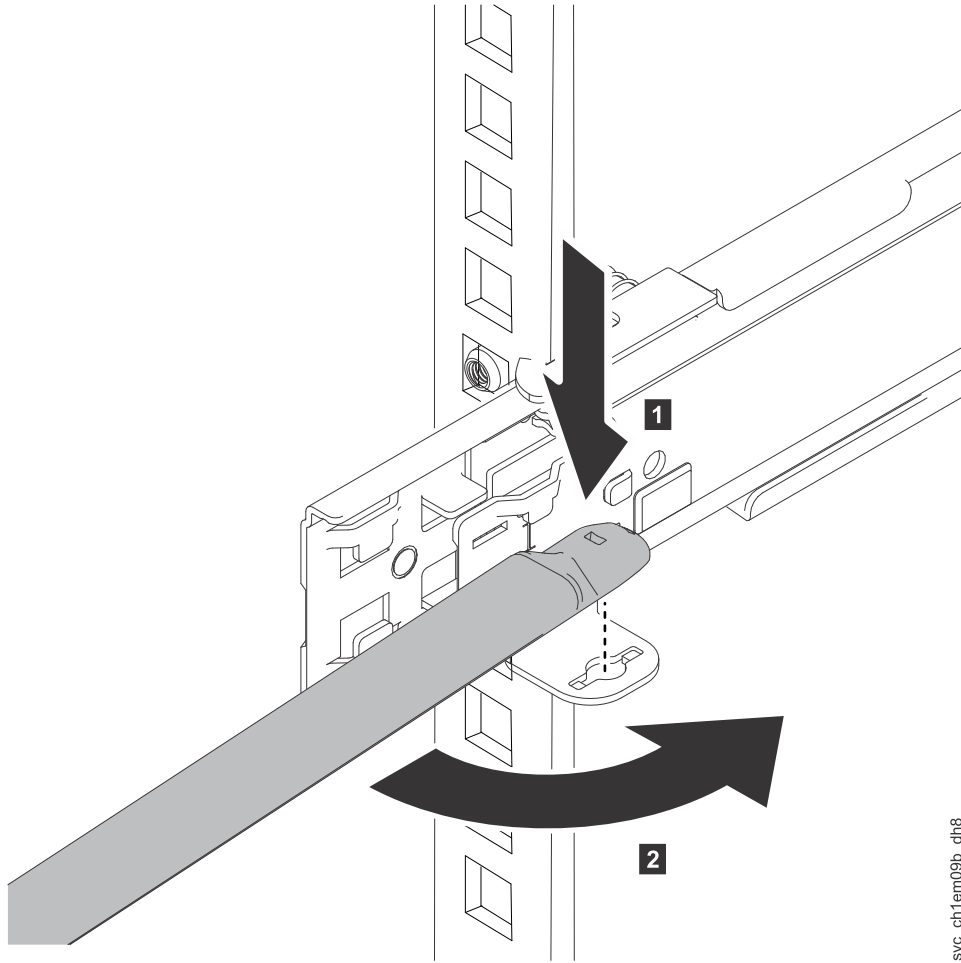
- The cable-management arm can be installed on either side of the node.
- Make sure the inner rail of the cable management support arm must be on top to work correctly.

About this task

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

Procedure

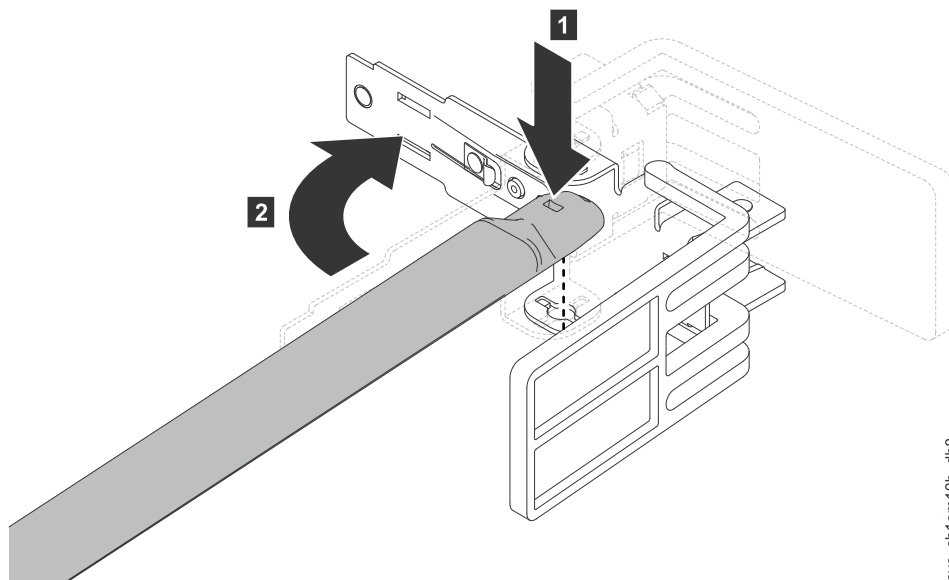
1. Install the cable management arm on the left-rear side of the node, as shown in Figure 27 on page 38
 - a. Connect one end of the support arm to the same slide rail to which you plan to attach the cable management arm.
 - b. Swing the other end of the support arm toward the rack.



svc_ch1em09b_dh8

Figure 27. Installing the cable-management arm

2. Connect the other end of the support arm to the stop bracket, as shown in Figure 28 on page 39.



svc_ch1em10b_dh8

Figure 28. Connecting the cable management support arm to the stop bracket

3. Connect the stop bracket to the slide rail, as shown in Figure 29 on page 40.
 - 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.

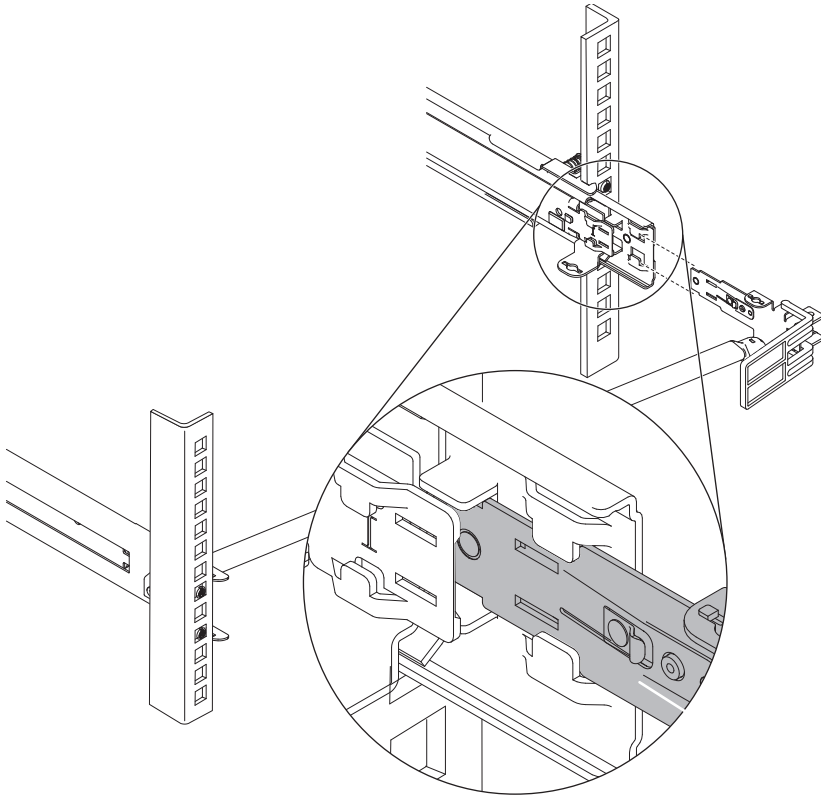


Figure 29. Connecting the stop bracket to the slide rail

4. Install the cable management arm stop bracket, as shown by Figure 30 on page 41.
 - 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.

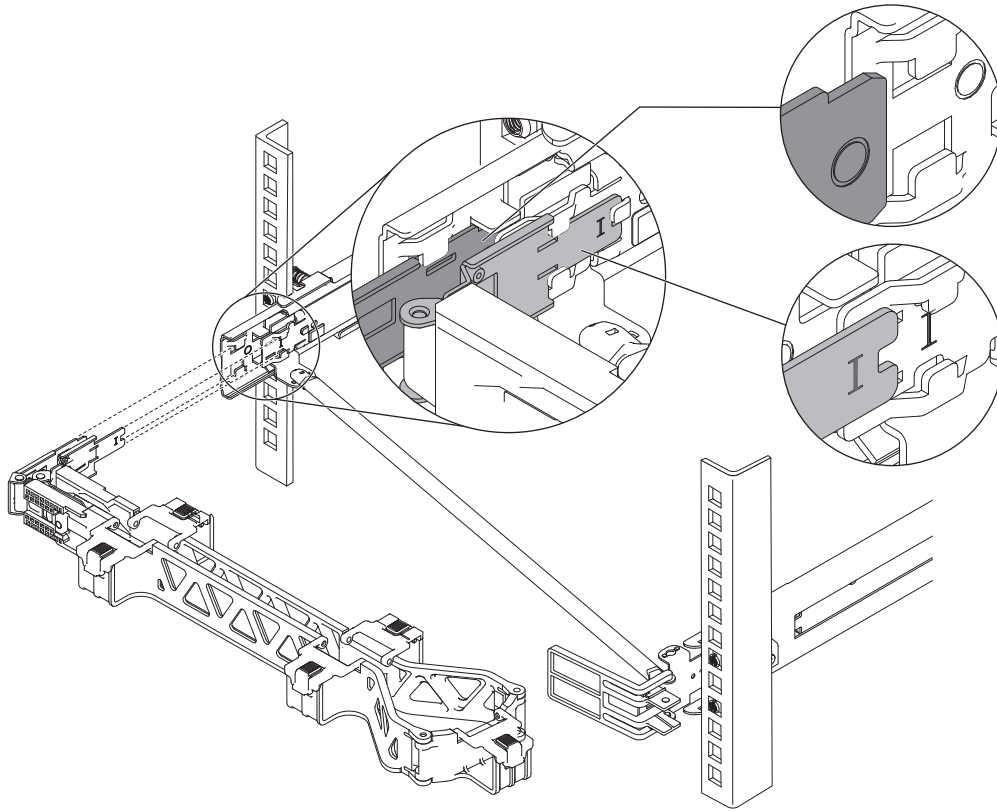


Figure 30. Installing the cable management arm stop bracket

5. Close the cable management support stop, as shown in Figure 31 on page 42.
 - 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.

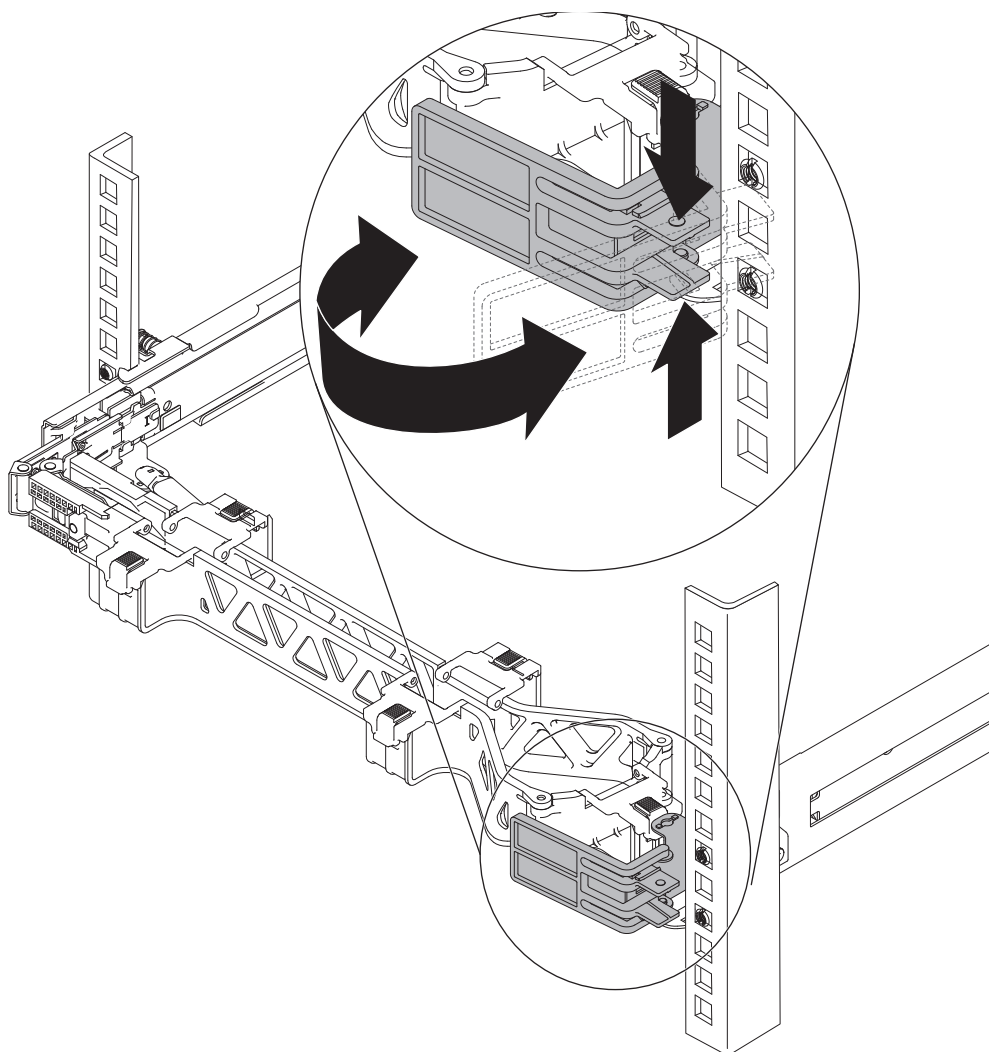


Figure 31. Closing the cable management support stop

6. Connect and route the cables, as shown in Figure 32 on page 43.
 - 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.

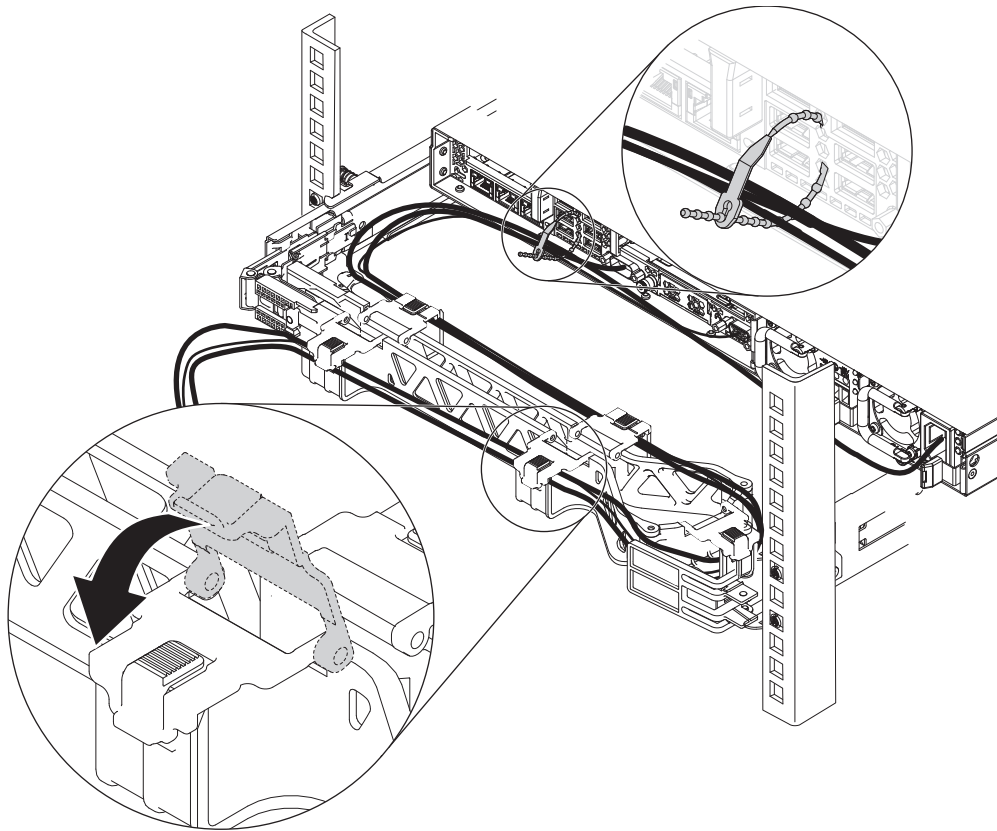


Figure 32. Connecting and routing the cables

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 33 on page 44. Cables must be bundled with the hook-and-loop fastener strap to ensure full range of movement of the cable management arm.

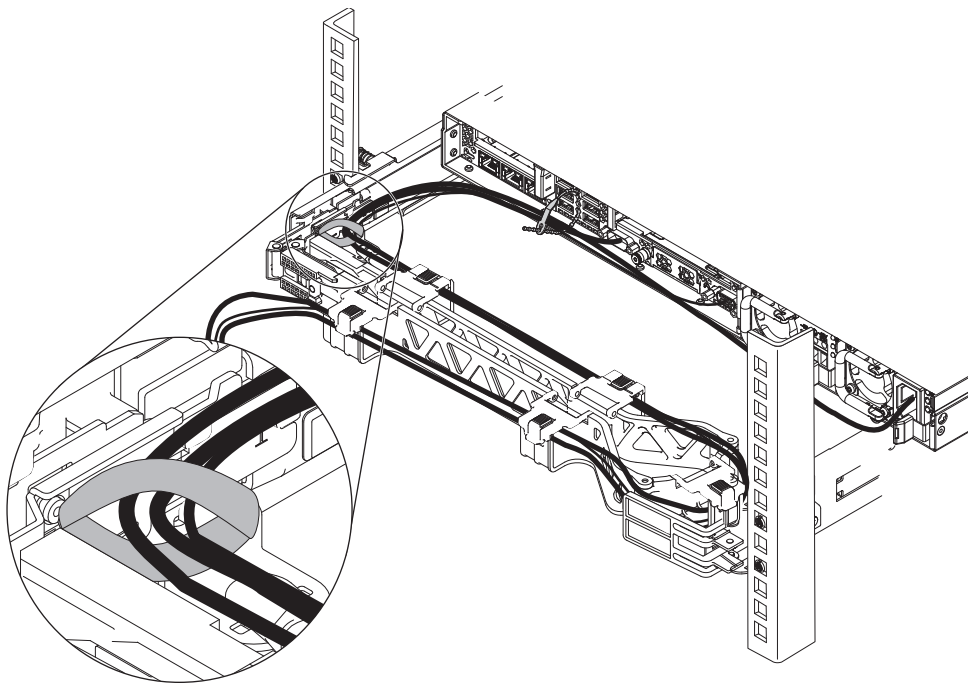


Figure 33. Securing the cables with hook-and-loop fastener strap

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 34 on page 45.
 - 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.

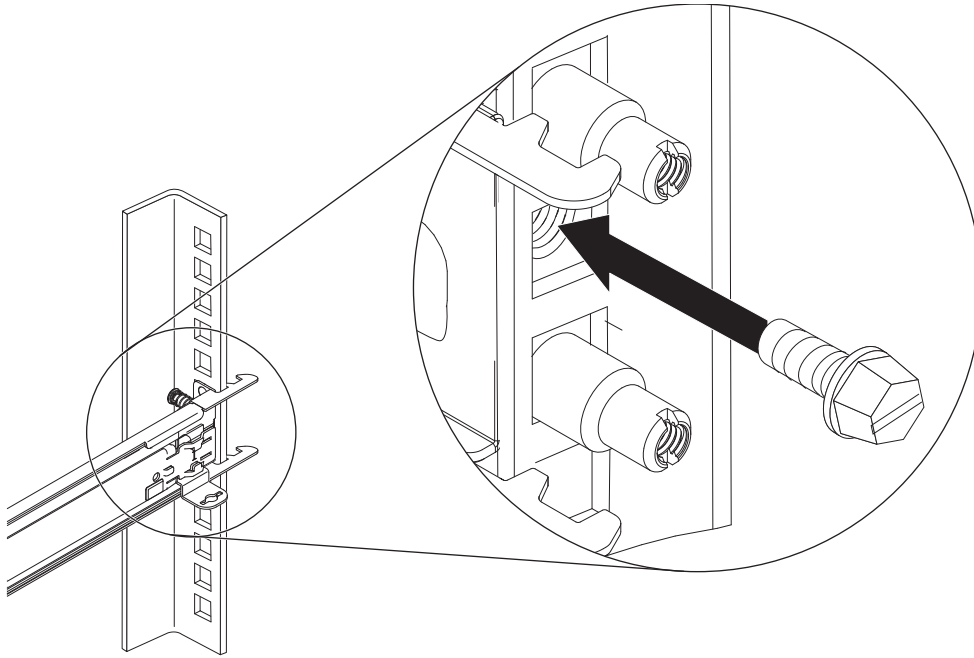


Figure 34. Securing the cable management arm and node for shipping

9. Optional: Install the front screws, as shown in Figure 35 on page 46.
 - 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.

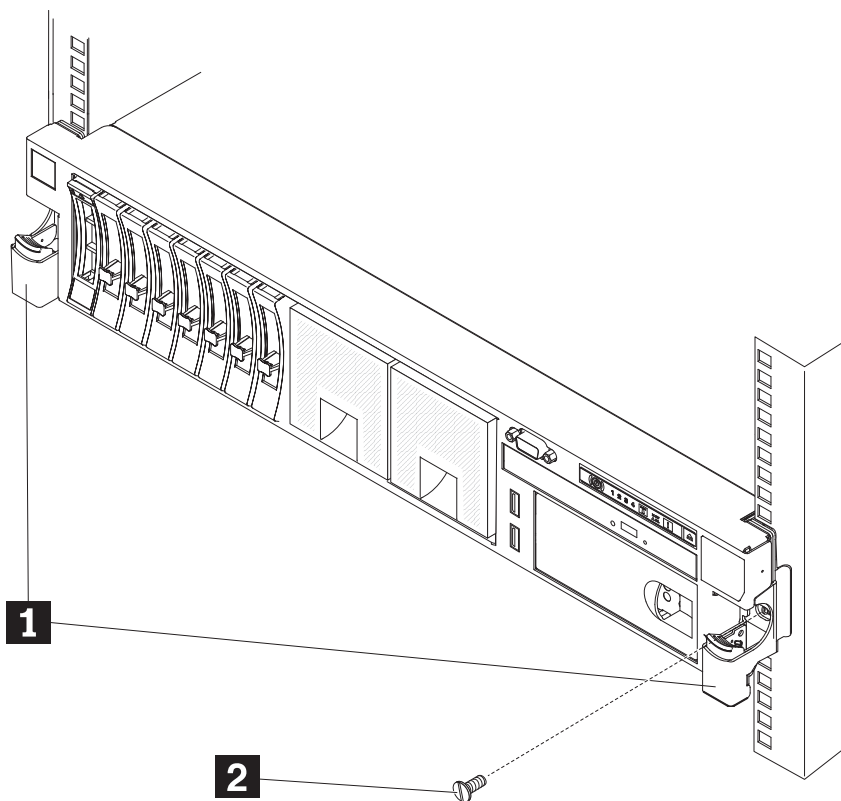


Figure 35. Installing the front screws

10. Optional: You can install the cable management arm on the opposite side, as shown in Figure 36 on page 47.
 - 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**.

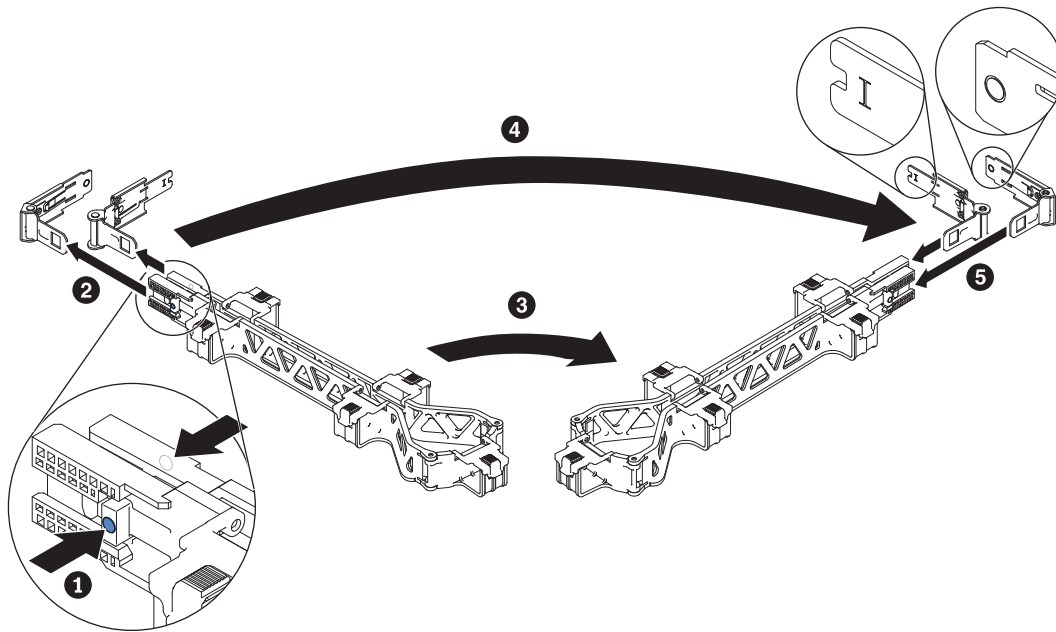


Figure 36. Installing the cable management arm on the opposite side

Replacing the cable-management arm: 2145-CG8 or 2145-CF8

You can replace the cable-management arm, which routes and secures power cables and other cables.

Before you begin

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

About this task

To attach the cable-management arm, follow these steps:

Procedure

1. At the rear of the rack, install the cable-management-support arm.
Insert both ends of the cable management support arm into the slide rail, as shown by Figure 37 on page 48.

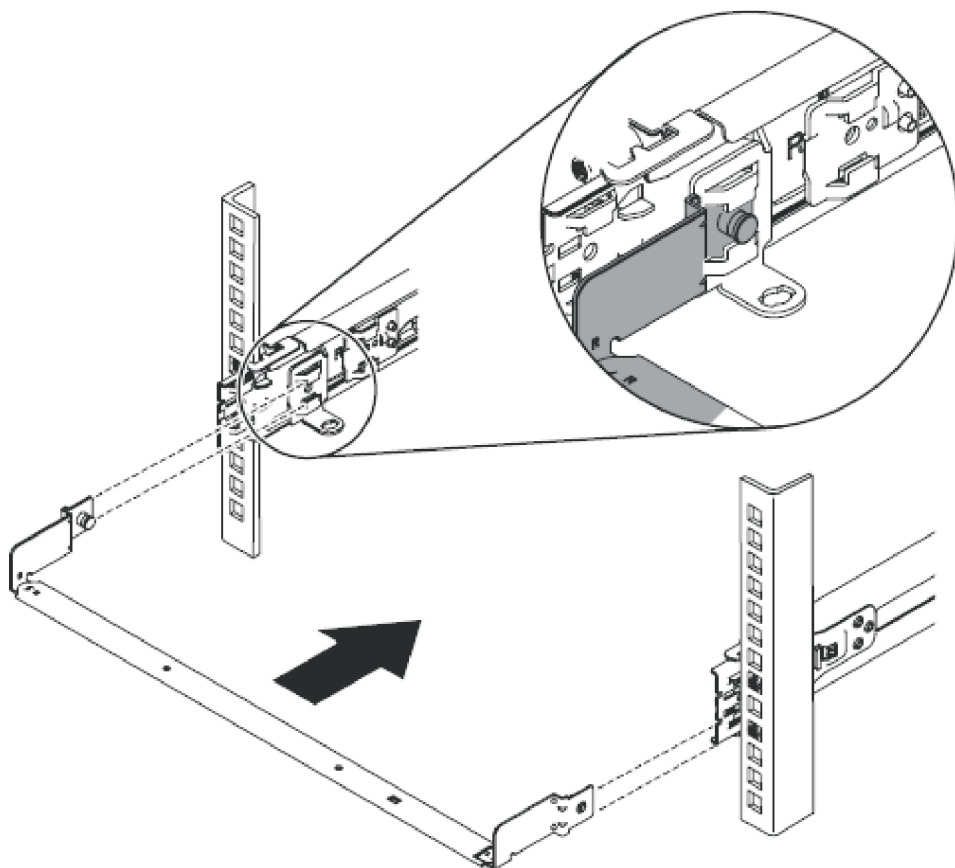


Figure 37. Installing the cable-management-support arm

2. Install the cable management arm, as shown in Figure 38 on page 49.

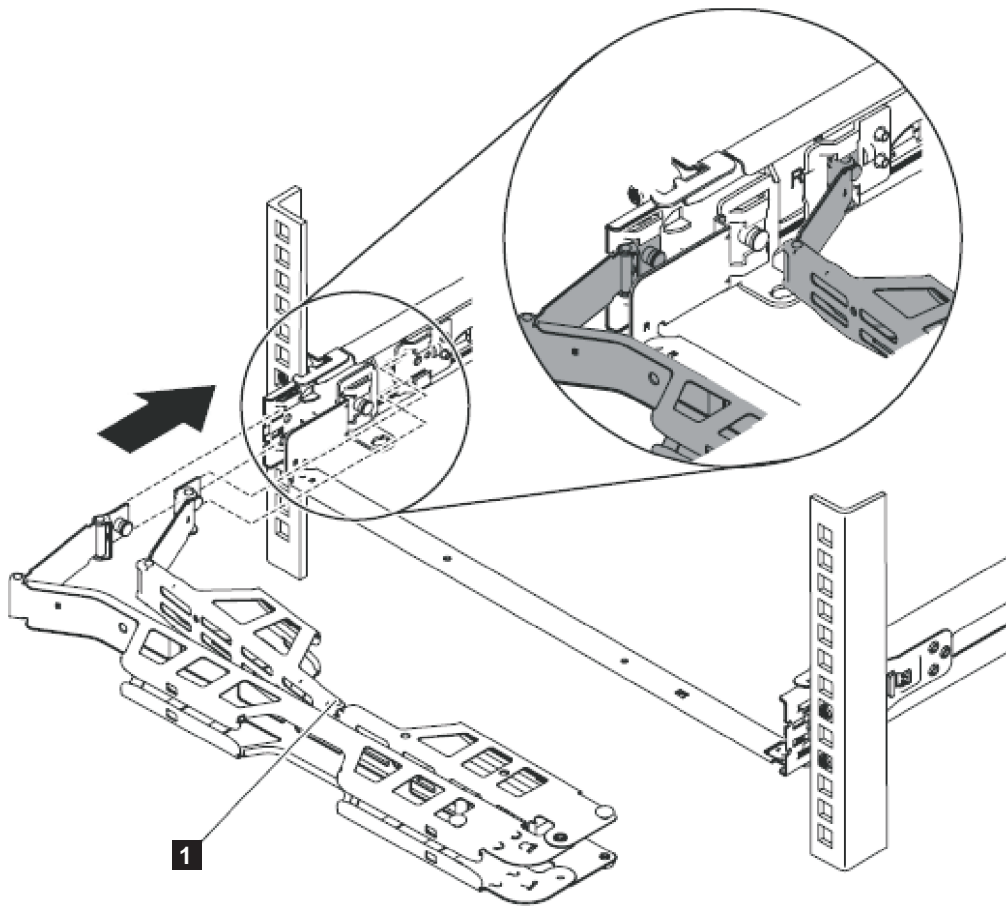


Figure 38. Installing the cable-management arm

Note: Make sure that the junctions on the arm, as shown by **1** in Figure 38, are facing the node.

Place the cable management arm on the support arm. Pull out both cable-management-arm pins and then slide the cable-management-arm tabs into the slots on both the inside and the outside of the slide rail. Push the tabs until they snap into place.

3. Adjust the location of the cable management arm, as shown in Figure 39 on page 50.

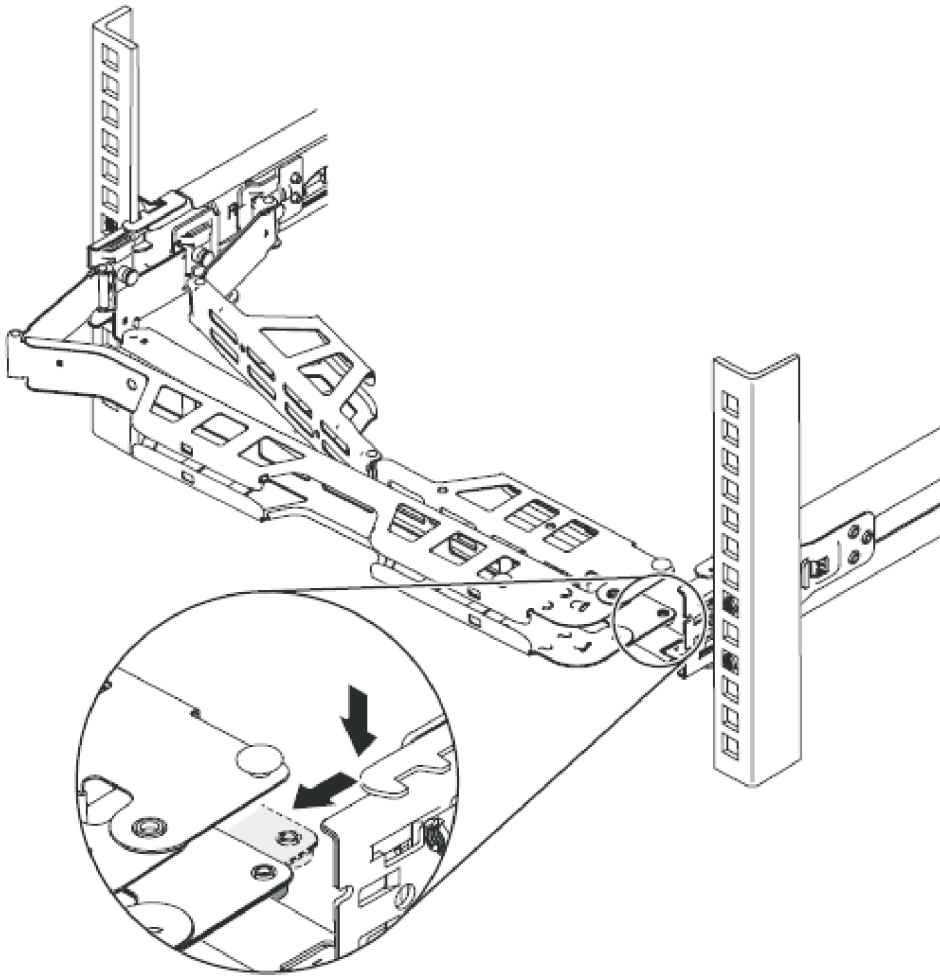


Figure 39. Adjusting the location of the cable-management arm

Ensure that the support rail is located between the 2 nailhead features.

4. Attach the power-and-serial-cable bundle, the Fibre Channel cables, and the one or two Ethernet cables to the rear of the node.
 - a. Route the data cables and power cords on the cable-management arm, as shown by **1** in Figure 40 on page 51.

If you attach the arm properly and route the cables properly, the arm swings into the rack as you pull the node forward in the rack, opening to allow the cables to follow the node toward the front of the rack. You can perform some service procedures without disconnecting the Fibre Channel cables and the Ethernet cables. You can also perform some service procedures without turning off the node or disconnecting the power cables.

- b. Secure the cables with cable ties or hook-and-loop fasteners.

Note: Leave some slack in all of the cables to avoid tension in the cables as the cable-management arm moves.

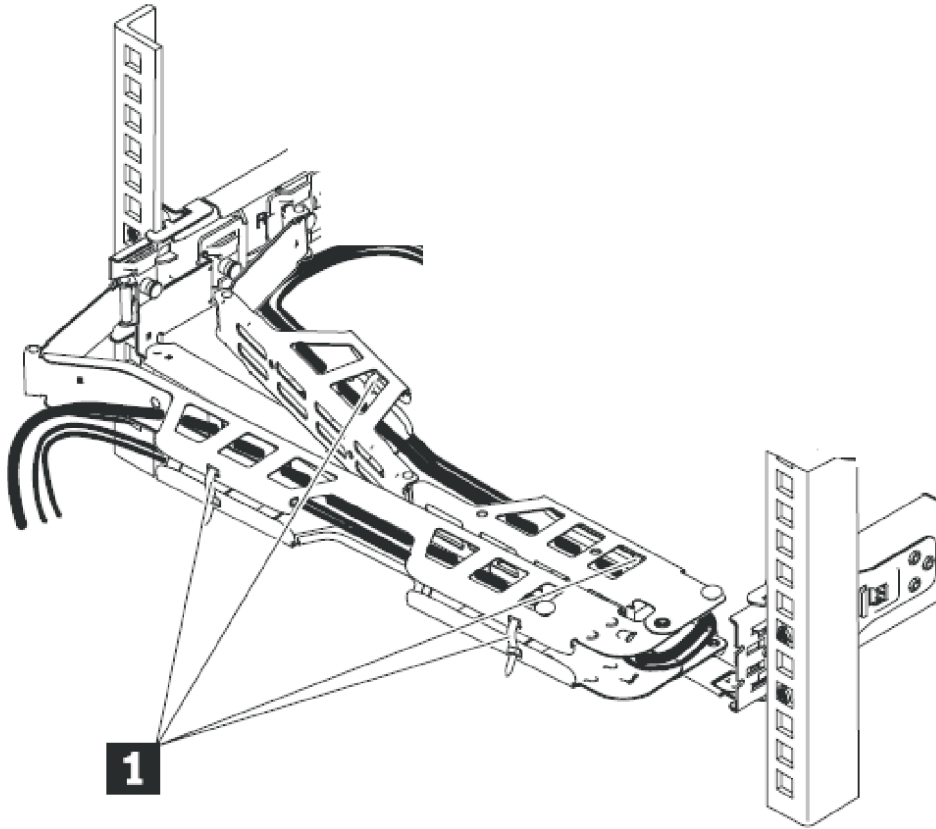


Figure 40. Connecting and routing the cables

5. Slide the node into the rack until it snaps into place.
6. Connect all cables to the back of the node.

Removing the cable-retention bracket

The cable-retention bracket ensures that the node does not mistakenly become unplugged from the uninterruptible power supply.

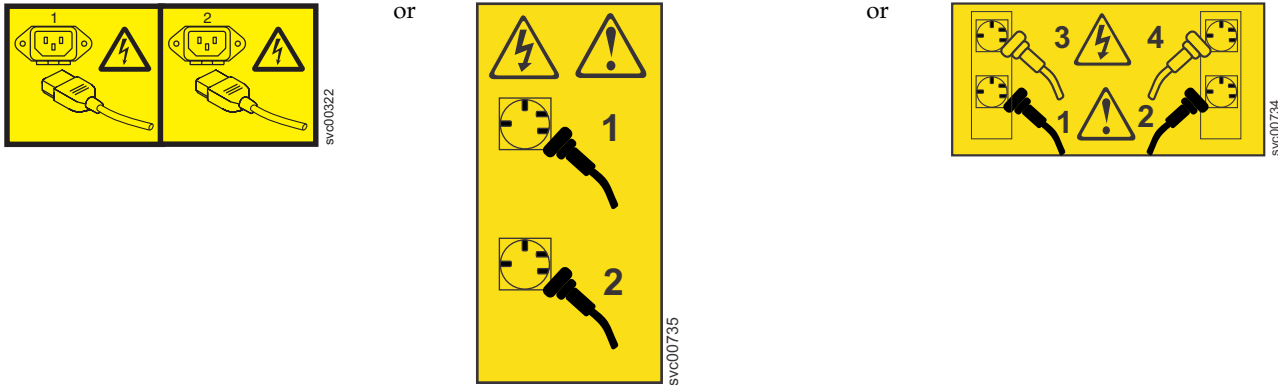
Removing the cable-retention brackets: 2145-CG8 or 2145-CF8

You must remove the two SAN Volume Controller 2145-CG8 or 2145-CF8 cable-retention brackets when removing the power cords from the 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

The SAN Volume Controller 2145-CG8 or 2145-CF8 uses two toolless cable-retention brackets. One cable retention bracket routes a cable to the uninterruptible power-supply. Another bracket routes a cable to one of the two SAN Volume Controller 2145-CG8 or 2145-CF8 power supplies, as shown in the following figure.

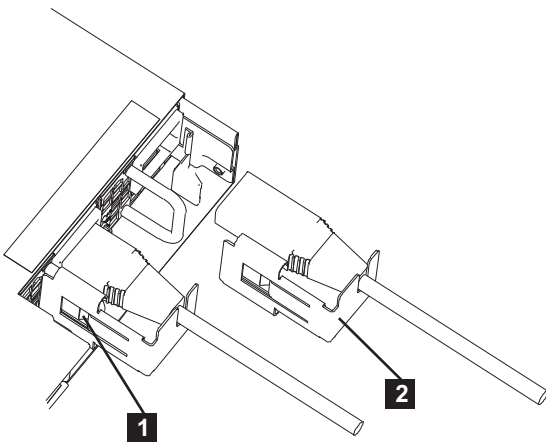


Figure 41. Cable-retention brackets

Each cable-retention bracket attaches to the back of the SAN Volume Controller 2145-CG8 or 2145-CF8 node. The brackets connect without screws.

This service action requires you to:

- Optionally, turn off the node.
- Disconnect the power cable that the retention bracket is on.

To remove a cable-retention bracket, perform these steps:

Procedure

1. Read the safety information.
2. Optional: Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 a power supply, and that is why you are removing the cable retention bracket, use MAP 5350 to make all of the necessary checks that 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 volume disks on the node. With the partner node available and no dependent volume disks on the node, you do not lose access to data if this node accidentally powers off.

3. 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.
4. When the node is turned off, from under the cable, carefully push the spring clip away from the cable to free the cable-retention bracket from the handle on the power supply.

The spring clip is shown by **1** in Figure 41 on page 52.

5. Pull both the bracket and the cable (**2**) away from the SAN Volume Controller 2145-CG8 or 2145-CF8 power supply.

Note: When you replace the power cords on the node, remember to replace the cable retention brackets.

6. Remove the cable-retention bracket from the power cord.

Replacing the cable-retention bracket

You can replace the cable-retention bracket after you install a SAN Volume Controller 2145-CG8 or 2145-CF8 node into the rack.

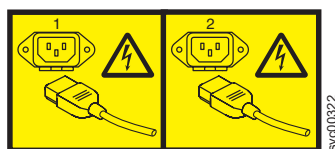
Replacing the cable-retention brackets: 2145-CG8 or 2145-CF8

You can replace one of the two cable-retention brackets on the back of a SAN Volume Controller 2145-CG8 or 2145-CF8 node. The cable-retention brackets anchor the power cord that runs from the uninterruptible power-supply to one of the two power supplies.

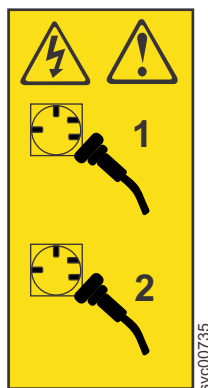
Before you begin

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 node uses two toolless cable-retention brackets. One retains each cable from the uninterruptible power-supply to one of the two power supplies, as shown in Figure 42.

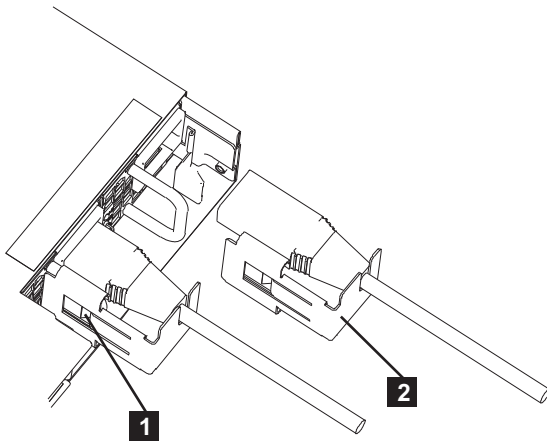


Figure 42. Cable-retention brackets

Each cable-retention bracket attaches to the back of the node. The brackets connect without screws.

Procedure

To replace each cable-retention bracket, complete the following steps.

1. 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 67.
2. 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.
3. Loosely install the cable-retention bracket on a power cord by slipping the power cord into the notch on the rear of the bracket.
4. Align the cable-retention bracket on the power cord so that the bracket is to the left of the cord, as shown by **2** in Figure 42.
5. Align the power cord with the power connector on the power supply and the bracket with the power-supply handle.
6. Push the power cord into the power connector on the power supply.
7. Carefully push the bracket against the power-supply handle to force the spring clip (**1**) over the leading edge of the handle.

Removing a node from a rack

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

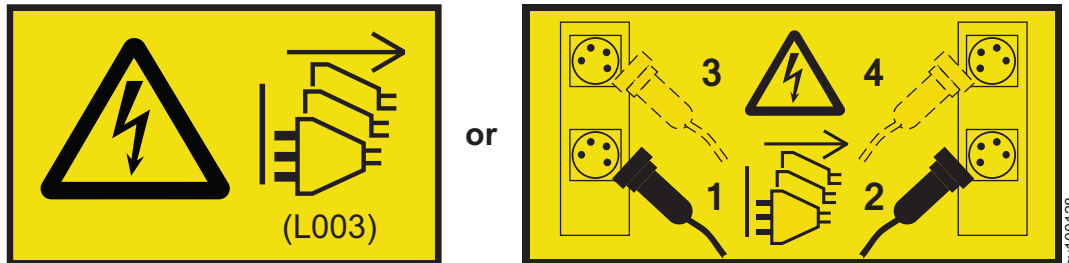
Removing a node from a rack: 2145-SV1

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 44 on page 58.

Procedure

1. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 43

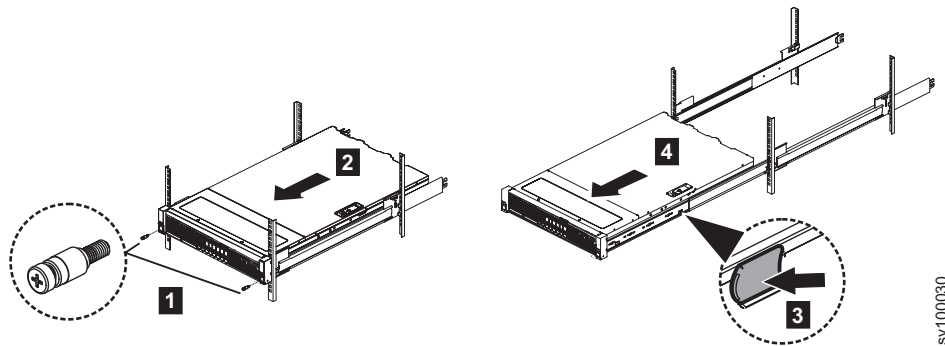


Figure 43. Remove the 2145-SV1 node chassis from the rack

- 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 44, and place it on a sturdy surface.

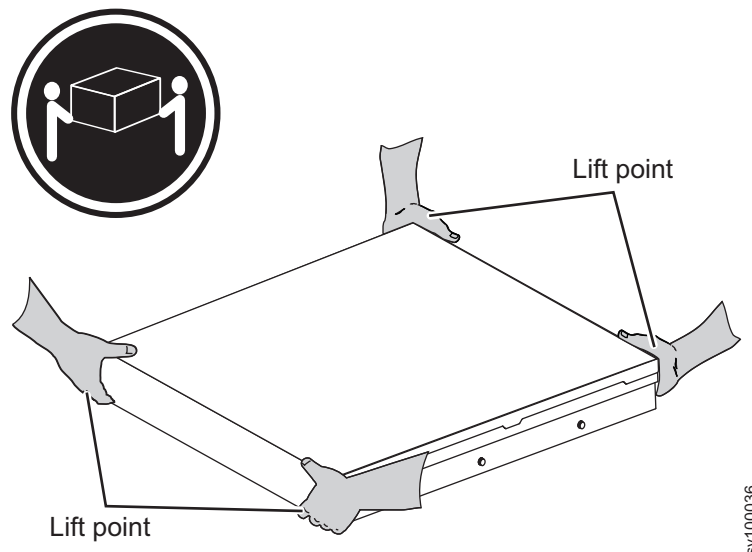


Figure 44. Lifting the 2145-SV1 node from the rack

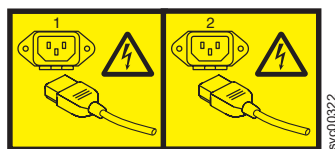
Removing a node from a rack: 2145-DH8

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

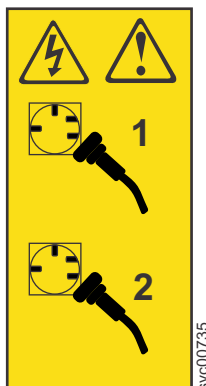
Before you begin

DANGER

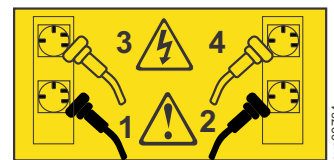
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



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.

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 45 on page 62.

Procedure

1. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 45.
5. Support the rear of the server, and lift the front of the server up slightly **2** to clear the nailhead **3** from the slot.

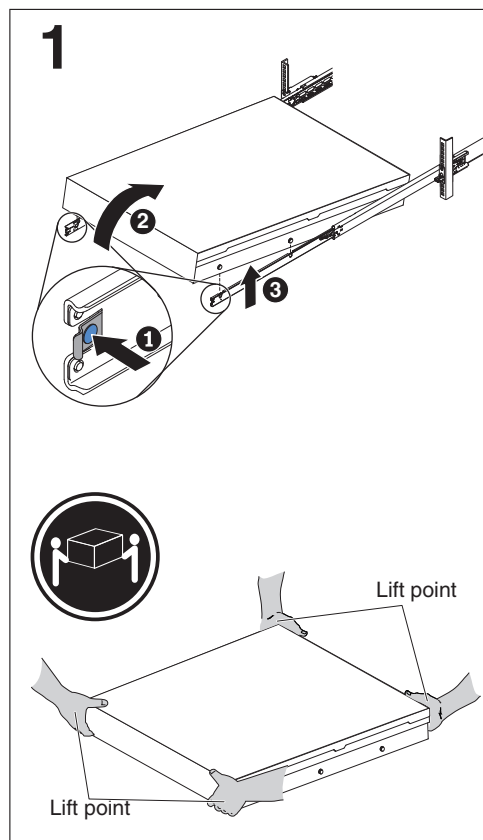


Figure 45. Removing the SAN Volume Controller 2145-DH8 from the rack

6. Lift the rear **1** of the server to level the server after the front nailheads clear the latches, as shown in Figure 46 on page 63.
7. Lift the server out of the rack **2** and place it on a sturdy surface.

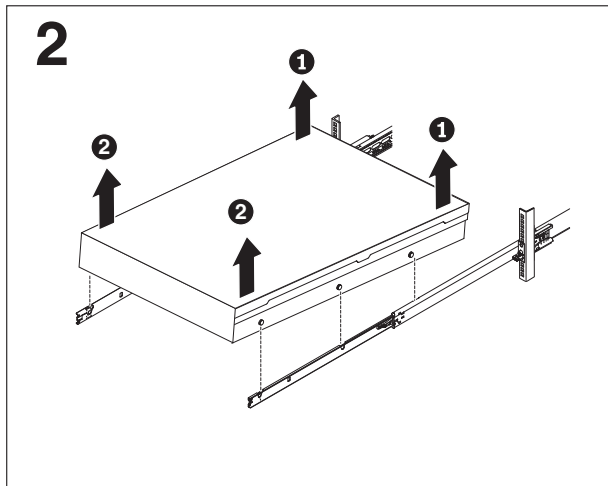


Figure 46. Lifting the server off the slide rails

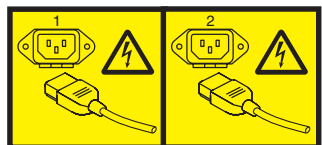
Removing a node from a rack: 2145-CG8 or 2145-CF8

Complete the following instructions when you are prompted to remove a SAN Volume Controller 2145-CG8 or 2145-CF8 node from a rack.

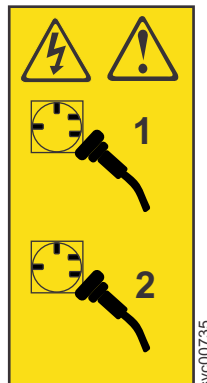
Before you begin

DANGER

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



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.

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 2145-CG8 or 2145-CF8 node from the rack, complete the following steps.

Procedure

1. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 forward the two white catches (**1** in Figure 47 on page 67) on the side of the rails, and lift up the front of the node very slightly.
5. Support the node from the front and the back and pull the node forward slightly and lift to remove the node from the back of the rails (**3**).

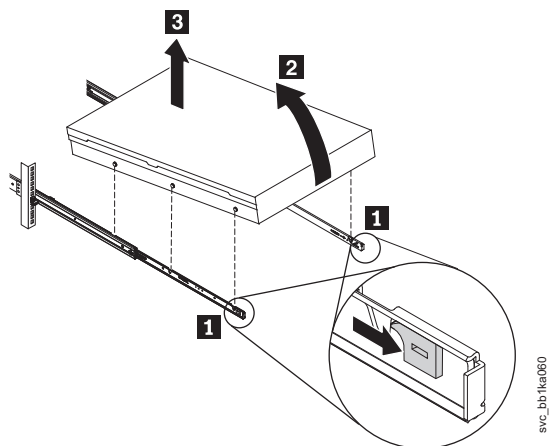


Figure 47. Removing the 2145-CG8 or 2145-CF8 node from the rack

Replacing a node in a rack

You must use caution when you replace a SAN Volume Controller 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 has 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)

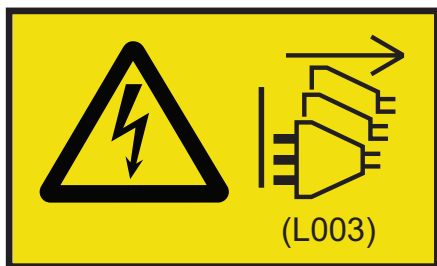
Replacing a node in a rack: 2145-SV1

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

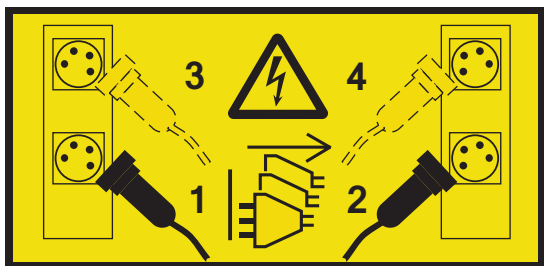
Before you begin

DANGER

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



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.

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 48.

Procedure

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

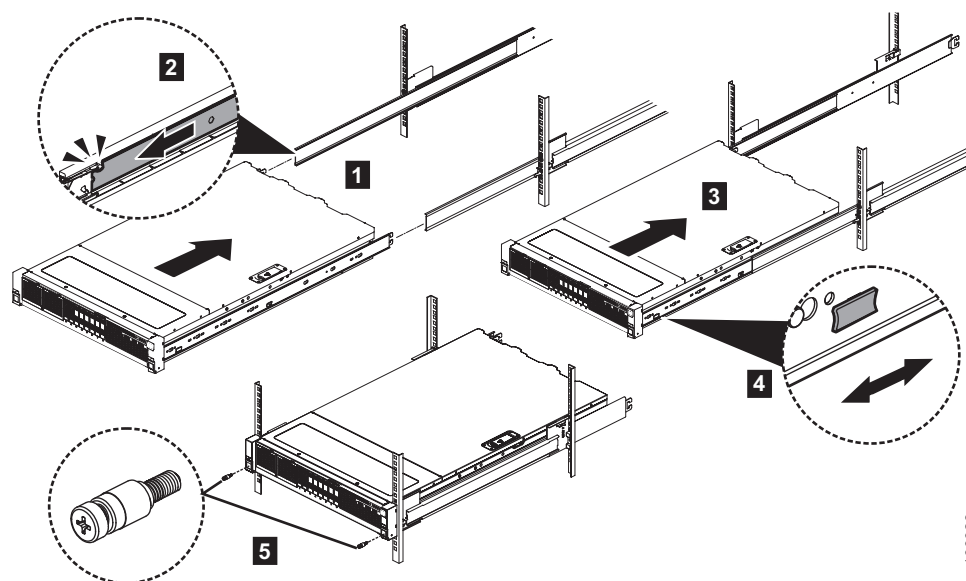


Figure 48. Replacing the 2145-SV1 chassis in the rack

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**).

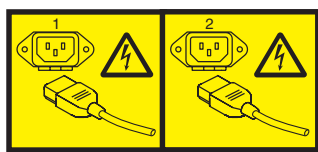
Replacing a node in a rack: 2145-DH8

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

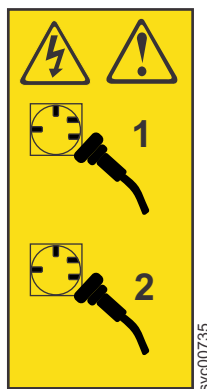
Before you begin

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 49 on page 78).
 - 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.

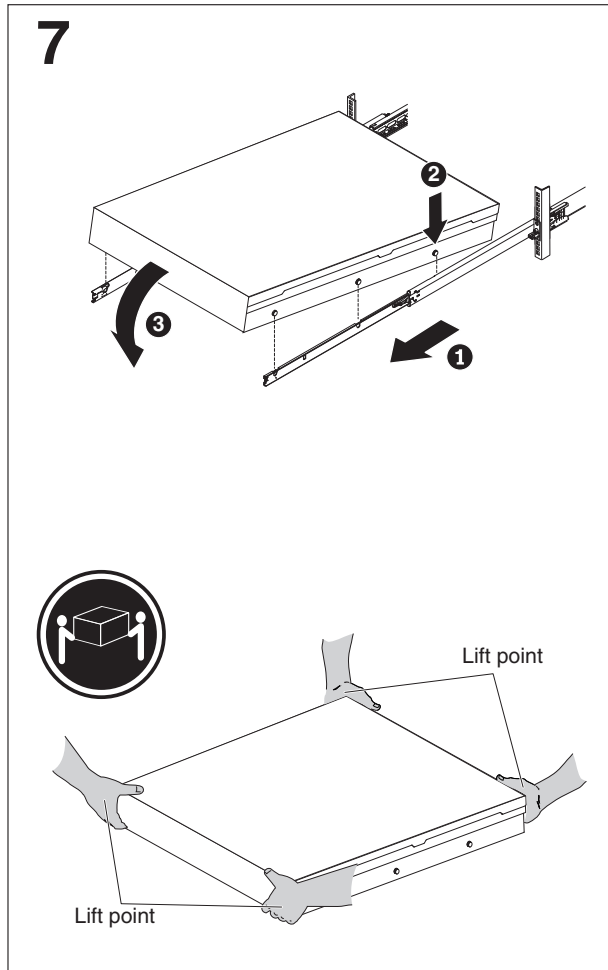


Figure 49. Installing the SAN Volume Controller 2145-DH8 node in the slide rails of the rack

2. Lift the locking levers (**1** in Figure 50) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

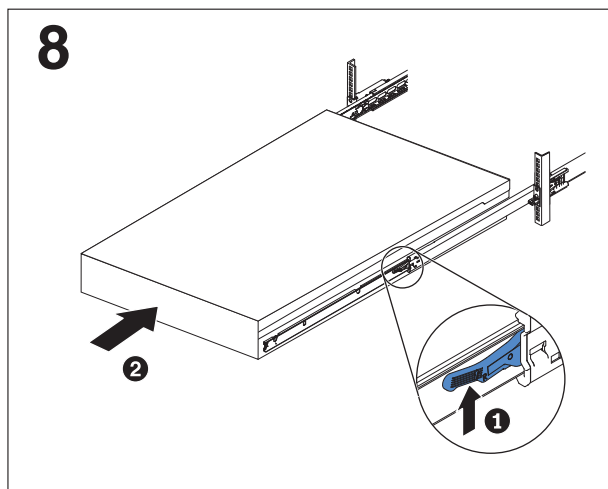


Figure 50. Raising the SAN Volume Controller 2145-DH8 locking levers of the slide rails of the rack

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.

Replacing a node in a rack: 2145-CG8 or 2145-CF8

Follow these instructions when you are prompted to replace the SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Before you begin

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*.

About this task

To replace the SAN Volume Controller 2145-CG8 or 2145-CF8 in a rack, follow these steps:

Procedure

1. Place the SAN Volume Controller 2145-CG8 or 2145-CF8 in the rails on the rack.
 - a. Pull the slide rails forward (**1** in Figure 51) until they click twice into place.
 - b. Carefully lift the server and tilt it into position over the slide rails so that the rear nail heads **2** on the server line up with the rear slots **3** on the slide rails.
 - c. Slide the server down until the rear nail heads slip into the two rear slots; then slowly lower the front of the server **4** until the other nail heads slip into the other slots on the slide rails.
 - d. Verify that the front latch **5** slides over the nail heads.

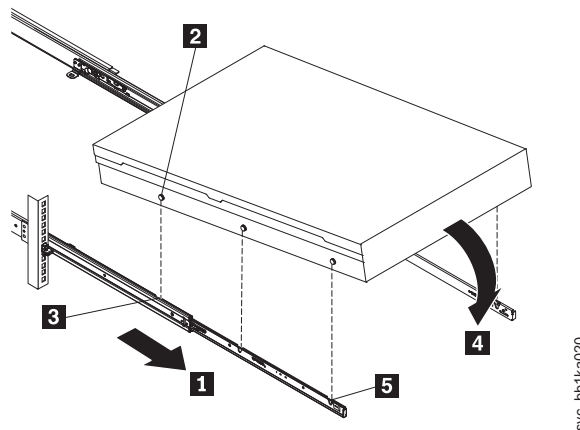


Figure 51. Installing a 2145-CG8 or 2145-CF8 node in the slide rails of the rack

2. Lift the locking levers (**1** in Figure 52 on page 80) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

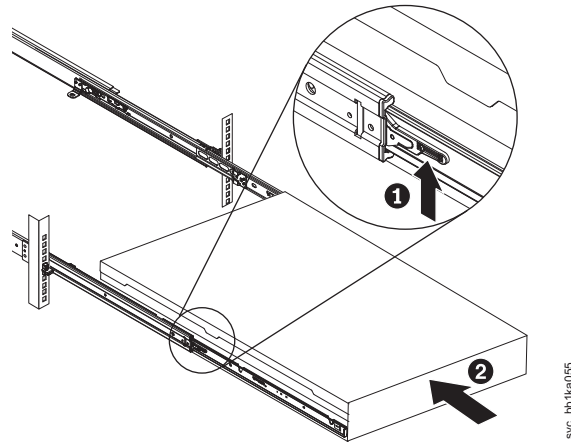


Figure 52. Raising the 2145-CG8 or 2145-CF8 locking levers of the slide rails of the rack

3. Replace the cable-management arm. See “Replacing the cable-management arm” on page 34.
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. See “Replacing the cable-retention bracket” on page 53.
6. Turn on the node.

Removing the support rails

The support rails can be removed if you need to move the SAN Volume Controller 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 54.
2. Remove the slide rails, as shown in Figure 53.

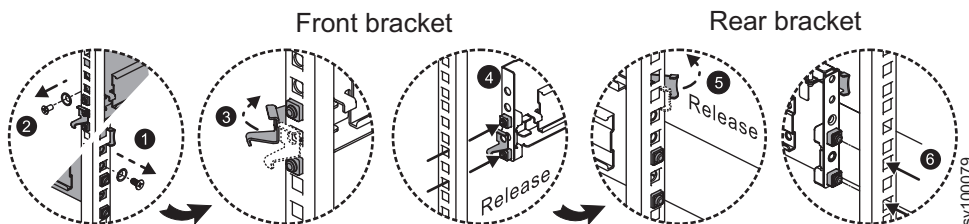


Figure 53. Removing the slide rails

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 58.
2. Remove the front end of the slide rails, as shown in Figure 54.
 - 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.

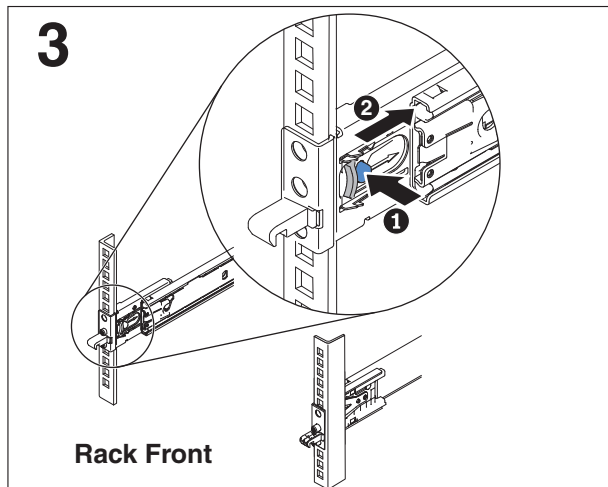


Figure 54. Removing the front end of the slide rails

3. Disengage the slide rails from the rear of the rack, as shown in Figure 55.
 - a. Pull the front of the slide rail forward to unlatch the rear hooks.
 - b. Remove the rails from the rack.

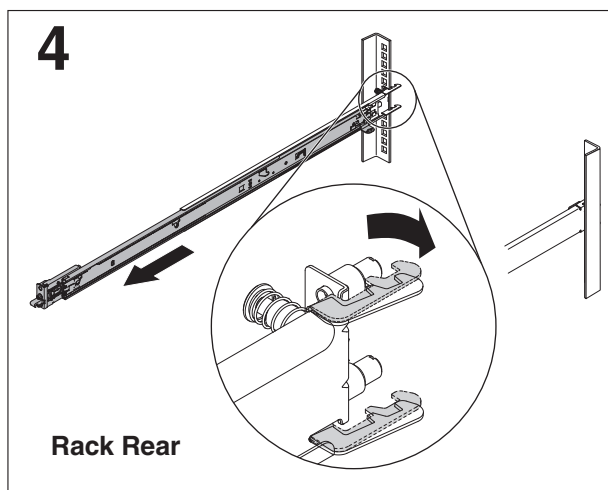


Figure 55. Removing the rear end of the slide rails

Removing the support rails: 2145-CG8 or 2145-CF8

You can remove the support rails that hold the 2145-CG8 or 2145-CF8 node.

Procedure

To remove the 2145-CG8 or 2145-CF8 support rails, follow these steps:

1. Remove the 2145-CG8 or 2145-CF8, as described in "Removing a node from a rack: 2145-CG8 or 2145-CF8" on page 63.
2. Remove the cable-management arm, as described in "Removing the cable-management arm: 2145-CG8 or 2145-CF8" on page 30.
3. Remove the front end of the slide rails, as shown in Figure 56.

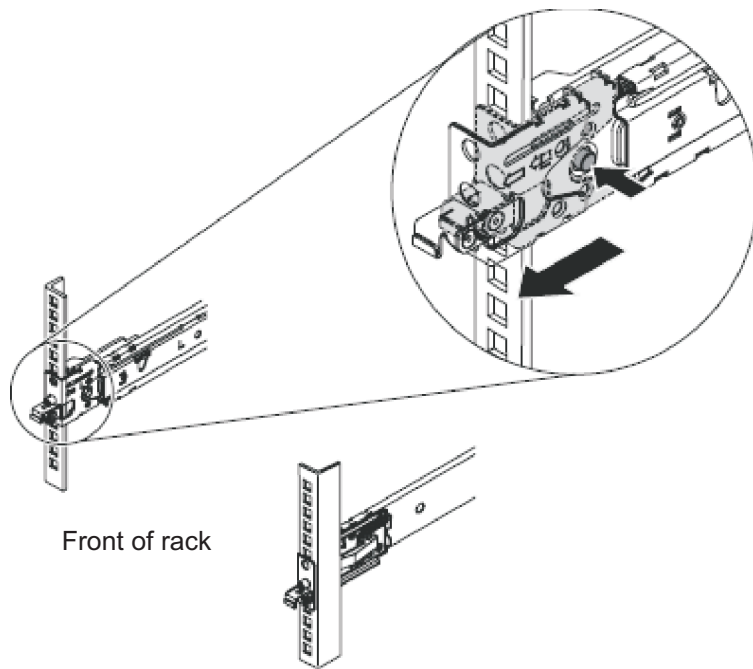


Figure 56. Removing the front end of the slide rails

4. To remove the slide rails from the front of the rack, push up the front tab and slide out the front latch. Press the blue button and lift slightly on the front of the slide rail. Remove the slide rail from the rack.
5. Remove the rear end of the slide rails, as shown in Figure 56.

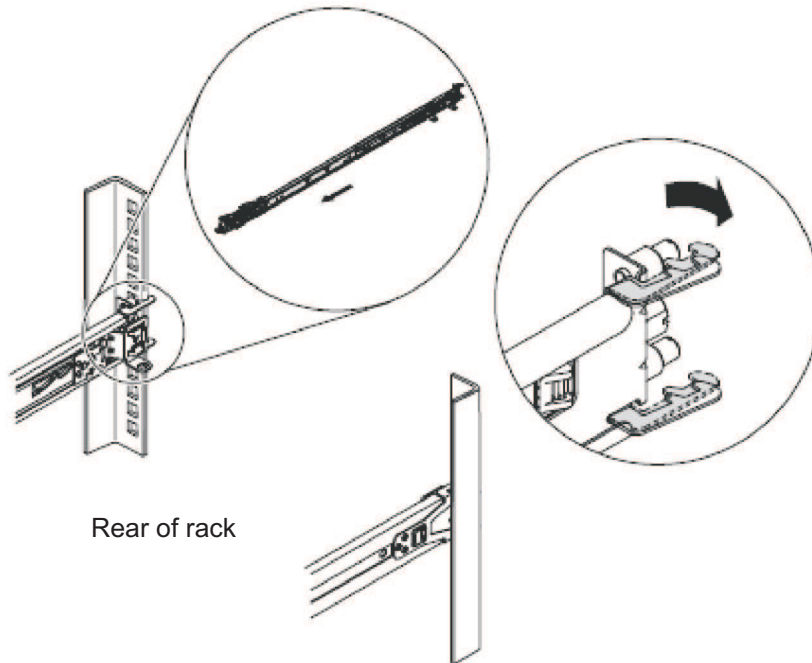


Figure 57. Removing the rear end of the slide rails

6. To disengage the slide rails from the rear of the rack, pull the slide rail forward to unlatch the rear hooks and take the rails out of the rack.

Replacing the support rails

You must replace or re-install the support rails that hold the SAN Volume Controller node, if they have been removed.

Before you begin

The instructions for replacing or installing the SAN Volume Controller 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 58 on page 84.

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.

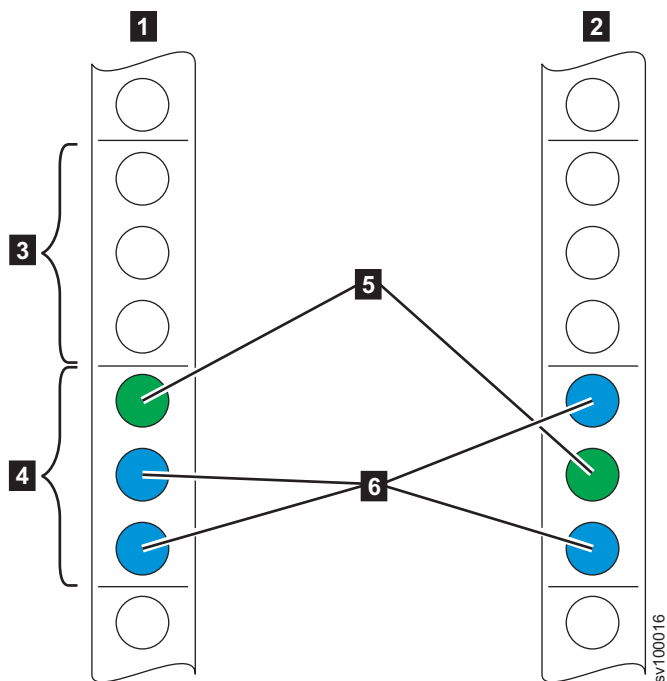


Figure 58. Identifying rack space

- 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 three-part rail, as shown in Figure 59.

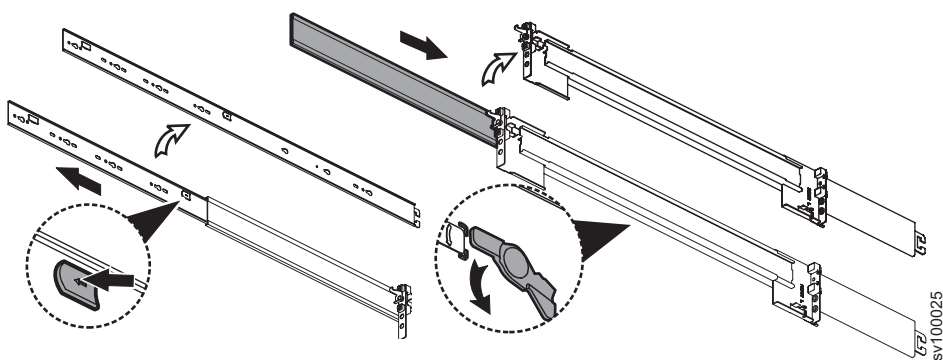


Figure 59. Detaching the inner rail section

- 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 60.

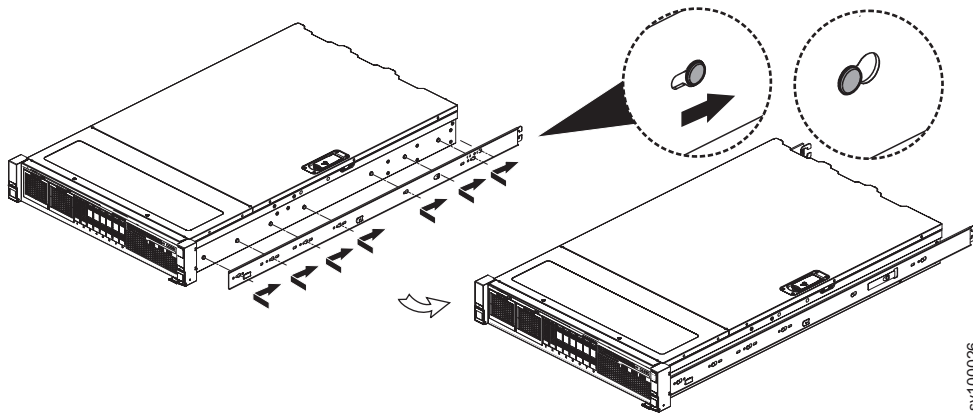


Figure 60. Attach inner rail section to chassis

5. Repeat steps 3 on page 84-4 on page 84 for the opposite rail.
6. Install the outer section of the rail to the front frame, as shown in the following figure.

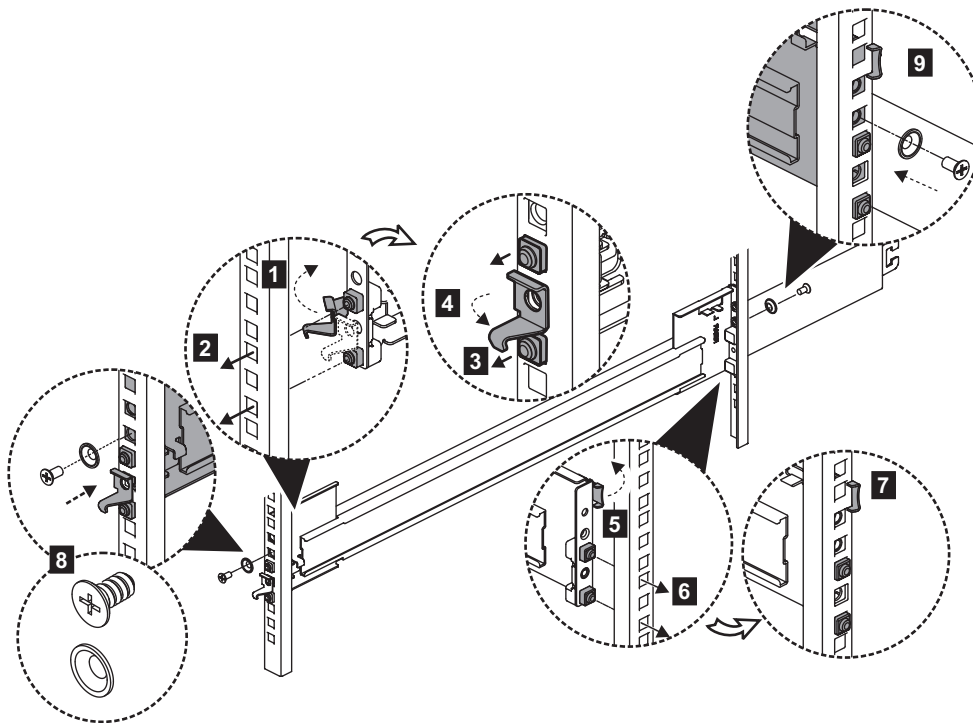


Figure 61. Install the bracket assembly to the frame

- 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 61.
 - 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 85-9 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 62.

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.

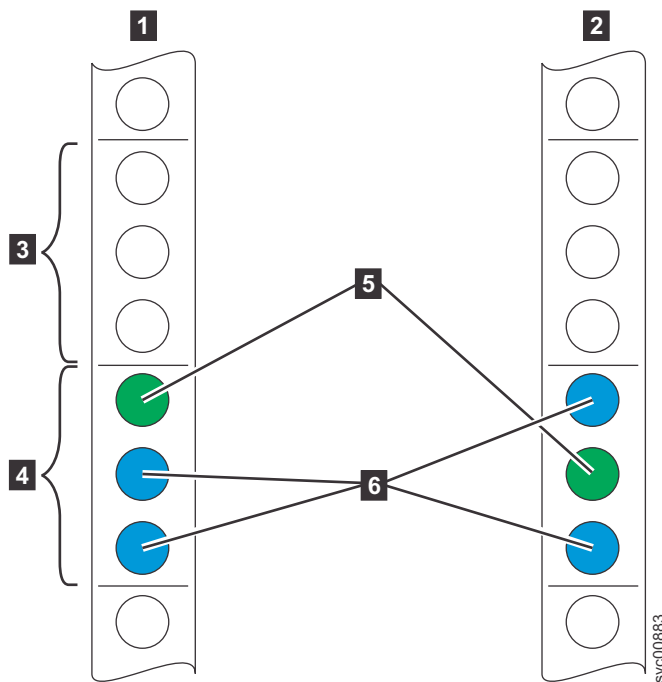
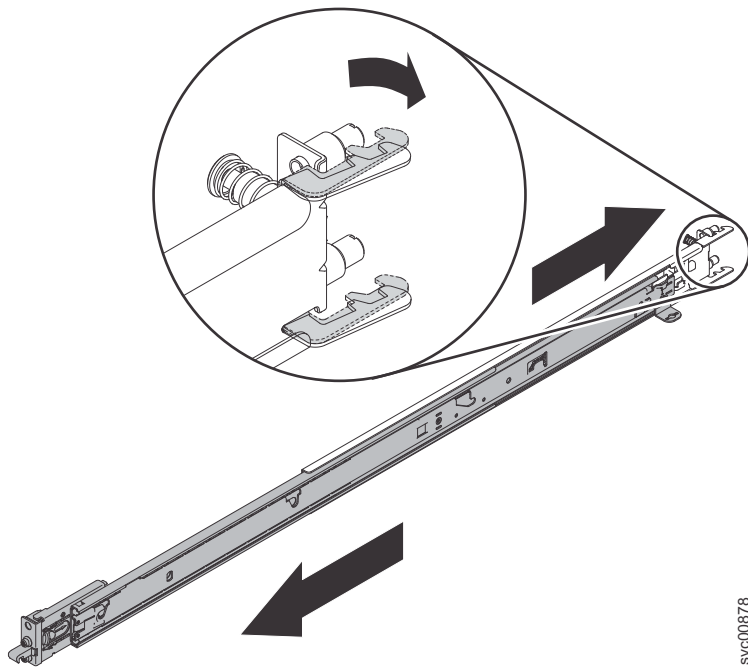


Figure 62. Identifying rack space

- 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 63 on page 87.
 - 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.



svc00878

Figure 63. Opening the rear slide-rail hooks

3. Install the rear end of the slide rails, as shown in Figure 64 on page 88.
 - 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.

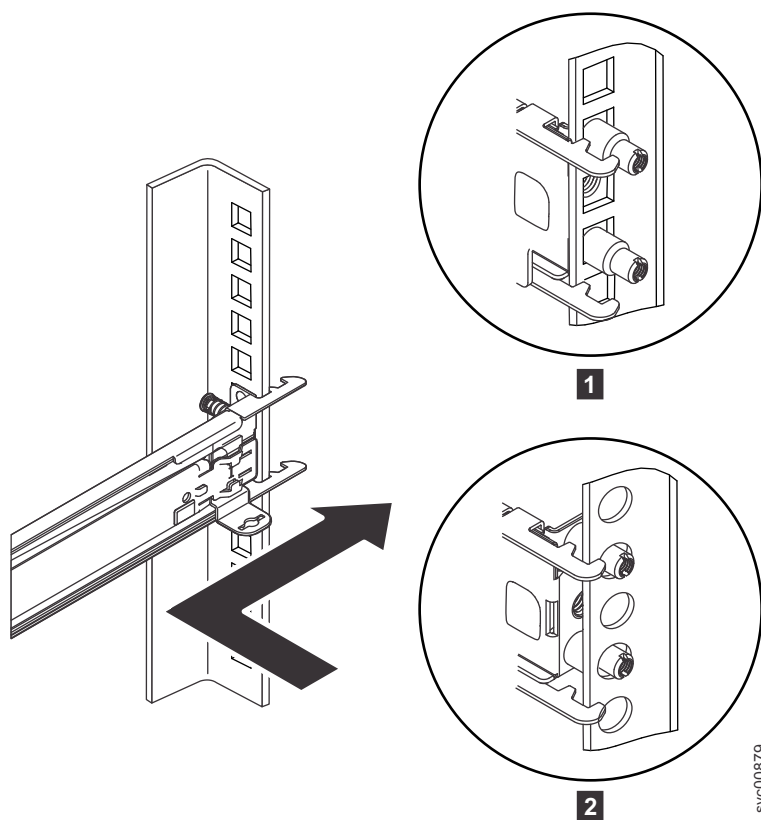
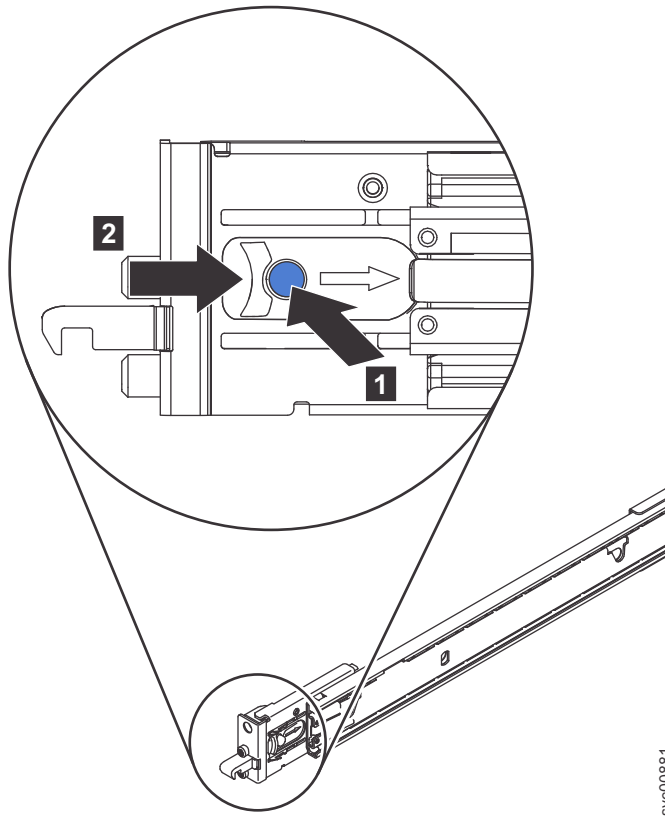


Figure 64. Installing rear end of slide rail

- 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 65 on page 89.

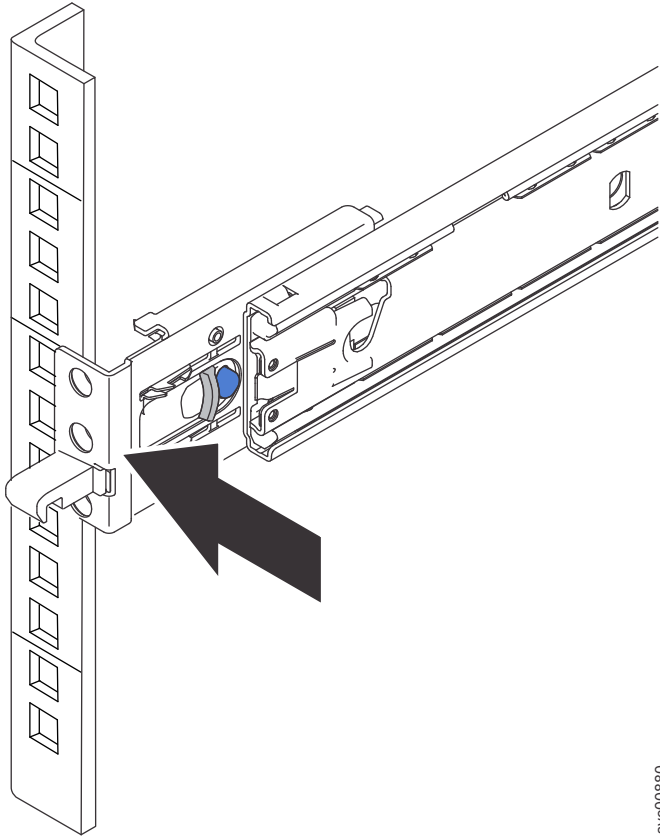
Note: If your slide rails are shipped with the front latches in the open position, skip this step and go to step 5 on page 89.



svc00881

Figure 65. Opening the front slide rail latch

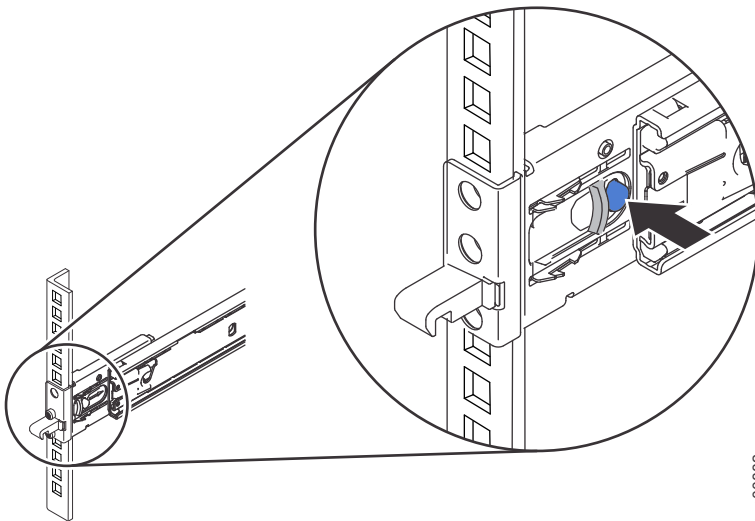
5. Align front of slide rails, as shown in Figure 66 on page 90.
 - a. Pull the slide rails forward and locate the front latches in the appropriate U spaces in front of the rack EIA rails.
 - b. Adjust the length of the rail as needed.
 - c. Make sure that the front end is being rotated into position with the front latch in front of the EIA rail of the rack.



svc00880

Figure 66. Aligning front of slide rail to rack front

6. Install the front end of the slide rails, as shown in Figure 67.
 - 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 67. Installing front end of slide rail

7. Repeat steps 1 on page 86 through 6 on page 90 to install the other rail into the rack.
8. Make sure that each front latch is fully engaged.

Installing the support rails: 2145-CG8 or 2145-CF8

Install the support rails that hold the 2145-CG8 or 2145-CF8 in the rack.

Before you begin

Notes:

- With some types of racks, you might find it helpful to remove the rack doors and side panels to provide easier access during installation.
- The slide rails are marked (RIGHT / FRONT and LEFT / FRONT) for proper placement on the rack flanges.
- The front and back of each rail has a spring-loaded rail-locking carrier, which can be locked in the open position and then released when the rail is in the rack.

When you are ready to install the support rails, use the customer's hardware-location chart and the Electronic Industries Alliance (EIA) positions on the rack to determine where in the rack that the SAN Volume Controller node is to be installed.

About this task

To install the support rails, follow these steps:

Procedure

1. Verify that you have all the items that you need for installing the support rails and that you have identified the front of each rail.
 - Slide rail (left)
 - Slide rail (right)
 - M6 screws (quantity 4)
2. Open the rear-slide-rail hooks, as shown in Figure 68.

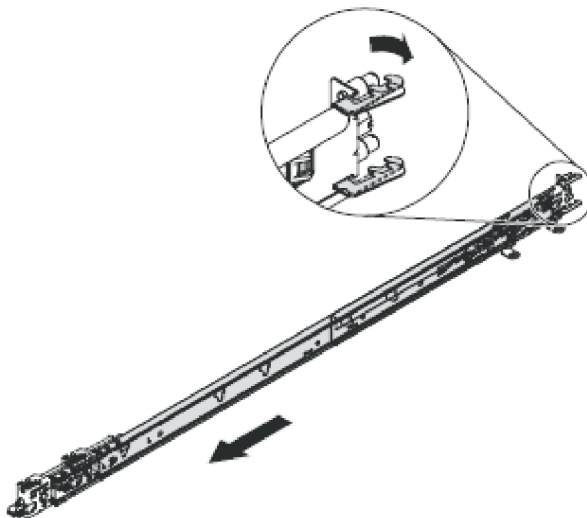


Figure 68. Opening the rear slide-rail hooks

Note: The maximum distance between the front and the rear EIA rails of the rack is 810 mm (31.9 in.).

Each slide rail is marked with either an R (right) or an L (left). Select one of the slide rails and pull the rear bracket all the way back. If a thumbscrew is installed in the slide rail, remove it.

3. Install the rear end of the slide rails, as shown in Figure 69.

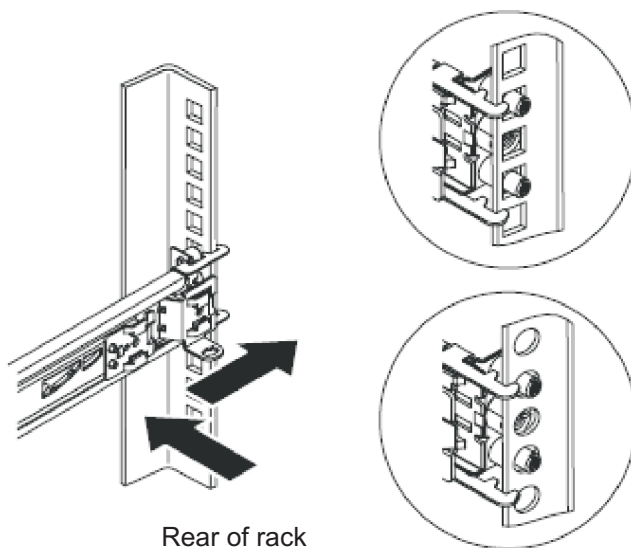


Figure 69. Installing the rear end of the slide rails

From the front of the rack, line up the two pins on the rear of the slide rail in the selected U on the rear of the rack. Push the rails so that the pins go into the holes and slide the rails into the rack to lock the rear of the slide rails into the rack.

4. Prepare the front end of the slide rails, as shown in Figure 70.

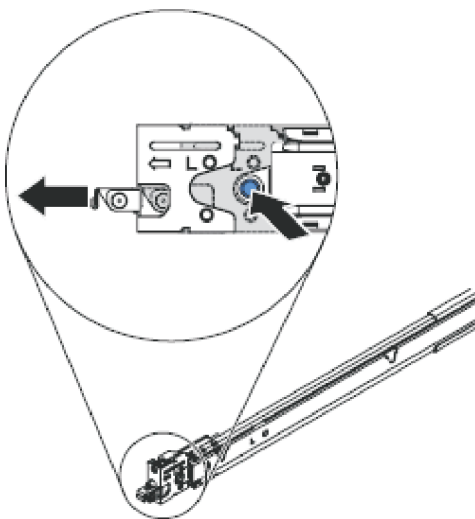


Figure 70. Preparing the front end of the slide rails

Push the blue button to allow the latch to slide forward. Then pull the slide rail forward and pull the latch on the front of the rail in the U on the front of the rack. Adjust the length of the rail.

5. Install the front end of the slide rails, as shown in Figure 71 on page 93.

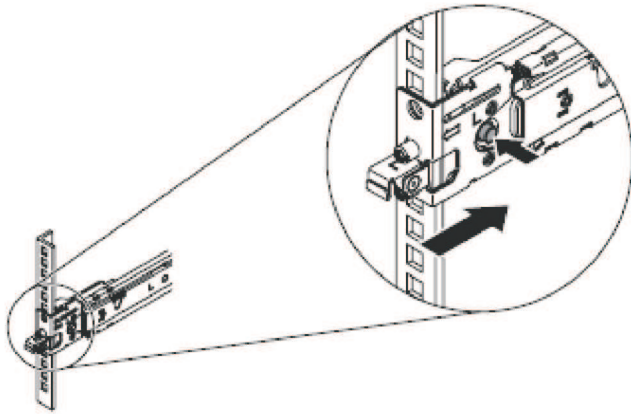


Figure 71. Installing the front end of the slide rails

Press the blue button to release the bracket. Push the front latch in all the way. Make sure the latch is fully engaged.

6. Install the other rail in the same manner.

Results

The installation of the support rails for the 2145-CG8 or 2145-CF8 is complete.

Removing the top cover

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

About this task

Note: The top cover on a SAN Volume Controller 2145-SV1 node consists of two parts: a back cover and a front cover.

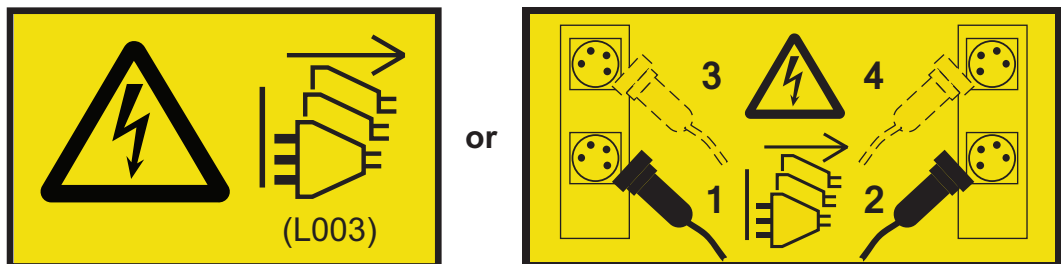
Removing the top covers: 2145-SV1

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 72.



Figure 72. 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 73.



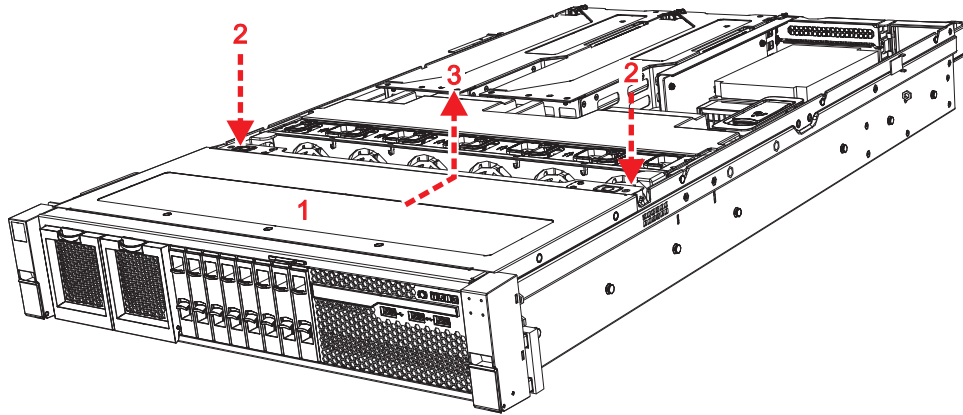
Figure 73. Removing the 2145-SV1 back cover

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 74) at the back edge of the top cover.



sv100108

Figure 74. 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 74) until you can lift it up.

9. Place the front cover in a safe location.

Removing the top cover: 2145-DH8

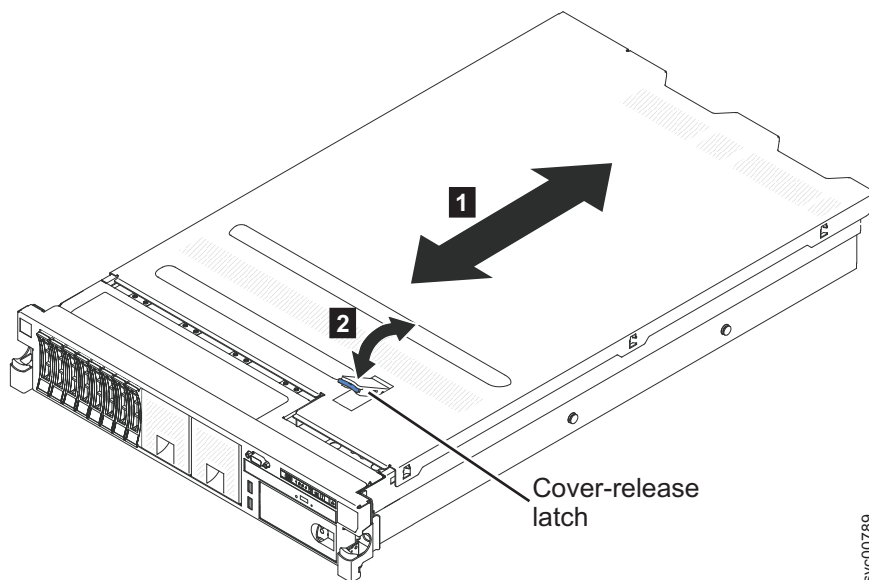
You might be required to remove the SAN Volume Controller 2145-DH8 top cover.

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 75 on page 96.



svc00789

Figure 75. Removing the 2145-DH8 cover

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

Removing the top cover: 2145-CG8 or 2145-CF8

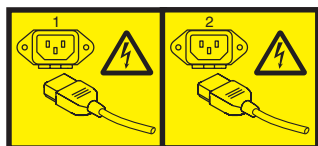
You can remove the top cover of a SAN Volume Controller 2145-CG8 or 2145-CF8 node to access the node components.

Before you begin

Important: Before you turn on the node, replace the cover for proper cooling and airflow. Operating the node for extended periods of time (more than 30 minutes) with the cover removed might damage components.

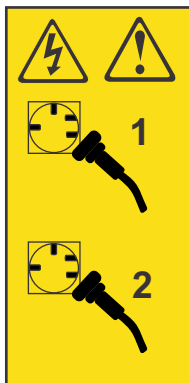
DANGER

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

About this task

To remove the SAN Volume Controller 2145-CG8 or 2145-CF8 cover, complete the following steps:

Note: Some parts remove or replace instructions call for removing the node. Removing the node normally is not necessary and only complicates the procedure.

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Optional: Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.

Most maintenance procedures that require you to remove the cover are performed with:

- The node turned off
- The power cables disconnected
- The data cables connected

Depending on the part that you are removing or replacing, you might be able to leave the power cords and the data cables connected. The removal or replacement procedure for each part describes what to do about power, the power cords, and the data cables.

If you are removing or replacing a hot-swap fan, for example, you can leave the node turned on, the power cords connected, and the data cables connected. However, do not run the node for longer than thirty minutes without the cover. If you must take a longer time, turn off the node as directed in MAP 5350.

3. You must work from the front and slide the node out to remove the SAN Volume Controller 2145-CG8 or 2145-CF8 top cover.

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

4. Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.
5. Press down firmly on the blue tab (**2** in Figure 76) that secures the cover (**1**) and slide the cover toward the rear of the node until the cover disengages the chassis.

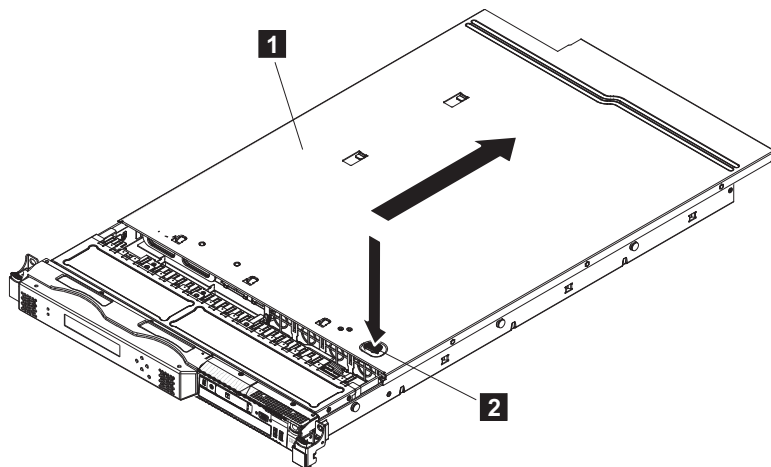


Figure 76. Removing the SAN Volume Controller 2145-CG8 or 2145-CF8 cover

- 1** Cover
- 2** Blue locking tab

6. Lift the cover off the SAN Volume Controller 2145-CG8 or 2145-CF8 node and set it aside.

Replacing the top cover

You must replace the top cover on the SAN Volume Controller node after maintenance is completed.

About this task

Note: The top cover on a SAN Volume Controller 2145-SV1 node 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

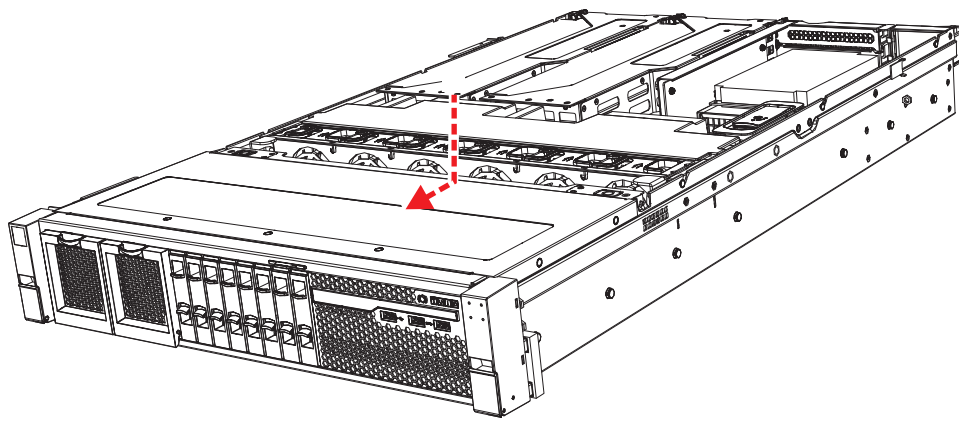
1. If you removed the node from the rack, replace it in the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 70.

Replacing the top front cover

Note: If you did not remove the front cover, continue to step 4 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 77.

Replacing the top back cover



sv100109

Figure 77. Replacing the 2145-SV1 top front 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 78 on page 99.



Figure 78. 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 79 on page 100.

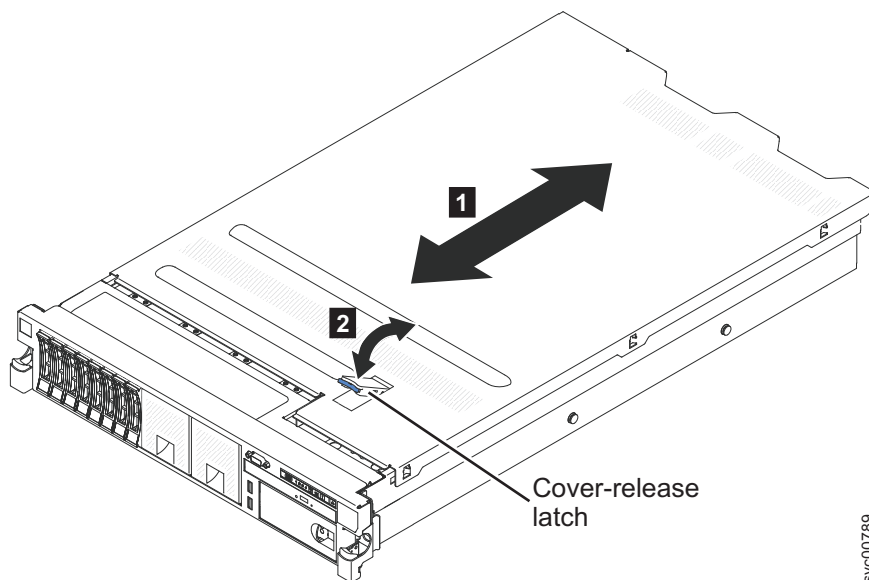


Figure 79. Replacing the SAN Volume Controller 2145-DH8 cover

- 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.

Replacing the top cover: 2145-CG8 or 2145-CF8

You can replace the top cover on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

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-CG8 or 2145-CF8, complete the following steps:

Procedure

1. 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 67.
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 cables before removing them from the back of the node.
3. Position the cover on top of the SAN Volume Controller 2145-CG8 or 2145-CF8.

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 80 on page 101.

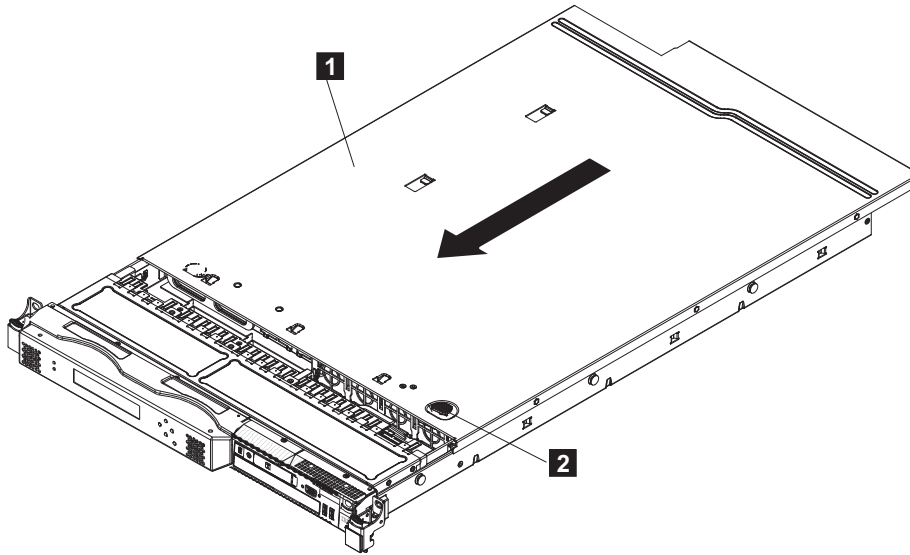


Figure 80. Replacing the SAN Volume Controller 2145-CG8 or 2145-CF8 cover

- 1** Cover
- 2** Blue locking tab

5. Verify that the cover correctly engages all the inset tabs on the node.

Removing the air baffle

You can remove the SAN Volume Controller air baffle.

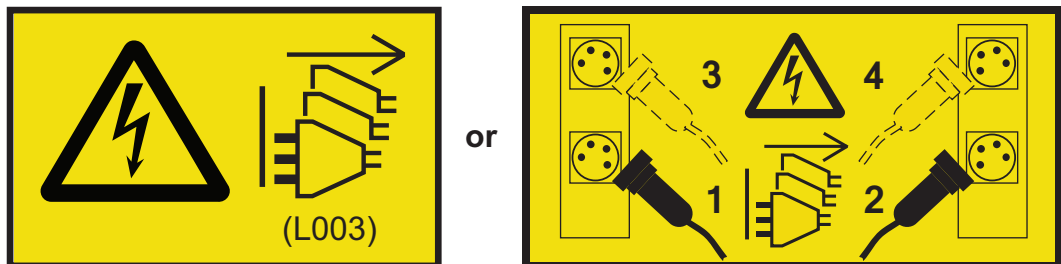
Removing the air baffle: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 81.



Figure 81. Removing the air baffle

3. Hold the air baffle at an angle and lift it out of the node, as shown in Figure 82 on page 103. Be careful to avoid the top cover latch posts that are on the left side of the chassis.



Figure 82. 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.

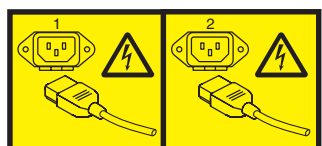
Removing the air baffle: 2145-DH8

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

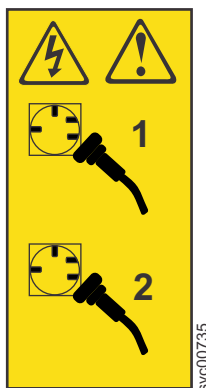
Before you begin

DANGER

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



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 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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 83.

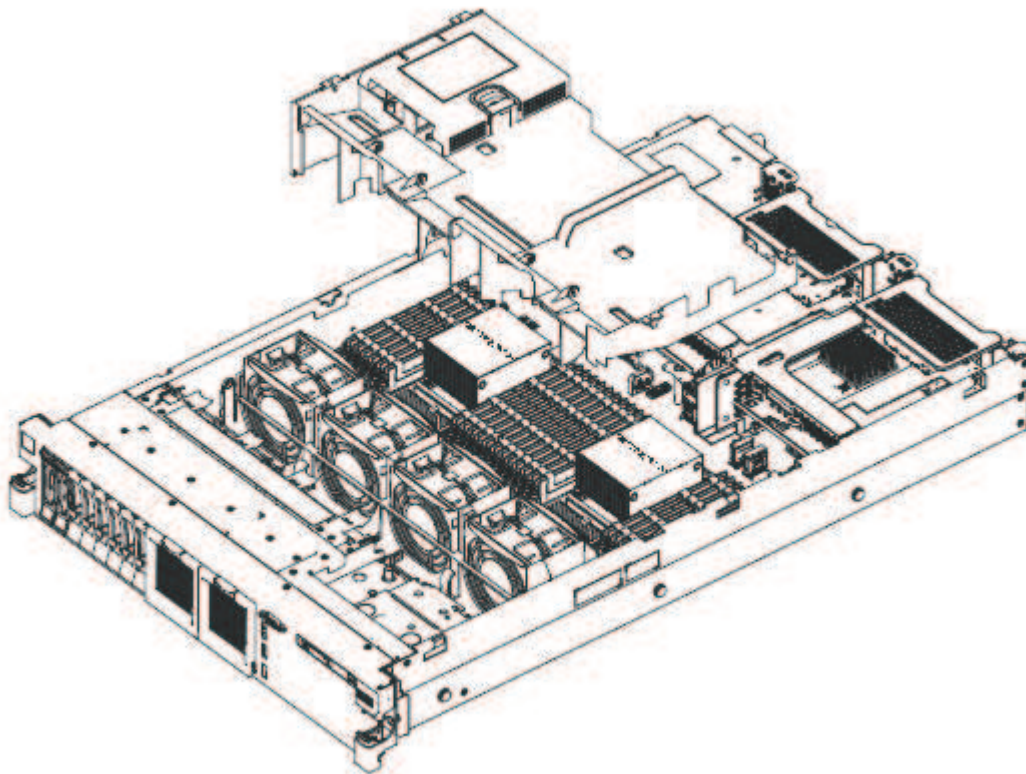


Figure 83. Removing the air baffle

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 SAN Volume Controller air baffle.

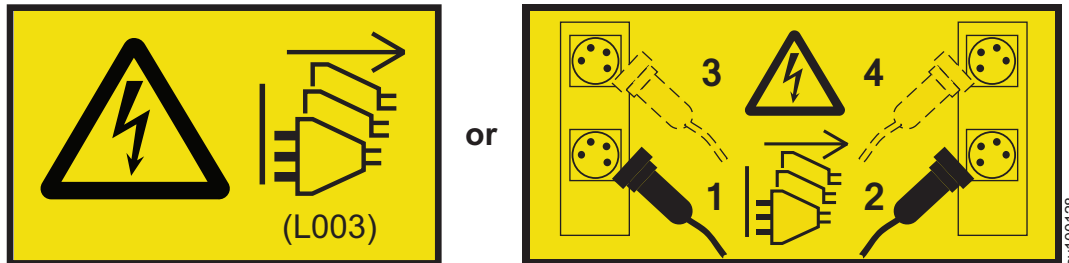
Replacing the air baffle: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 84 on page 106.

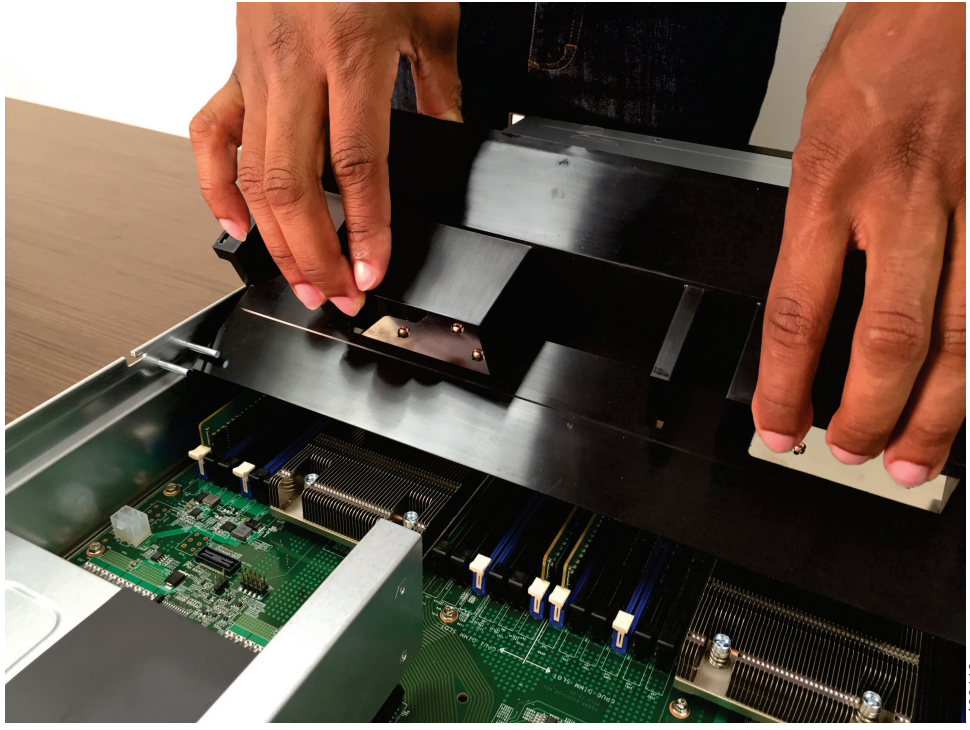


Figure 84. Aligning the air baffle

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 85 on page 107.



Figure 85. Replacing the air baffle

5. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 98.
6. If you removed the node from the rack, replace it, as described in “Replacing a node in a rack: 2145-SV1” on page 70.
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 powers on when the cords are reconnected.

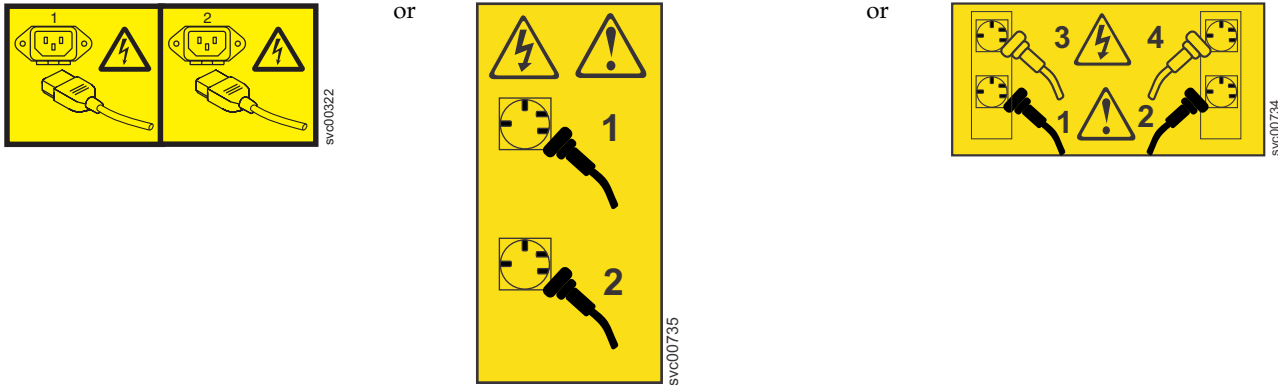
Replacing the air baffle: 2145-DH8

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)



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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 86 on page 109, making sure that all cables are out of the way. Press the air baffle down until it is securely seated.

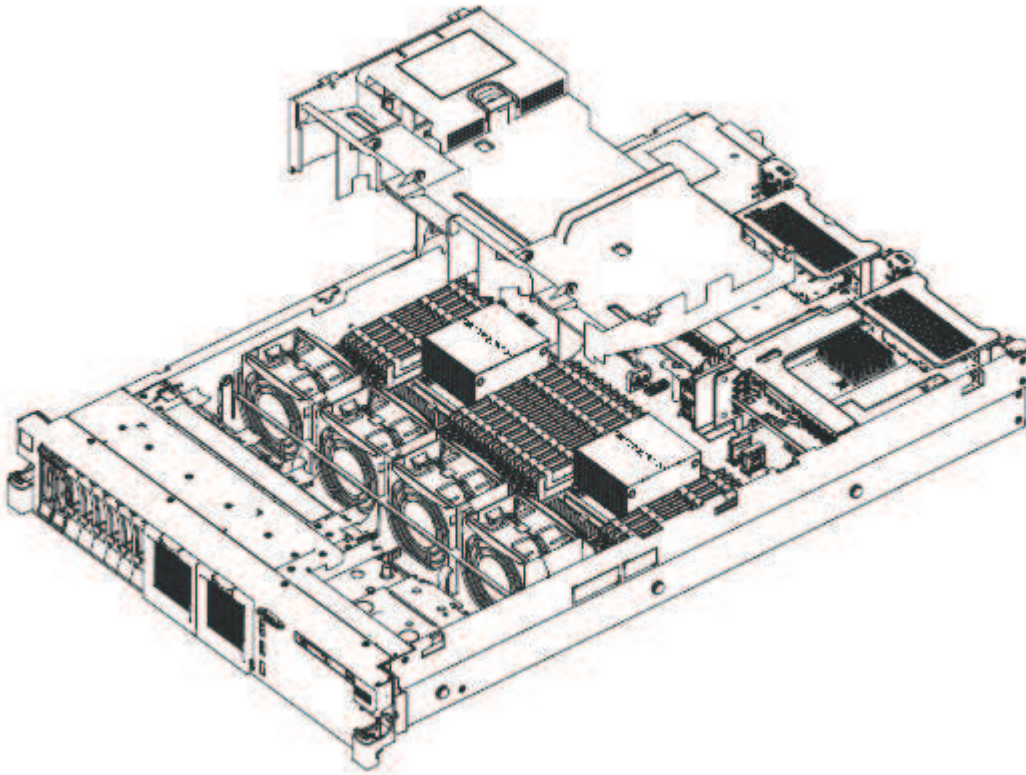


Figure 86. Replacing the air baffle

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 87) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

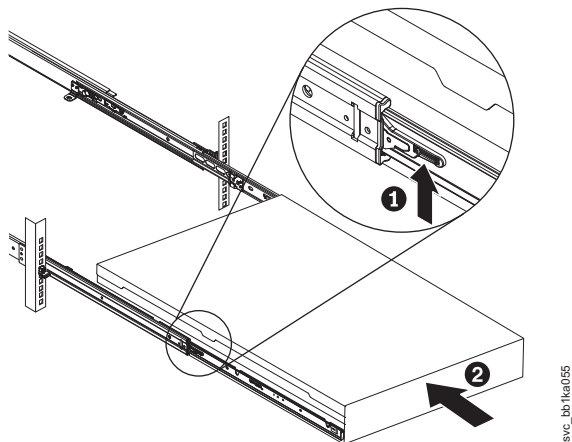


Figure 87. Raising the locking levers of the slide rails of the rack

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 xxvii.

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 *IBM SAN Volume Controller Troubleshooting Guide* 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 88) forward, and pull the server forward along the slide rails.

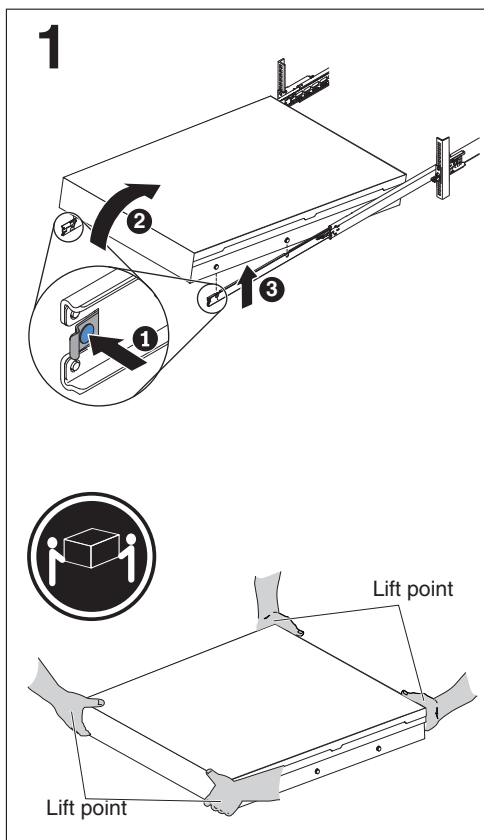


Figure 88. Removing the SAN Volume Controller 2145-DH8 from the rack

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 89.

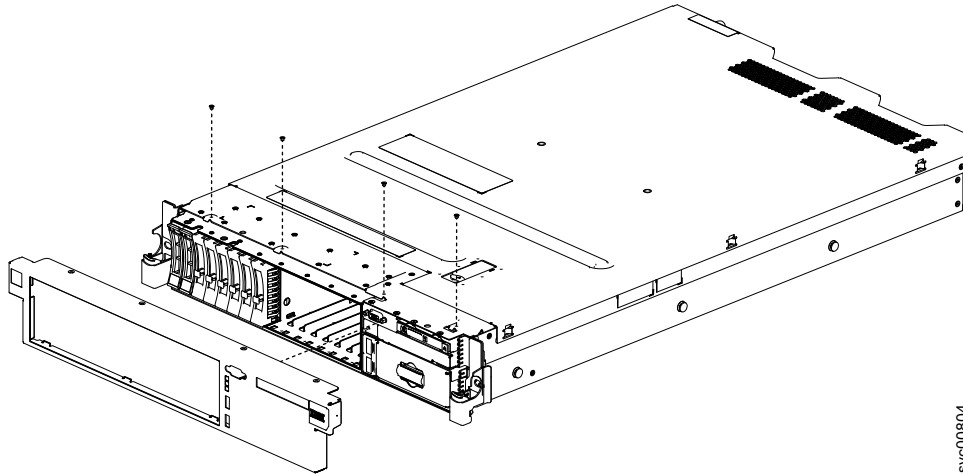


Figure 89. Removing the 2145-DH8 bezel

8. Remove the LED cable from the LED PCB on the back of the bezel assembly as shown in Figure 90.

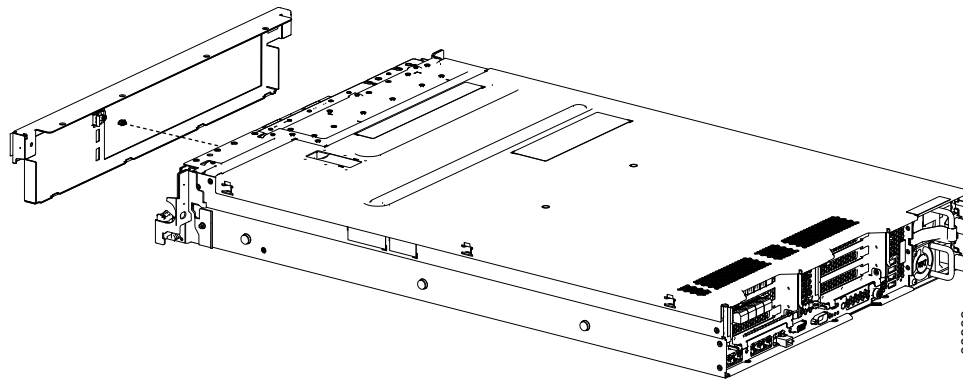


Figure 90. Removing the LED cable from the back of the bezel assembly

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 xxvii.

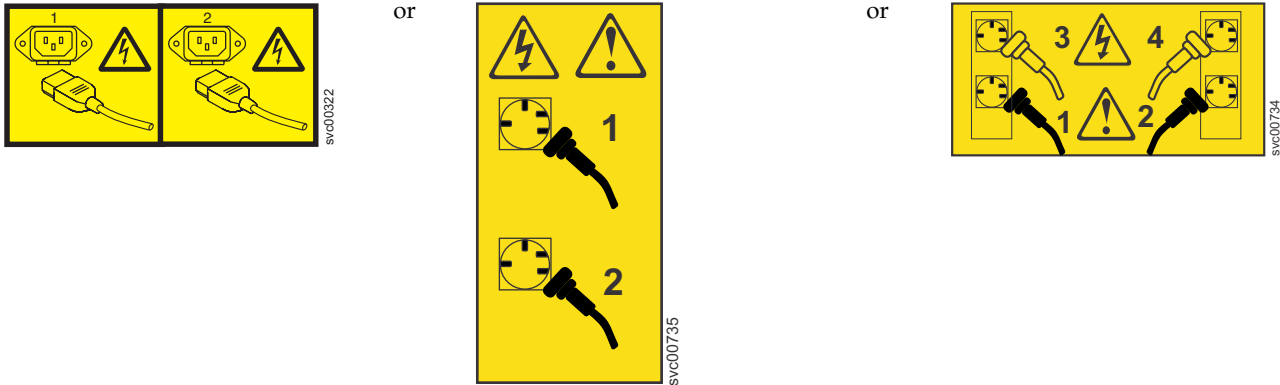
Replacing the bezel: 2145-DH8

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)



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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 91.

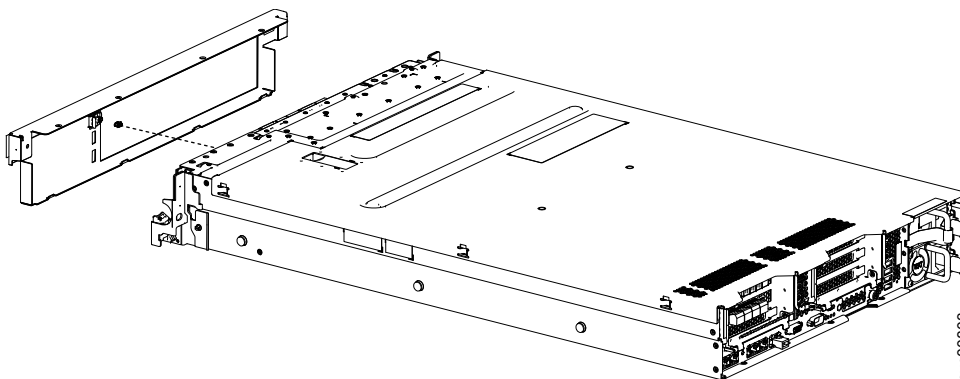


Figure 91. Connecting the LED cable to the back of the bezel assembly

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 92 on page 113.

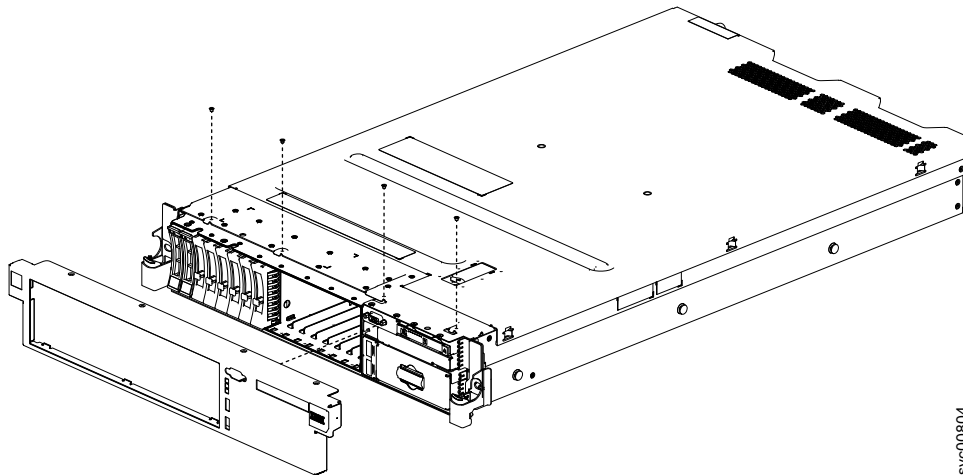


Figure 92. Replacing the SAN Volume Controller 2145-DH8 bezel

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 93) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

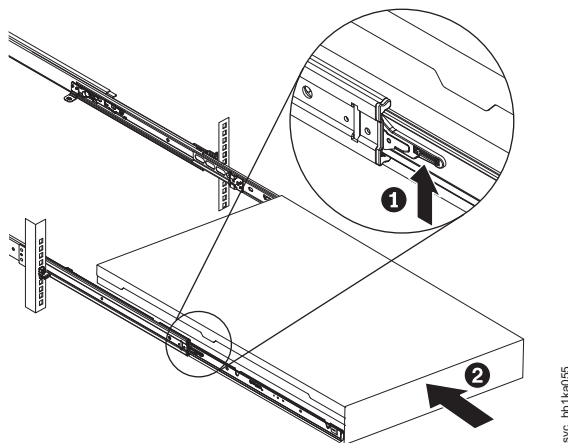


Figure 93. Raising the locking levers of the slide rails of the rack

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 xxvii.

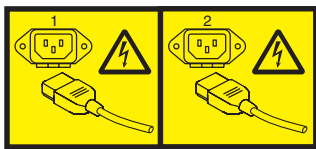
Removing the 240 VA safety cover: 2145-DH8

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

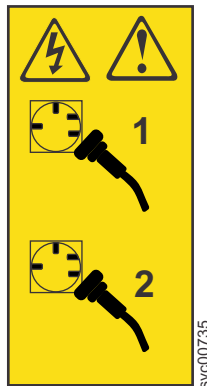
Before you begin

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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.

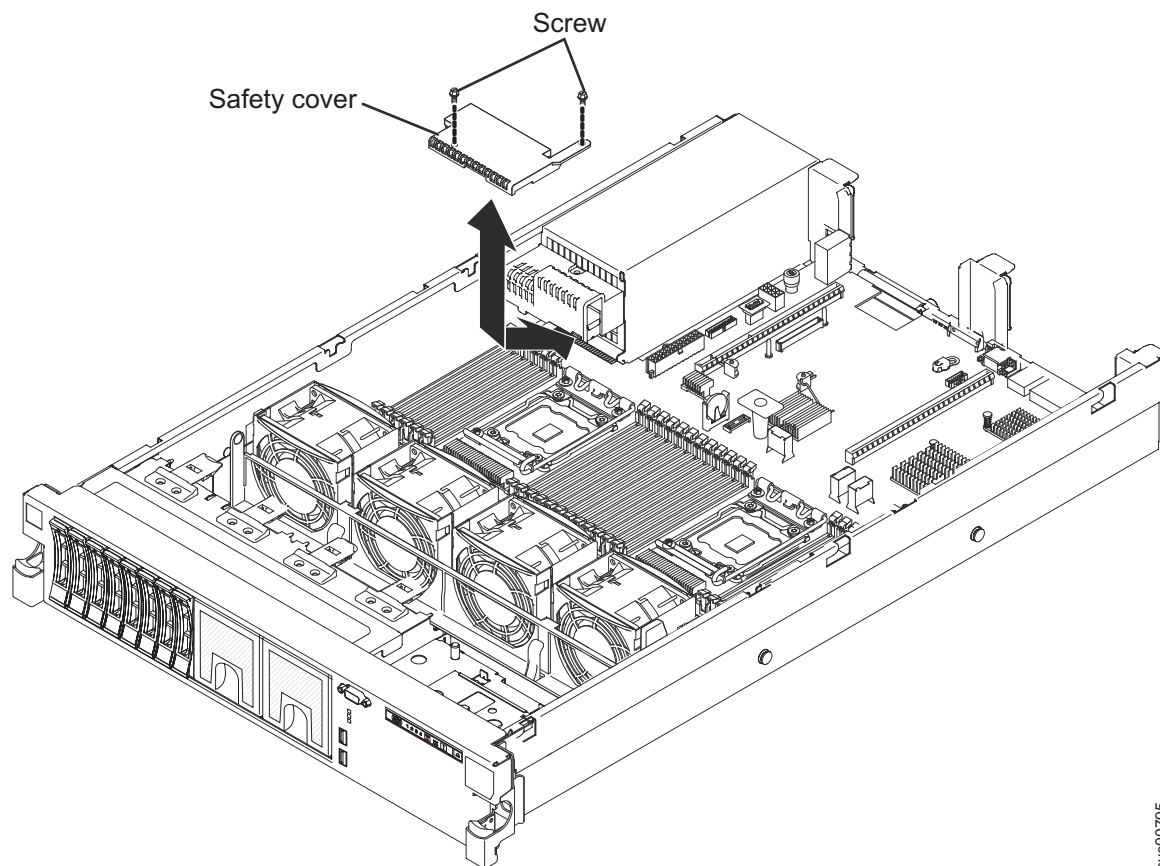


Figure 94. Removing the SAN Volume Controller 2145-DH8 240 VA safety cover

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 94
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 xxvii.

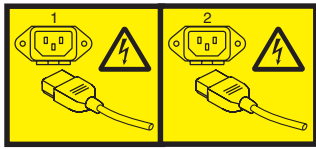
Replacing the 240 VA safety cover: 2145-DH8

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

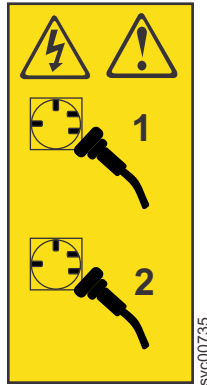
Before you begin

DANGER

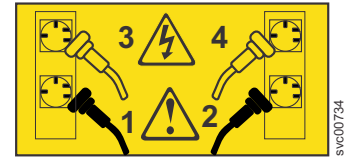
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



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

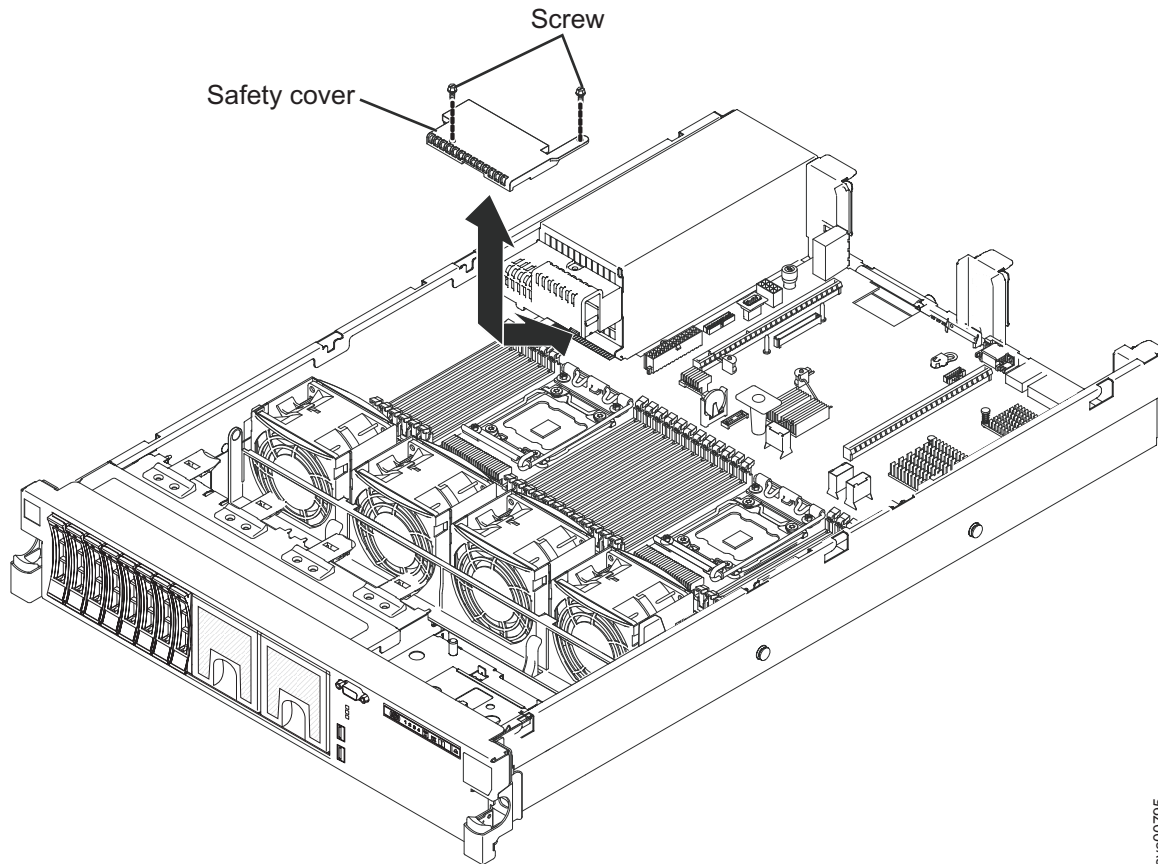
This service action assumes:

- 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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 95 on page 117.



svc00795

Figure 95. 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 96 on page 118) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

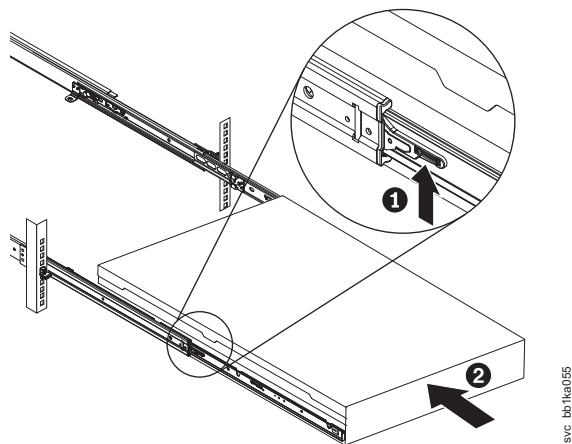


Figure 96. Raising the locking levers of the slide rails of the rack

12. Turn on the node.

Removing the service controller

You can remove the service controller from the SAN Volume Controller.

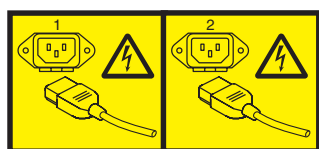
Removing the service controller: 2145-CG8 or 2145-CF8

You can remove the service controller in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

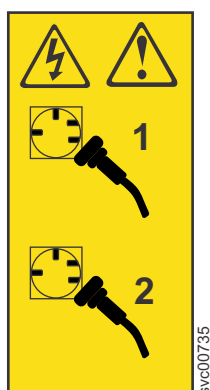
Before you begin

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

This service action is used in two separate removal and replacement procedures, which each have unique power requirements:

- If you are replacing the service controller, this service action is often written as if you must turn off the node and disconnect the USB service-controller cable. See Fastpath.
- If you are replacing a hot-swap drive, you do not have to turn off the node, and you can leave the service-controller cable attached to the service controller.

To remove the service controller, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. If you are intending to replace the service controller field-replaceable unit (FRU), use one of the following methods to read and record the WWNN of the node.
 - From the front panel, press the down button until Node: xxxx shows in the display. Press the right button until Node WWNN: nnnnn is displayed. Read and record the last 5-digits of the WWNN.
 - From the cluster vital product data (VPD), record the last five digits of the WWNN or the WWPNN of the Fibre Channel ports.

If you cannot obtain the WWNN with either method, obtain the information from your storage-attached network (SAN) switch.

3. If replacing the service controller: Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
4. Optional: Slide the node out on its slide rails to the fully extended position.

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.

Fast path: You can perform this service procedure with the node in place.

5. Locate the recessed, blue service-controller release buttons on each side of the controller. See Figure 97.

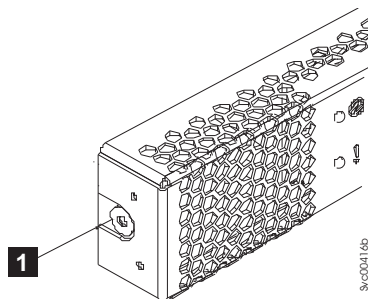


Figure 97. Left release button of a 2145-CG8 or 2145-CF8 service controller

6. Gently press both release buttons, shown by **2** in Figure 98 on page 120, and release the catch while pulling gently forward on the service controller.

The service controller moves slightly forward.

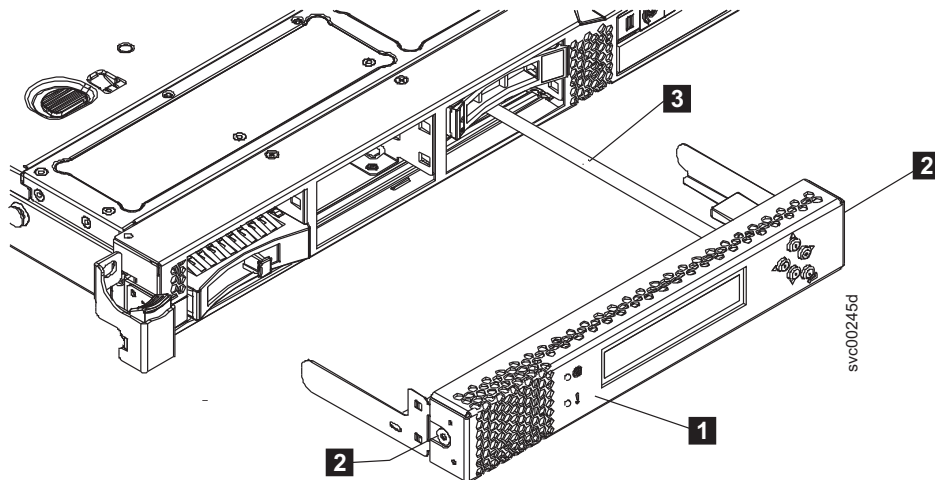


Figure 98. Service controller for the 2145-CG8 or 2145-CF8 with attached USB cable

- 1 Service controller
- 2 Service-controller release buttons
- 3 USB service-controller cable

Attention: If you meet any resistance, do not pull harder, or you might damage the release mechanism.

Stop pressing the release buttons once the service-controller locking mechanism clears the 2145-CG8 or 2145-CF8.

7. Pull the service controller fully out of the frame.

If you are replacing a hot-swap drive, you can leave the service-controller cable attached to the service controller. Rest the service controller on another surface while removing and replacing the drive to prevent strain on the cable.

8. If you are intending to replace the service controller FRU, detach the USB cable, shown by 3 in Figure 99, from the service controller.

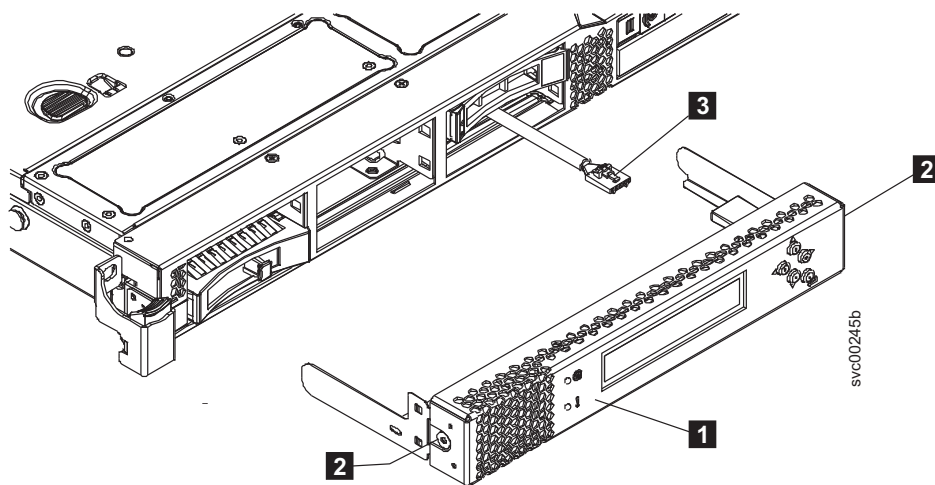


Figure 99. SAN Volume Controller 2145-CG8 or 2145-CF8 service controller

9. If you are intending to replace the service controller FRU, label the one that you are removing to avoid a possible worldwide node name (WWNN) conflict if the service controller is ever reused.

Note: When you replace a service controller, it is normal to change the worldwide node name (WWNN) of the new service controller to match the one that is being replaced. In this case, you will have two service controllers with the same WWNN. Clearly label the service controller that you are removing and indicate that its WWNN is now a duplicate and that it must not be connected to a SAN before its WWNN is reset.

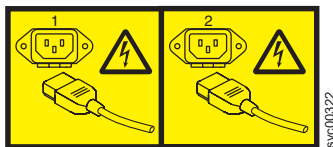
Removing and replacing the USB service controller cable: 2145-CG8 or 2145-CF8:

You can remove and replace the USB service-controller cable in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

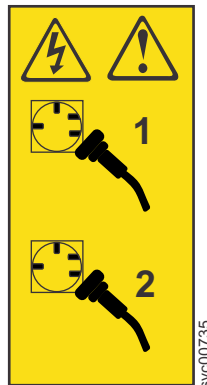
Before you begin

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

This service action requires you to remove the cover and:

- Turn the node off.
- Disconnect the power cables.
- Disconnect or reconnect the USB service-controller data cable.

Complete the following steps to remove or replace the service controller cable.

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. 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. 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.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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 54.
6. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
 7. Remove the service controller from the SAN Volume Controller 2145-CG8 or 2145-CF8, as described in “Removing the service controller: 2145-CG8 or 2145-CF8” on page 118.
 8. Remove or replace the USB service-controller cable.

To remove the USB service-controller cable, perform the following procedure:

 - a. Disconnect the USB cable (**1** in Figure 100) from the service controller (**2**).

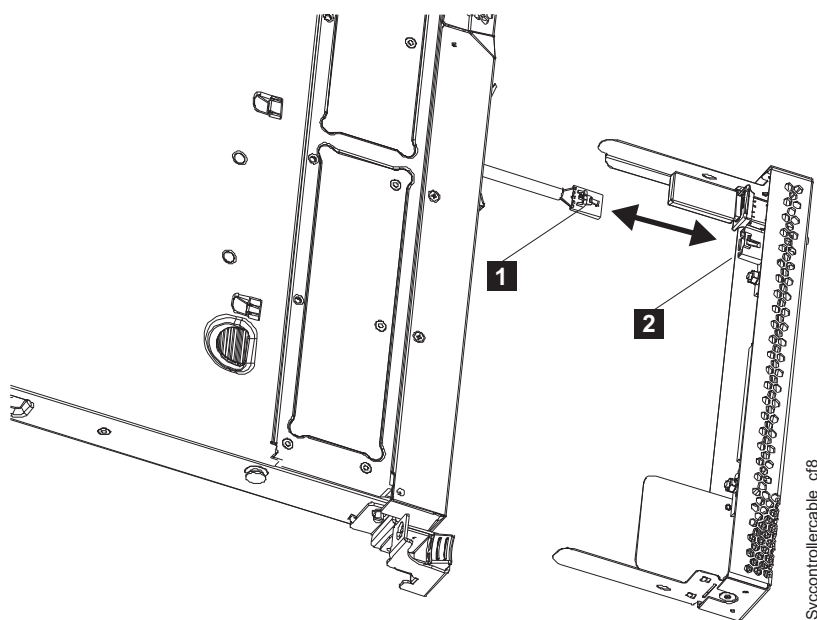


Figure 100. Removing and replacing the USB cable in the SAN Volume Controller 2145-CG8 or 2145-CF8 service controller

1 USB cable

2 USB connector

- b. Locate the USB connector (**1** in Figure 101 on page 123) on the left side of the SAN Volume Controller 2145-CG8 or 2145-CF8.

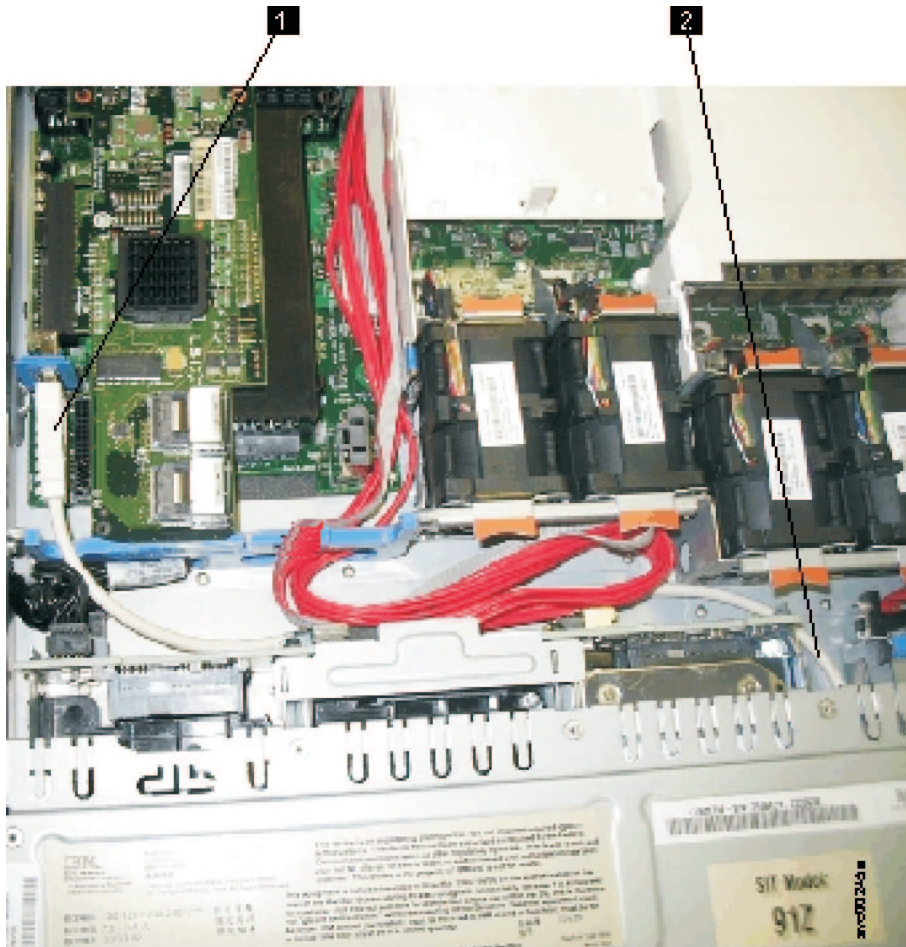


Figure 101. USB service-controller cable connected to the disk controller and USB riser card (SAN Volume Controller 2145-CF8 shown)

- 1** USB connector on the disk controller and USB riser card
- 2** USB cable
- c. Grasp the blue lockbar (**2** in Figure 102 on page 124) and slide it toward the USB riser-card assembly (**3**) to the unlock position and remove the USB cable (**1**) from the connector.

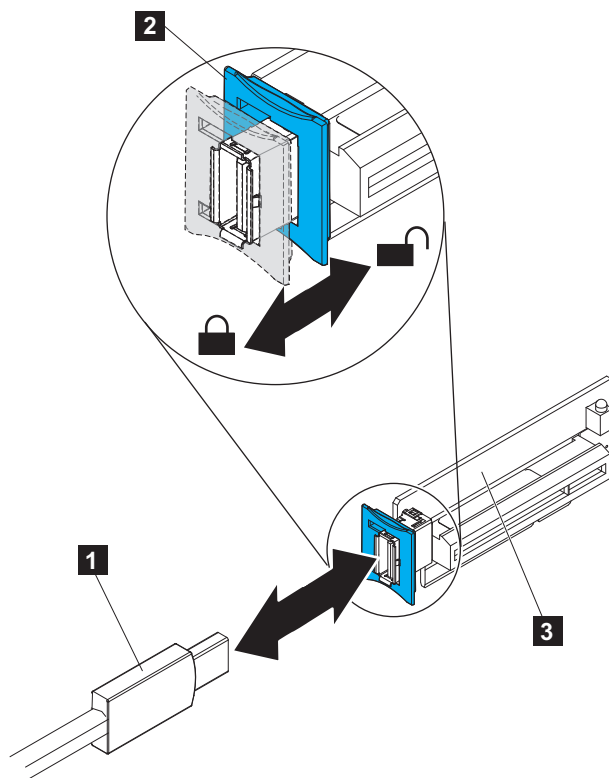


Figure 102. USB service-controller cable connector on the USB riser card

- d. Remove the cable from the node.

To replace the USB service-controller cable, perform the following procedure:

- a. To reinstall the cable, *carefully* thread the USB cable through disk-drive bay 5, routing the larger connector of the cable to the USB connector (**1** in Figure 101 on page 123) on the USB riser card. Route the cable beneath any red SAS cables that are attached to the disk backplane.
- b. Align the USB service-controller cable (**1** in Figure 102) with the connector on the USB riser-card assembly (**3**) and push it into the connector until it is firmly seated.
- c. Slide the blue lockbar (**2**) toward the USB service-controller cable to the locked position until it is seated firmly.
- d. Install the other end of the USB cable in the USB connector (**2** in Figure 100 on page 122) on the rear of the service controller.
- e. Carefully install the service controller, as described in “Replacing the service controller: 2145-CG8 or 2145-CF8.”

Important: Ensure that the USB cable is pushed back into the empty drive bay, and ensure that the cable is not trapped above or below the bay.

- 9. After replacing the cable and the service controller, perform the procedure to replace the top cover, as described in “Replacing the top cover” on page 98.

After completing the procedure, the node is reinstalled in the rack with the power on.

Replacing the service controller

You can replace the SAN Volume Controller service controller.

Replacing the service controller: 2145-CG8 or 2145-CF8

Use the following information to replace the service controller for a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

About this task

To replace the service controller, complete the following steps:

Procedure

1. When the service controller, as shown by **1** in Figure 103, is close enough to the USB cable (**3**), attach the cable to the service controller, if necessary.

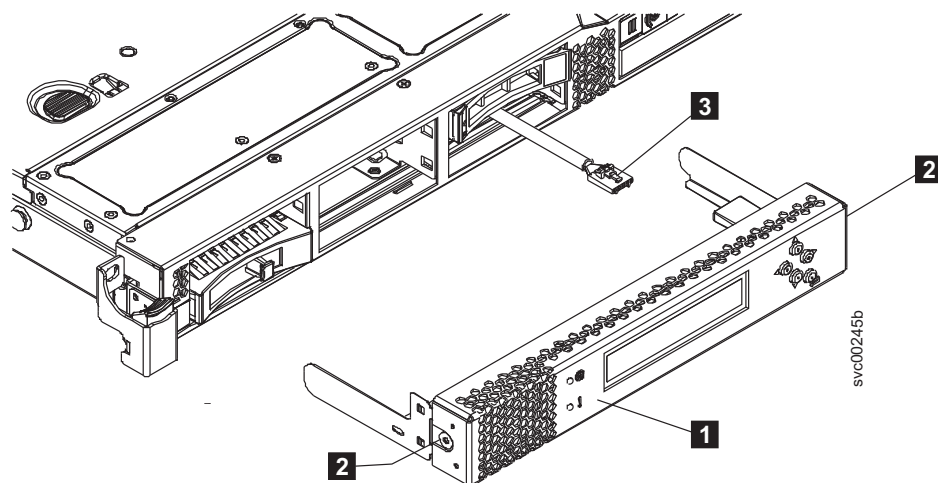


Figure 103. SAN Volume Controller 2145-CG8 or 2145-CF8 service controller (SAN Volume Controller 2145-CF8 shown)

- 1** Service controller
 - 2** Service-controller release buttons
 - 3** USB service-controller cable
2. Align the service controller with the service controller bay on the SAN Volume Controller 2145-CG8 or 2145-CF8 node, and gently begin to push the service controller into the node.
 3. Continue gently pushing the service controller into the frame until the rear connectors are fully seated and the front metal work of the service controller is up to the frame.
- Important:** Ensure that the USB cable is pushed back into the empty drive bay, and ensure that the cable is not trapped above or below the bay.
4. 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 67.
 5. 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.
 6. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
 7. If you pulled out the node to the fully-extended position on the rack, lift the locking levers (**1** in Figure 104 on page 126) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

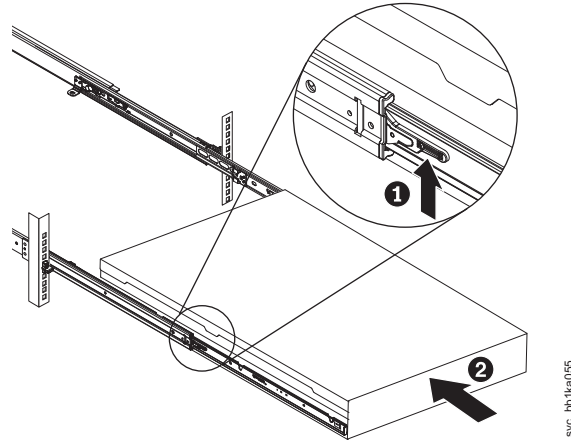


Figure 104. Raising the locking levers of the slide rails of the rack

8. Turn on the node.

Note: The worldwide port names (WWPNs) of the Fibre Channel ports are derived from the worldwide node name (WWNN) of the service controller. If you do not perform step 9, you might have to rezone the Fibre Channel switches if the switch zoning uses WWPN. You must restart the host systems before they are able to access disks through this node.

9. If you replaced the service controller as part of concurrent maintenance, you must rewrite the WWNN on the new service controller. If you do not, and the Fibre Channel switch zoning uses WWPNs, you cannot add the node back into the cluster until the Fibre Channel switches in the SAN are rezoned. The host systems cannot access the Fibre Channel ports on that node until the host systems are reconfigured.

The node finally stops with **Validate WWNN** in the front panel. Press **select** and use the left and right buttons until either **Disk WWNN** or **Panel WWNN** is displayed. If you use **Disk WWNN**, which is what the node was using before the service controller was changed, you do not have to reconfigure SAN switches and applications.

Press and release the down button until **Use Disk WWNN** is displayed. If your selection is correct, press **Select** to verify that the WWNN that you set matches the WWNN that you recorded when you removed the service controller.

You must choose either the WWNN stored on disk or the WWNN stored on the service controller to allow the node to start. If neither of these options is suitable, see the **Change WWNN?** option from the front panel **Actions** options for instructions on changing the value.

What to do next

Wait one minute. If **Cluster: *cluster_name*** is displayed, the node has rejoined the cluster. If **Cluster:** does not display, see "MAP 5000" in the *IBM SAN Volume Controller Troubleshooting Guide* to determine how to solve this problem or contact the IBM support center.

Replacing a disk drive and a service controller: 2145-CG8 or 2145-CF8

You can replace a service controller at the same time that you replace the disk drive on a SAN Volume Controller 2145-CG8 or 2145-CF8. However, you might not be able to complete a node rescue because the nonvolatile memory in the "new" service controller does not contain the operating system software required to do so.

Also, if you must replace the hard disk and the service controller at the same time, you cannot boot the node to complete node rescue. If you find that you cannot run node rescue, then use the following procedure to complete the rescue:

- Swap the service controller with a service controller from a working node. The results are the following:
 - The “new” service controller that is swapped into the working node has its nonvolatile memory updated when the node is booted from the hard disk.
 - The service controller that is swapped into the failed node from the working node contains the operating system that is required to complete node rescue on that failed node.
- When all updates are complete, swap the service controllers again, returning them to their original nodes.

Removing and replacing the power-cable assembly: 2145-CG8 or 2145-CF8

You can remove and replace the power-cable assembly if you have problems with the power supply and suspect that a power or signal cable is defective.

Before you begin

The power-cable assembly is composed of two power cables in a SAN Volume Controller 2145-CG8 or 2145-CF8 node and a signal cable that are bound together. You can remove the power-cable assembly if you have problems with the power supply and suspect that a power or signal cable is defective.

Make sure that power to the SAN Volume Controller 2145-CG8 or 2145-CF8 node is turned off before you remove the power-cable assembly. When removing the power-cable assembly, ensure that you also remove it from the uninterruptible power supply.

Turn off the node while ensuring that its data is mirrored and synchronized, as described in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.

About this task

To remove the power-cable assembly, complete steps 1 through 7 on page 128.

To replace the power-cable assembly, complete steps 8 on page 128 through 12 on page 128.

Procedure

Removing the power-cable assembly

1. Check the SAN Volume Controller 2145-CG8 or 2145-CF8 node power LED (**1** in Figure 105 on page 128).
 - If the light is on, go to step 2 on page 128.
 - If the light is either off or flashing, power has already been removed from the SAN Volume Controller node. Go to step 7 on page 128.

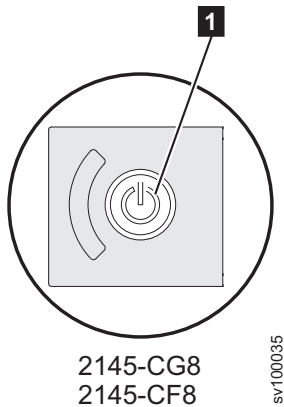


Figure 105. Power LED on the 2145-CG8 or 2145-CF8 operator-information panel

1 Power LED

Important: Nodes operate in pairs. Both nodes are in the same I/O group. One node must be operational if you are servicing the other node. If both nodes are not functioning, you cannot access any of the disks in that I/O group.

2. Turn off the node while ensuring that its data is mirrored and synchronized. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* for information.

Attention: If both SAN Volume Controller nodes are online, removing the power from one SAN Volume Controller can cause performance degradation while I/O operations are automatically rerouted to other SAN Volume Controller. Ensure that this performance outcome is acceptable before continuing with this procedure.

3. Press and release the power-control button **1** shown in Figure 105. Wait one minute for the SAN Volume Controller to turn off. Ignore a missing node error code if displayed by other nodes in the cluster. When maintenance procedures are completed, the error will resolve itself.
4. If necessary, pull back the cable-management arm, remove any cable ties or hook-and-loop fasteners that might be securing the power cords, and free the power cords from the cable-management arm.
5. Remove the cable-retention bracket.
6. Remove the cable-retention bracket from the 2145 UPS-1U.
7. Remove each power cord and serial cable from the back of the node.

Replacing the power-cable assembly

8. Replace each power cord and verify that each cord that you replace is seated well.
9. Replace the serial cable for the node and verify that each serial cable that you replace is seated well.
10. Replace the cable-retention bracket and the 2145 UPS-1U cable-retention bracket.
11. If possible, route the power cords on the cable-management arm, secure the power cords with cable ties or hook-and-loop fasteners, and close the cable-management arm.
12. If the node does not turn on automatically, press and release the power-control button.

Note: The 2145 UPS-1U turns off only when its power button is pressed, input power has been lost for more than five minutes, or the SAN Volume Controller node has shut it down following a reported loss of input power.

Removing the memory modules (DIMM)

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

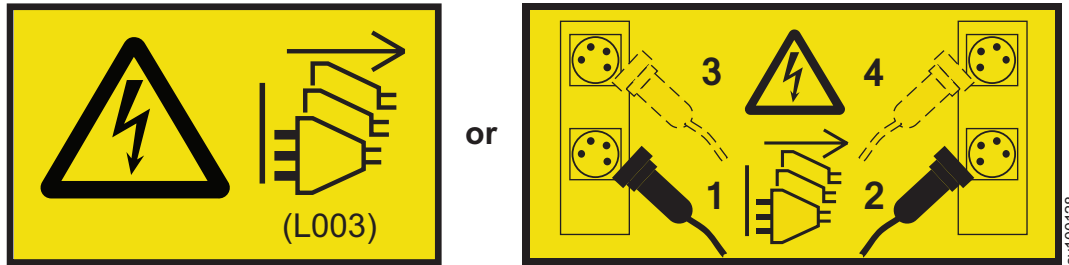
Removing the memory modules: 2145-SV1

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 106 on page 130 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).

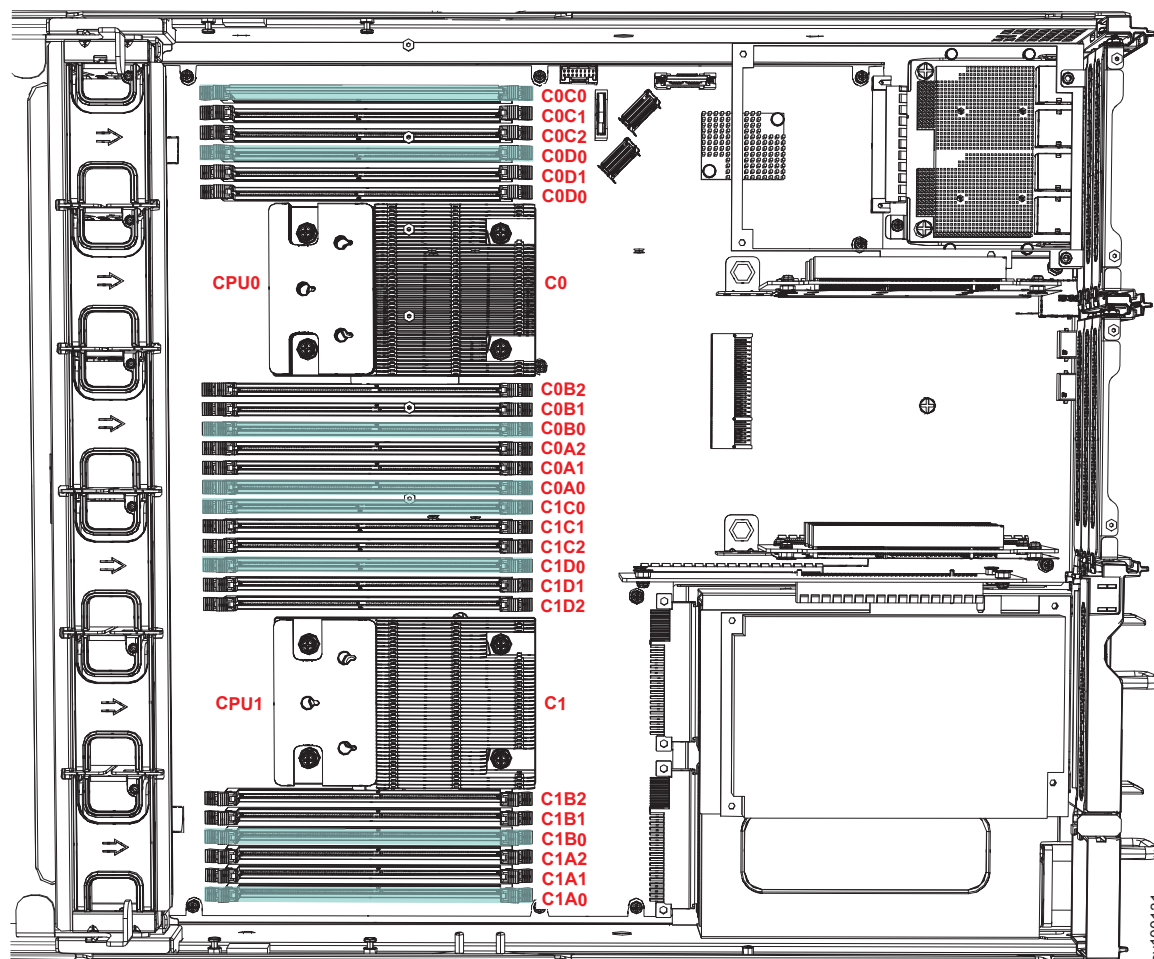


Figure 106. Locations of the DIMM connectors on the system board

- 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

- Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
- Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.
- Remove the top cover, as described in “Removing the top covers: 2145-SV1” on page 93.
- Remove the air baffle, as described in “Removing the air baffle: 2145-SV1” on page 101.
- Press the locking tabs on the side of the DIMM to eject it, as shown in Figure 107 on page 131.

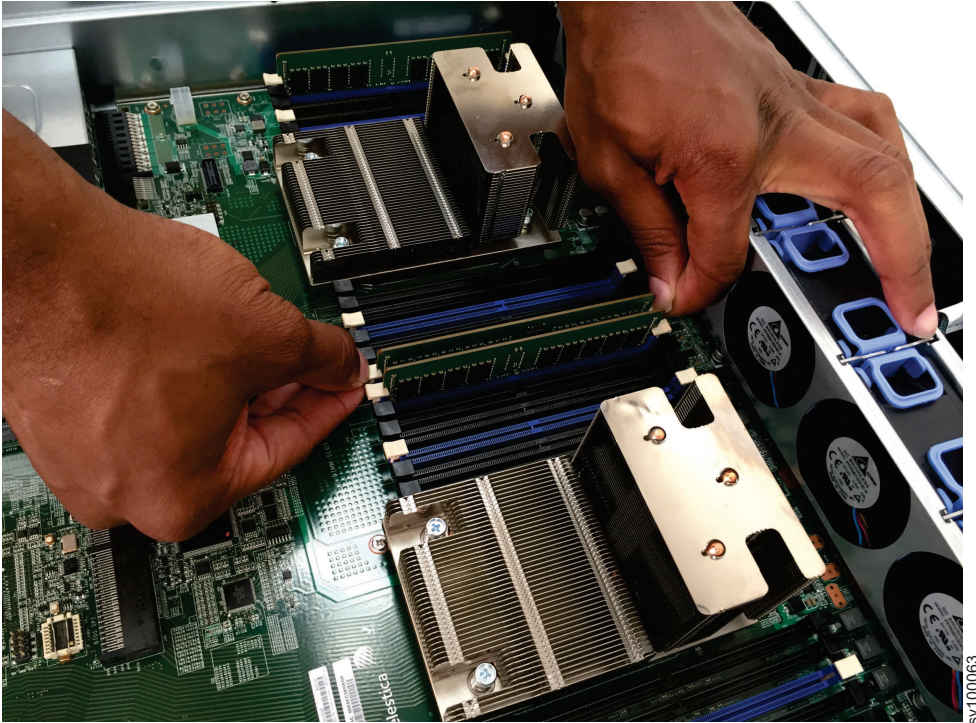


Figure 107. Ejecting a memory module

6. Lift the DIMM up and out of the slot, as Figure 108 shows.

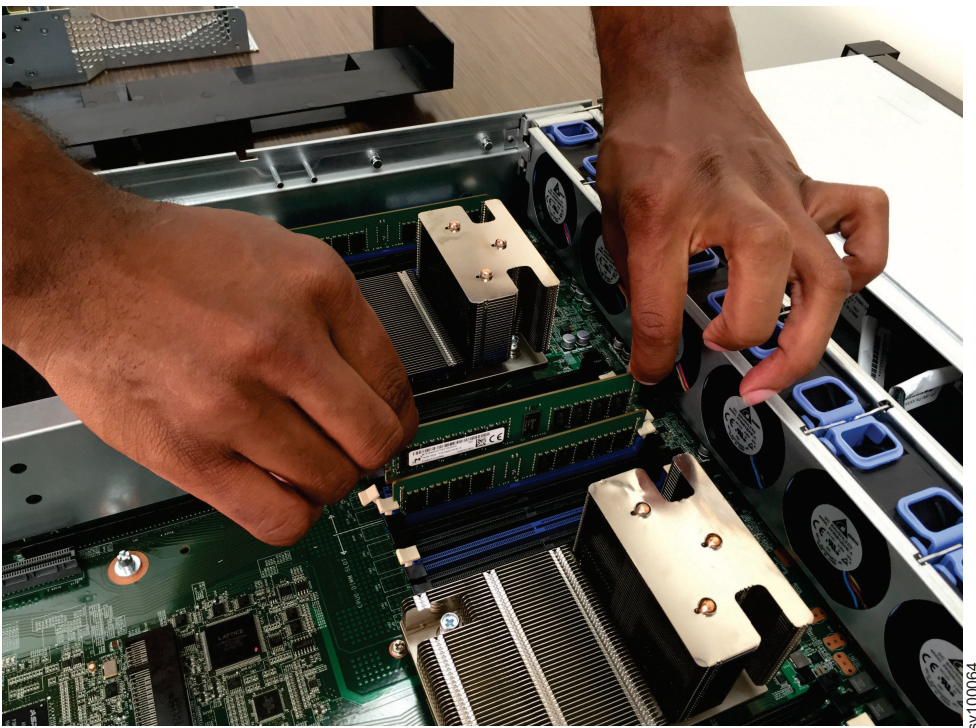


Figure 108. Removing a memory module

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 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 109.

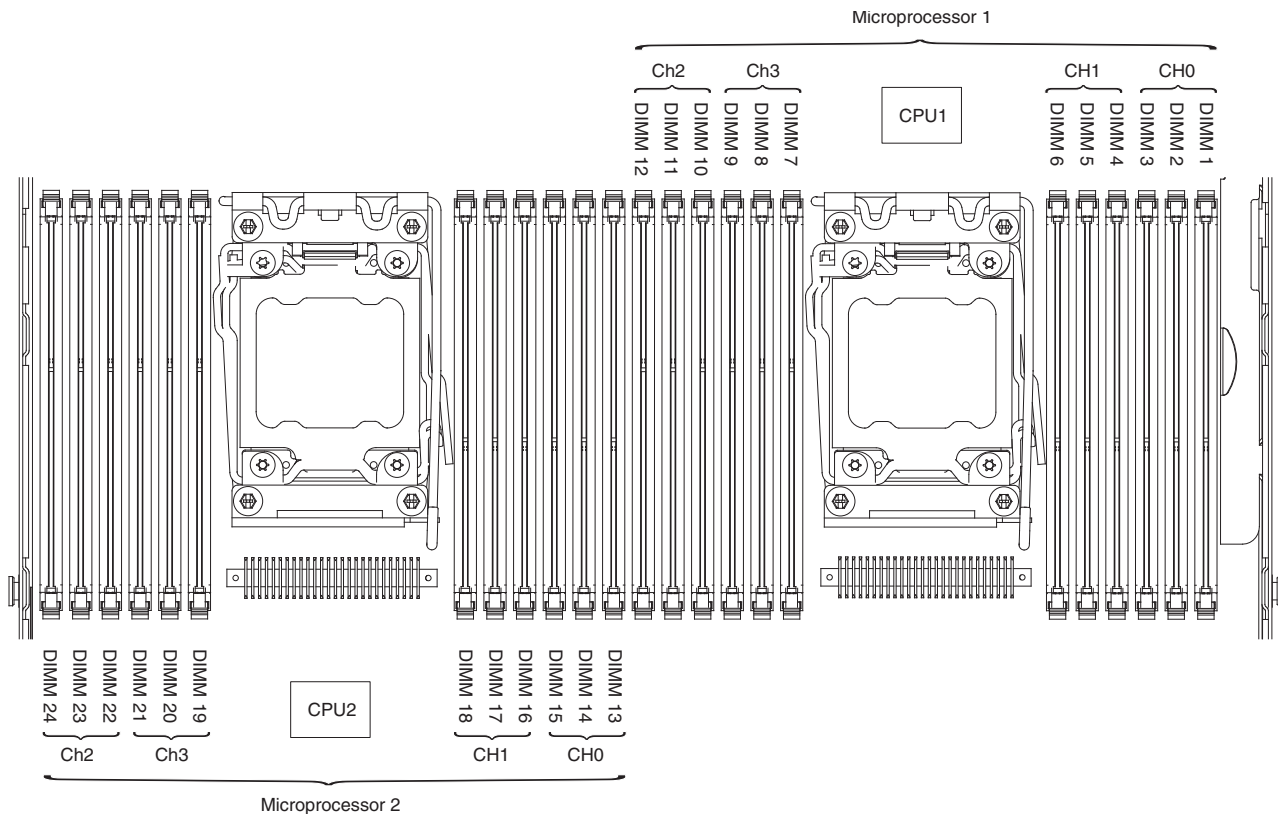


Figure 109. Locations of the DIMM connectors on the system board

About this task

Perform the following steps to remove the memory modules:

Procedure

1. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 54.
3. Remove the top cover. See “Removing the top cover” on page 93.
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 110. This action pulls the memory module **3** out of the connector.

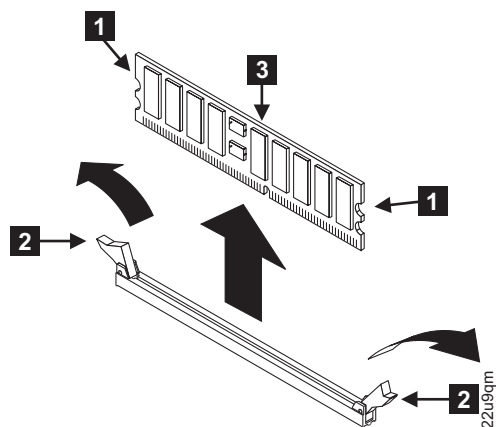


Figure 110. Removing the memory modules

- 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.

Removing the memory modules: 2145-CG8 or 2145-CF8

You can remove a memory module from a SAN Volume Controller 2145-CG8 or 2145-CF8 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 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-CG8 node uses three modules in DIMM slots. **3**, **6**, and **9**, as shown in Figure 111 on page 134.

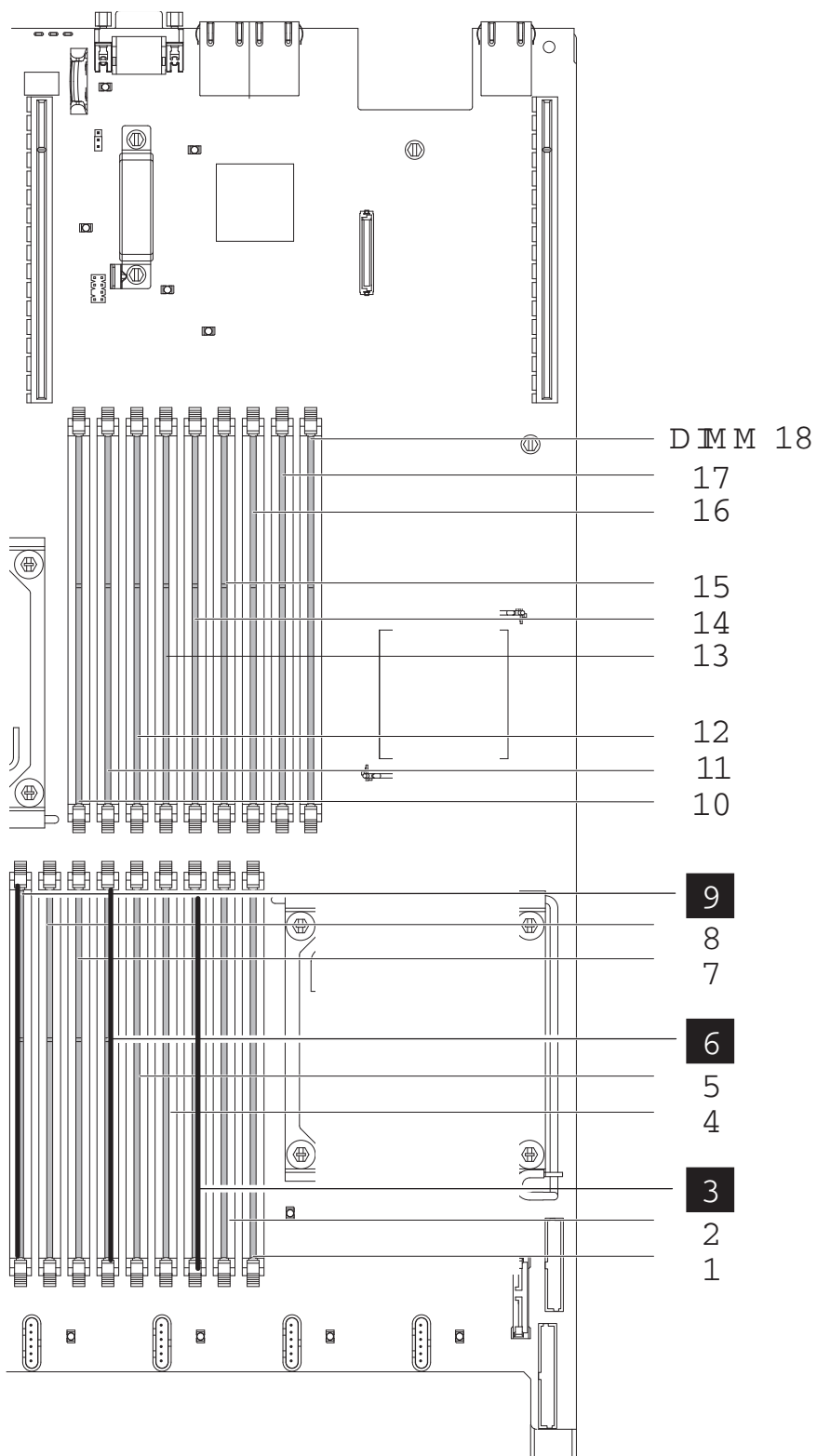


Figure 111. Locating the SAN Volume Controller 2145-CG8 memory modules

- The SAN Volume Controller 2145-CF8 node uses six modules in DIMM slots **2**, **3**, **5**, **6**, **7**, and **8**, as shown in Figure 112 on page 135.

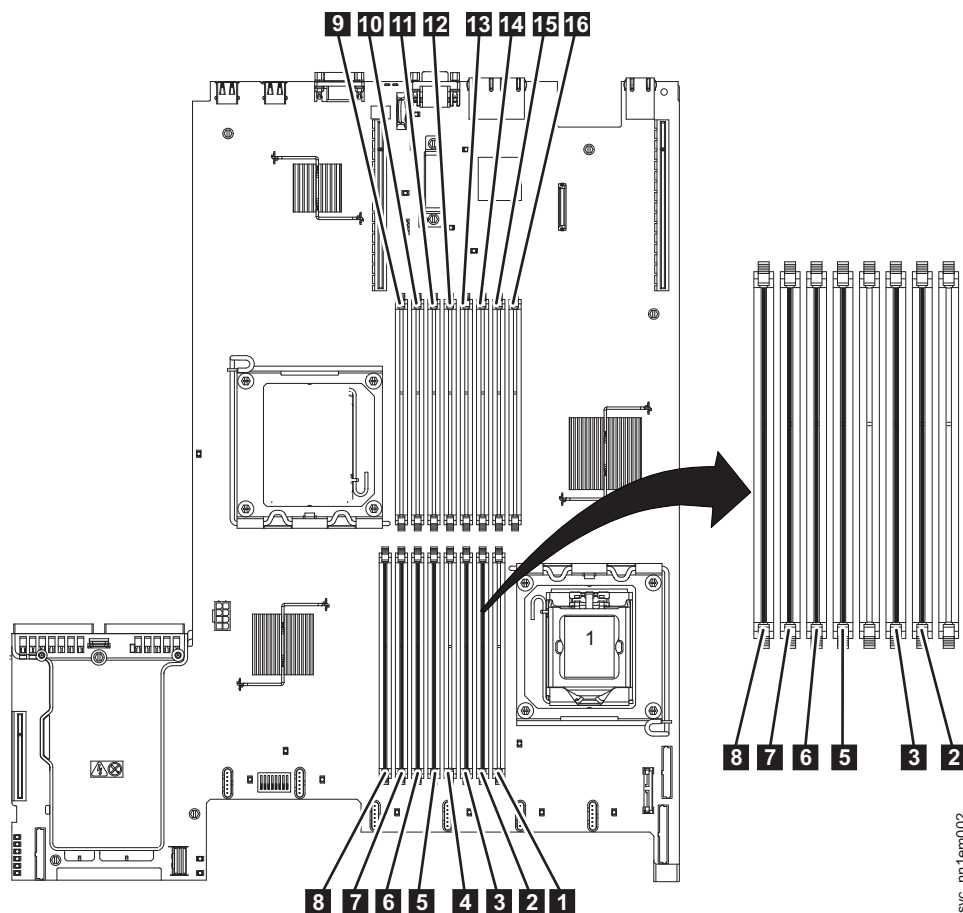


Figure 112. Locating the SAN Volume Controller 2145-CF8 memory modules

About this task

Perform the following steps to remove the memory modules:

Procedure

1. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 54.
3. Remove the top cover. See “Removing the top cover” on page 93.
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 113 on page 136. This action pulls the memory module **3** out of the connector.

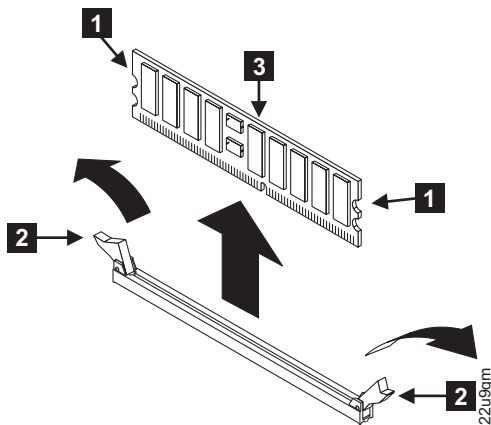


Figure 113. Removing the memory modules

- 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 SAN Volume Controller 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.

Before you begin

Review Figure 114 on page 137 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.

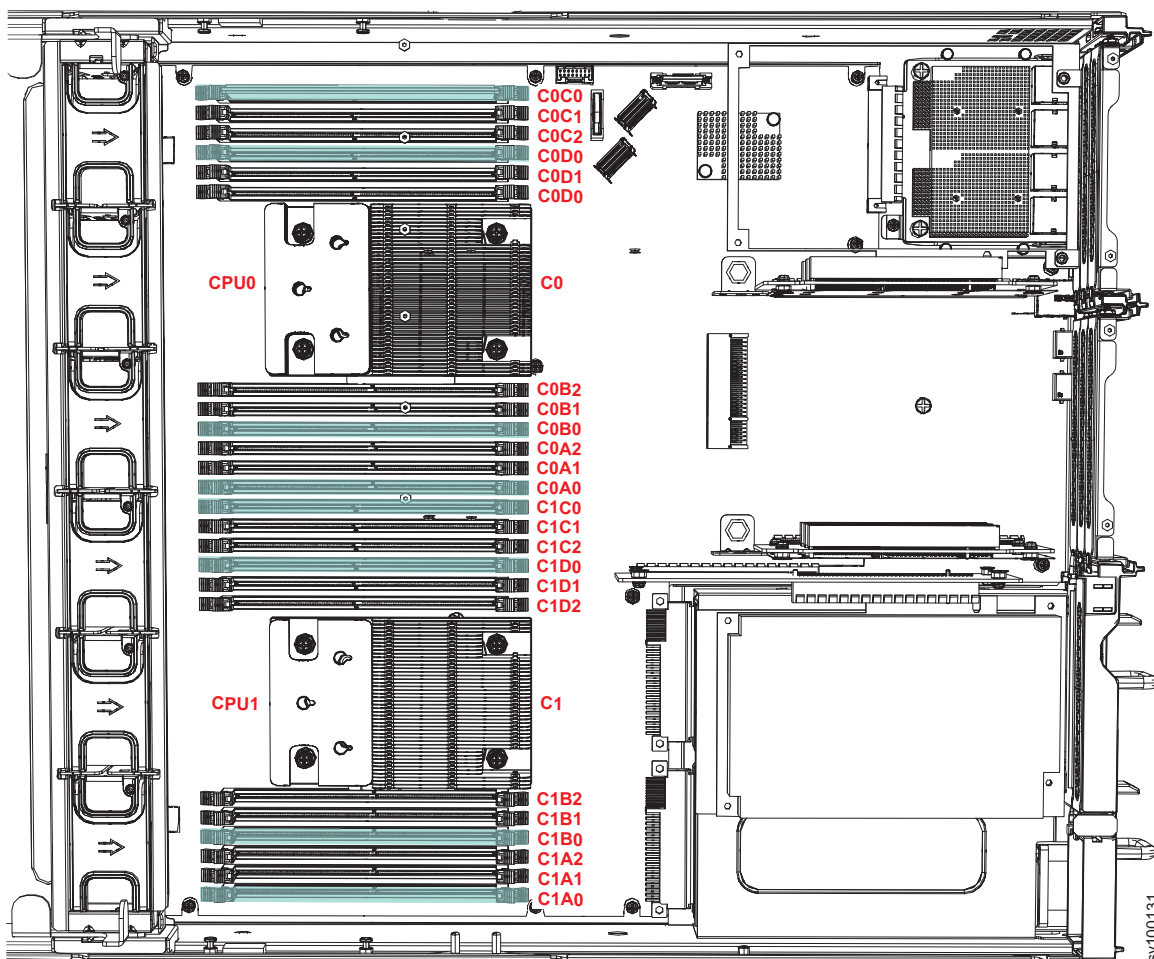


Figure 114. Locations of the DIMM connectors

Table 19 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 19. DIMM slots populated with the memory RDIMM

Memory required	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
254 MB	A0, C0, B0, D0, A1 C1, B1, D1

Procedure

1. Remove PCIe riser assembly 1 and 2, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 284.
2. Remove the air baffle over the DIMMs, as described in “Removing the air baffle: 2145-SV1” on page 101.
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. Then, 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 115. 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.

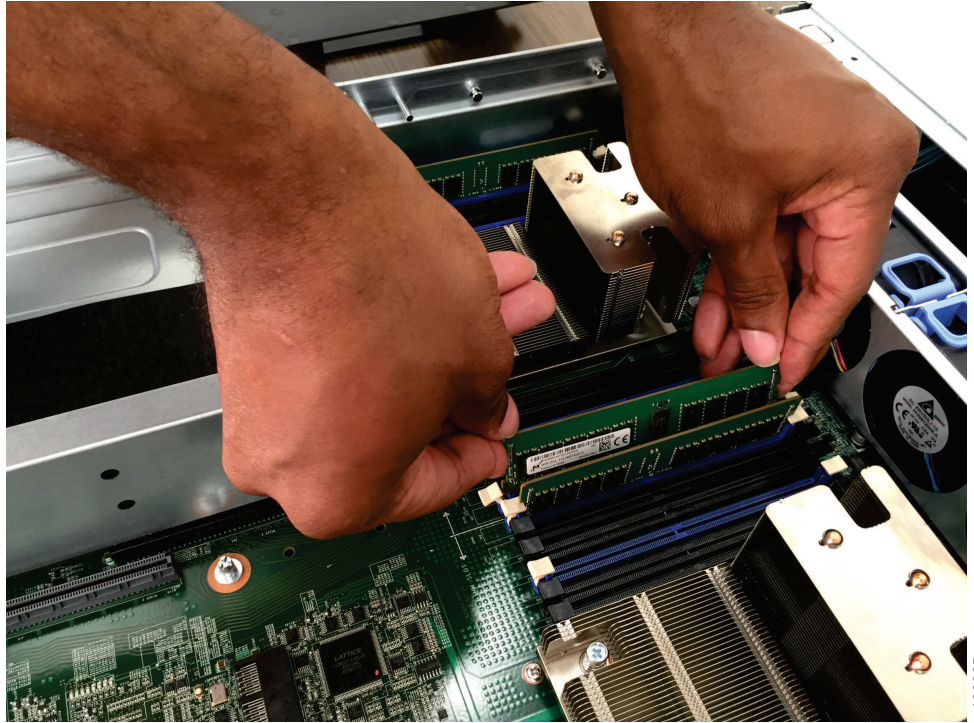


Figure 115. Installing the DIMM

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 on page 137 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 104.
9. Replace PCIe riser assembly 1 and 2, as described “Replacing a PCI express riser-card assembly: 2145-SV1” on page 288.
10. Install the cover, as described in “Replacing the top covers: 2145-SV1” on page 98.
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.

About this task

See Figure 116 on page 139 for the locations of the DIMM connectors on the system board.

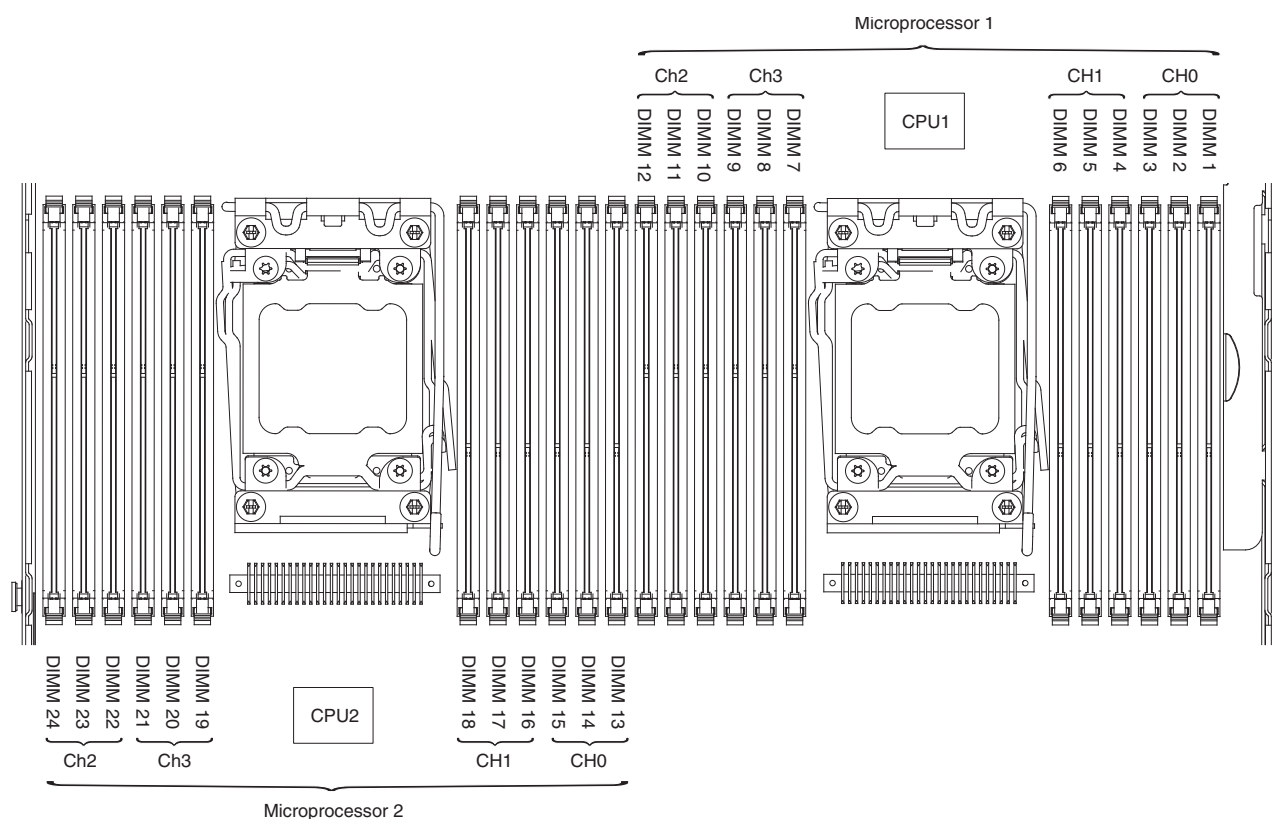


Figure 116. Locations of the DIMM connectors on the system board

Table 20 lists the eight DIMM slots that are populated with the memory RDIMM.

Table 20. 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.

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 117. 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.

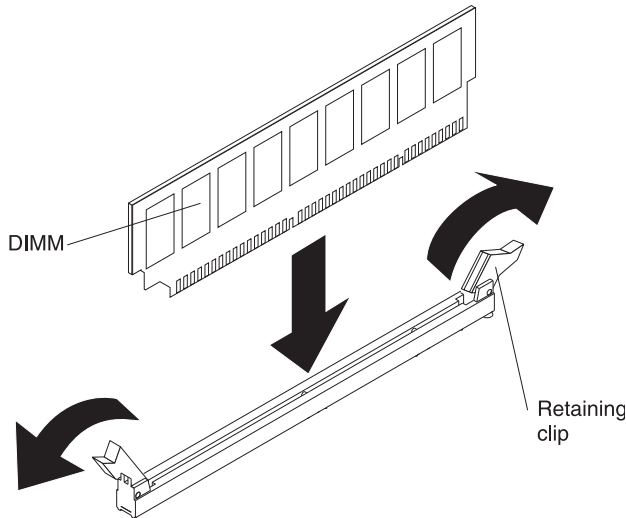


Figure 117. Installing the DIMM

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 on page 139 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.

Replacing the memory modules: 2145-CG8 or 2145-CF8

The memory modules on a 2145-CG8 or 2145-CF8 node are electrostatic-discharge (ESD) sensitive. Take precautions to avoid damage from static electricity.

About this task

Complete the following steps to replace the memory modules on a 2145-CG8 or 2145-CF8 node.

Attention: To avoid breaking the retaining clips or damaging the memory module connectors, open and close the clips gently.

Procedure

1. With the clips **2** open, lower the memory module **3** into the connector, as shown in Figure 118 on page 141. Insert the DIMM fully to close the clips.

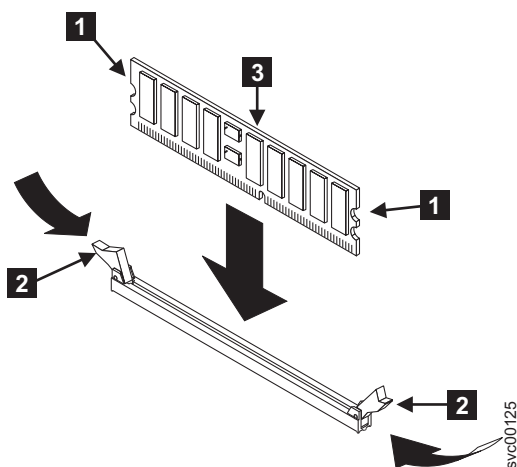


Figure 118. Replacing a memory module

2. On a SAN Volume Controller 2145-CG8 or 2145-CF8 node, grasp the DIMM air baffle and replace it, making sure that the pin goes into the pin hole on the system board to the left of DIMM connector 8.
3. Replace the top cover on the node.
4. Replace the node in the rack.
5. Restore all power to the node.

If a node error 511 - 515 displays on the front panel:

 - a. Press power to turn off the node.
 - b. Remove the power cable from the node.
 - c. Wait 20 seconds and then replace the power cable.
 - d. Turn on the node.
 - e. If the error is displayed again, the memory bank might be disabled. Complete the following steps to enable a disabled memory bank:
 - 1) Press power to turn off the node.
 - 2) Attach the display and keyboard to the rear panel connectors. No special cables are required.
 - 3) Turn on the node and press F1 until the setup menu displays.
 - 4) Go to the configuration menu, select **Memory**, and enable the disabled memory bank.
 - 5) Save the settings, exit the configuration program, and then restart the node.
 - f. If the error is displayed again, remove and replace the memory module again to ensure that it is seated correctly. If that does not resolve the error, the memory module connector might be the problem. Replace the system board on the SAN Volume Controller models 2145-CG8, and 2145-CF8.
6. 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.
7. For the SAN Volume Controller 2145-CG8 or 2145-CF8, grasp the DIMM air baffle and replace it, making sure that the pin goes into the pin hole on the system board to the left of DIMM connector 8.
8. Replace the top cover. See "Replacing the top cover" on page 98.
9. 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 67.

10. 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.
11. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
12. Lift the locking levers (**1** in Figure 119) on the slide rails and push the node **2** all the way into the rack until it clicks into place.

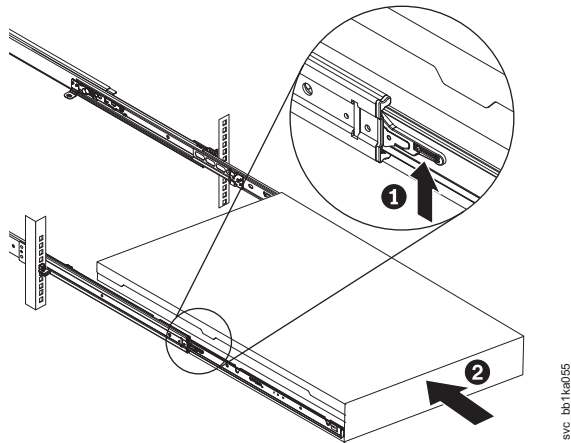


Figure 119. Raising the locking levers of the slide rails of the rack

13. Turn on the node.
14. If there is a problem when restarting the node, see MAP 5900 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 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 SAN Volume Controller node.

- SAN Volume Controller 2145-SV1 node use serial advanced technology attachment (SATA) boot drives.
- SAN Volume Controller 2145-DH8, 2145-CG8, and 2145-CF8 nodes use serial attached SCSI (SAS) boot drives.

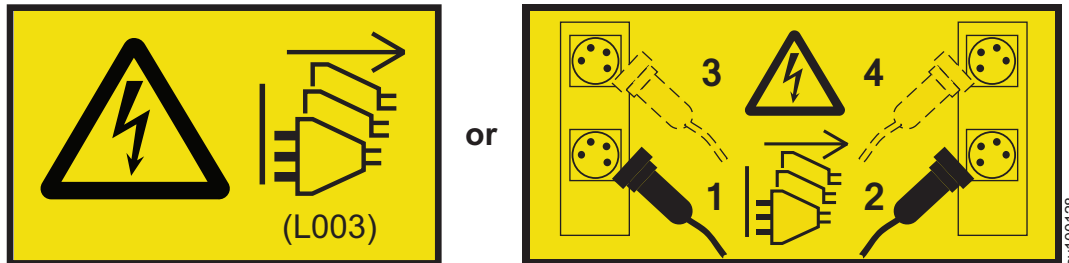
Removing the SATA boot drive: 2145-SV1

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 120 on page 144.



Figure 120. Operating the release handle on a 2145-SV1 boot drive

4. Gently pull the drive assembly from the slot, as shown in Figure 121.



Figure 121. 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.

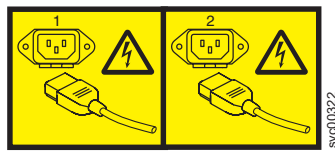
Removing the SAS boot drive: 2145-DH8

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

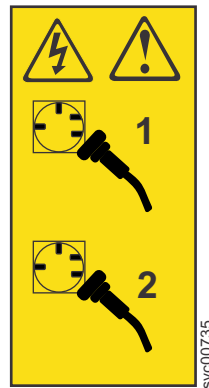
Before you begin

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 122 on page 146.

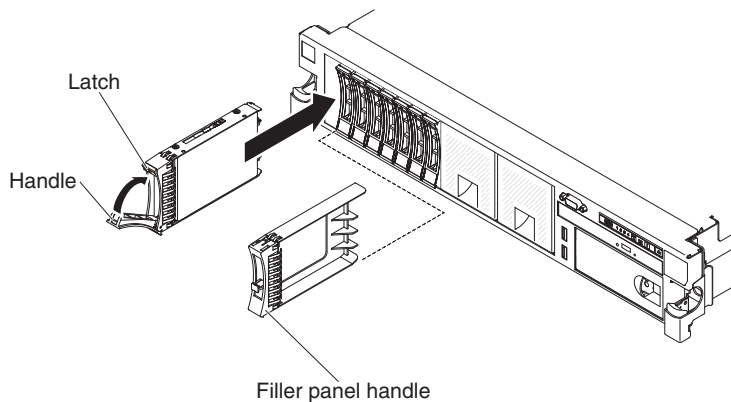


Figure 122. Removing a 2145-DH8 boot drive

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.

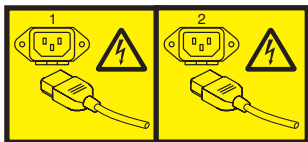
Removing the SAS boot drive: 2145-CG8 or 2145-CF8

You can remove the SAS boot drive from a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

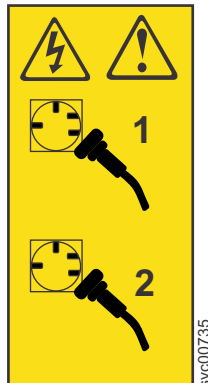
Before you begin

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

This service action requires you to turn off the node.

To remove the 2145-CG8 or 2145-CF8 disk drive, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. Slide the node out on its slide rails to the fully extended position.

Fast path: You can perform this service procedure with the node in place. Slide the node out six inches to verify that the cover is in place, then return the node to its locked 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.

4. 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. 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.
 - b. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
 - c. 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.
 - d. Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.
5. Make sure that the cover is in place and fully closed.

Attention: To avoid damage to the disk drive connectors, make sure that the cover is in place and fully closed whenever you install or remove the hard-disk drive.
6. Remove the service controller. See “Removing the service controller” on page 118.

You do not have to disconnect the service controller cable. You can suspend the service controller by its cable or rest the service controller on another surface while removing and replacing the drive.
7. Slide the orange release latch (**1** in Figure 123) gently to the left to unlock the drive handle of the boot drive. For details on the boot drive location, see “Locating the IDs for disk drives: 2145-CG8 or 2145-CF8” on page 148.

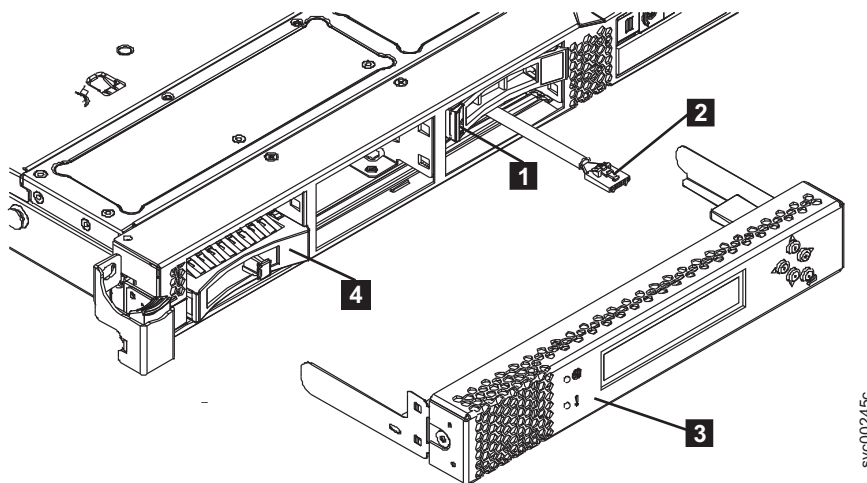


Figure 123. Boot drive location (SAN Volume Controller 2145-CF8 shown)

- 1** Boot-drive release latch (in drive bay 4 for the 2145-CF8 and in drive bay 6 for the 2145-CG8)
 - 2** Service-controller USB cable (in drive bay 5 for the 2145-CF8 and in drive bay 7 for the 2145-CG8)
 - 3** Service controller
 - 4** Drive bay filler panel (shown in drive bay 1 in the 2145-CF8 diagram, but also in all other unused drive bays on both the 2145-CF8 and the 2145-CG8)
8. Grasp the open drive handle and slide the drive out of the drive bay.

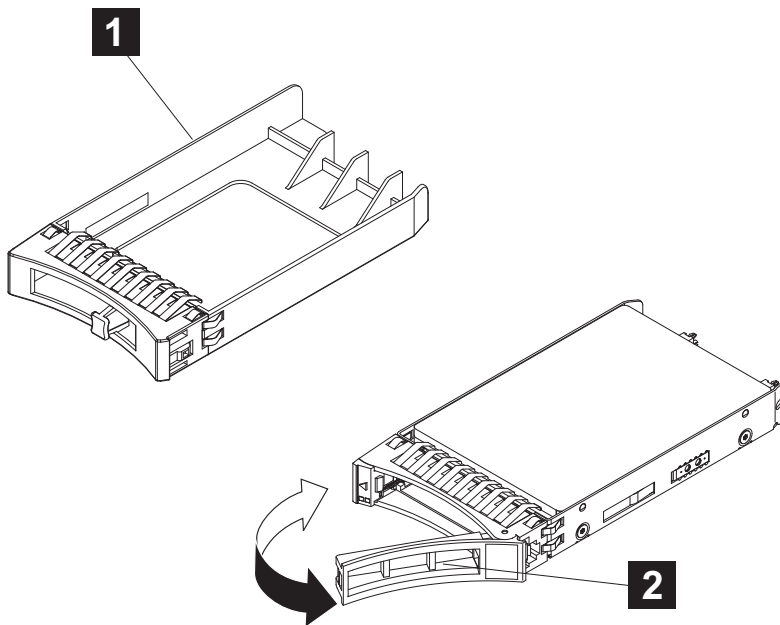


Figure 124. Drive-bay filler panel and disk-drive handle

- 1** Drive bay blank EMC filler assembly (used in all empty drive bays)
- 2** Handle of SAS disk drive

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

Locating the IDs for disk drives: 2145-CG8 or 2145-CF8:

The hot-swap-drive ID that is assigned to each drive is printed on the front of the node, but is covered by the service controller.

About this task

Figure 125 shows the location of the disk drives for the SAN Volume Controller 2145-CF8 by drive ID.

The ID numbers and the drive-bay numbers are the same.

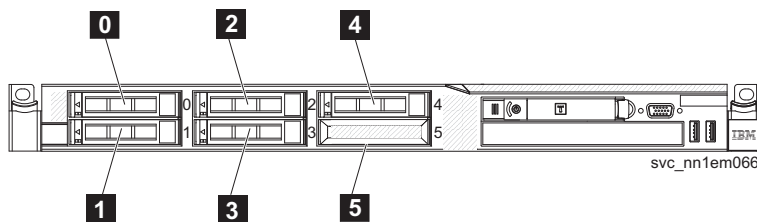


Figure 125. Drive IDs for SAN Volume Controller 2145-CF8

- 0** Drive bay 0
- 1** Drive bay 1
- 2** Drive bay 2
- 3** Drive bay 3
- 4** Drive bay 4 (reserved for the node boot disk)

5 Drive bay 5 (reserved for service controller)

Figure 126 shows the location of the disk drives for the SAN Volume Controller 2145-CG8 by drive ID.

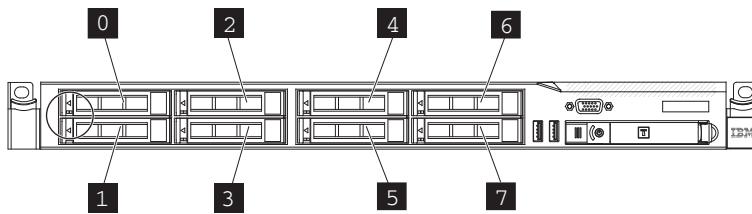


Figure 126. Drive bay IDs for the SAN Volume Controller 2145-CG8

- 0** Drive bay 0
- 1** Drive bay 1
- 2** Drive bay 2
- 3** Drive bay 3
- 4** Drive bay 4
- 5** Drive bay 5
- 6** Drive bay 6 (reserved for the node boot disk)
- 7** Drive bay 7 (reserved for service controller cable)

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 SAN Volume Controller node.

- SAN Volume Controller 2145-SV1 node use serial advanced technology attachment (SATA) boot drives.
- SAN Volume Controller 2145-DH8, 2145-CG8, and 2145-CF8 nodes use serial attached SCSI (SAS) boot drives.

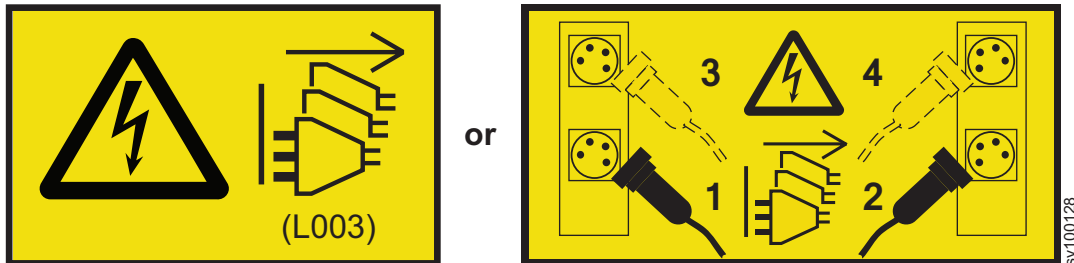
Replacing the SATA boot drive: 2145-SV1

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 127 on page 151 shows.



sv100046

Figure 127. Aligning the 2145-SV1 boot drive

5. Gently push the drive assembly into the slot until the drive stops, as shown in Figure 128.



sv100047

Figure 128. Replacing a 2145-SV1 boot drive

6. Lift the release handle to the closed (locked) position, as Figure 129 on page 152 shows.



Figure 129. 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 70.
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.

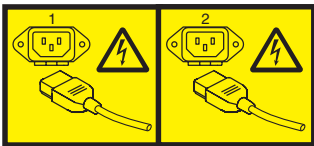
Replacing the SAS boot drive: 2145-DH8

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

Before you begin

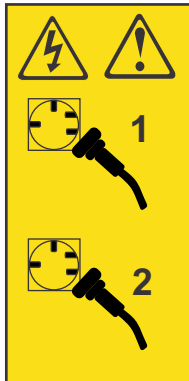
DANGER

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



svc00322

or



svc00735

or



svc00734

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 130.

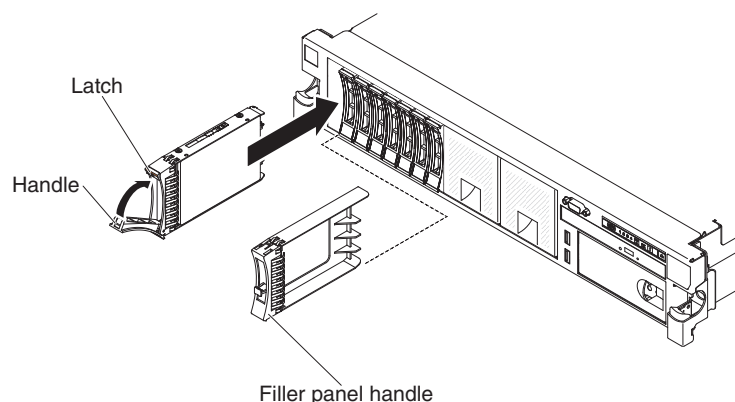


Figure 130. Replacing a SAN Volume Controller 2145-DH8 boot drive

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.

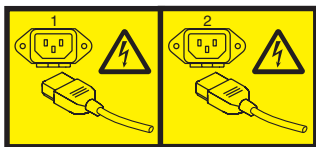
Replacing the SAS boot drive: 2145-CG8 or 2145-CF8

You can replace the serial attached SCSI (SAS) boot drive for the SAN Volume Controller 2145-CG8 or 2145-CF8 node.

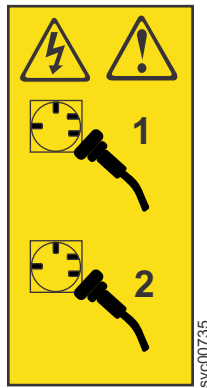
Before you begin

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.

- Locate the documentation that comes with the disk drive and follow those instructions in addition to the instructions in this topic.
- Make sure that you have all the cables and other equipment that are specified in the documentation that comes with the drive.
- Install the boot drive in drive bay 4 for SAN Volume Controller 2145-CF8 nodes and in drive bay 6 for SAN Volume Controller 2145-CG8 nodes.
- Check the instructions that come with the drive to determine whether you have to set any switches or jumpers on the drive. Set the SAS ID for the device, if necessary.

To replace a SAN Volume Controller 2145-CG8 or 2145-CF8 disk drive, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
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. Make sure that the disk-drive handle is in the open (unlocked) position.

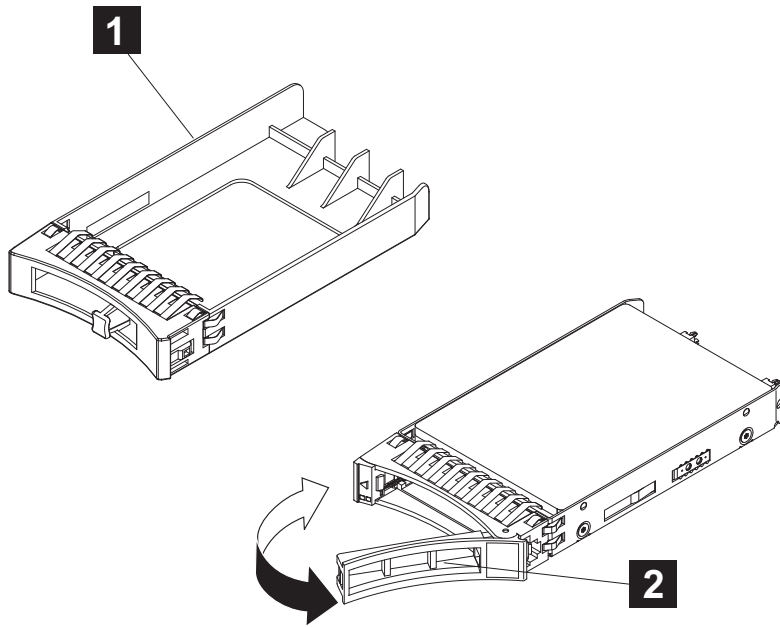


Figure 131. Drive-bay filler panel and disk-drive handle

- 1** Drive bay filler panel (used in all empty drive bays)
 - 2** SAS disk drive with handle extended
5. Align the drive assembly with the guide rails in drive bay 4 for SAN Volume Controller 2145-CF8 nodes and in drive bay 6 for SAN Volume Controller 2145-CG8 nodes. See “Locating the IDs for disk drives: 2145-CG8 or 2145-CF8” on page 148 for details.
 6. Gently push the drive assembly into the bay until the drive stops.
Attention: On the 2145-CG8, inserting the disk drive too forcefully can damage the service controller cable. When inserting the disk drive, push the cable to the right hand side of the lower drive bay. Do not apply any force when inserting the disk drive. If the disk drive does not push fully home, reposition the cable closer to the right and try again.
 7. Rotate the tray handle to the closed (locked) position.
 8. Install the service controller. See “Replacing the service controller” on page 124.
 9. 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 67.
 10. 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.
 11. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
 12. Lift the locking levers (**1** in Figure 132 on page 156) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

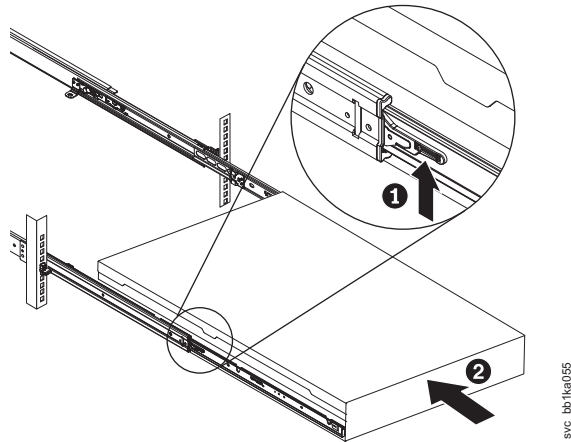


Figure 132. Raising the locking levers of the slide rails of the rack

13. Turn on the node. When you turn on the node, use the node rescue procedure to install the SAN Volume Controller software on the new disk. Then add the node back into the cluster. See "Performing the node rescue" in the *IBM SAN Volume Controller Troubleshooting Guide*.

Note: If you must replace the hard disk and the service controller at the same time, you might not be able to start the node to perform node rescue. See "Replacing a disk drive and a service controller: 2145-CG8 or 2145-CF8" on page 126.

Removing the drive backplane

You might need to remove the drive backplane on a SAN Volume Controller node.

Before you begin

The type of backplane varies for each SAN Volume Controller 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, 2145-CG8, and 2145-CF8 node.

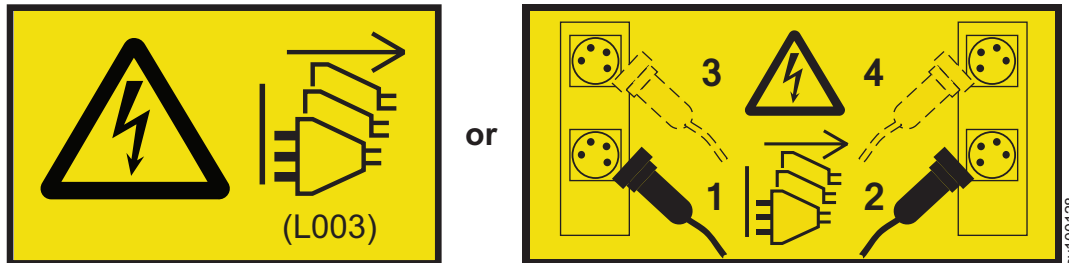
Removing the SATA drive backplane and cables: 2145-SV1

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 93.
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 284.
5. Remove the air baffle, as described in “Removing the air baffle: 2145-SV1” on page 101.
6. Remove the fan bracket, as described in “Removing the fan bracket: 2145-SV1” on page 342.
7. Remove fans 1 and 2, as described in “Removing the fans: 2145-SV1” on page 328.
8. Lift the two front tabs and rotate the backplane assembly toward the rear of the node to remove it, as shown in Figure 133 on page 158.

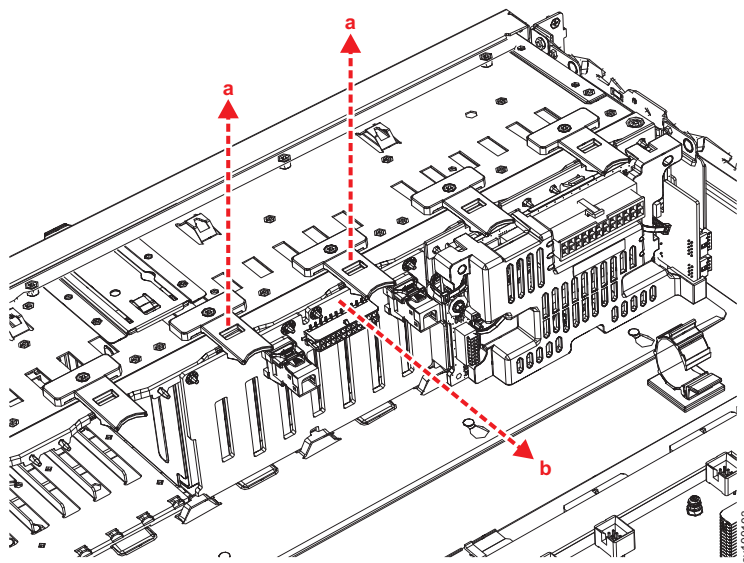


Figure 133. Removing the 2145-SV1 SATA drive backplane

9. Disconnect all cables from the SATA drive backplane. Figure 134 on page 159 shows the location of the SATA drive backplane and connectors.

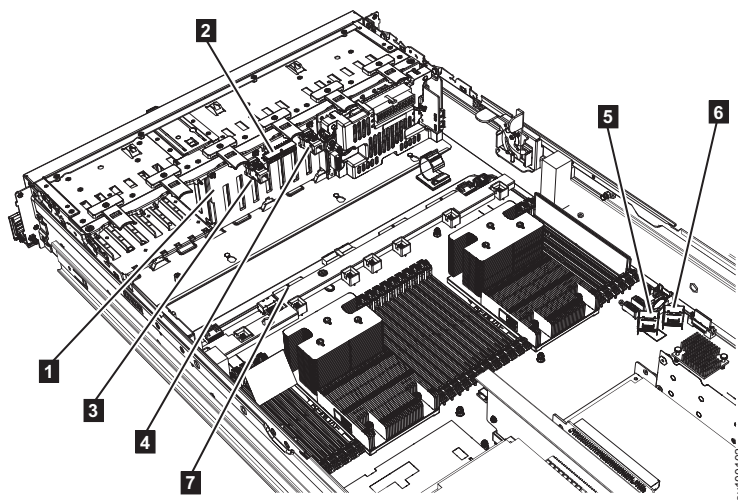


Figure 134. The 2145-SV1 SATA drive backplane and connectors

- 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.

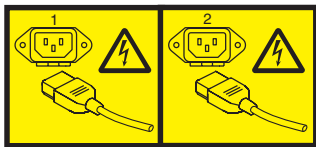
Removing the disk-drive backplane: 2145-DH8

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

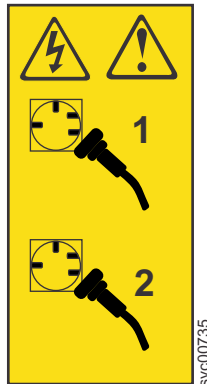
Before you begin

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 135 on page 161.

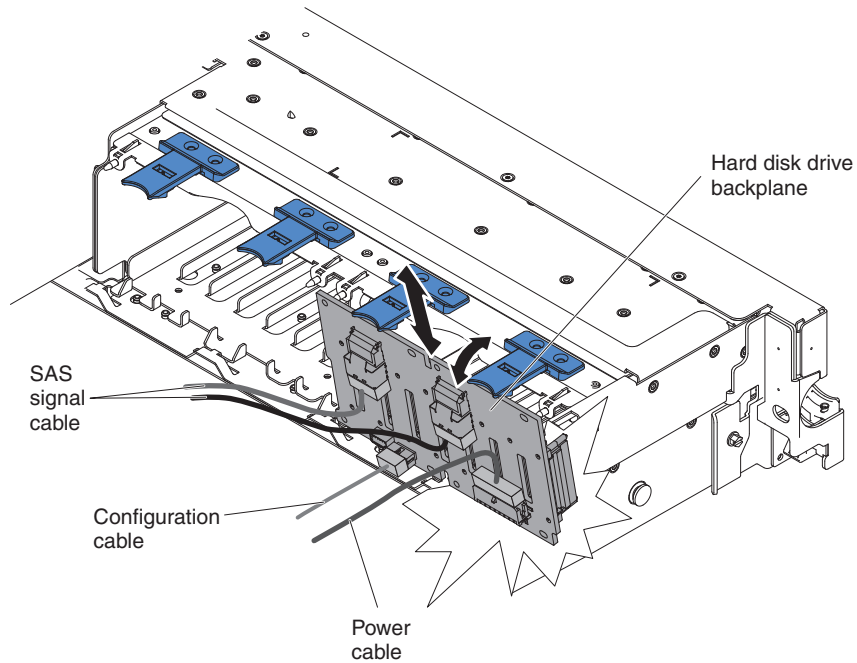


Figure 135. The 2145-DH8 disk drive backplane

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.

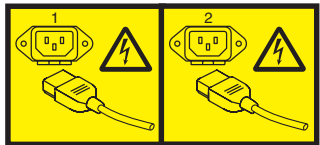
Removing the disk-drive backplane: 2145-CG8 or 2145-CF8

Use the following information to remove the disk-drive backplane from a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

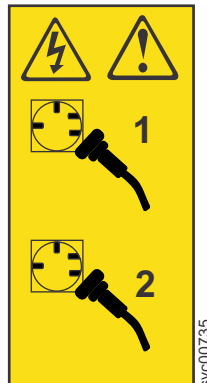
Before you begin

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

This service action requires you to remove the cover and complete the following actions:

- Turn the node off.
- Disconnect the power cables.
- Disconnect the internal SAS data cables.

To remove the SAN Volume Controller 2145-CG8 or 2145-CF8 disk-drive backplane, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. Slide the node out on its slide rails to the fully extended position.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. Optional: 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.

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.

6. Optional: Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.

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

7. Remove the service controller. See “Removing the service controller” on page 118.
8. Pull the disk drives and filler panels out of the node slightly to disengage them from the backplane. See “Removing the boot drive” on page 142.
9. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
10. Remove fans 4, 5, and 6, as described in “Removing the fans: 2145-CG8 or 2145-CF8” on page 332.
11. Disconnect all cables from the disk-drive backplane.

Note: You can also choose to disconnect the cables after removing the backplane from the brackets, if that is easier for you.

The high-speed SAS cable and the boot-disk SAS cable are shown in Figure 136 on page 163.

The boot-disk cable is shown after disconnecting the cable from the disk controller so that you can see the connectors more clearly.

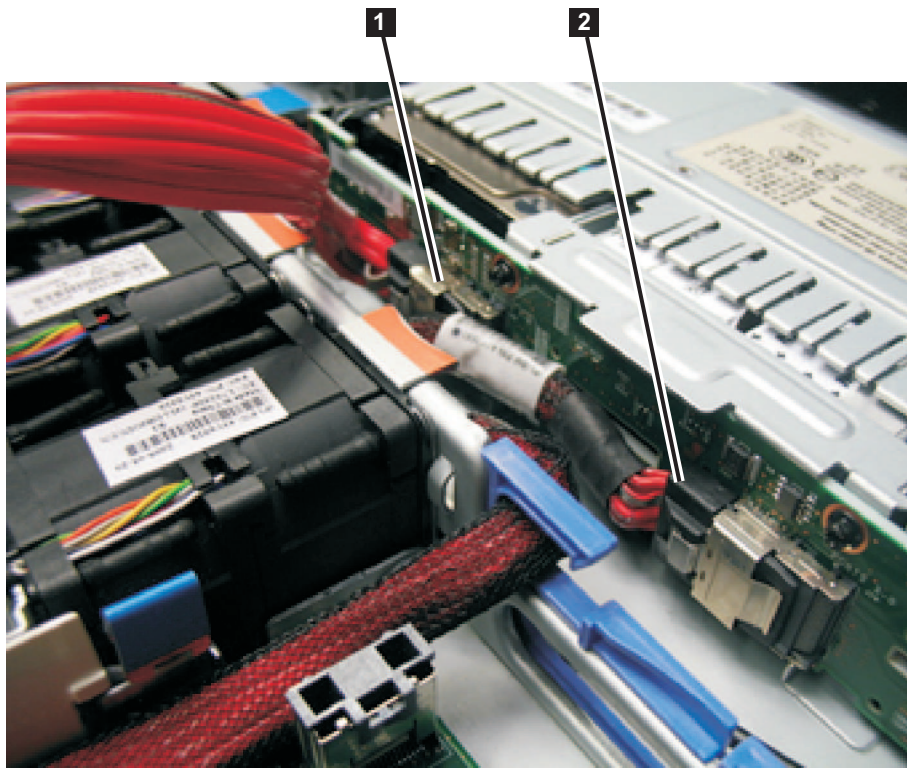


Figure 136. Boot-disk SAS cable and the high-speed SAS cable connected to the disk backplane in the SAN Volume Controller 2145-CG8 or 2145-CF8

The SAN Volume Controller 2145-CG8 has two backplanes. Each backplane supports four of the eight drive bays. One backplane supports the boot disk in drive bay 6 and drive bays 4, 5, and 7, which are either reserved or empty. The other backplane supports the optional flash drives in drive bays 0, 1, 2, and 3.

1 Boot-disk signal cable that is plugged into the disk-drive backplane to support drive bay 6 on the SAN Volume Controller 2145-CG8 or drive bay 4 on the SAN Volume Controller 2145-CF8

2 High-speed SAS-adapter cable that is plugged into the middle of the disk drive backplane to support drive bays 0, 1, 2, and 3

(Not pictured) Backplane-control cable that is in the lower right connector on the back of the backplane

12. Lift up the disk-drive backplane (**1** in each of the following two illustrations to disengage the backplane edges (2145-CG8) or tabs (2145-CF8) (**2**) from the slots (**3**) on a backplane bracket. In the 2145-CG8 node, pull up slowly on each backplane until it is clear of the slots on the bracket and remove it from the node, as shown in Figure 137 on page 164.

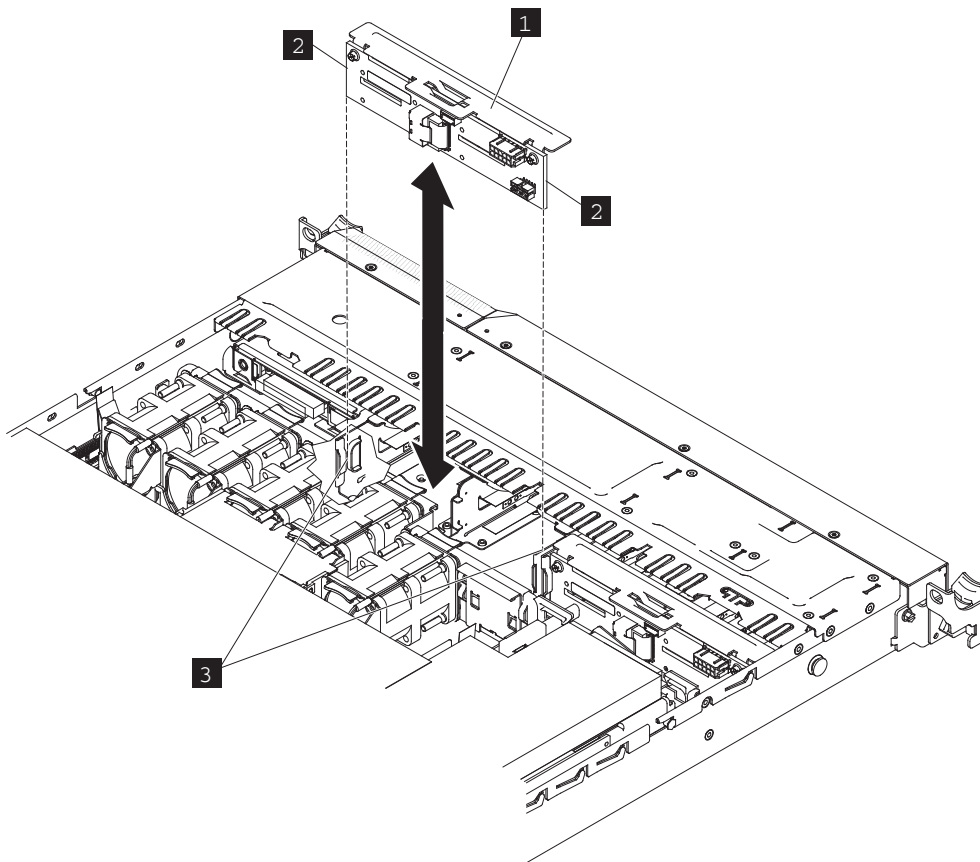


Figure 137. The 2145-CG8 boot-disk backplane

In the 2145-CF8 node, push the backplane backwards until it is clear of the slots on the bracket and remove it from the node, as shown in Figure 138 on page 165.

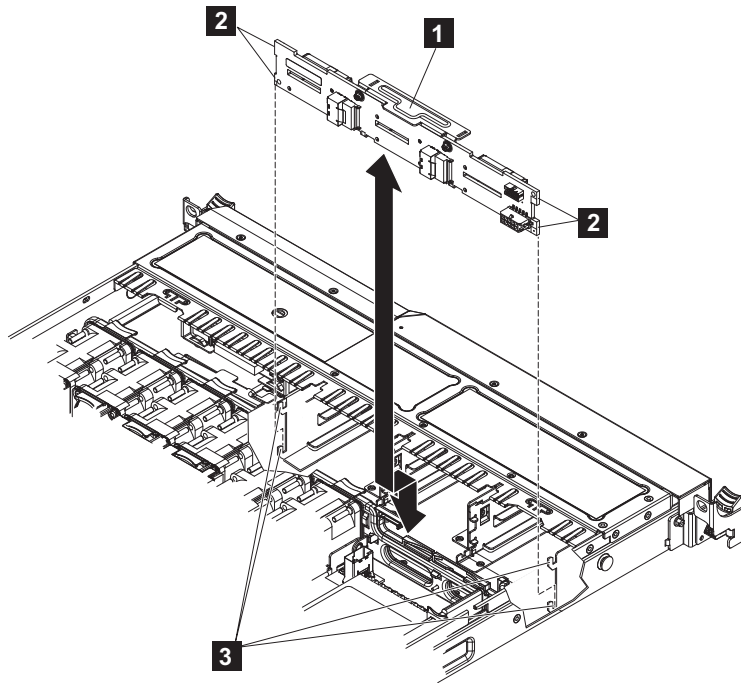


Figure 138. The SAN Volume Controller 2145-CF8 disk backplane

- 1** Disk-drive backplane
- 2** Backplane edges on the 2145-CG8 and tabs on the 2145-CF8
- 3** Backplane-bracket slots

13. If you are instructed to return a disk-drive 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 SAN Volume Controller node.

Before you begin

The type of backplane varies for each SAN Volume Controller 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, 2145-CG8, and 2145-CF8 node.

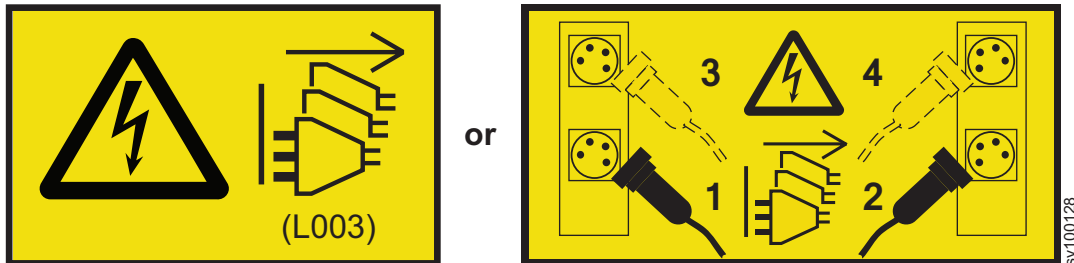
Replacing the SATA drive backplane and cables: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- The power cables are disconnected.
- The top covers are removed.

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

- The PCI express riser assembly 1 is removed.
- The air baffle is removed.
- The fan cage assembly is removed.

About this task

Procedure

Figure 139 on page 167 shows the location of the SATA drive backplane and connectors. To replace the disk-drive backplane, complete the following steps.

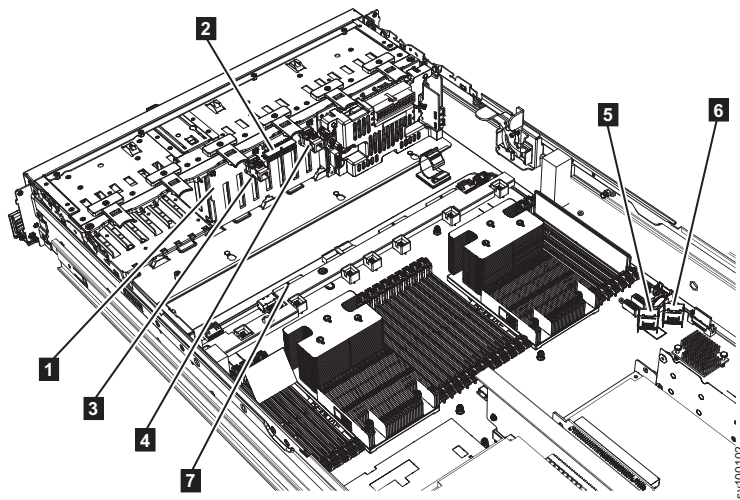


Figure 139. 2145-SV1 SATA drive backplane

- 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
 - 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.

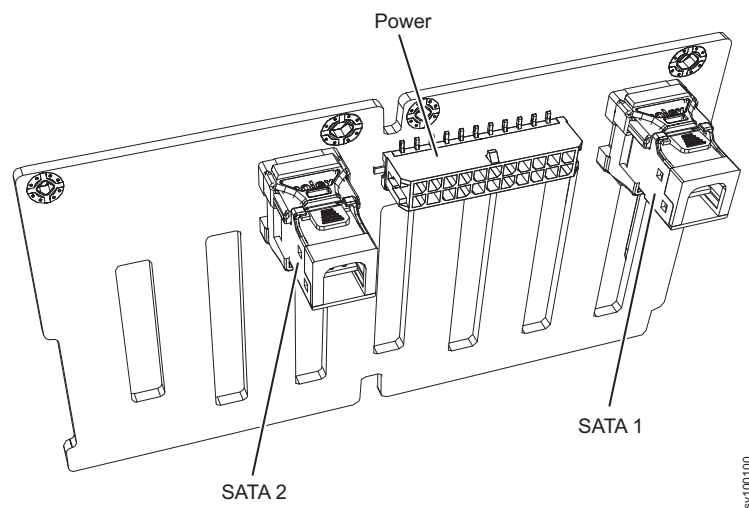


Figure 140. Power and cable connectors on the 2145-SV1 disk drive backplane

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.
5. If you removed the fans, reinstall them, as described in “Replacing the fans: 2145-SV1” on page 334.
6. Reinstall the covers, as described in “Replacing the top covers: 2145-SV1” on page 98.
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 70.
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.

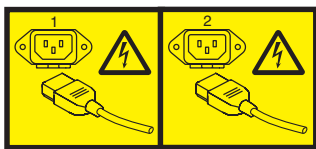
Replacing the disk-drive backplane: 2145-DH8

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

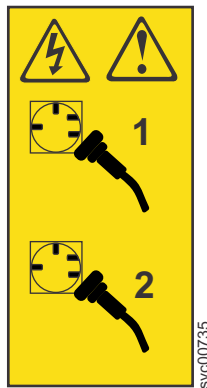
Before you begin

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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:

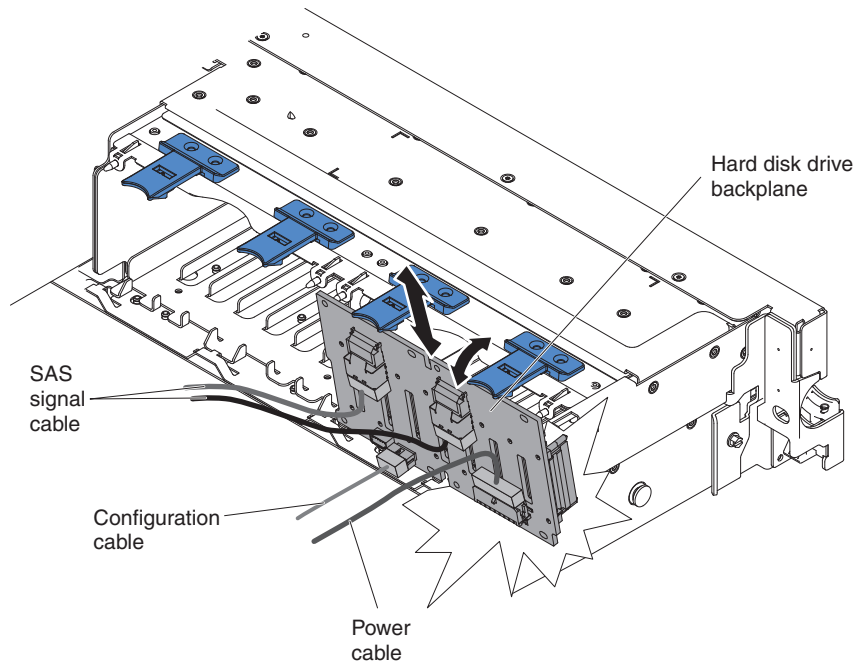


Figure 141. The 2145-DH8 disk drive backplane

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. Replace the service controller.
9. If you removed the node from the rack, replace the node in the rack.
10. 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.
11. If you removed the power cords, replace the power cords.
12. Lift the locking levers (**1** in Figure 142 on page 172) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

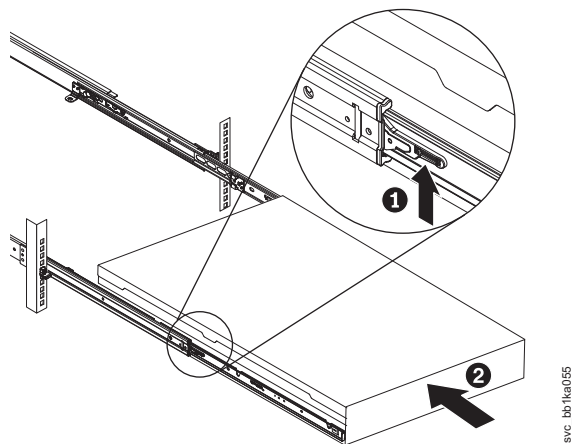


Figure 142. Raising the 2145-DH8 locking levers of the slide rails of the rack

13. Turn on the node.

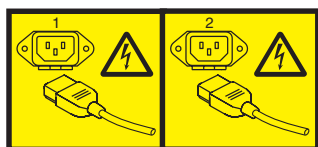
Replacing the disk-drive backplane: 2145-CG8 or 2145-CF8

You can replace the SAN Volume Controller 2145-CG8 or 2145-CF8 disk-drive backplane, which includes the SAS backplane.

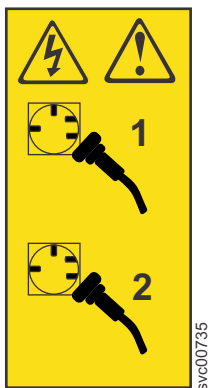
Before you begin

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



About this task

To replace the SAN Volume Controller 2145-CG8 or 2145-CF8 disk-drive backplane, complete the following steps:

Procedure

1. Align the tabs (**2** on Figure 143 on page 173 and Figure 144 on page 174) on the disk-drive backplane with the slots on the backplane bracket (**3** on Figure 143 on page 173 and Figure 144 on page 174).
2. Insert the 2145-CF8 disk-drive backplane tabs into slots on the backplane bracket and push the disk-drive backplane down until the backplane is fully seated and the tabs locked in place.

You can reconnect the boot-disk cable to the connector on the left side (when viewed from the rear) of the back of the backplane before installing the backplane into the brackets, or you can connect the cable after you install the backplane, if that is easier for you.

The other end of this cable attaches to the disk-controller and USB riser card assembly, as shown in Figure 145 on page 175.

If you are using flash drives, you can connect the labeled end of the high-speed SAS cable to the connector in the middle of the back of the disk-drive backplane. The other end of this cable attaches to the high-speed SAS adapter at the rear of the node.

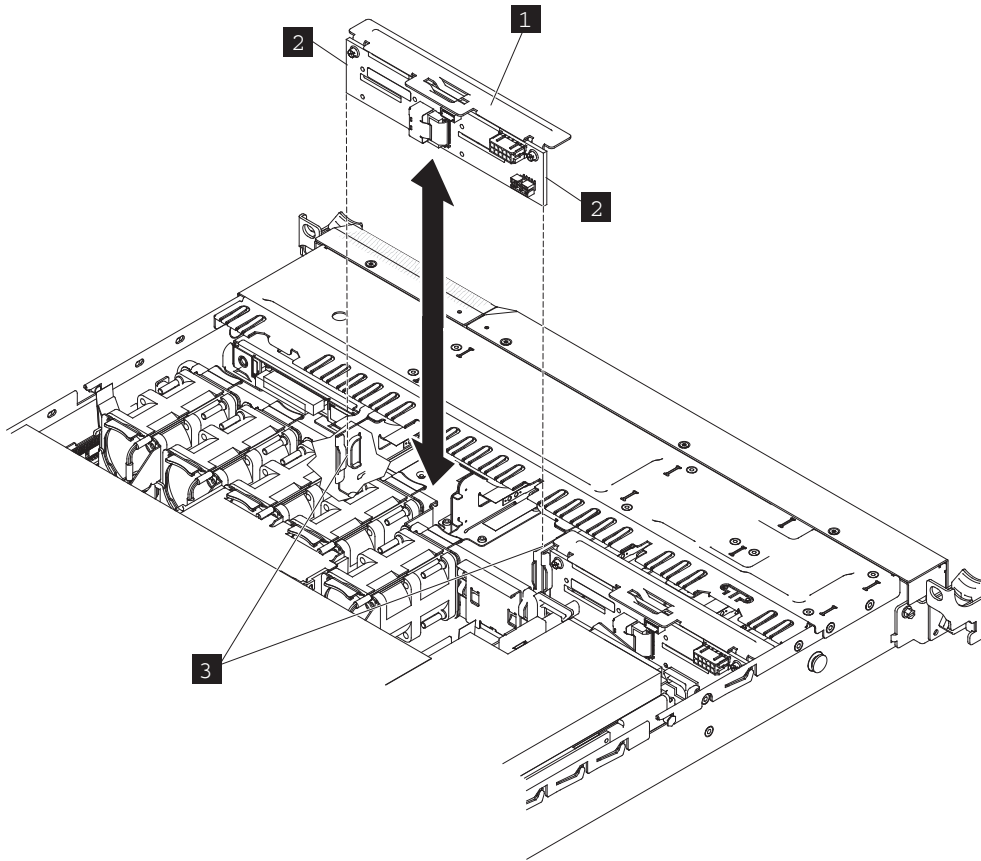


Figure 143. The 2145-CG8 boot-disk backplane

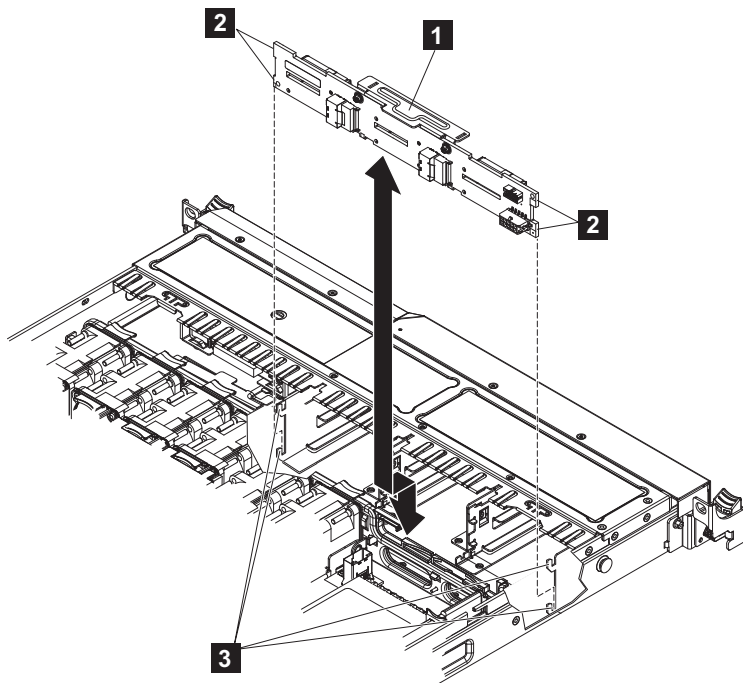


Figure 144. The SAN Volume Controller 2145-CF8 disk backplane

- 1** Disk-drive backplane
 - 2** Backplane edges on the 2145-CG8 and tabs on the 2145-CF8
 - 3** Backplane-bracket slots
3. Reconnect the cables to the disk-drive backplane.
- The boot-drive cable and the high-speed SAS-adapter cable are shown in Figure 145 on page 175.

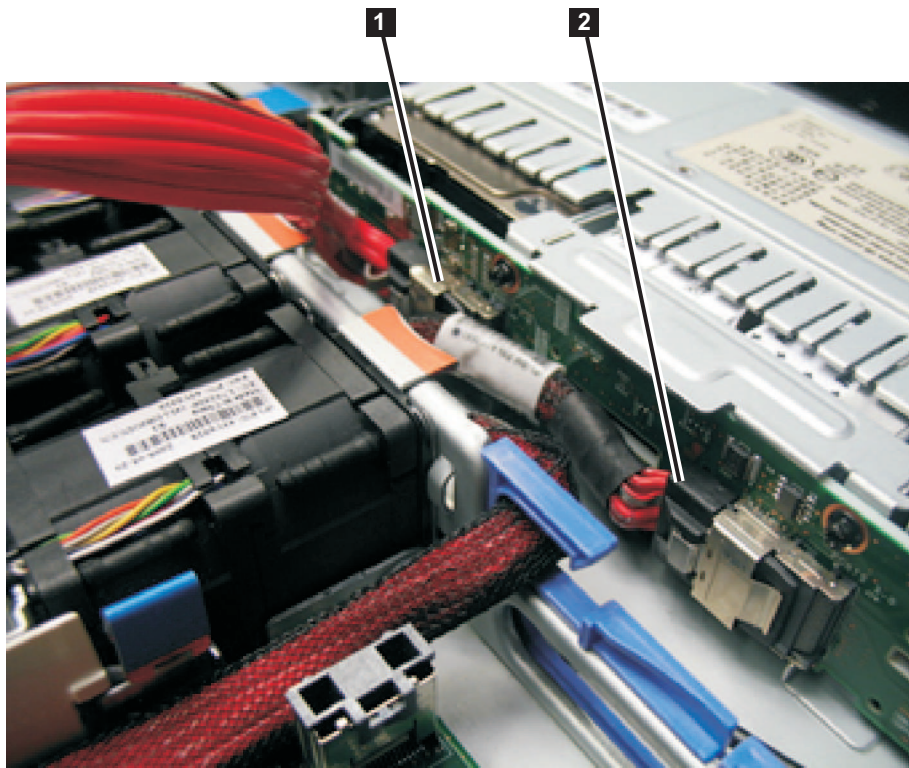


Figure 145. Boot-disk SAS cable and the high-speed SAS cable connected to the disk backplane in the SAN Volume Controller 2145-CG8 or 2145-CF8

1 Boot-disk signal cable that is plugged into the disk-drive backplane to support drive bay 4

2 High-speed SAS-adapter cable that is plugged into the middle of the backplane to support drive bays 0, 1, 2, and 3

(Not pictured) Backplane-control cable that should plug into the lower right connector on the back of the backplane

4. Reconnect the boot-disk SAS cable to the SAS disk controller.

The boot-drive cable and the high-speed SAS-adapter cable are shown in Figure 146 on page 176.

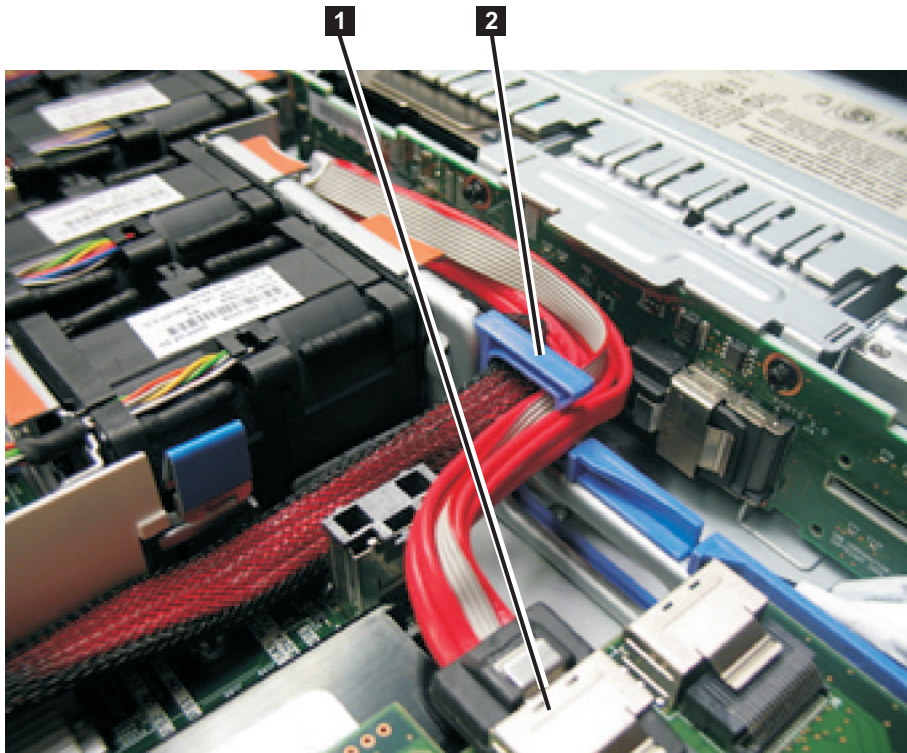


Figure 146. Boot-disk SAS cable routed through the blue bulkhead clip and connected to the SAS disk controller in the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1** Boot-disk SAS cable that is plugged into the disk-controller-and-USB-riser-card assembly
 - 2** Blue bulkhead clip with the high-speed SAS-adapter cable and the boot-disk SAS cable
5. Reinstall the fans, as described in “Replacing the fans” on page 334.
 6. Reinstall the cover, as described in “Replacing the top cover” on page 98.
 7. Reinstall the disk drives and drive-bay blank electromagnetic compatibility (EMC) filler assemblies, as described in “Replacing the boot drive” on page 149.
 8. Replace the service controller, as described in “Replacing the service controller” on page 124.
 9. 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 67.
 10. 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.
 11. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
 12. Lift the locking levers (**1** in Figure 147 on page 177) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

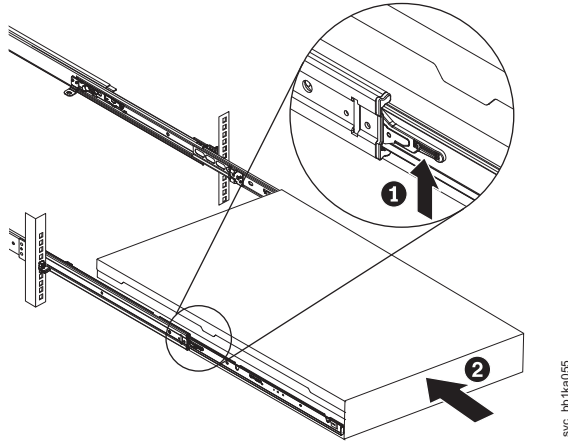


Figure 147. Raising the locking levers of the slide rails of the rack

13. Turn on the node.

Removing a flash drive

You can remove flash drives in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

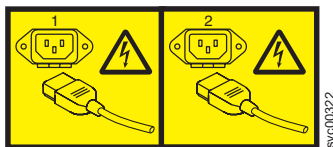
Removing a flash drive: 2145-CG8 or 2145-CF8

You can remove an installed flash drive from a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

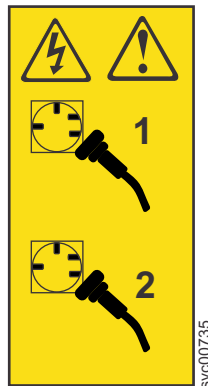
Before you begin

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



If you are installing a high-speed SAS adapter feature and one or more flash drive features, use the instructions that come with each MES update to install and configure the high-speed SAS adapter and each flash drive.

About this task

This topic describes how to remove a flash drive that was installed and configured, but that must now be removed from a SAN Volume Controller 2145-CF8 node.

The SAN Volume Controller 2145-CF8 node supports from one to four optional 2.5-inch Flash drives in addition to the one required boot drive that ships with the node.

You do not have to turn off the node to initiate this service action. You can leave the node turned on, the power cords connected, and the data cables connected to accomplish this service action from the fully extended rail position.

Although you do not have to turn off the node, Flash drives require some planning before you can simply swap one drive for another.

See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* for information about ensuring that data is mirrored and synchronized, and that there are no dependent volumes (VDisks) on the node before removing an Flash drive, whether you are turning off the node or swapping the drive while the node is turned on.

To remove the SAN Volume Controller 2145-CF8 flash drive, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Slide the node out on its slide rails to the fully extended position.

Fast path: You can perform this service procedure with the node in place. Slide the node out six inches to verify that the cover is in place, then return the node to its locked position.

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

3. Optional: If you must remove the node from the rack to work on it, perform the following procedure to turn off the node, remove all cables, and remove the node from the rack:
 - a. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
 - b. 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.
 - c. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
 - d. 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.
 - e. Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.
4. Make sure that the node top 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.

5. If the service controller (**1** in Figure 148 on page 179) is in place, press the release buttons (**2**) on each side of the service controller assembly to release the service controller from the node, but do not disconnect the USB service controller cable. Slide the service controller from the node and support it somewhere, if possible, or gently suspend the service controller from the service controller cable.

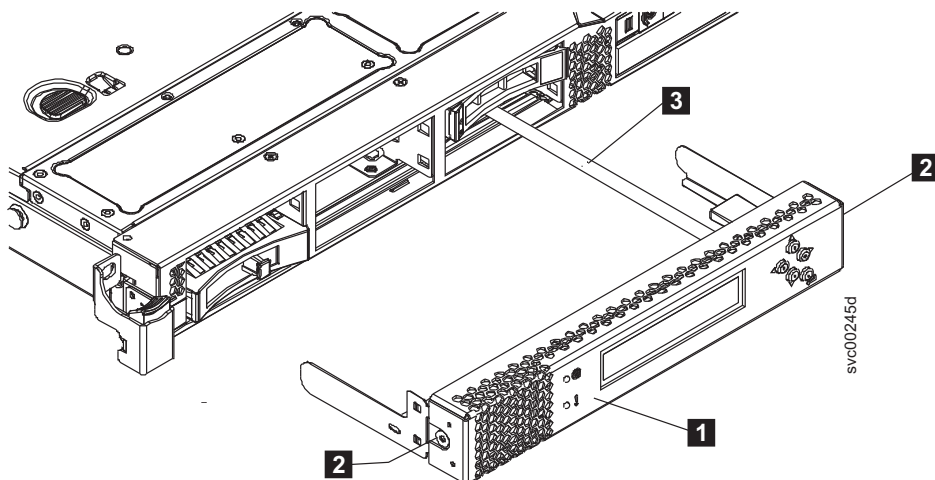


Figure 148. Service controller with attached USB cable (SAN Volume Controller 2145-CF8 shown)

- 1 Service controller
- 2 Service-controller release buttons
- 3 Service controller USB cable

6. Remove the drive from the drive bay:
 - a. Slide the orange release latch at the left end of the handle gently to the left to unlock the drive handle.
 - b. Rotate the drive handle to the open (unlocked) position, as shown in Figure 149.
 - c. Gently slide out the drive assembly along the guide rails until the drive is free of the drive bay.

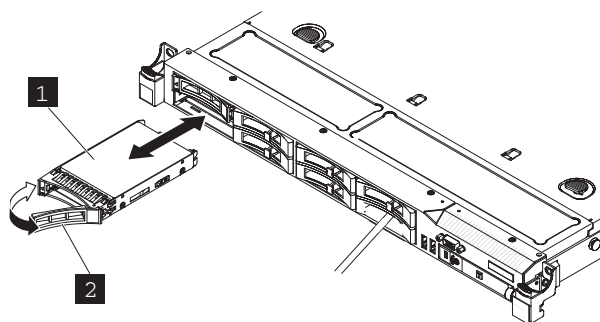


Figure 149. Solid-state drive (SSD) (SAN Volume Controller 2145-CG8 shown)

- 1 Flash drive
- 2 Drive handle

The system error LED and the DASD diagnostics panel LED turn on when a flash drive is removed from a drive bay. The system error LED and the DASD diagnostics panel LED turn off when the flash drive is replaced in the drive bay. If you do not replace the flash drive in the same drive bay, the system error LED and the DASD diagnostics panel LED remain lit. To clear the system error LED and the DASD diagnostics panel LED, turn off the node using the instructions given in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* and remove both power cables.

7. If you are not replacing the drive right away, install a drive-bay blank electromagnetic compatibility (EMC) filler assembly into the empty drive bay.
To make sure that there is adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

The electromagnetic interference (EMI) integrity and cooling of the node are protected by having all bays and PCI slots covered or occupied. When you install a drive, save the drive bay blank EMC filler assembly from the drive bay to cover any later removal of the device.

8. If you are removing additional hot-swap flash drives, do so now.
9. If you are replacing drives, replace them now, as described in “Replacing a flash drive: 2145-CG8 or 2145-CF8.”
10. 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 a flash drive

You can replace flash drives in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Replacing a flash drive: 2145-CG8 or 2145-CF8

You can remove an installed flash drive from a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Before you begin

If you are installing a high-speed SAS adapter (feature code 4500) and one to four flash drives (feature code 4601), use the instructions that come with each MES update to install and configure the high-speed SAS adapter and each flash drive.

About this task

This procedure describes how to replace a flash drive that was installed and configured, but then removed.

Each of the SAN Volume Controller 2145-CG8 or 2145-CF8 nodes support from one to four 2.5-inch Flash drives in addition to the required boot drive.

To replace the flash drive from the SAN Volume Controller 2145-CG8 or 2145-CF8, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. If the service controller is in place, press the release button on the side of the service controller assembly to release it from the node, but do not disconnect the USB service controller cable. Slide the service controller from the node and support it somewhere, if possible, or gently suspend the service controller from the service controller cable.
3. If the drive bay contains a drive-bay blank electromagnetic compatibility (EMC) filler assembly, remove the filler from the drive bay.

The electromagnetic interference (EMI) integrity and cooling of the node are protected by having all bays and PCI slots covered or occupied. When you install a drive, save the drive bay blank EMC filler assembly from the drive bay to cover any later removal of the device.
4. Touch the static-protective package that contains a new drive to any unpainted metal surface on the node; then, remove the drive from the package and place it on a static-protective surface.
5. Install the drive in the drive bay:

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

 - a. Make sure that the tray handle is in the open (unlocked) position.
 - b. Align the drive assembly with the guide rails in the bay, as shown in Figure 150 on page 181.

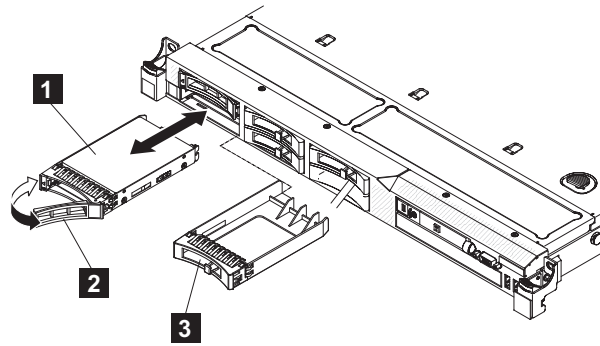


Figure 150. SAN Volume Controller 2145-CG8 or 2145-CF8 drive and drive-bay filler

- 1 Flash drive
- 2 Drive handle
- 3 Drive-bay blank electromagnetic compatibility (EMC) filler assembly

- c. Gently push the drive assembly into the bay until the drive stops.
- d. Rotate the tray handle to the closed (locked) position.

The system error LED and the DASD diagnostics panel LED turn on when a flash drive is removed from a drive bay. The system error LED and the DASD diagnostics panel LED turn off when the flash drive is replaced in the drive bay. If you do not replace the flash drive in the same drive bay, the system error LED and the DASD diagnostics panel LED remain lit. To clear the system error LED and the DASD diagnostics panel LED, turn off the node using the instructions given in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* and remove both power cables.

- 6. If you are installing additional hot-swap flash drives, do so now.
- 7. Install the service controller. See “Replacing the service controller” on page 124.
- 8. 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 67.
- 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 and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
- 11. If you turned off the node during the service procedure, 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.

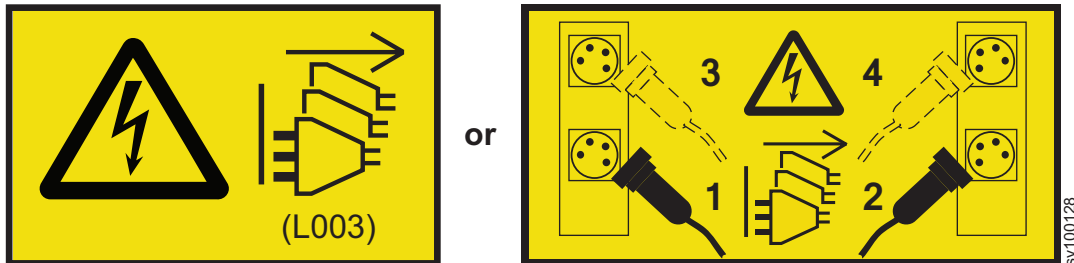
Removing the battery backplane and cables: 2145-SV1

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 93.
- The batteries are removed, as described in “Removing the battery: 2145-SV1” on page 210.
- The PCI express riser assemblies 1 and 2 are removed, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 284.
- The air baffle is removed, as described in “Removing the air baffle: 2145-SV1” on page 101.
- The fan cage assembly is removed, as described in “Removing the fan bracket: 2145-SV1” on page 342.

About this task

To remove the SAN Volume Controller 2145-SV1 battery backplane or the attached cables, complete the following steps, as needed. Figure 151 on page 183 shows the location of the battery backplane and the cable connectors.

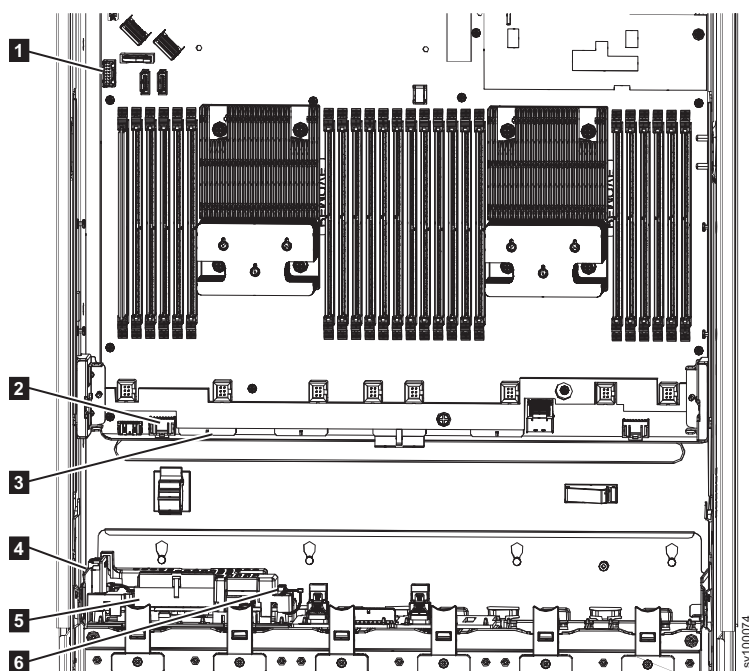


Figure 151. 2145-SV1 battery backplane and cable connectors

- 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 152 shows the battery backplane and several cables.

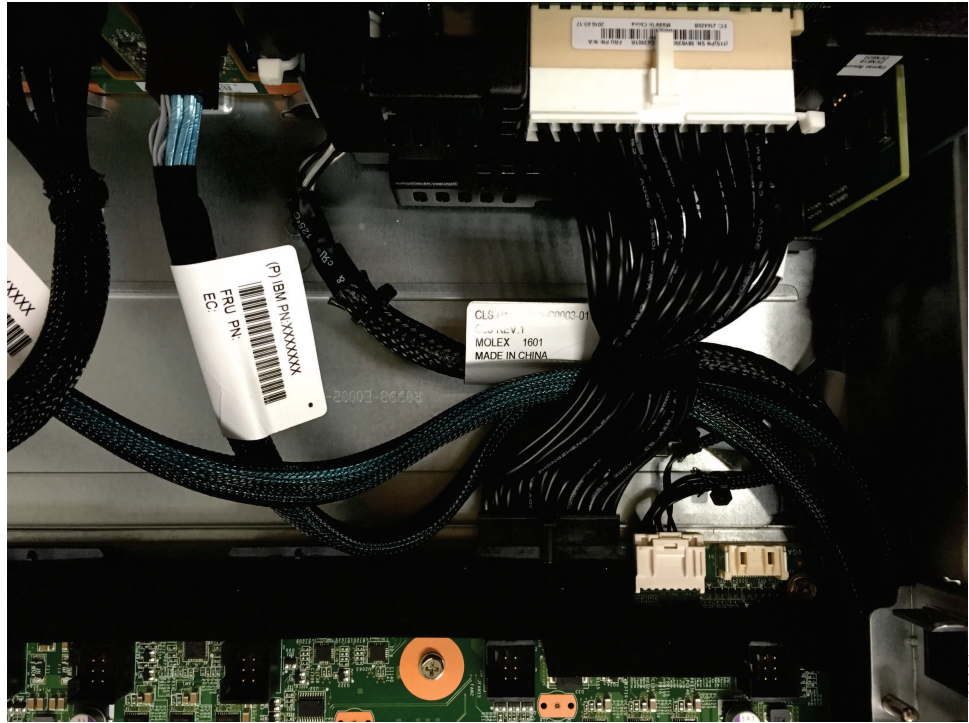


Figure 152. 2145-SV1 backplane and cables

Procedure

1. Raise the blue locking tabs and slightly pull back the battery backplane, as shown in Figure 153 on page 185. Then, lift the battery backplane from the chassis.

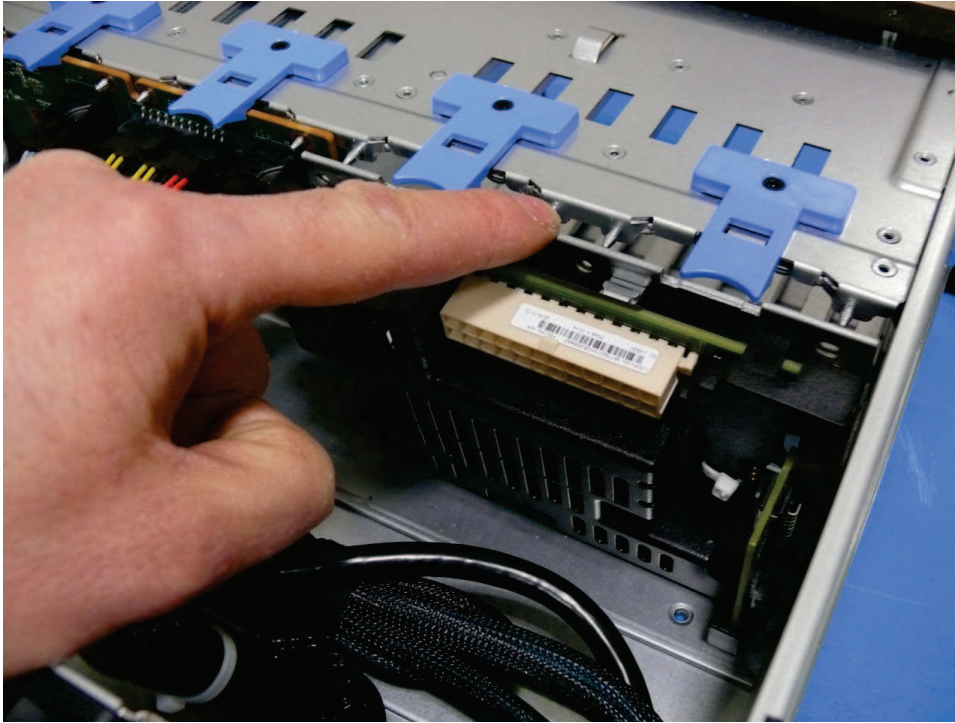


Figure 153. Removing the 2145-SV1 battery backplane

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.

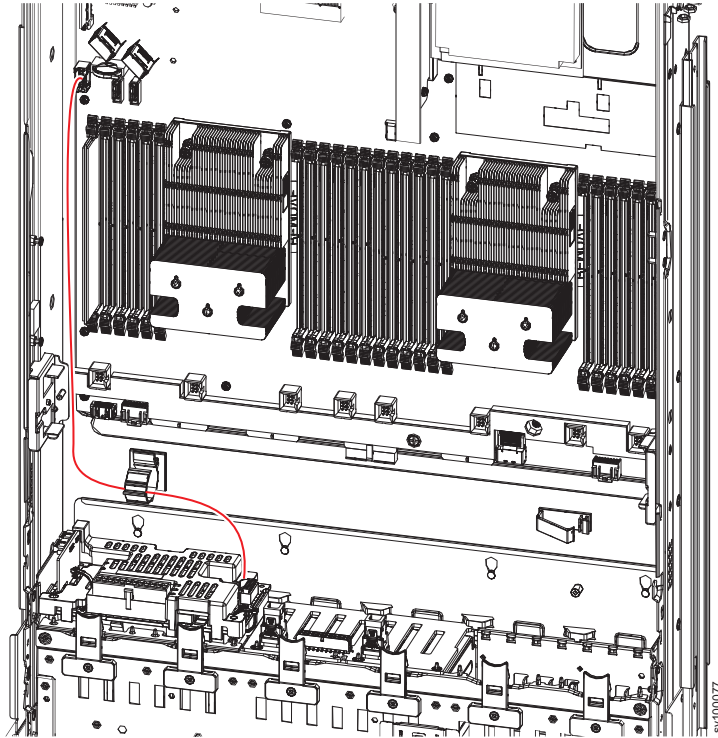


Figure 154. 2145-SV1 battery backplane LPC cable and connector

4. Remove the power sense cable between the battery backplane and the main board, as shown in Figure 155 on page 187.

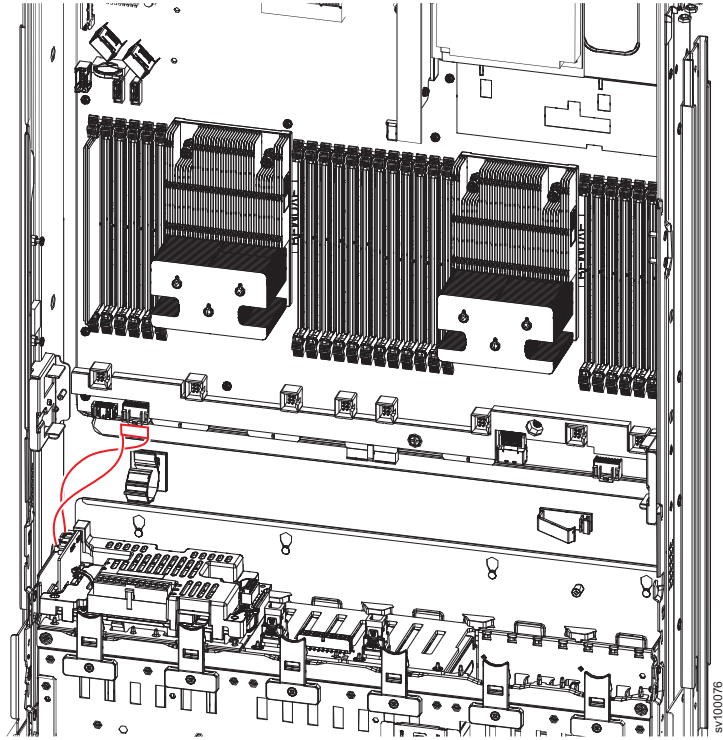


Figure 155. 2145-SV1 battery backplane power sense cable

5. Remove the power cable between the battery backplane and the system board, as shown in Figure 156 on page 188.

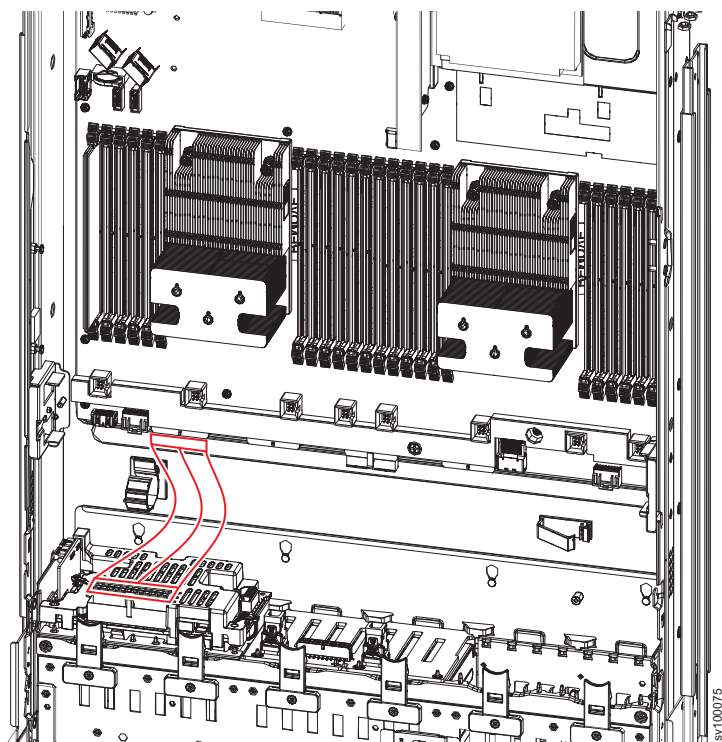


Figure 156. 2145-SV1 battery backplane power cable

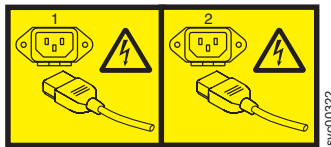
Removing the battery backplane and cables: 2145-DH8

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

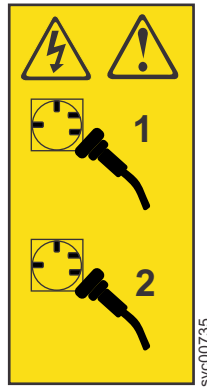
Before you begin

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 157 on page 190 and Figure 158 on page 191 show the backplane and associated cables.

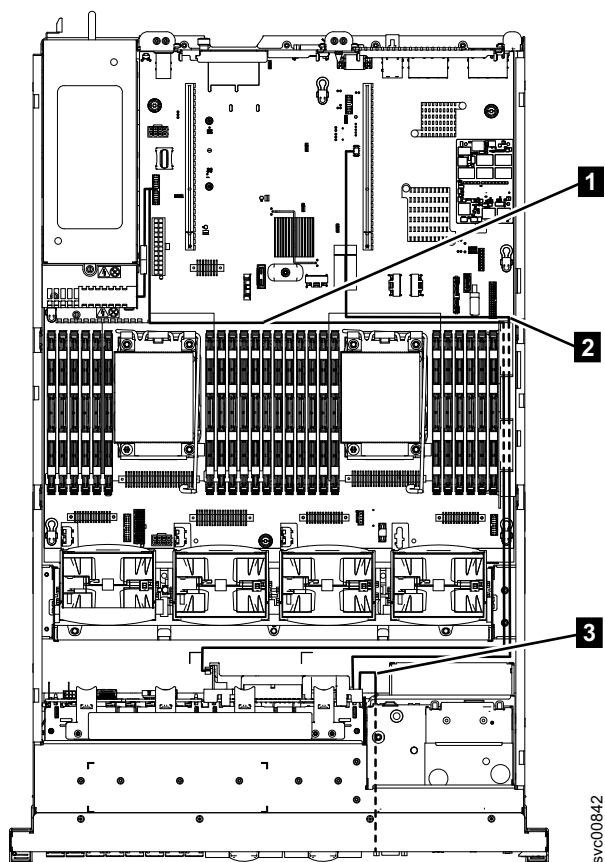


Figure 157. 2145-DH8 Battery backplane-power sense, LPC and LED cables

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

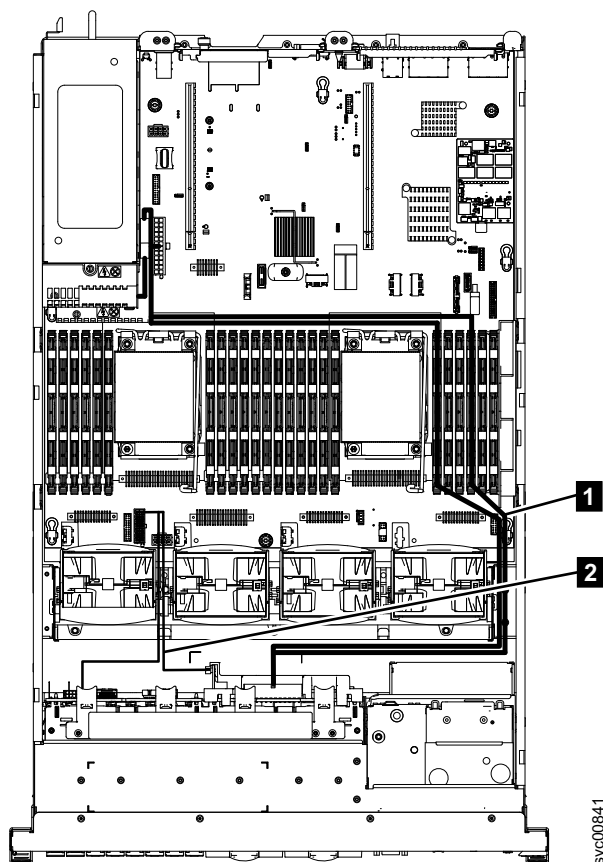


Figure 158. 2145-DH8 Battery backplane-power and EPOW cables

- 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 159 on page 192.

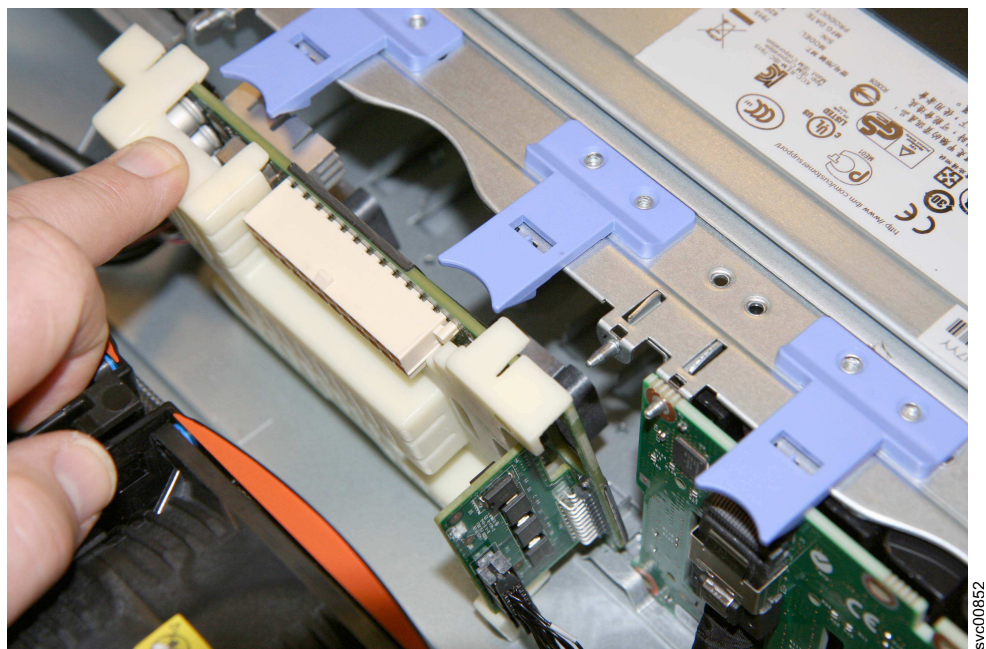


Figure 159. Removing the battery backplane

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 160 on page 193.

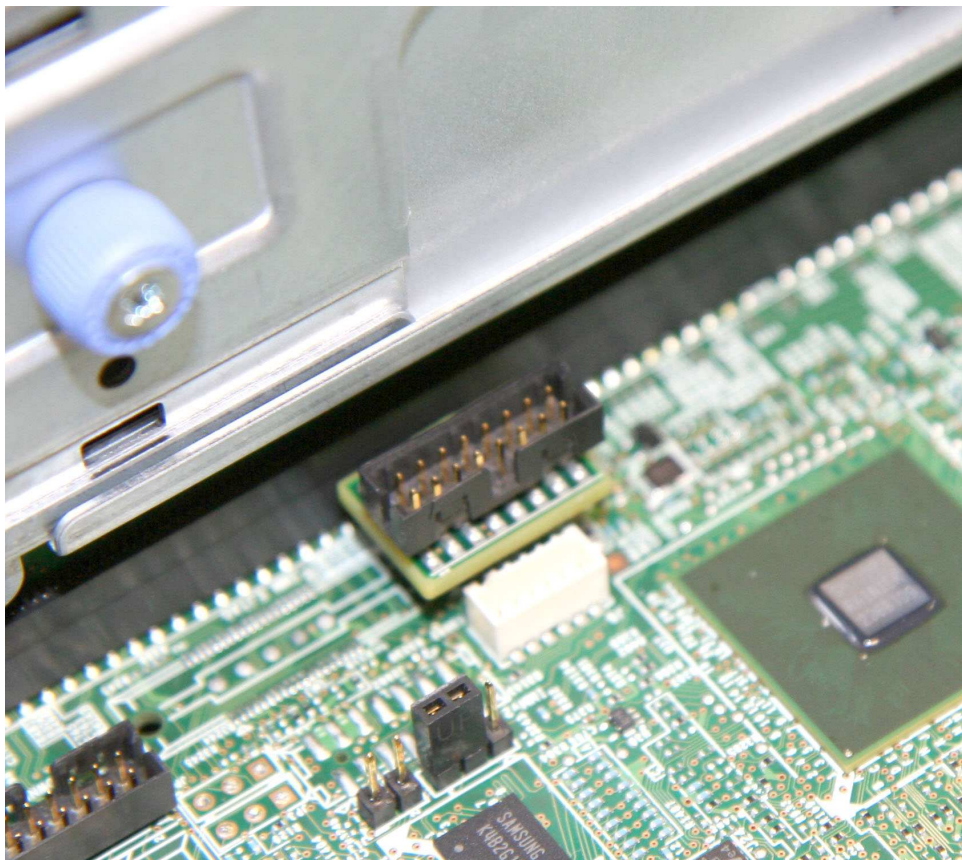


Figure 160. The LPC adapter that is fitted to the LPC connector on the system board, two views

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 161 on page 194, with the DIMM wrapped by the power sense cable.

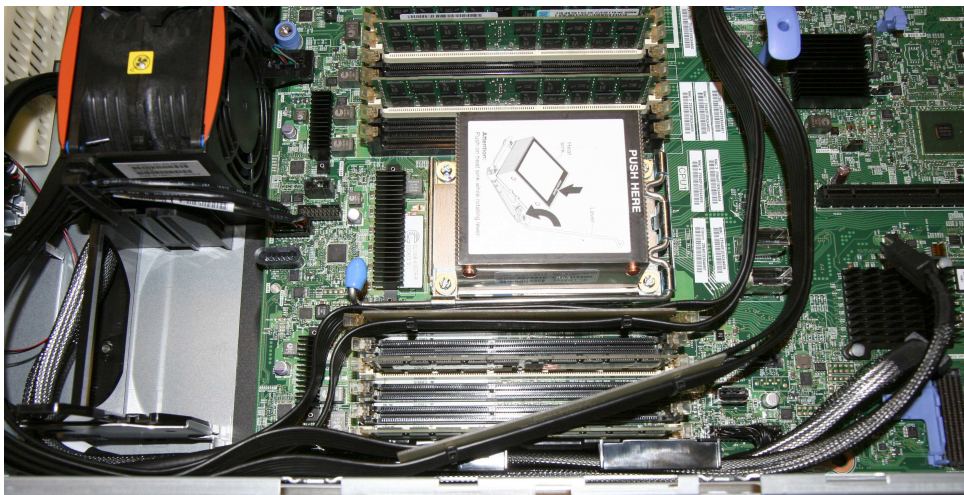
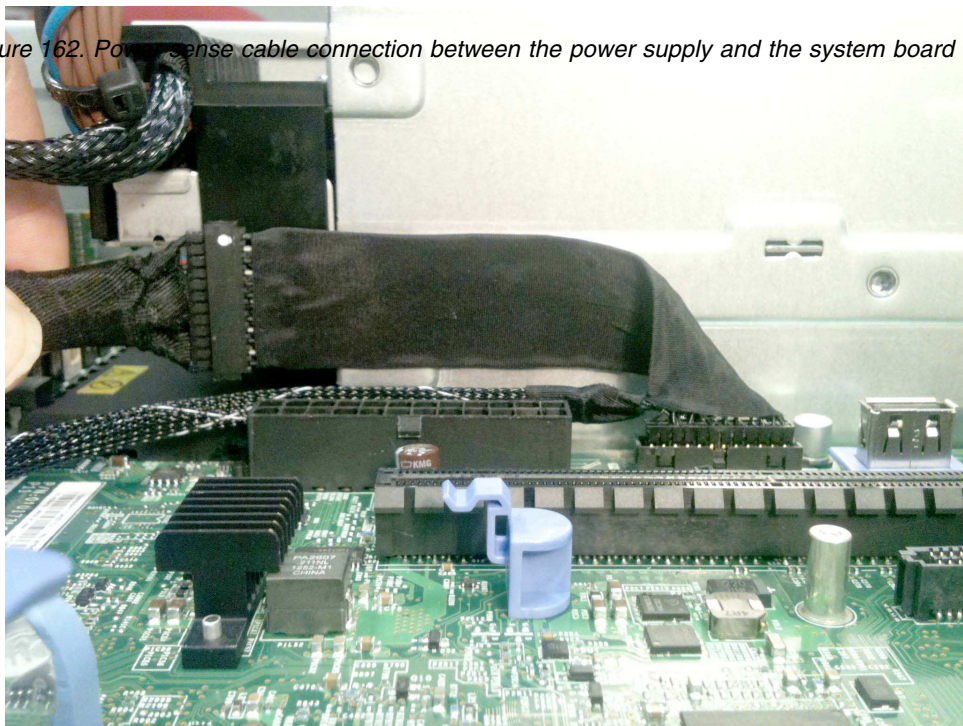


Figure 161. Dummy DIMM, slot 6

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 162.

Figure 162. 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.

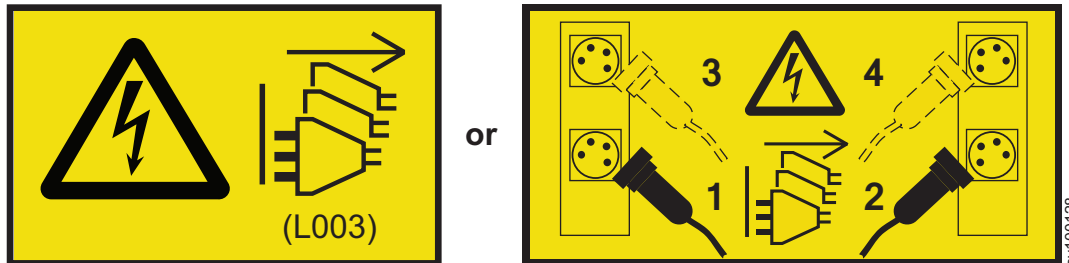
Replacing the battery backplane and cables: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 163 on page 196 shows the backplane and the cable connectors on the main board.

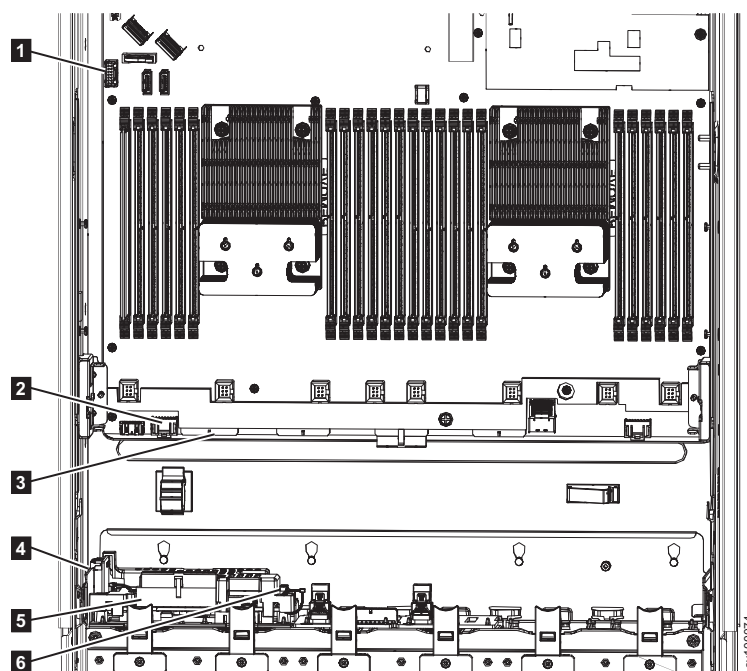


Figure 163. 2145-SV1 battery backplane and cable connectors

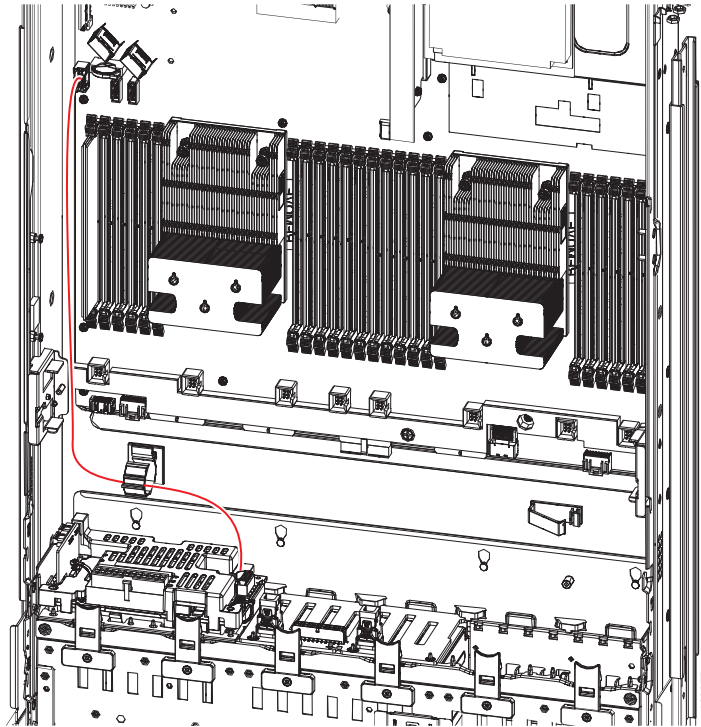
- 1 Low Pin Count (LPC) cable connector on the main board
- 2 Battery backplane power sense cable connector on the main board

- 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 164.

Figure 164. 2145-SV1 battery backplane LPC cable



2. Attach the battery backplane LPC cable to the battery backplane, as shown in Figure 164.

3. Attach the battery backplane power sense cable to the main board, if needed, as shown in Figure 165.

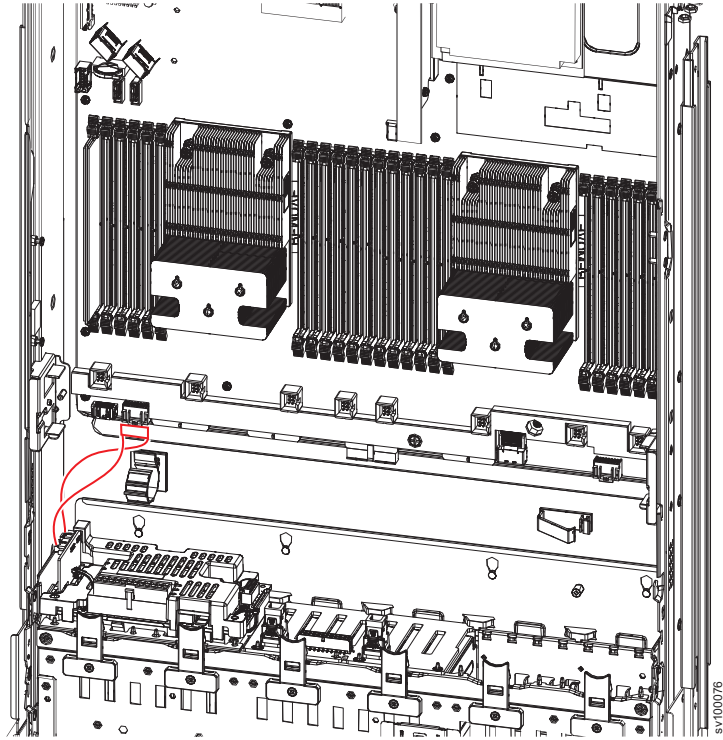


Figure 165. 2145-SV1 battery backplane power sense cable

4. Attach the battery backplane power sense cable to the battery backplane, as shown in Figure 165 on page 199.
5. Attach the battery backplane power cable to the main board, if needed, as shown in Figure 166 on page 201.

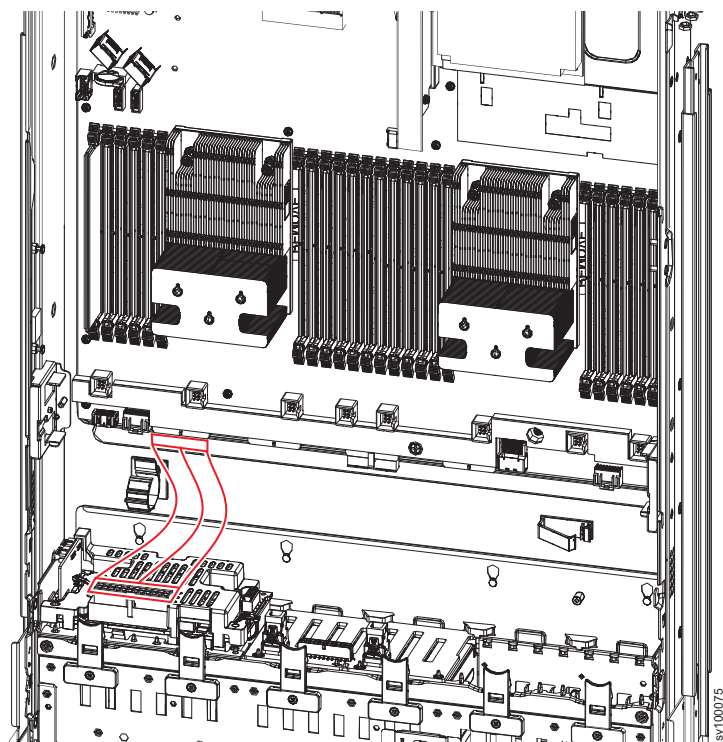


Figure 166. 2145-SV1 battery backplane power cable

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 167 on page 202.

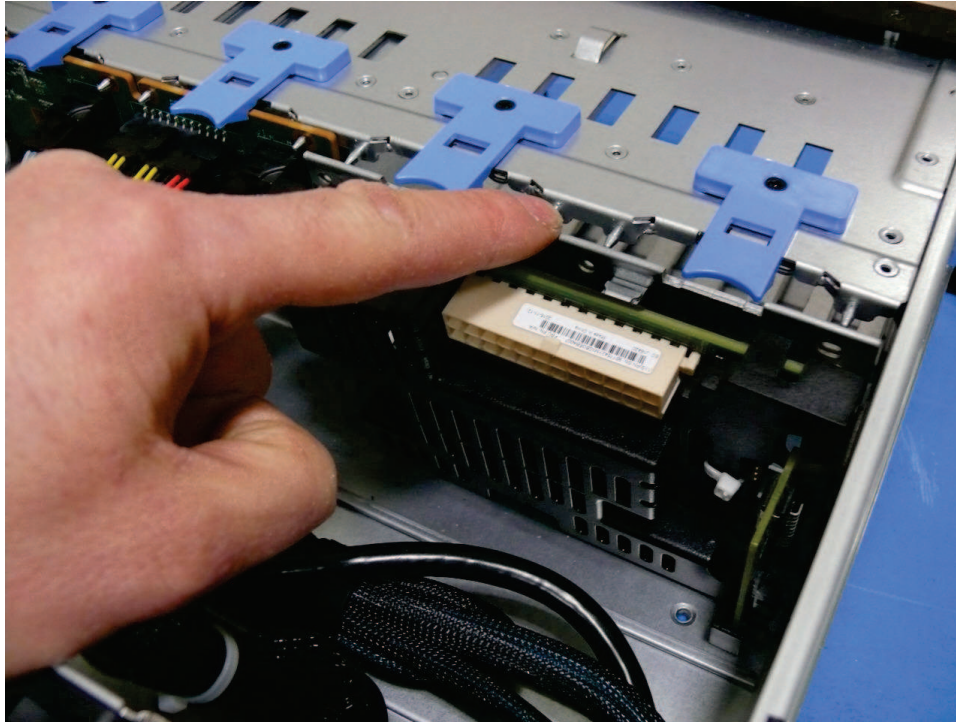


Figure 167. Battery backplane in the 2145-SV1 chassis

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 104.
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 288.
10. Replace the top covers, as described in “Replacing the top covers: 2145-SV1” on page 98.
11. If you removed the node from the rack, replace it, as described in “Replacing a node in a rack: 2145-SV1” on page 70.
12. Reconnect any signal cables.
13. Turn on the node by reconnecting both power cords.

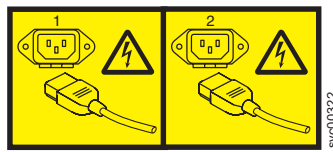
Replacing the battery backplane and cables: 2145-DH8

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

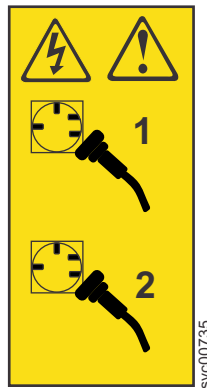
Before you begin

DANGER

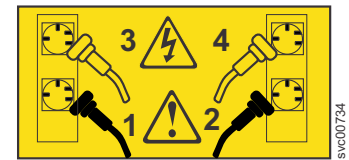
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



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 168 on page 204 and Figure 169 on page 205 show the backplane and associated cables.

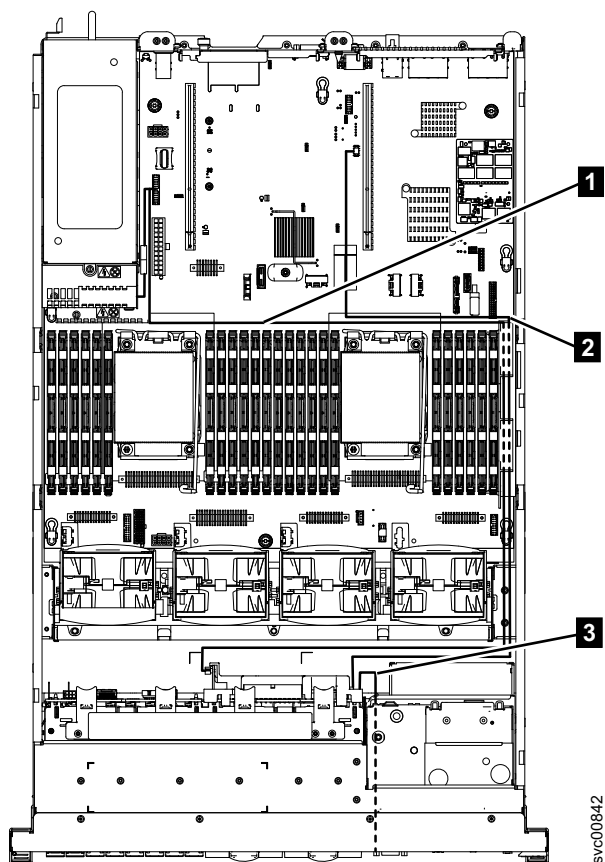


Figure 168. 2145-DH8 Battery backplane-power sense, LPC and LED cables

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

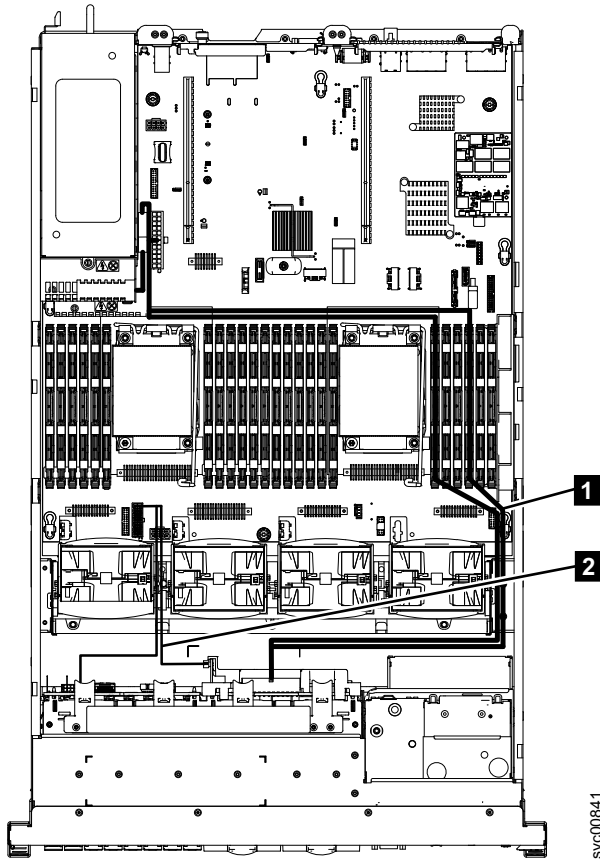


Figure 169. 2145-DH8 Battery backplane-power and EPOW cables

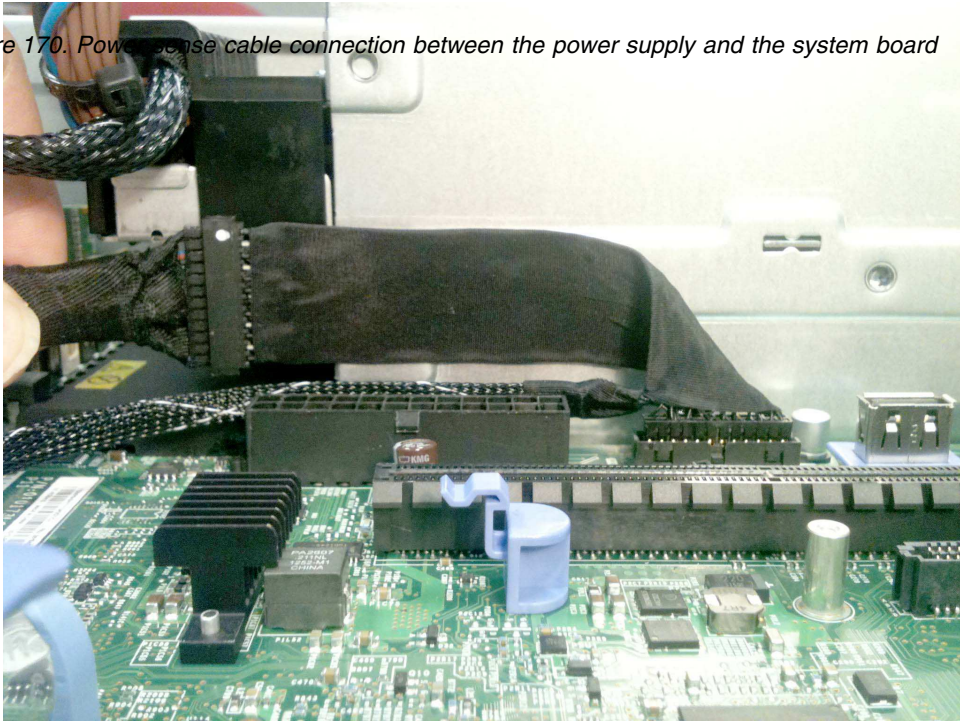
- 1** Power cable
- 2** Emergency power off Warning (EPOW) cable

Procedure

Power Sense cable (power supply unit end that is shown in Figure 170 on page 206)

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

Figure 170. 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 171)
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 171. 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 172.

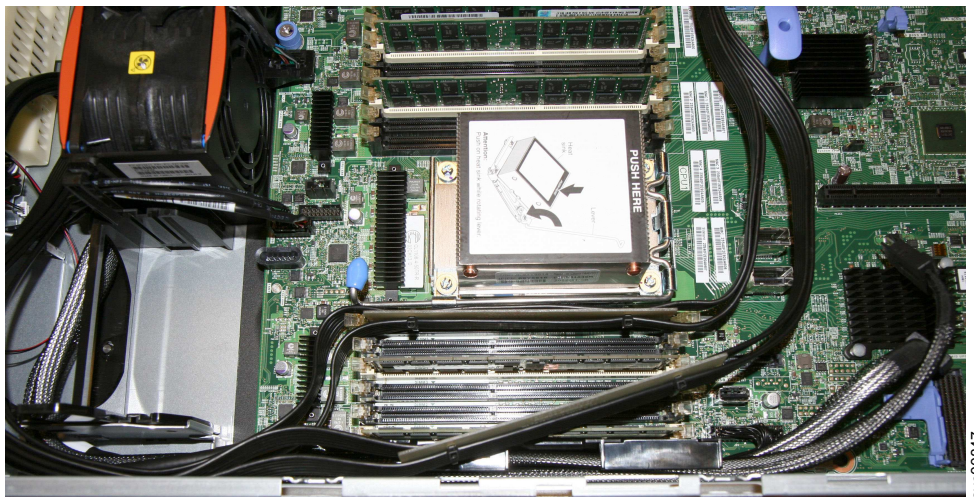


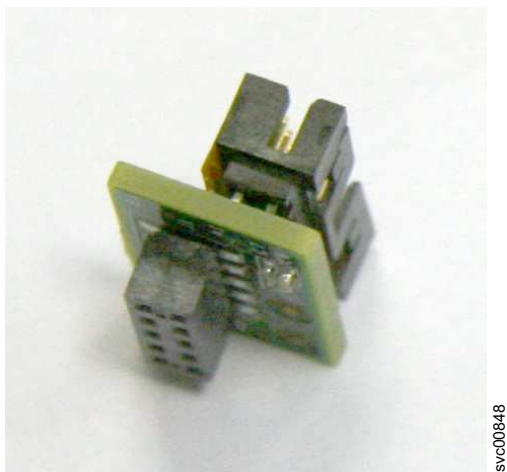
Figure 172. Bend the power cable after the dummy DIMM to avoid the heat sink

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.

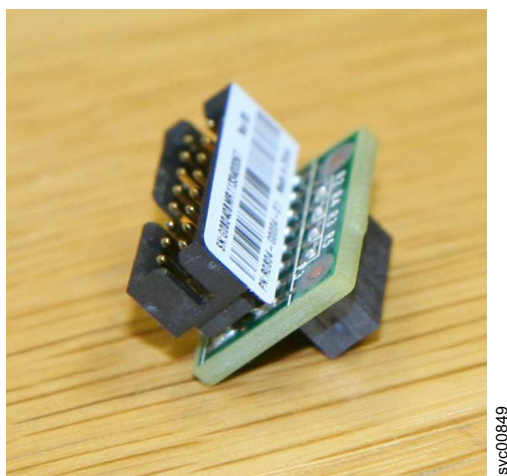
Note: The short wire connects to the disk drive backplane and the long wire to the battery backplane.

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 173 on page 208.



svc00848



svc00849

Figure 173. 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 174 on page 209)

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

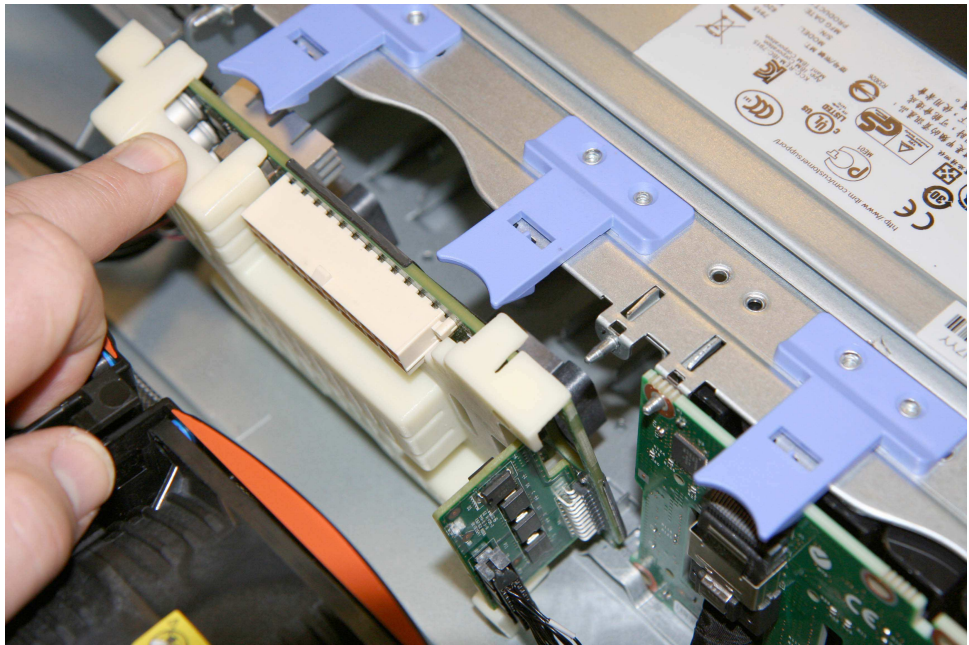


Figure 174. Fitting the battery backplane

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 175 on page 210) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

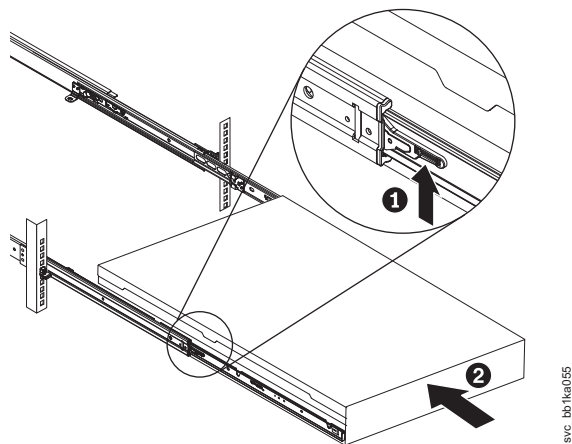


Figure 175. Raising the 2145-DH8 locking levers of the slide rails of the rack

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*.

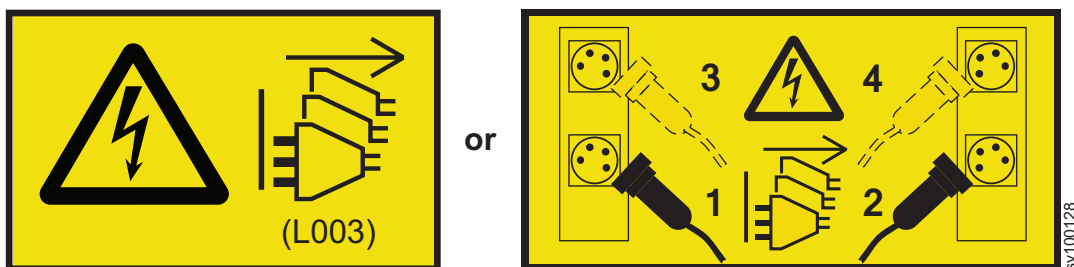
Removing the battery: 2145-SV1

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 state 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 20.
2. Pull the battery catch and swing down the front cover of the battery, as shown in Figure 176.



Figure 176. Release the battery module on the 2145-SV1 node

3. Gently pull the battery assembly out of the battery slot, as shown in Figure 177 on page 212.



Figure 177. 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 state 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 20.
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 178.

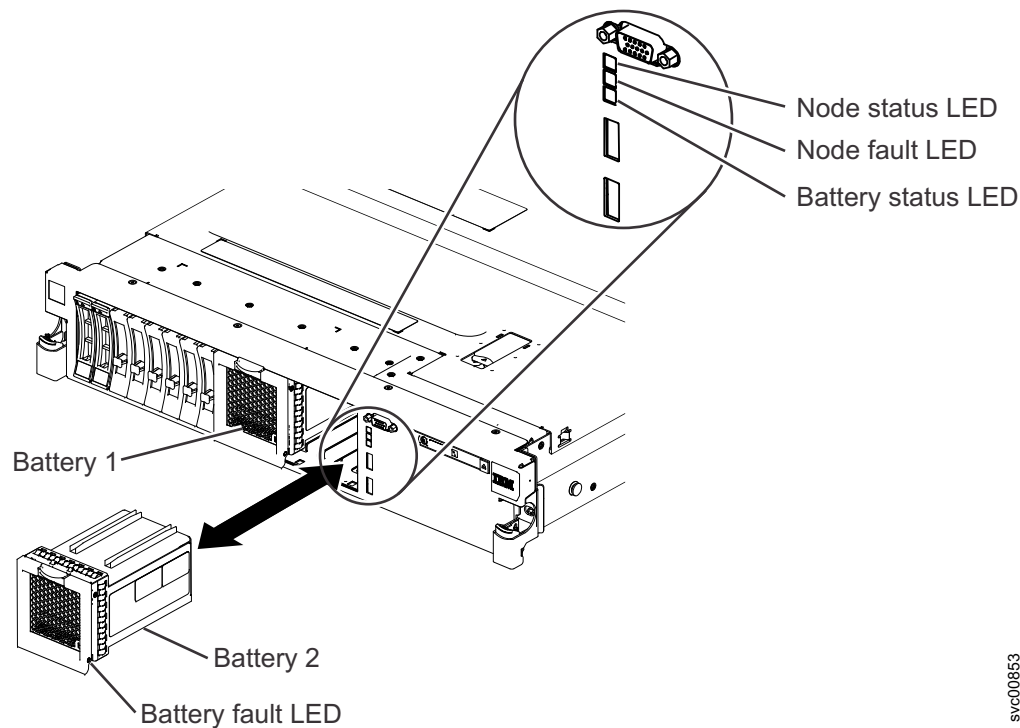


Figure 178. Removing the battery in the SAN Volume Controller 2145-DH8 node

- 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 state 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 20.
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 179 on page 215.



Figure 179. 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 180.



Figure 180. 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 67.
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 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 state 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” on page 20.
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 181 on page 217.

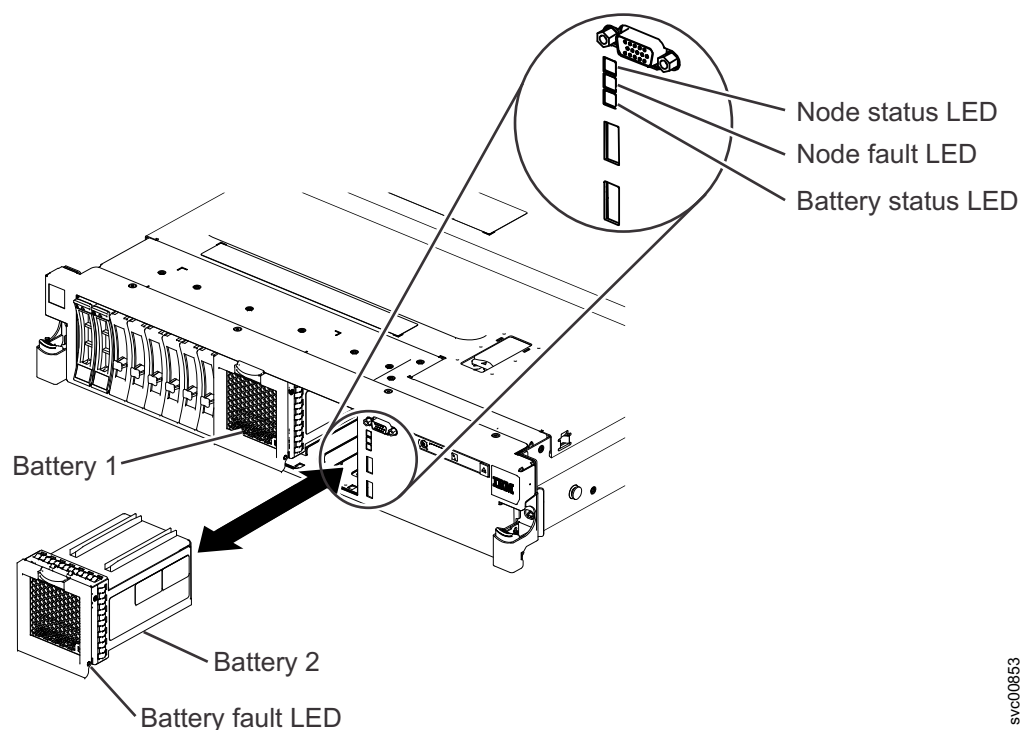


Figure 181. Replacing the battery in the SAN Volume Controller 2145-DH8 node

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, as described in “Replacing a node in a rack” on page 67.
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*.

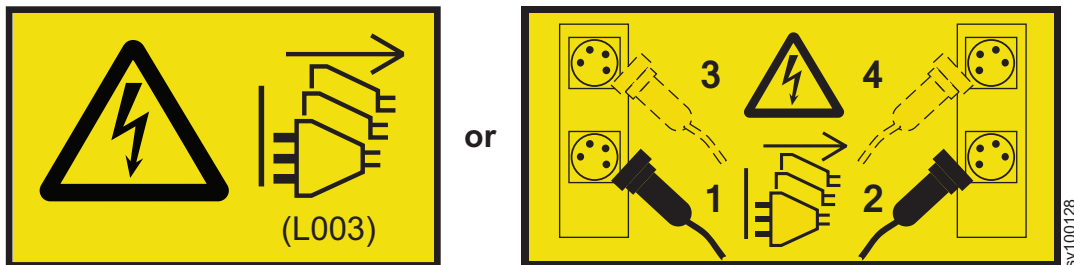
Removing the CMOS battery: 2145-SV1

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)



CAUTION:

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

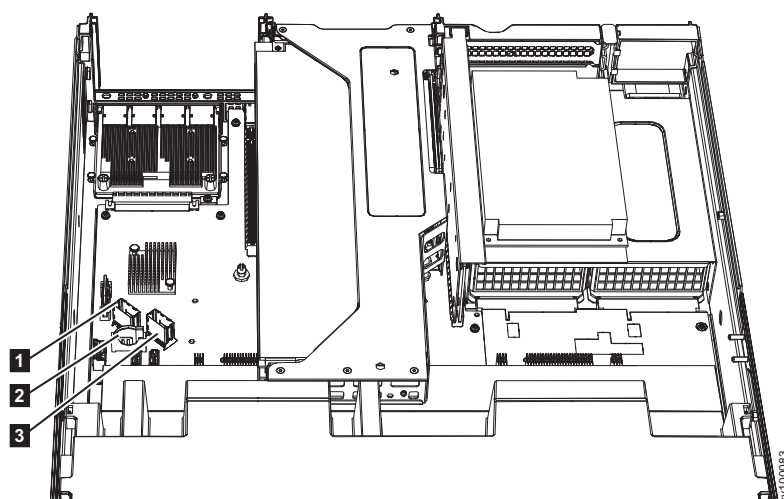
Do not: Throw or immerse into water, heat to more than 100°C (212°F), repair or disassemble. (C003)

About this task

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

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 20.
3. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 54.
7. Remove the top back cover, as described in "Removing the top covers: 2145-SV1" on page 93.
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 182 on page 219.



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

Figure 182. 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 183.
 - b. Use your thumb and index finger to lift the battery from the holder **5** in the direction (b) shown in Figure 183.

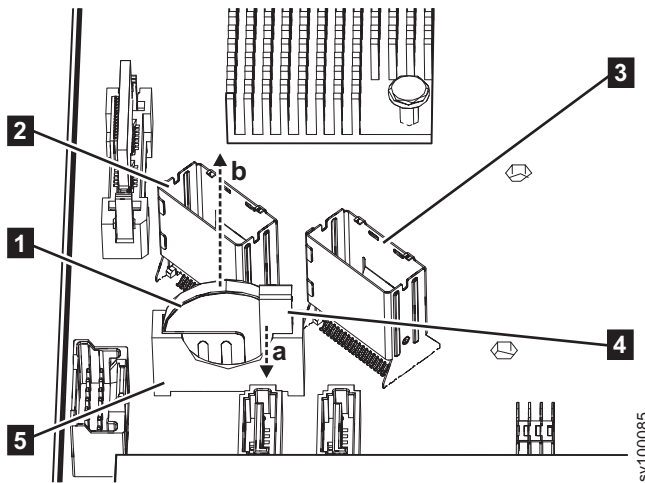


Figure 183. Removing the 2145-SV1 CMOS battery

- 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.

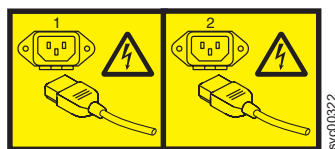
Removing the CMOS battery: 2145-DH8

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

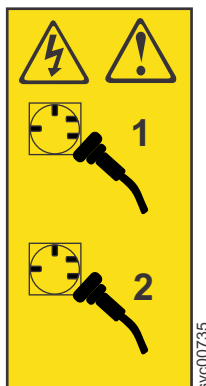
Before you begin

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 20 refers.
3. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 54.
7. Remove the top cover, as described in “Removing the top cover: 2145-DH8” on page 95.
 8. Locate the battery on the system board, as shown by Figure 184.

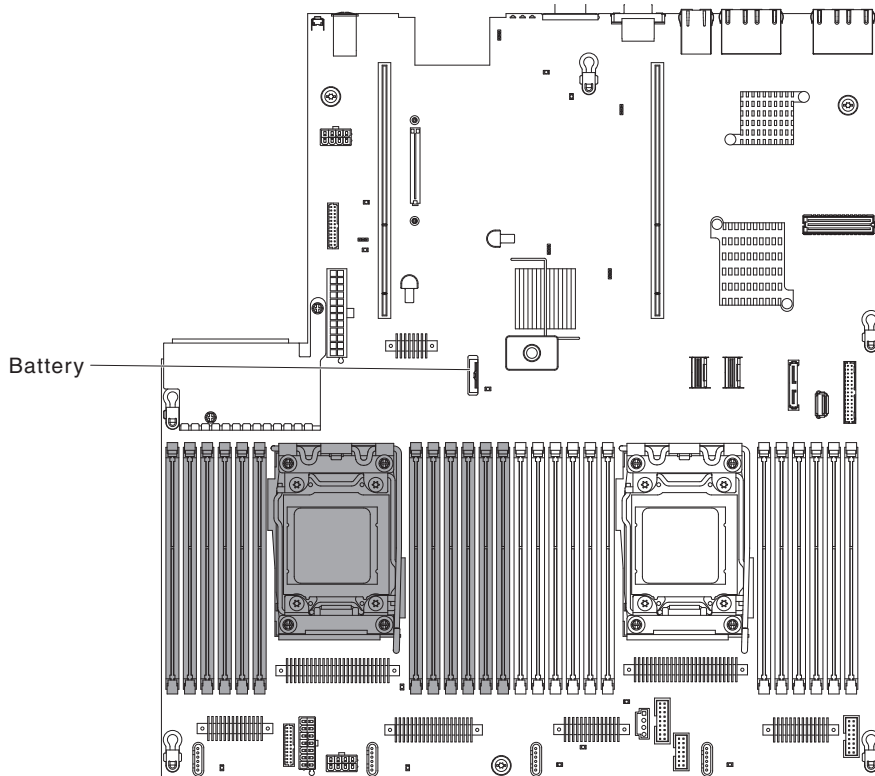


Figure 184. Location of the SAN Volume Controller 2145-DH8 CMOS battery holder

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 185.

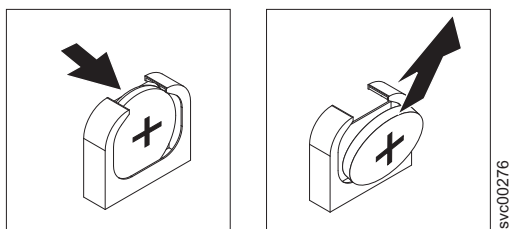


Figure 185. SAN Volume Controller 2145-DH8 CMOS battery holder

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.

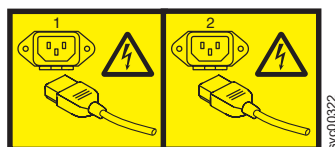
Removing the CMOS battery: 2145-CG8 or 2145-CF8

You can remove the CMOS battery from a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

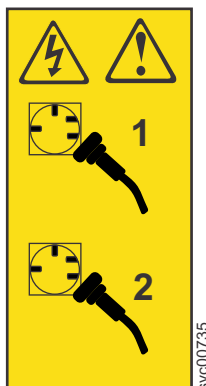
Before you begin

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

This service action requires you to remove the cover and complete the following actions:

- Turn the node off.
- Disconnect the power cables.
- Optionally disconnect the Fibre Channel and Ethernet data cables.

To remove the CMOS battery, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. 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.

4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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 54.
6. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
7. Locate the battery **1** on the system board. Figure 186 shows the location of the battery.

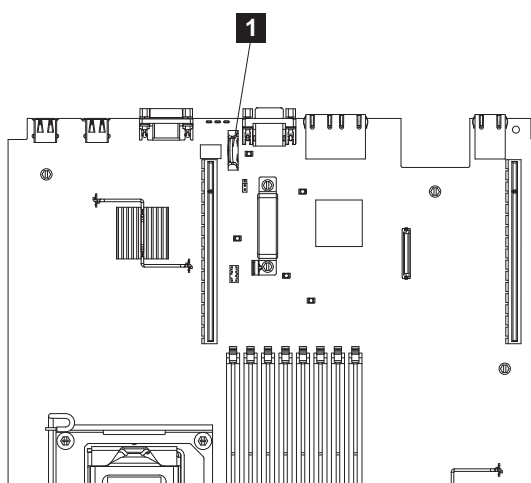


Figure 186. Location of the SAN Volume Controller 2145-CG8 or 2145-CF8 CMOS battery holder

8. Remove the CMOS battery, as shown in Figure 187:

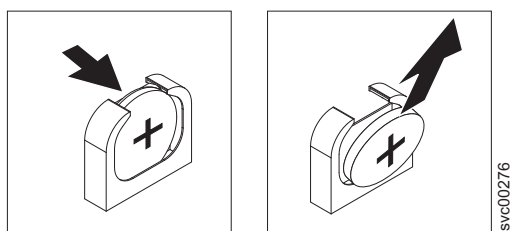


Figure 187. SAN Volume Controller 2145-CG8 or 2145-CF8 CMOS battery holder

- 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.
9. Recycle or discard the battery as instructed by local regulations.

See the warning 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*.

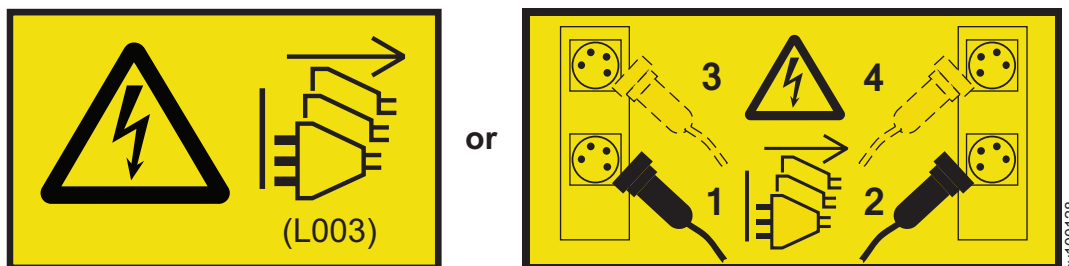
Replacing the CMOS battery: 2145-SV1

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)



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)

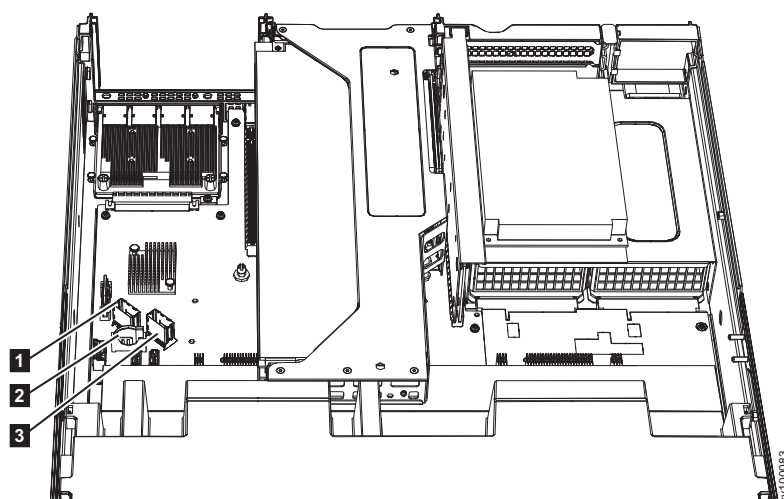
About this task

This service action assumes that the following precautions were taken:

- The node is turned off.
- The power cables are disconnected.
- The CMOS battery is removed from the node.
- The top back cover is off.
- PCI express riser assembly 1 is removed.
- The SATA cables are unplugged from the main board SATA cable connectors.

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 188 on page 227.



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

Figure 188. 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 189.
 - b. Insert the battery into the holder **5** in the direction (b) shown in Figure 189. The “+” mark on the battery must face towards the front of the node.

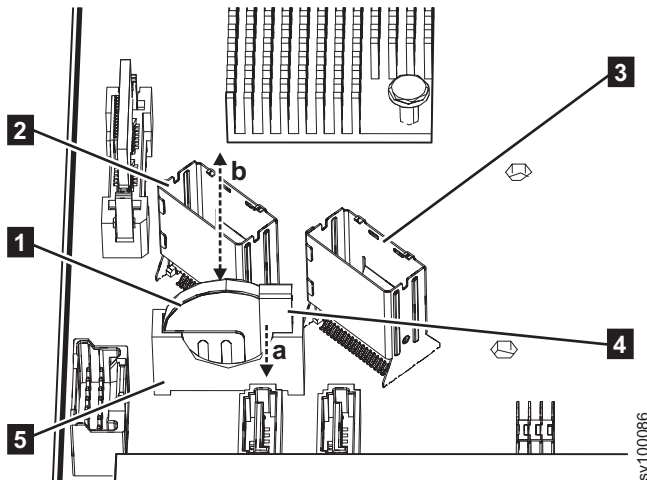


Figure 189. Replacing the 2145-SV1 CMOS battery

- 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 188 on page 227.
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 165.
 5. Replace PCI express riser assembly 1, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 288.
 6. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 98.
 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 70.
 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.

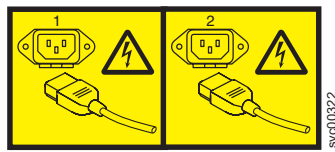
Replacing the CMOS battery: 2145-DH8

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

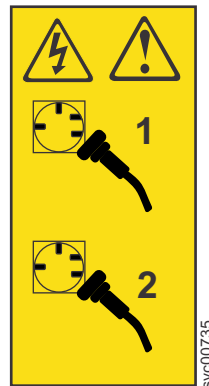
Before you begin

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 190 on page 230.

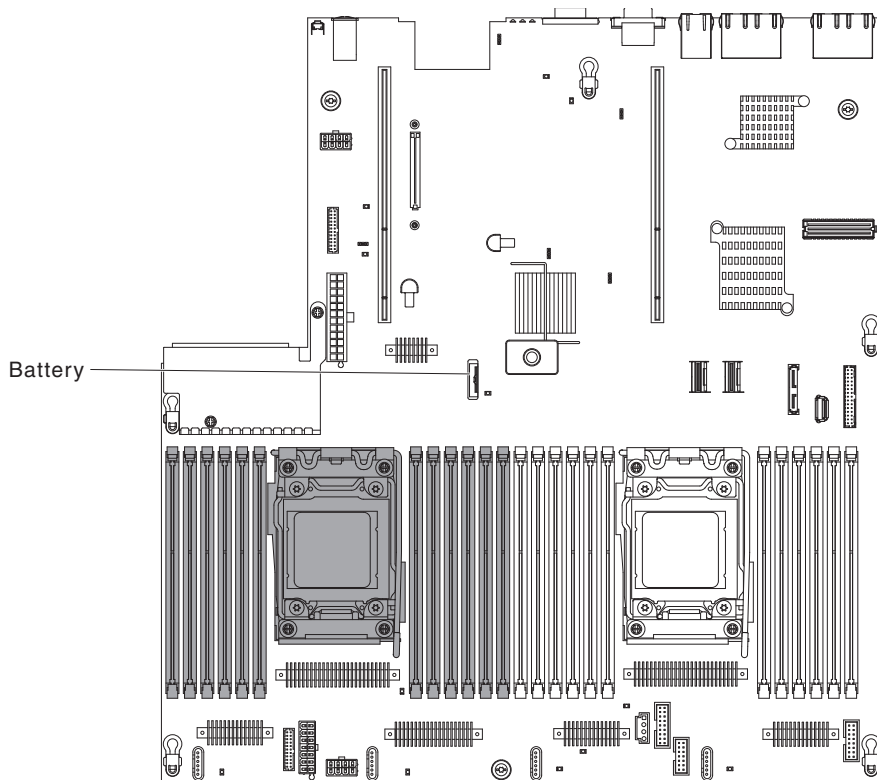


Figure 190. Location of the SAN Volume Controller 2145-DH8 CMOS battery holder

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 191.

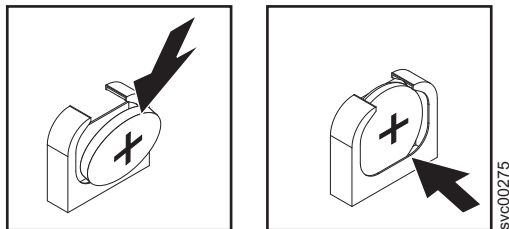


Figure 191. SAN Volume Controller 2145-DH8 CMOS battery holder

- 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 192) on the slide rails and push the node **2** all the way into the rack until it clicks into place.

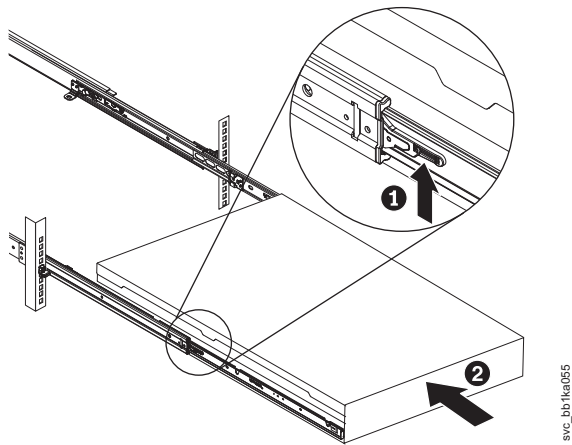


Figure 192. Raising the locking levers of the slide rails of the rack

10. Turn on the node.
11. If a problem causes you to restart the node, see MAP 5900 in the *IBM SAN Volume Controller Troubleshooting Guide*. Then, connect a monitor and keyboard to the system and reset the BIOS date and time.

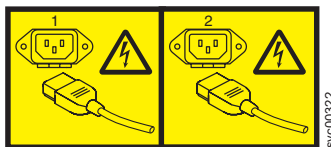
Replacing the CMOS battery: 2145-CG8 or 2145-CF8

You can replace the system-board CMOS battery on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

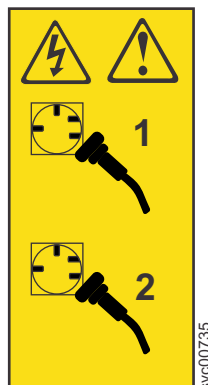
Before you begin

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 actions have been completed:

- 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-CG8 or 2145-CF8 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. Figure 193 shows the location (**1**) of the battery on the system board.

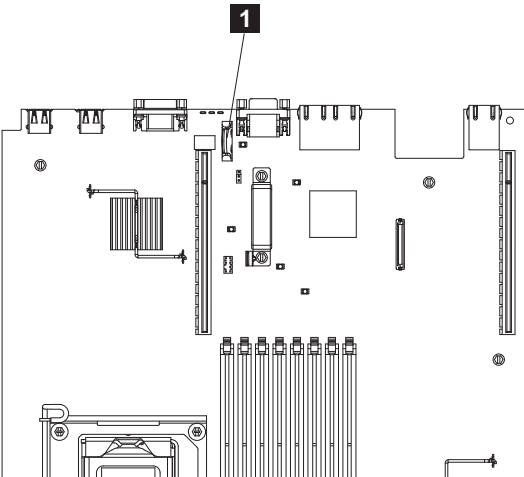


Figure 193. Location of the SAN Volume Controller 2145-CG8 or 2145-CF8 CMOS battery holder

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 194.

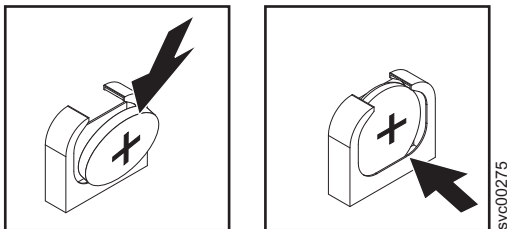


Figure 194. SAN Volume Controller 2145-CG8 or 2145-CF8 CMOS battery holder

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. See "Replacing the top cover" on page 98.
6. 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 67.
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, as described in "Replacing the cable-retention bracket" on page 53.
9. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in "Replacing the cable-retention brackets: 2145-CG8 or 2145-CF8" on page 53.
10. Lift the locking levers (**1** in Figure 195) on the slide rails and push the node **2** all the way into the rack until it clicks into place.

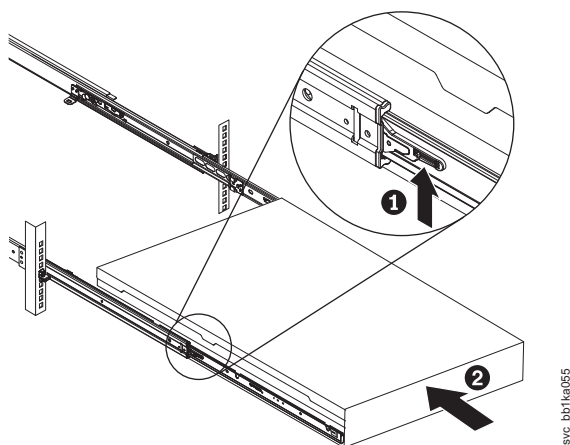


Figure 195. Raising the locking levers of the slide rails of the rack

11. Turn on the node.
12. If there is a problem restarting the node, see MAP 5900 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 SAN Volume Controller 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)

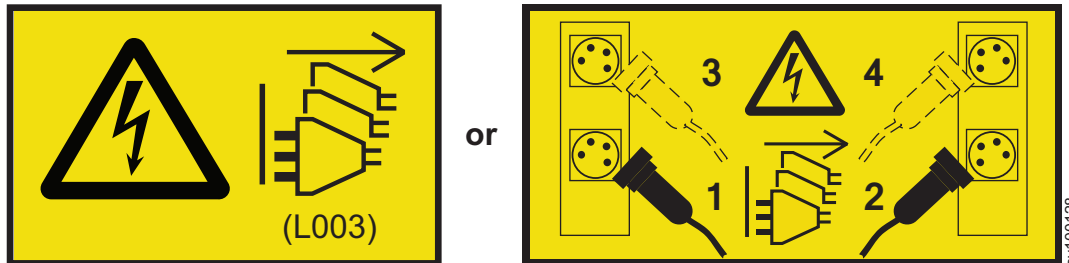
Removing a power supply: 2145-SV1

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 20.
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 196 shows the release tab for power supply unit 1.



Figure 196. Release in the 2145-SV1 power supply

5. Grasp the handle and pull the power supply out of the node, as shown in Figure 197 on page 236.



Figure 197. 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.

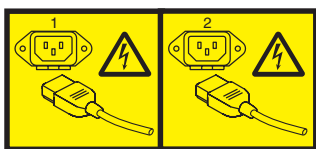
Removing a power supply: 2145-DH8

You can remove either of the two 750 watt 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 removing PSU 2 during a service action.

Before you begin

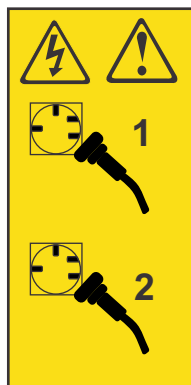
DANGER

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 20.
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 198.

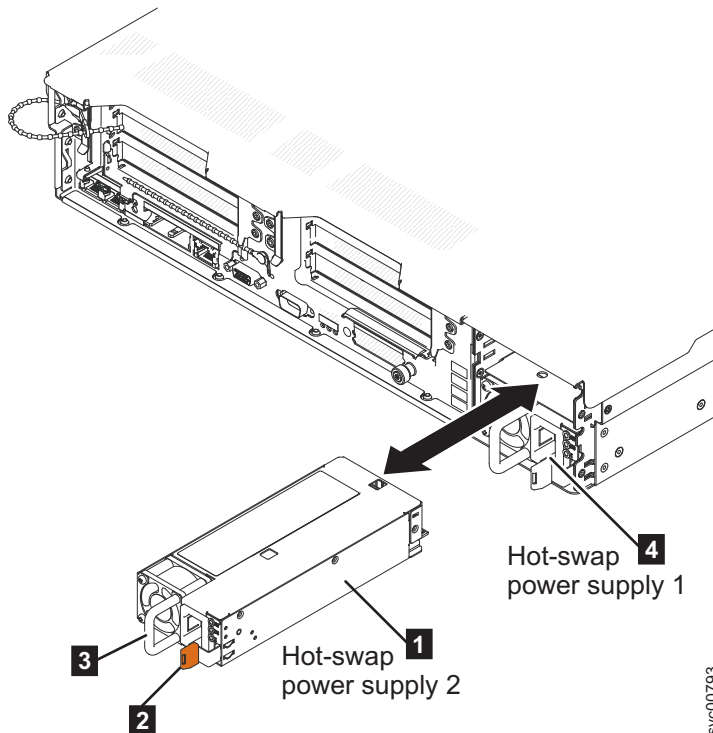


Figure 198. Removing the SAN Volume Controller 2145-DH8 power supply

- 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.

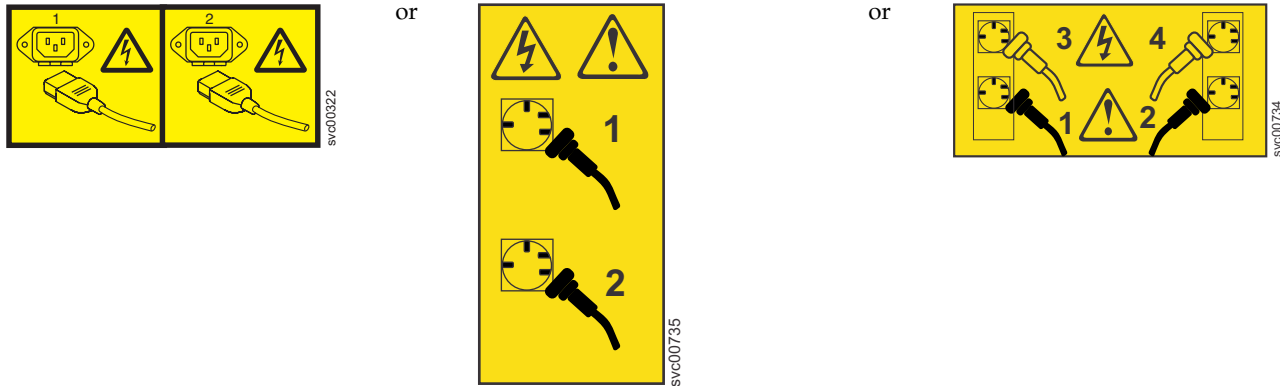
Removing a power supply: 2145-CG8 or 2145-CF8

You can remove and replace either of the two 675-watt hot-swap redundant power supplies in the SAN Volume Controller 2145-CG8 or 2145-CF8 node. These 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.

About this task

This service action requires you to complete the following actions:

- Optionally, turn the node off.
- Disconnect the power cable on each power supply that you are removing.

Important: You can hot swap the power supply. However, using MAP 5350 to power off the node through proven methods avoids risking an abrupt power failure on the node, which avoids the possible corruption of data.

To remove the SAN Volume Controller 2145-CG8 or 2145-CF8 power supply, complete the following steps.

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Optional: Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 power supply, use MAP 5350 to make all of the necessary checks that 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. 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.

4. Remove the cable-retention bracket and the power cord from the power supply that you are replacing, as described in “Removing the cable-retention brackets: 2145-CG8 or 2145-CF8” on page 51.
5. To remove the power supply **1**, press and hold the release tab **2** to the left. Grasp the handle **3** on the rear of the power supply, as shown in Figure 199, and pull the power supply out of the node.

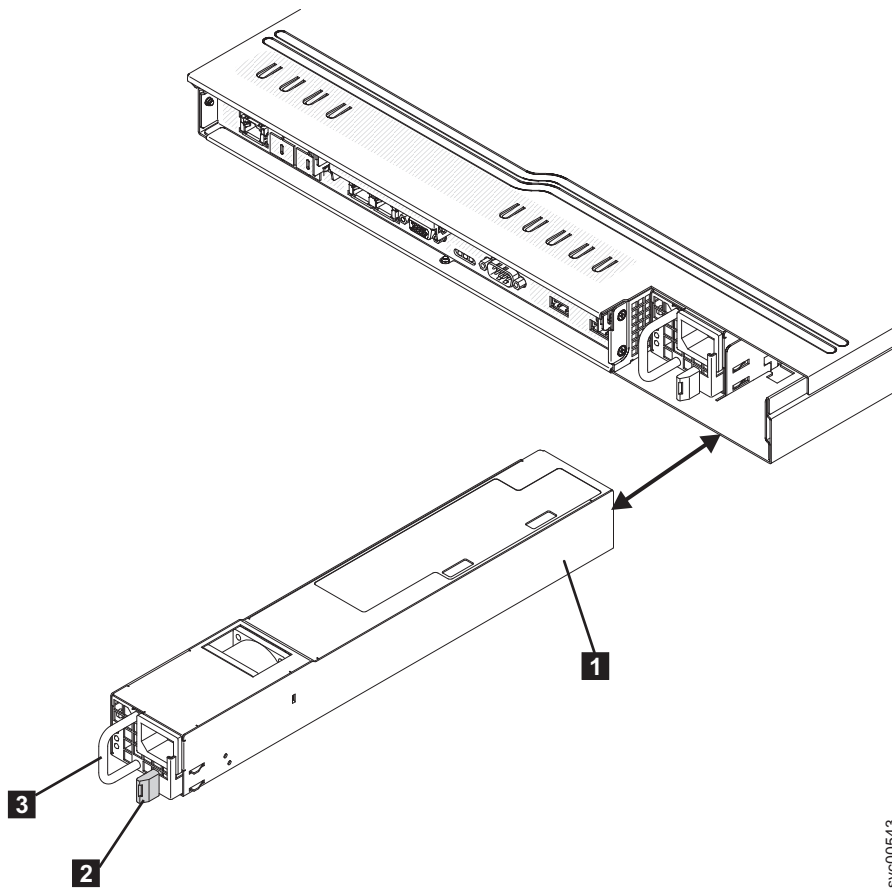


Figure 199. SAN Volume Controller 2145-CG8 or 2145-CF8 power supply

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

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.

Replacing a power supply

You might need to replace the SAN Volume Controller 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)

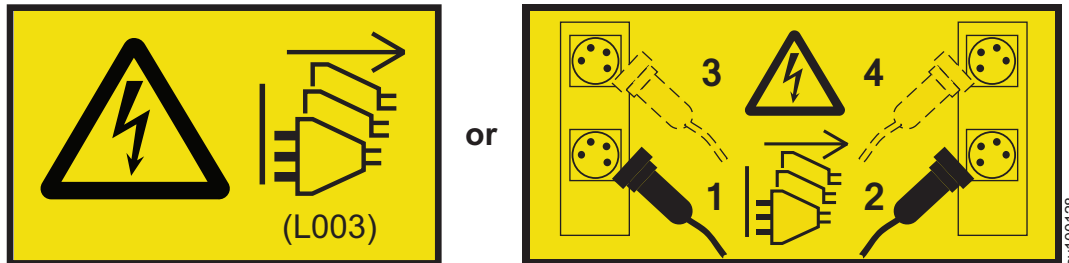
Replacing a power supply: 2145-SV1

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 200 on page 242. 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 200. 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 201. 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.

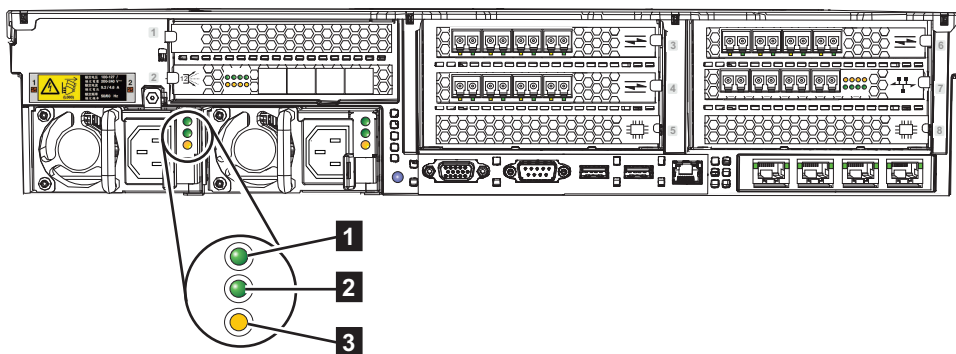


Figure 201. 2145-SV1 AC, DC, and power-error LEDs

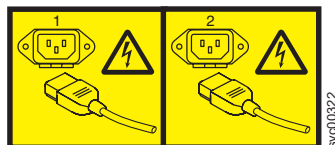
Replacing a power supply: 2145-DH8

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.

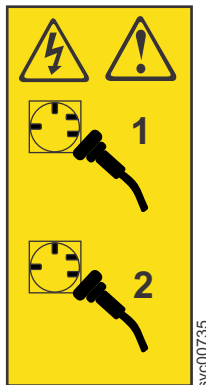
Before you begin

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 202 on page 244, 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.

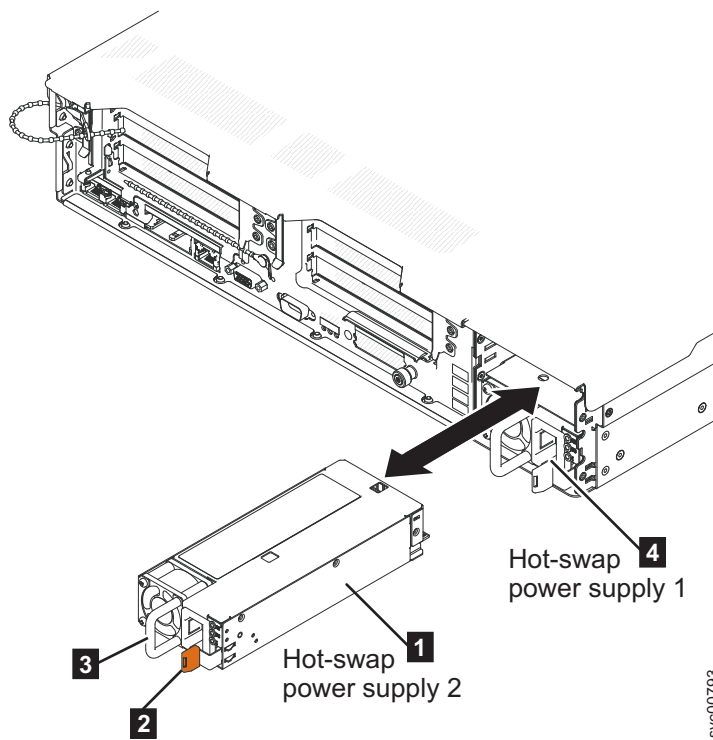
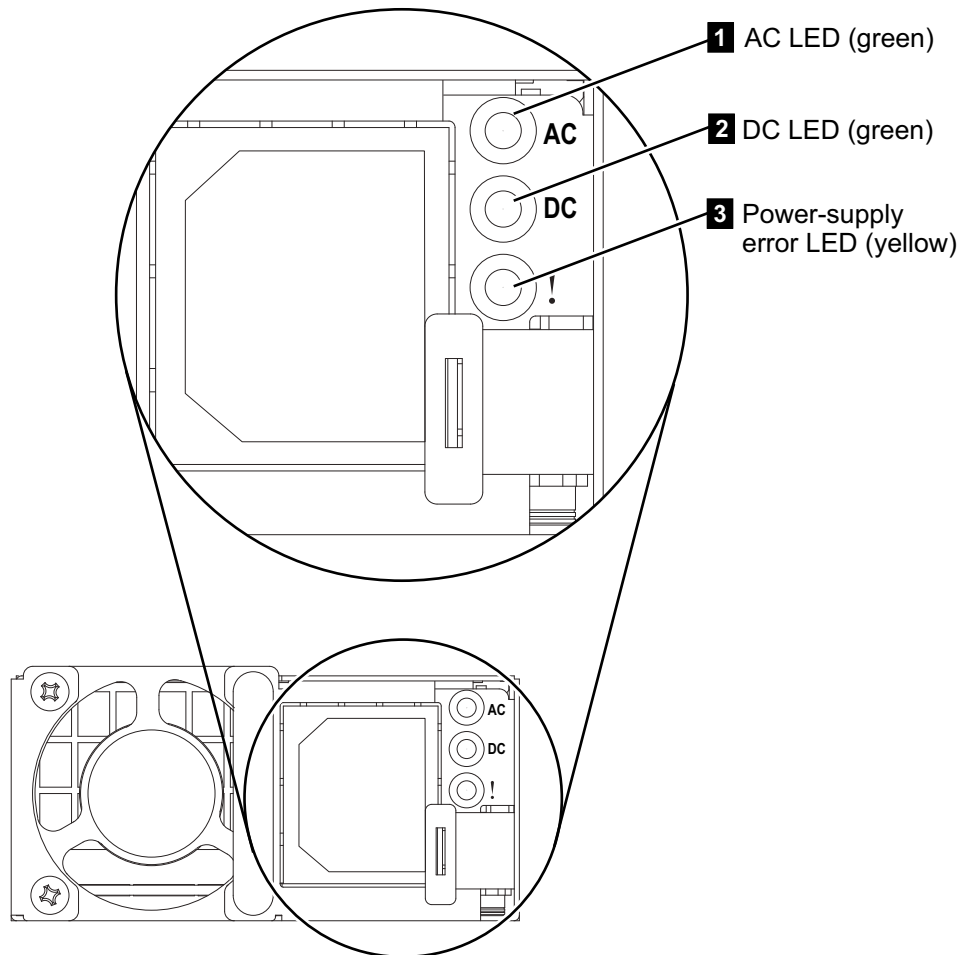


Figure 202. Replacing the SAN Volume Controller 2145-DH8 power supply

- 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 203 on page 245) 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.



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Figure 203. 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.

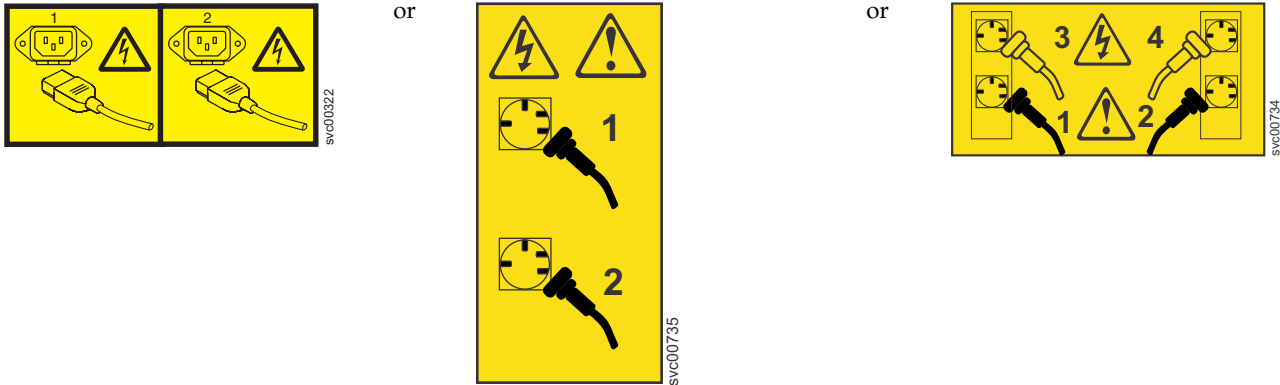
Replacing a power supply: 2145-CG8 or 2145-CF8

You can replace either of the two 675-watt hot-swap redundant power supplies in the SAN Volume Controller 2145-CG8 or 2145-CF8 node. These 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 replace the power supply.

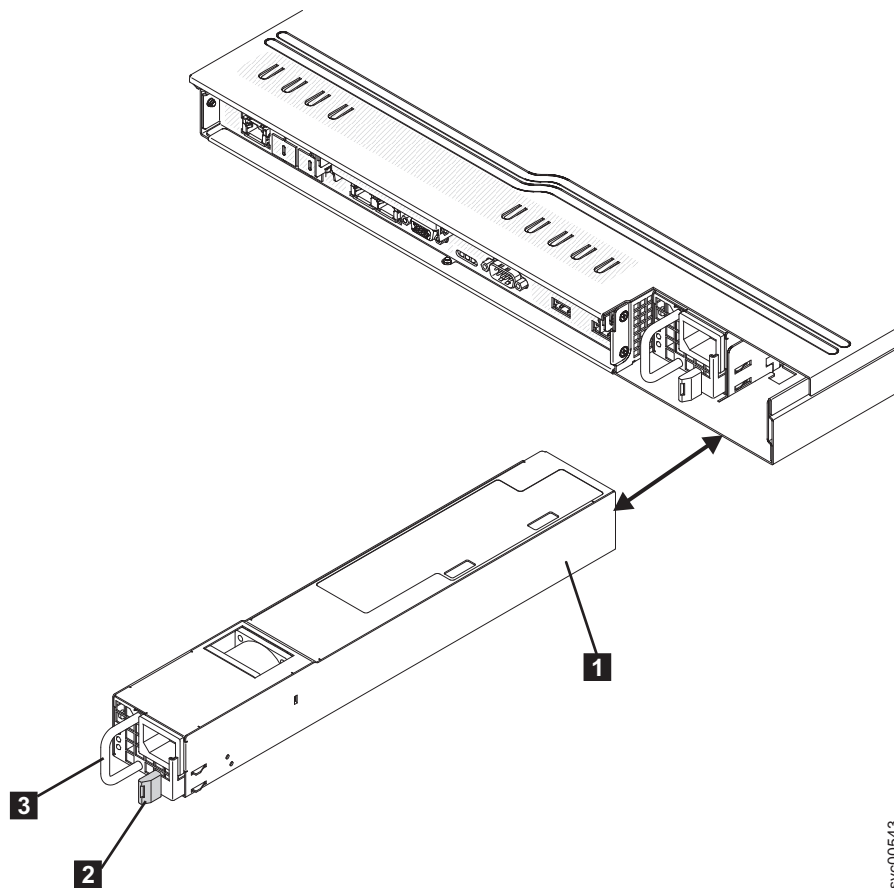
About this task

Important: You can hot swap the power supply. However, using MAP 5350 to power off the node through proven methods avoids risking an abrupt power failure on the node, which avoids the possible corruption of data. This procedure assumes that you have turned off the node 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*.

To replace the SAN Volume Controller 2145-CG8 or 2145-CF8 power supply, complete the following steps.

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Grasp the handle on the rear of the power supply, as shown in Figure 204 on page 247. Slide the power supply forward fully into the node until it clicks in place. Verify that the power supply connects firmly into the power-supply connector.



svc00543

Figure 204. SAN Volume Controller 2145-CG8 or 2145-CF8 power supply

- 1** Power supply
 - 2** Power-supply release tab
 - 3** Power-supply handle
3. Attach the cable-retention bracket to the power cord from the 2145 UPS-1U and connect the cord to the power-cord connector on the power supply, as described in “Replacing the cable-retention brackets: 2145-CG8 or 2145-CF8” on page 53.
 4. If necessary, turn on the node.
 5. To the left of the power-cord connector on each power supply, verify that the AC power LED (**1**) and the DC power LED (**2**) are lit, as shown in Figure 205 on page 248.
- The green power LEDs indicate that the power supply is operating correctly. A power-supply error is indicated by the amber power-supply error LED (**3**).

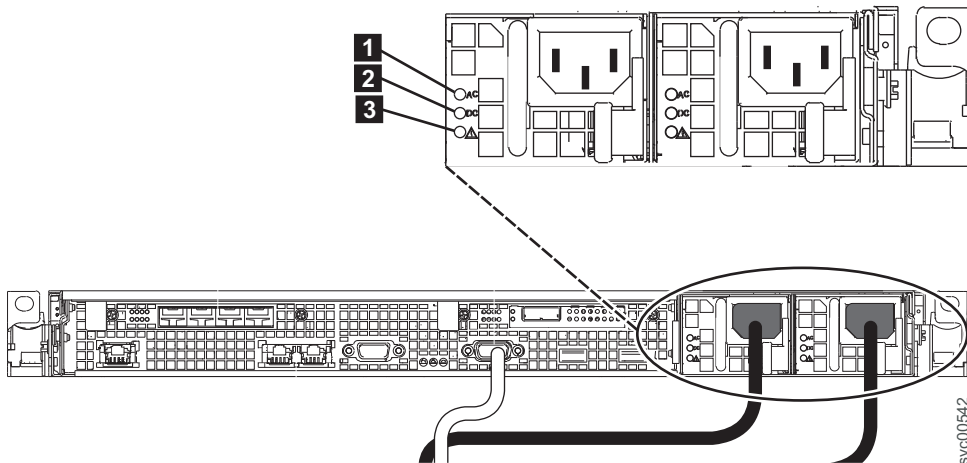


Figure 205. SAN Volume Controller 2145-CG8 or 2145-CF8 AC, DC, and power-error LEDs

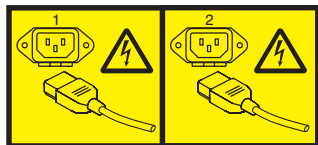
Removing the redundant AC-power switch: 2145-CG8 or 2145-CF8

Use this topic when you need to remove a redundant AC-power switch on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

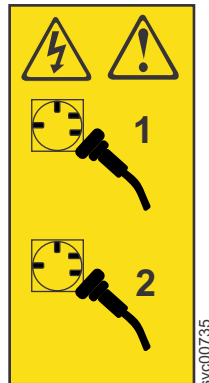
Before you begin

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



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

Note: The following procedure is applicable only for 2145-CG8 or 2145-CF8 nodes.

To remove a redundant AC-power switch, complete the following steps.

Procedure

1. Turn off each SAN Volume Controller node that is connected by an uninterruptible power supply to the redundant AC-power switch. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
 - a. One or two nodes might be connected to the redundant AC-power switch. If two nodes are connected to the redundant AC-power switch, you must ensure that both nodes are not in the same I/O group before you turn off the nodes. If the nodes are both turned off and they are in the same I/O group, the customer will lose access to the data that is managed by that I/O group.
 - b. If both nodes that are powered by the redundant AC-power switch are in the same I/O group, turn off one node, disconnect it from the redundant AC-power switch, and connect it to a different power source. Then, turn the node back on. When it has recovered and rejoined the I/O group, it can maintain the I/O access when the other node is turned off and when the redundant AC-power switch is removed. When you perform this operation, pay particular attention to checking when it is safe to turn off the second node. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide*.
2. Remove both the redundant AC-power switch input-power cables from the site power distribution unit and unthread them in the rack, so they will slide out when the redundant AC-power switch is removed. There might be enough access to disconnect them from the redundant AC-power switch while it is in the rack, but often it is more convenient to leave them attached and remove them with the redundant AC-power switch.
3. Remove the one or two redundant AC-power switches to 2145 UPS-1U power cables from the redundant AC-power switch. There is no need to disconnect them from the 2145 UPS-1U.
4. Remove the four screws that hold the redundant AC-power switch in the rack. Be careful to support the redundant AC-power switch during this procedure because the screws are the only support for the unit.
5. The redundant AC-power switch can be slid out of the rack along with the input-power cables if they are still attached.

Replacing the redundant AC-power switch: 2145-CG8 or 2145-CF8

You might need to replace a redundant AC-power switch on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Before you begin

Note: The following procedure is applicable only for 2145-CG8 or 2145-CF8 nodes.

The redundant AC-power switch FRU assembly includes the redundant AC-power switch and the input power cables. They should all be replaced together. These instructions assume that a redundant AC-power switch has been removed and the one or two nodes that were connected to it are powered off.

About this task

To replace a redundant AC-power switch, complete the following steps.

Procedure

1. Attach each of the two mounting plates to the redundant AC-power switch using three M3 Torx T8 head screws. Position the mounting face, as shown in Figure 206 on page 250, on the side of the redundant AC-power switch that contains the output power sockets.



Figure 206. Attaching the mounting plates

2. Using the labels provided, label each end of the two redundant AC-power switch input power cables. Unless the configuration is changing, the labels are the same as those on the cables removed with the old redundant AC-power switch.

Label the end of the rack power distribution, using the general format, as follows:

Power source *name*, outlet *id* to
redundant AC-power switch *location* [MAIN | BACKUP] input

Example:

Power source D2, outlet 4 to redundant AC-power switch pos 7 MAIN input

3. Label the end of the redundant AC-power switch end, as follows:
Redundant AC-power switch *location* [MAIN | BACKUP]
input from Power source *name*, outlet *id*
4. Connect the input power cables to the redundant AC-power switch. You want to connect the cables now, because it is difficult to access the input power sockets on the redundant AC-power switch when it is installed in a rack.
5. Connect the main input power cable to the redundant AC-power switch.
6. Connect the backup input power cable to the redundant AC-power switch.
7. Secure both the redundant AC-power switch input cables, as shown in Figure 207, using the clips of the redundant AC-power switch.



Figure 207. Power cable clips

8. Install the redundant AC-power switch in the rack. The four “C” clips for mounting the unit should already be positioned in the rack mounting bar.

9. Position the redundant AC-power switch in the rack, pushing the cables through to the front of the rack. Mount in place using the four M6 screws.
10. Connect the redundant AC-power switch power input cables to the site power.
 - a. Determine a suitable cable route from the redundant AC-power switch to the power distribution units.
 - b. Route the main input power cable of the redundant AC-power switch to the specified power distribution unit, and connect it.
 - c. Route the backup input power cable of the redundant AC-power switch to the specified power distribution unit, and connect it.
 - d. Verify that the redundant AC-power switch power cables are tidy. Ensure that they do not obstruct other equipment and are tied in place where necessary.
11. Test the redundant AC-power switch before connecting it to the 2145 UPS-1U, using MAP 5340 in the *IBM SAN Volume Controller Troubleshooting Guide*.
12. Connect the one or two 2145 UPS-1U units that are powered by this redundant AC-power switch. The power cables should still be plugged into the 2145 UPS-1U units.
 - a. Connect the other end into the output power sockets on the front of the redundant AC-power switch.
 - b. Check the labels on the cables to see which socket they should be connected to.
 - c. If the uninterruptible power supply units do not power on automatically, power them on by pressing the power button for five seconds.
13. Power on the one or two SAN Volume Controller nodes connected to this redundant AC-power switch.

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, 2145-DH8, 2145-CG8 or 2145-CF8 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 208 shows an SFP transceiver and its release handle.



Figure 208. 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 the Fibre Channel adapter assembly

Use the information in this topic when you need to remove a Fibre Channel adapter or Fibre Channel adapter assemblies.

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 xxvii.

Removing the Fibre Channel adapter assembly: 2145-CG8 or 2145-CF8

To remove the SAN Volume Controller 2145-CG8 or 2145-CF8 Fibre Channel adapter assembly, complete the following steps:

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)

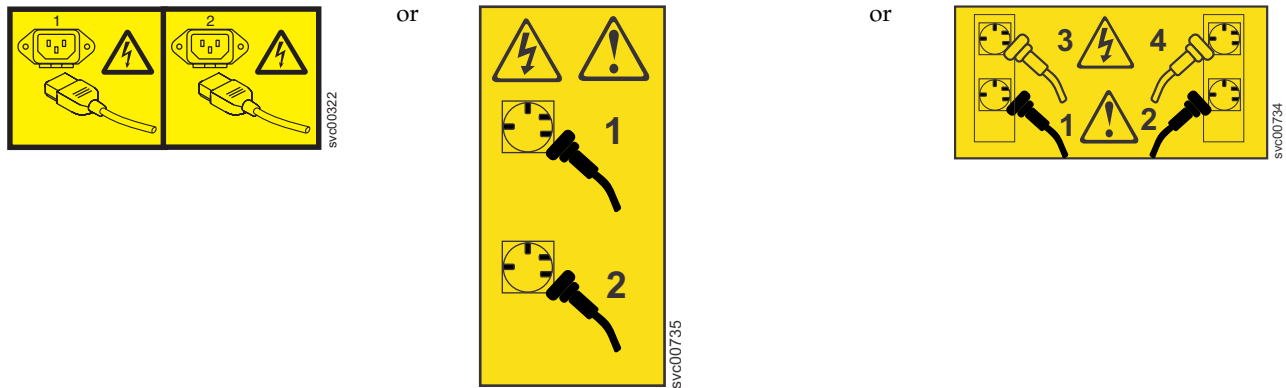


Figure 209 shows the connectors on the rear of the SAN Volume Controller 2145-CG8 or 2145-CF8 node.

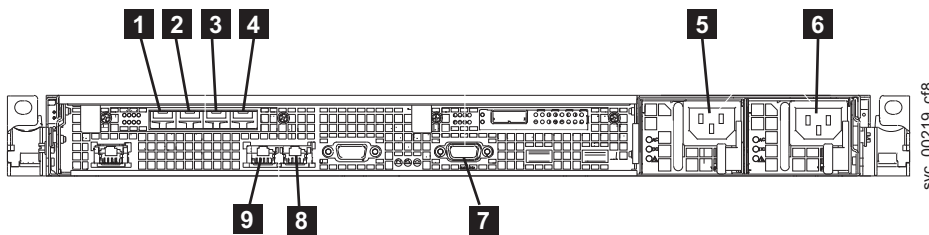


Figure 209. Connectors on the rear of the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1 Fibre Channel port 1
- 2 Fibre Channel port 2
- 3 Fibre Channel port 3
- 4 Fibre Channel port 4
- 5 Power connector 1
- 6 Power connector 2
- 7 Serial port for Uninterruptible power supply communications (RS232)
- 8 Ethernet port 1 (1 Gbps)
- 9 Ethernet port 2 (1 Gbps)

Note: On a 2145-CG8 node, a second Fibre Channel adapter may be installed. Verify which Fibre Channel adapter you are removing. The correct adapter will be indicated in the directed maintenance procedure you are following.

About this task

This service action requires you to remove the cover and complete the following actions:

- Turn off the node.
- Disconnect the power cables.

- Disconnect the data cables.

To remove the SAN Volume Controller 2145-CG8 or 2145-CF8 Fibre Channel adapter assembly, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. Slide the node out on its slide rails to the fully extended position.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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.
6. Optional: Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.
You can accomplish most service actions when the node is fully extended from the rack on its slide rails. 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.
7. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
8. Identify the Fibre Channel adapter you are removing. When looking at the rear of the node, adapter 1 (required) is on the left; adapter 2 (optional) is on the right.
9. Remove all small form-factor pluggable (SFP) transceivers before removing the adapter, as described in “Removing and replacing a Fibre Channel SFP transceiver” on page 251.
10. Remove the two M3 screws that attach the adapter assembly to the back rail.

The Fibre Channel adapter assembly and the high-speed SAS adapter assembly each attach to the back rail with two screws. You can see a partial view of the rail with the Fibre Channel adapter assembly attached in Figure 210.

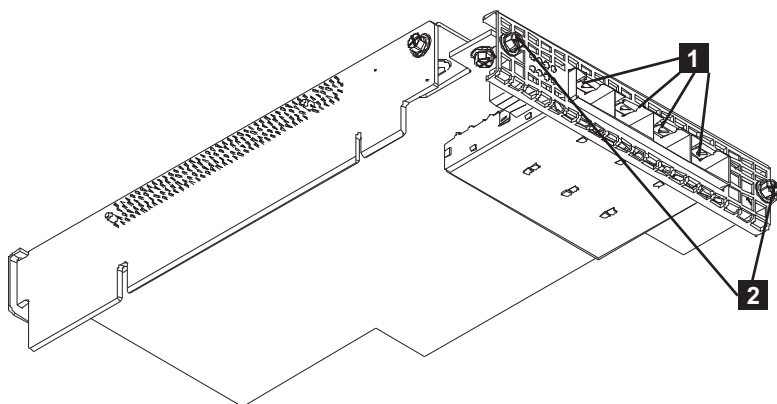


Figure 210. The SAN Volume Controller 2145-CG8 or 2145-CF8 Fibre Channel adapter 1

1 Fibre Channel ports 1 - 4

2 Back-rail retaining screws

11. After removing the back-rail retaining screws for the adapter assembly, grasp the riser-card assembly at either end and pull up and out of the slot 1 riser-card connector, as shown in Figure 211. Once the riser card clears the connector, gently twist the card assembly to separate the assembly from the node.

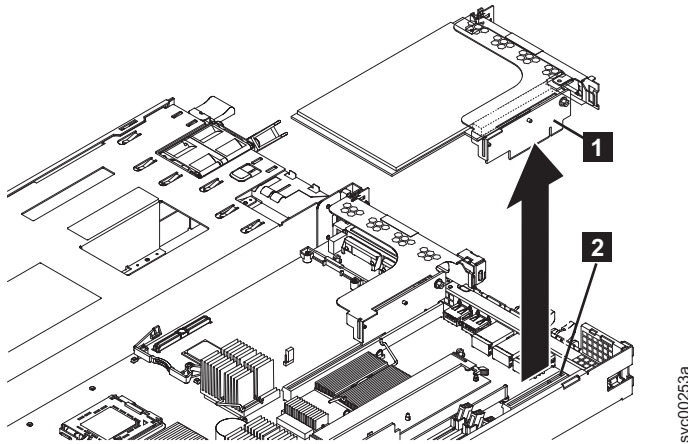


Figure 211. Removing the Fibre Channel riser-card assembly for the SAN Volume Controller 2145-CG8 or 2145-CF8

Remove the identified Fibre Channel riser card assembly.

12. Place the riser-card assembly on a flat, static-protective surface.
13. If you are instructed to return the Fibre Channel adapter assembly, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

Replacing the Fibre Channel adapter assembly

Use these instructions when you need to replace the adapter assemblies.

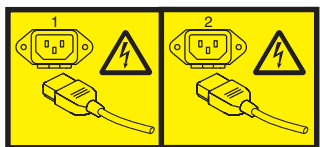
Replacing the Fibre Channel adapter assembly: 2145-CG8 or 2145-CF8

You can remove the Fibre Channel adapter assembly in a SAN Volume Controller 2145-CG8 or 2145-CF8 node and replace it with a new one.

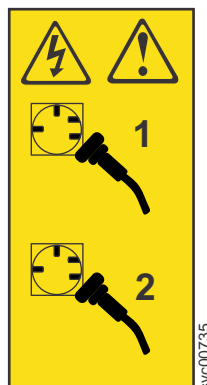
Before you begin

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

Complete the following steps to replace the Fibre Channel adapter assembly.

1. Remove all small form-factor pluggable (SFP) transceivers, as described in “Removing and replacing a Fibre Channel SFP transceiver” on page 251.
2. Identify the adapter location. Replace the adapter into the same position one was removed from.
3. Grasp each end of the riser card. Tilt the adapter so that the side with the PCI riser card is higher than the opposite side, and the back is higher than the front.
4. Locate the cage which houses the SFP transceivers through the hole in the back of the node.
5. Align the Fibre Channel adapter riser-card connector with the connector on the system board, as shown in Figure 212.

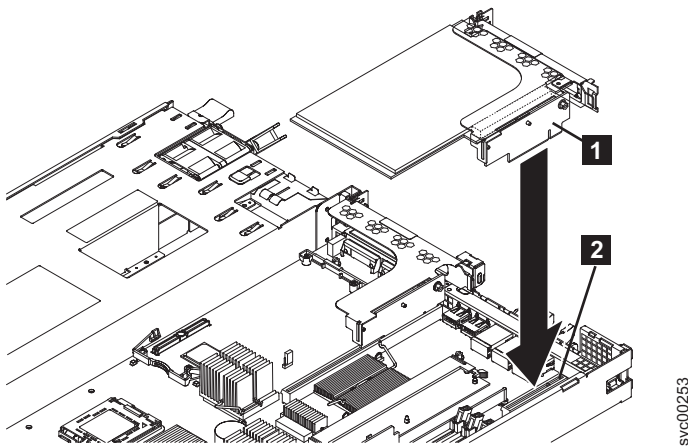


Figure 212. Replacing the Fibre Channel riser-card assembly

6. Press down on the top of the riser card until the card settles in the slot.
7. Anchor the adapter assembly using two fastening screws from the back of the node.

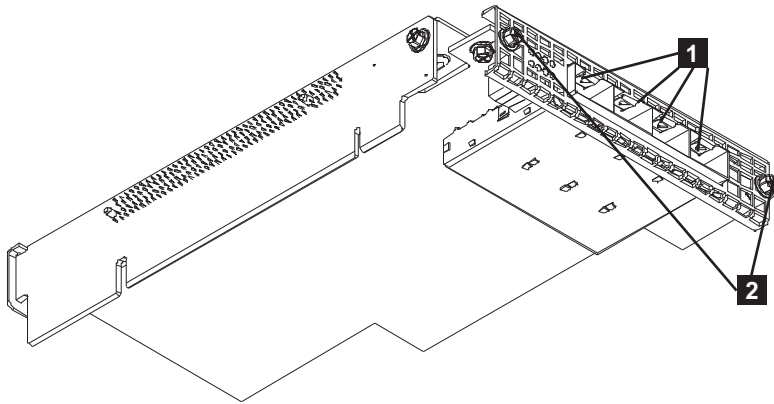


Figure 213. Fibre Channel adapter

- 1** Fibre Channel ports
- 2** Back-rail retaining screws

8. Install all of the SFP transceivers into the adapter, as described in “Removing and replacing a Fibre Channel SFP transceiver” on page 251.
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. Replace the top cover. See “Replacing the top cover” on page 98.
11. Place the node in the rack. See “Replacing a node in a rack” on page 67.
12. Replace the cable-retention brackets and reconnect the power cables, as described in “Replacing the cable-retention brackets: 2145-CG8 or 2145-CF8” on page 53.
13. Turn on the node.

Removing and replacing an Ethernet SFP transceiver

When a failure occurs on a single 10 gigabits per second (Gbps) Ethernet link, the small form-factor pluggable (SFP) transceiver might need to be replaced. The following procedure is applicable to SAN Volume Controller 2145-SV1, 2145-DH8, 2145-CG8 or 2145-CF8 nodes.

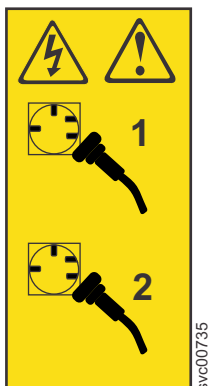
Before you begin

DANGER

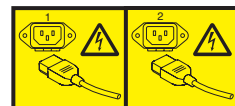
Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



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. To display information about the Ethernet ports, including their location, issue the **lsportfc** 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 described in “Preparing to remove and replace parts” on page 20.
2. Carefully identify the 10 Gbps Ethernet port that is failing.
3. Turn off the node while ensuring that its data is mirrored and synchronized. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* for information. You 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 the cable out. 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. If the serial cable is removed, remember to replace it.
5. Remove the SFP transceiver from the port that has the problem.

Locate the release handle that is incorporated into the SFP transceiver, unclip the handle, and then use the handle to pull out the SFP transceiver.

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. Push the new SFP transceiver into the aperture. Gently push the SFP transceiver until it is fully inserted; then swing the release handle over to lock it in place.

Figure 214 illustrates an SFP transceiver and its release handle.



Figure 214. SFP transceiver

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 by using the front panel power button.
10. Confirm that the error is now fixed. Use the front-panel display to check the SAN port status. If possible, check the status that is given by the Ethernet monitoring tools of the customer. Depending on the failure indication that you originally noted, either mark the error as fixed or restart the node.

Removing the 10 Gbps Ethernet riser-card assembly

An authorized IBM service provider can remove the 10 Gbps Ethernet riser-card 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 xxvii.

Removing the 10 Gbps Ethernet riser-card assembly: 2145-CG8

An authorized IBM service provider can remove the 10 gigabits per second (Gbps) Ethernet riser-card assembly from the SAN Volume Controller 2145-CG8 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)

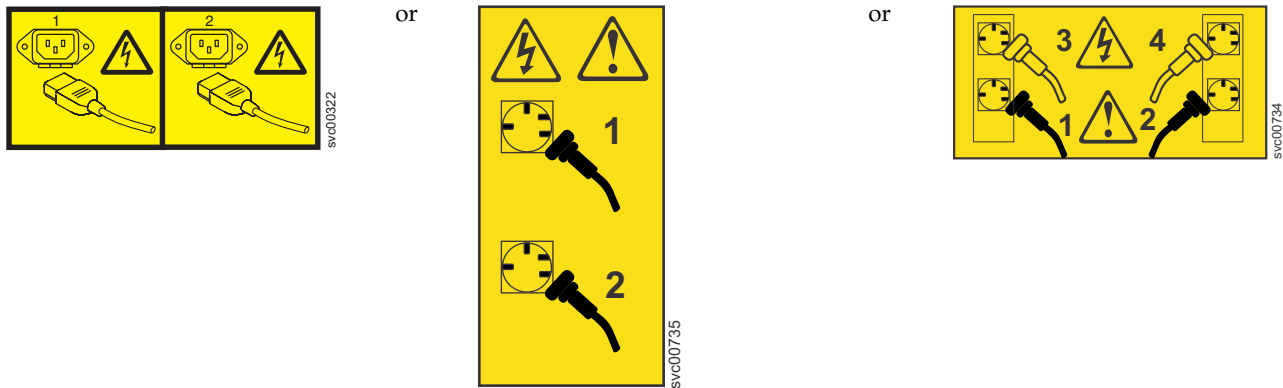


Figure 215 shows the connectors on the rear of the SAN Volume Controller 2145-CG8:

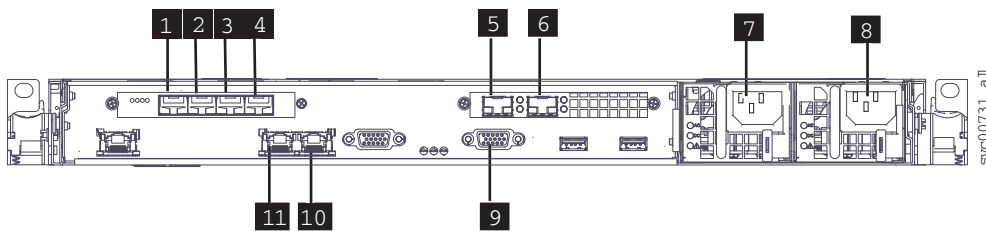


Figure 215. Connectors on the rear of the SAN Volume Controller 2145-CG8

- 1** Fibre Channel port 1
- 2** Fibre Channel port 2
- 3** Fibre Channel port 3
- 4** Fibre Channel port 4
- 5** Ethernet port 3 (10 Gbps)
- 6** Ethernet port 4 (10 Gbps)
- 7** Power connector 1
- 8** Power connector 2
- 9** Serial port for Uninterruptible power-supply communications (RS232)
- 10** Ethernet port 1 (1 Gbps)
- 11** Ethernet port 2 (1 Gbps)

About this task

This service action requires you to remove the cover and complete the following actions:

- Turn the node off.
- Disconnect the power cables.
- Disconnect the data cables.

To remove the SAN Volume Controller 2145-CG8 10 Gbps Ethernet riser-card assembly, perform the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Perform the procedure to remove the top cover, performing the optional steps to turn off the node and remove the node from the rack, if it is easier to work on the node that way, as described in “Removing the top cover” on page 93.

As you label and remove all cables after turning off the node in the “Removing the top cover” on page 93 procedure, be sure to remove the serial cable from the UPS that attaches to the serial port on the back of the node before you attempt to remove the fiber optic cable and the Ethernet small form-factor pluggable (SFP) transceiver from the first port on the Ethernet card in the 10 Gbps Ethernet riser-card assembly.

Remove the two fiber optic cables from the 10 Gbps Ethernet riser-card assembly by pressing their release tabs and pulling each cable out. Be careful to exert pressure only on the connectors and do not pull on the fiber optic cables.

3. Remove both Ethernet SFP transceivers, as described in “Removing and replacing an Ethernet SFP transceiver” on page 257 before removing the Ethernet riser-card assembly.
4. Remove the two M3 screws that attach the Ethernet riser-card assembly to the back rail.

The 10 Gbps Ethernet riser-card assembly attaches to the back rail with two screws, as shown in the partial view of the rail with the 10 Gbps Ethernet riser-card assembly attached in Figure 216.

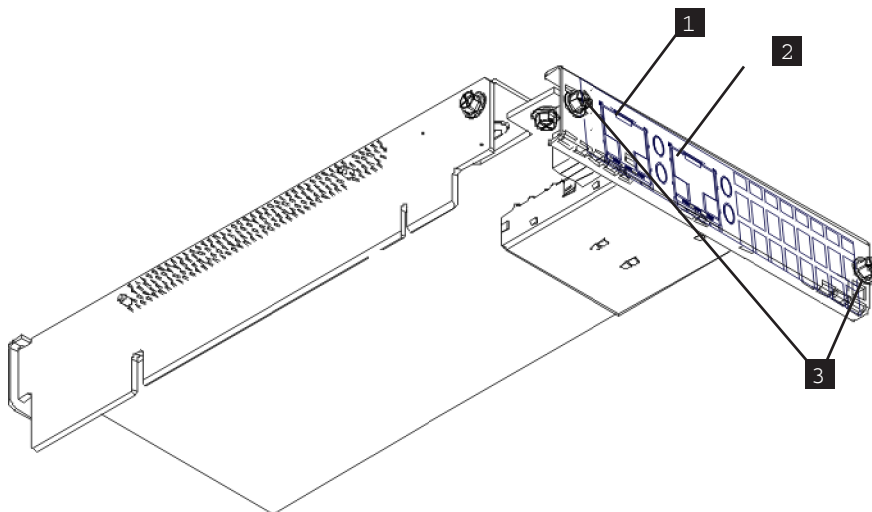


Figure 216. 2145-CG8 10 Gbps Ethernet riser-card assembly with cutaway view of back rail

- 1 10 Gbps Ethernet port 1
 - 2 10 Gbps Ethernet port 2
 - 3 Back-rail retaining screws
5. After removing the back-rail retaining screws for the Ethernet riser-card assembly, grasp the Ethernet riser-card assembly at either end and pull up out of the PCI slot 2 riser-card connector, as shown in Figure 217 on page 262. Once the Ethernet riser-card assembly clears the connector, gently twist the Ethernet riser-card assembly to separate the Ethernet riser-card assembly from the node.

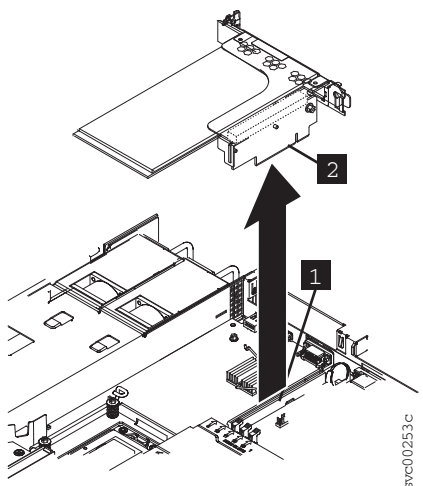


Figure 217. Removing the 10 Gbps Ethernet riser-card assembly

- 1** PCI slot 2 riser-card connector
- 2** 10 Gbps Ethernet riser-card assembly

When looking from the back, the PCI slot 1 connector is the connector on the left. The 10 Gbps Ethernet riser-card assembly attaches to the PCI slot 2 connector on the right side of the system board, when looking from the back.

Note: Do not power on the node with nothing connected to the system planar PCI slot 2. If you are replacing the Ethernet adapter, insert the replacement adapter. If you are not replacing the Ethernet adapter, either insert a high speed SAS adapter (feature code 4500), or a riser card. If you need a riser card and do not have one, you can remove the riser card from the 10 Gbps Ethernet card that you just removed.

6. Place the Ethernet riser-card assembly on a flat, static-protective surface.
7. If you are instructed to return the 10 Gbps Ethernet riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the 10 Gbps Ethernet riser-card assembly

An IBM authorized service provider can replace the 10 Gbps Ethernet riser-card 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 xxvii.

Replacing the 10 Gbps Ethernet riser-card assembly: 2145-CG8

An authorized IBM service provider can replace the 10 gigabits per second (Gbps) Ethernet riser-card assembly into the SAN Volume Controller 2145-CG8 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)

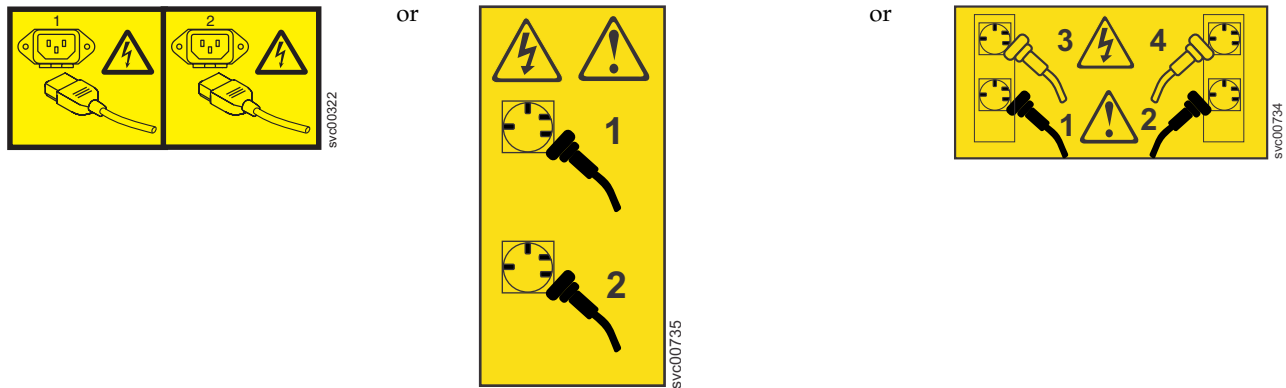


Figure 218 shows the connectors on the rear of the SAN Volume Controller 2145-CG8 node.

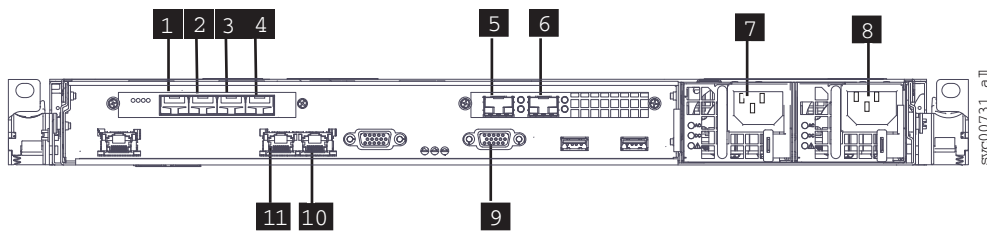


Figure 218. Connectors on the rear of the 2145-CG8 node

- 1** Fibre Channel port 1
- 2** Fibre Channel port 2
- 3** Fibre Channel port 3
- 4** Fibre Channel port 4
- 5** 10 Gbps Ethernet port 1
- 6** 10 Gbps Ethernet port 2
- 7** Power connector 1
- 8** Power connector 2
- 9** Serial port for UPS communications (RS232)
- 10** 1 Gbps Ethernet port 2
- 11** 1 Gbps Ethernet port 1

About this task

This service action assumes that you have removed the top cover and that the following actions are completed:

- The node is off.
- The power cables are disconnected.
- The data cables are disconnected.

To replace the 10 Gbps Ethernet riser-card assembly on a 2145-CG8 node, perform the following steps:

Procedure

1. If present, remove both Ethernet small form-factor pluggable (SFP) transceivers before replacing the Ethernet riser-card assembly, as described in “Removing and replacing an Ethernet SFP transceiver” on page 257.
2. Grasp each end of the Ethernet riser-card assembly, tilt the Ethernet riser-card assembly so that the side with the PCI riser card is higher than the opposite side, and the back is higher than the front.
3. Locate the cage that houses the Ethernet SFP transceivers through the hole in the back of the node.
4. Align the 10 Gbps Ethernet riser-card assembly connector with the PCI slot 2 connector on the system board, as shown in Figure 219.

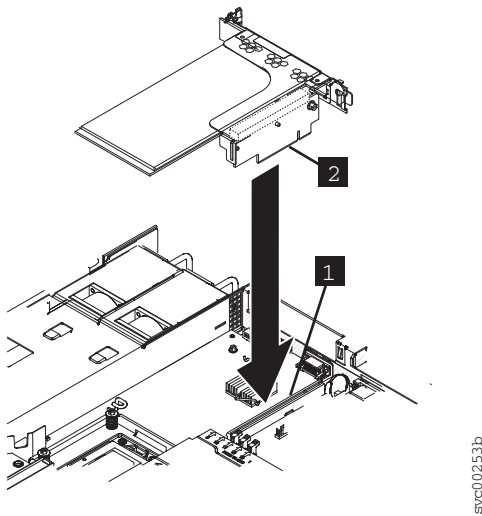


Figure 219. Replacing the 10 Gbps Ethernet riser-card assembly for the 2145-CG8

- 1** PCI slot 2 riser-card connector
- 2** 10 Gbps Ethernet riser-card assembly

When looking from the back, the PCI slot 1 connector is the connector on the left. The 10 Gbps Ethernet riser-card assembly attaches to the PCI slot 2 connector on the right side of the system board, when looking from the back.

5. Press down on the top of the Ethernet riser-card assembly until the card settles in the slot.
6. Anchor the Ethernet riser-card assembly using two fastening screws from the back of the node, as shown in the cutaway view of a section of the rail in Figure 220 on page 265.

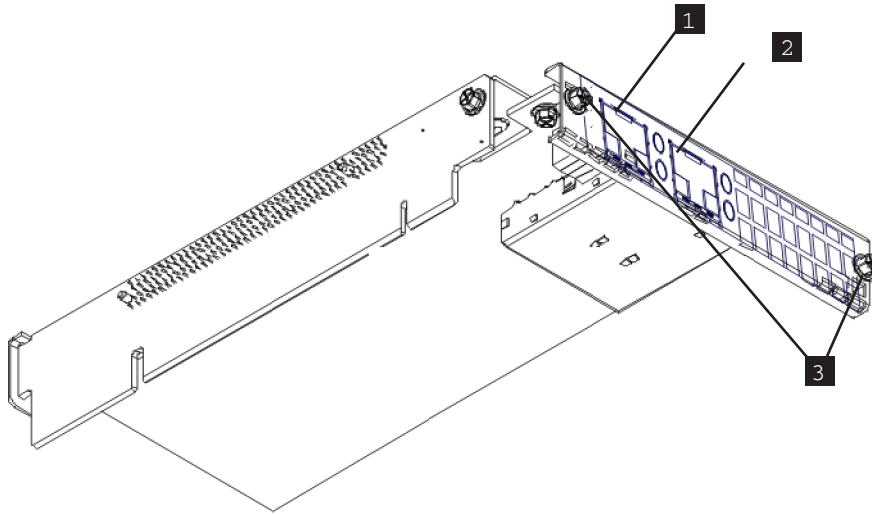


Figure 220. 2145-CG8 10 Gbps Ethernet riser-card assembly with cutaway view of back rail

- 1** 10 Gbps Ethernet port 1
- 2** 10 Gbps Ethernet port 2
- 3** Back-rail retaining screws

7. Install both SFP transceivers into the Ethernet riser-card assembly, as described in “Removing and replacing an Ethernet SFP transceiver” on page 257.
8. If you did not do so as part of the procedure for replacing the Ethernet SFP transceivers, 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.
9. If you did not do so as part of the procedure for replacing the Ethernet SFP transceivers, replace the top cover, following the procedure in “Replacing the top cover” on page 98 and being careful to reattach the fiber optic cable to Ethernet port 1 before replacing the serial cable connecting the node to the UPS.

After following the procedure to replace the top cover, the node is installed in the rack, all cables are reconnected, and the node is turned on.

Removing the high-speed SAS adapter assembly

You can remove the high-speed adapter assembly in a SAN Volume Controller 2145-CG8 or 2145-CF8.

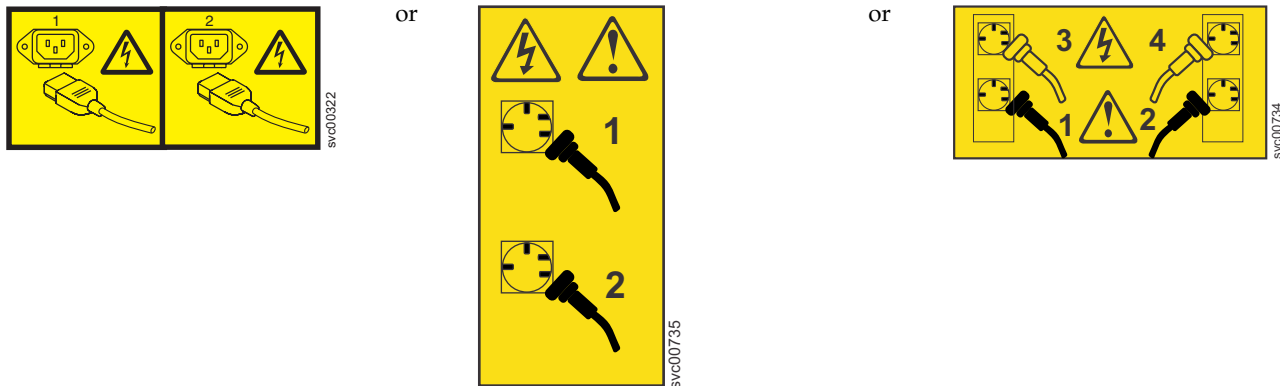
Removing the high-speed SAS adapter assembly: 2145-CG8 or 2145-CF8

You can remove the SAN Volume Controller 2145-CG8 or 2145-CF8 high-speed SAS adapter assembly.

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 service action requires you to remove the cover and complete the following actions:

- Turn the node off.
- Disconnect the power cables.
- Disconnect the data cables.

To remove the SAN Volume Controller 2145-CG8 or 2145-CF8 high-speed SAS adapter assembly, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. 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.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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.
6. Optional: Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.
7. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
8. Remove the two M3 screws that attach the adapter assembly to the back rail.
The high-speed SAS adapter assembly and the Fibre Channel adapter assembly each attach to the back rail with two screws, as shown in the partial view of the rail with the high-speed SAS adapter assembly attached in Figure 221 on page 267.

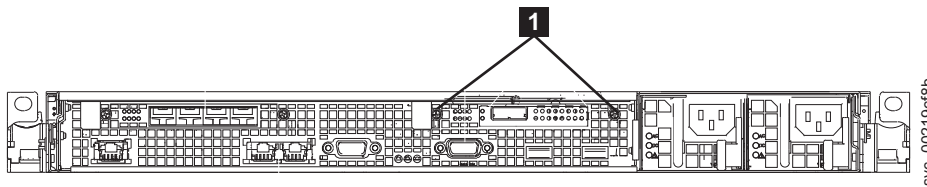


Figure 221. High-speed SAS adapter assembly mounted in the back rail of the SAN Volume Controller 2145-CG8 or 2145-CF8

9. After removing the back-rail retaining screws for the adapter assembly, grasp the riser-card assembly at the rear edge and lift to remove the assembly, as shown in Figure 222.

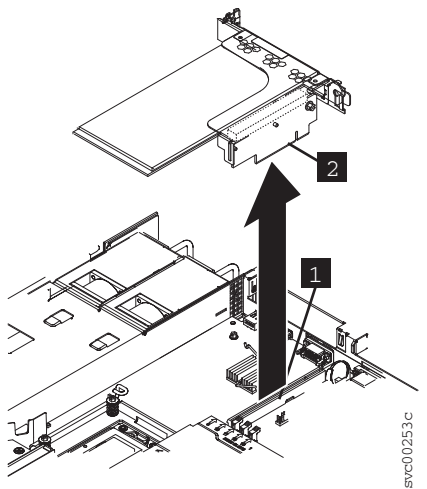


Figure 222. Removing the high-speed SAS riser-card assembly for the SAN Volume Controller 2145-CG8 or 2145-CF8

10. Grasp the high-speed SAS adapter riser-card assembly by its top edge or upper corners and pull the card up out of the slot 2 riser-card connector.

Note: Do not power on the node with nothing connected to the system planar PCI slot 2. If you are replacing the SAS adapter (supported only on CG-8), insert the replacement adapter. If you are not replacing the SAS adapter, either insert a high-speed SAS adapter, or a riser card. If you need a riser card and do not have one, you can remove the riser card from the 10 Gbps Ethernet card that you just removed.

When looking from the back, the slot 2 connector is the connector on the right. The 4-port Fibre Channel adapter attaches to the slot 1 connector on the left side of the system board, when looking from the back.

11. Remove the high-speed SAS adapter cable from the adapter.
12. Place the high-speed SAS adapter riser-card assembly on a flat, static-protective surface.
13. If you are instructed to return the high-speed SAS adapter riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the high-speed SAS adapter assembly

You can replace the high-speed SAS adapter assembly in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Replacing the high-speed SAS adapter assembly: 2145-CG8 or 2145-CF8

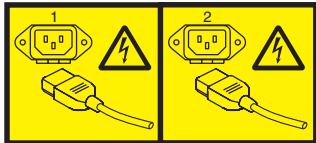
You can replace the high-speed SAS adapter assembly that was removed from a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Before you begin

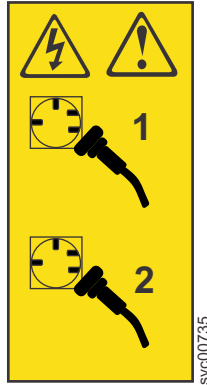
If you are installing a high-speed SAS adapter assembly and one or more flash drives, use the instructions that come with each MES update to install and configure the high-speed SAS adapter and each flash drive.

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

Complete the following steps to replace the SAN Volume Controller 2145-CG8 or 2145-CF8 high-speed SAS adapter assembly, after removing an adapter that was already configured:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Attach the high-speed SAS cable to the connector on the bottom of the high-speed SAS adapter, as described in “Replacing the high-speed SAS cable: 2145-CG8 or 2145-CF8” on page 273.
Attach the cable so that the end with the label is to the front of the node and the end without the label attaches to the adapter.
3. Insert the adapter into the riser card, then insert the assembly into the slot 2 connector on the system board.

As you start inserting the adapter, align the edge connector on the low-profile adapter with the connector on the riser-card assembly. Make sure that the adapter snaps into the riser-card securely. Then press the riser-card edge connector **2** firmly into the system-board slot 2 connector **1**, as shown in Figure 223 on page 269.

When viewed from the back of the node, the slot 1 connector is on the left and contains the Fibre Channel adapter assembly. The slot 2 connector is on the right when viewed from the back of the node.

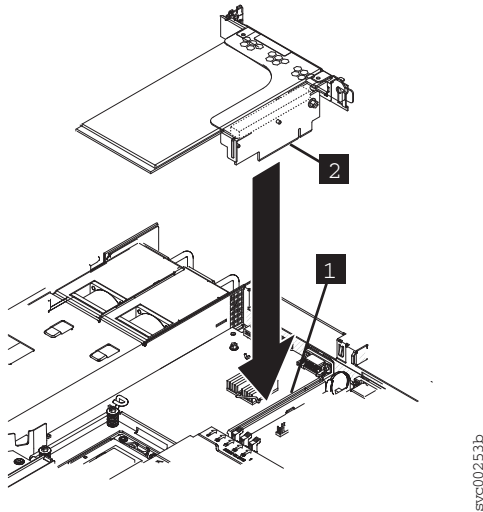


Figure 223. Replacing the high-speed SAS riser-card assembly for the SAN Volume Controller 2145-CG8 or 2145-CF8

1 Slot 2 connector

2 High-speed SAS adapter

4. Grasp the high-speed SAS adapter assembly to steady it while you align and attach the adapter assembly to the back rail with the two M3 screws that were removed during the removal of the adapter.

The high-speed SAS adapter assembly and the Fibre Channel adapter assembly each attach to the back rail with two screws (**1**), as shown in the view of the rail with the high-speed SAS adapter assembly attached in Figure 224.

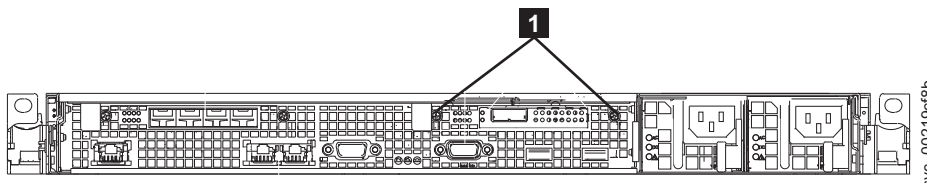


Figure 224. High-speed SAS adapter assembly mounted in the back rail of the SAN Volume Controller 2145-CG8 or 2145-CF8

5. 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.
6. Replace the top cover. See “Replacing the top cover” on page 98.
After following the procedure to replace the top cover, the node is installed in the rack and is turned on.

Removing the high-speed SAS adapter cable and flash drive

You can remove the high-speed adapter assembly, the adapter cable, and the serial attached SCSI (SAS) flash drives in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

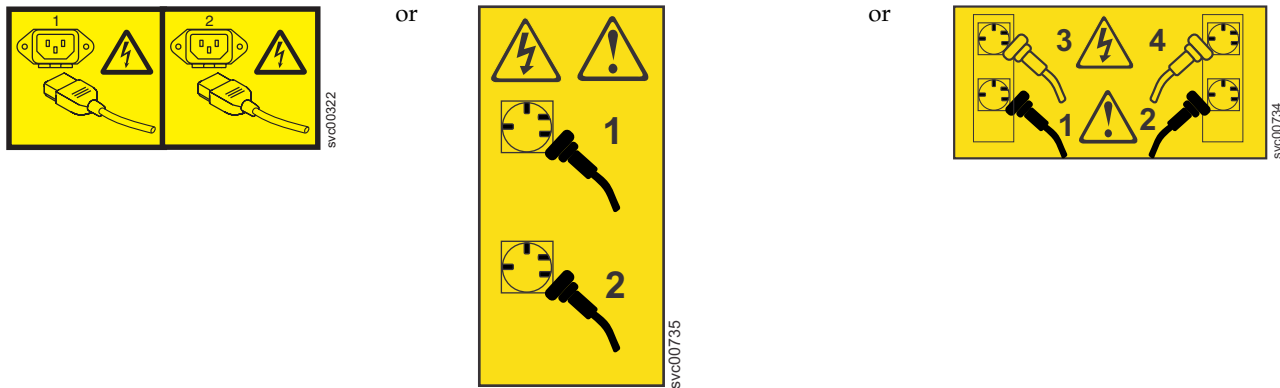
Removing the high-speed SAS cable: 2145-CG8 or 2145-CF8

You can remove the high-speed SAS cable from a SAN Volume Controller 2145-CG8 or 2145-CF8 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

This service action requires you to remove the cover and complete the following actions:

- Turn the node off.
- Disconnect the power cables.
- Disconnect the data cables.

To remove the SAN Volume Controller 2145-CG8 or 2145-CF8 high-speed SAS adapter cable, complete the following steps :

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. Slide the node out on its slide rails to the fully extended position.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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.
6. Optional: Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.

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

7. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
8. Remove the high-speed SAS adapter from the slot 2 riser-card connector at the rear of the system board, as described in “Removing the high-speed SAS adapter assembly: 2145-CG8 or 2145-CF8” on page 265.

The high-speed SAS cable is shown in Figure 225 on page 271.



Figure 225. High-speed SAS adapter assembly and high-speed SAS cable in the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1** High-speed SAS cable plugged into the high-speed SAS adapter assembly
 - 2** High-speed SAS adapter assembly
9. Disconnect the high-speed SAS cable from the high-speed SAS adapter.
 10. Remove the cable from the blue bulkhead clip behind the disk backplane, as shown in Figure 226 on page 272.

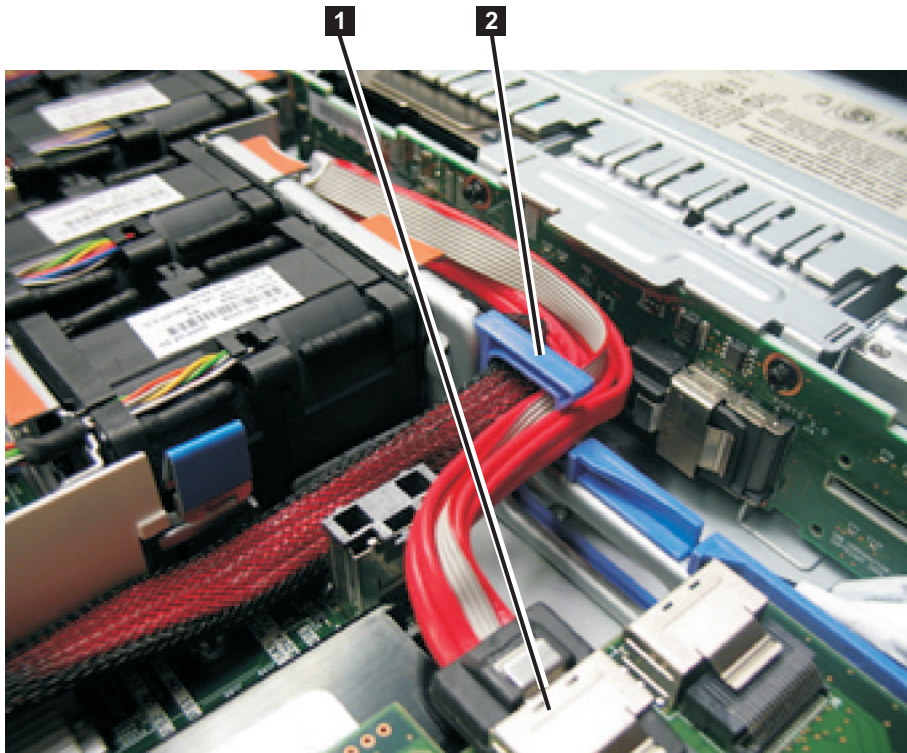


Figure 226. Boot-disk SAS cable routed through the blue bulkhead clip and connected to the SAS disk controller in the SAN Volume Controller 2145-CG8 or 2145-CF8

1 Boot-disk SAS cable that is plugged into the disk-controller-and-USB-riser-card assembly

2 Blue bulkhead clip with the high-speed SAS-adapter cable and the boot-disk SAS cable

Remove the boot-disk SAS cable from the blue bulkhead clip if necessary, before removing the high-speed SAS adapter cable from the clip.

11. Disconnect the high-speed SAS cable from the SAS connector in the center of the back of the disk backplane, as shown in Figure 227 on page 273.

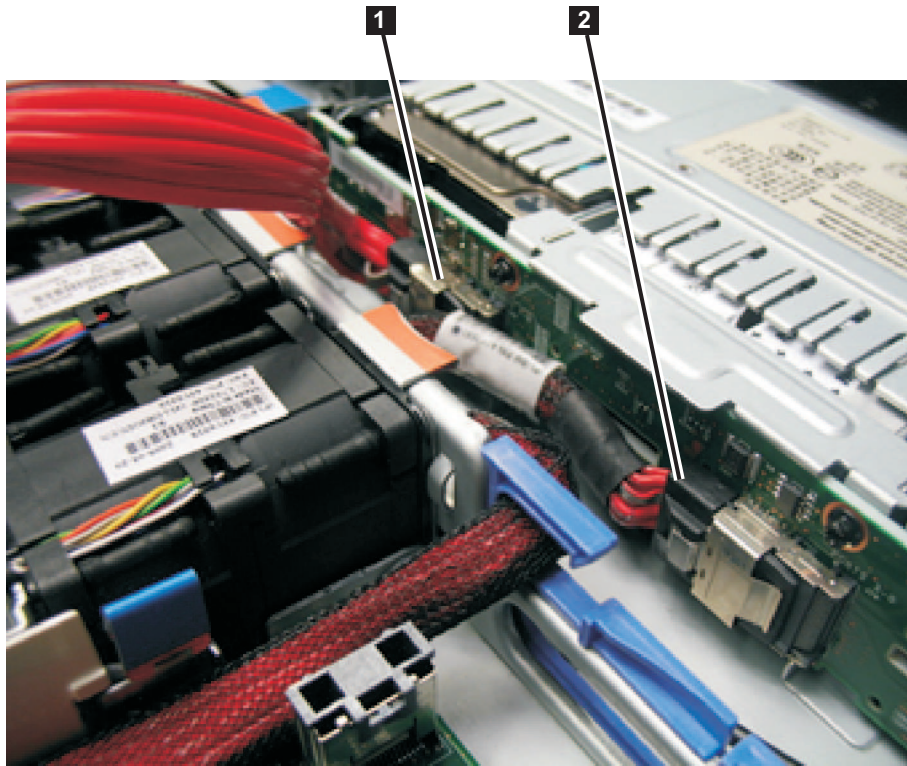


Figure 227. Boot-disk SAS cable and the high-speed SAS cable connected to the disk backplane in the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1 Boot-disk SAS cable that is plugged into the disk-drive backplane to support drive bay 4
- 2 High-speed SAS-adapter cable that is plugged into the middle of the backplane to support drive bays 0, 1, 2, and 3

12. Remove the cable from the SAN Volume Controller 2145-CG8 or 2145-CF8.

Replacing the high-speed SAS adapter cable and flash drive

You can replace the high-speed SAS adapter, the adapter cable, and the serial attached SCSI (SAS) flash drives in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Replacing the high-speed SAS cable: 2145-CG8 or 2145-CF8

You can replace the high-speed SAS cable on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

About this task

Complete the following steps to replace the SAN Volume Controller 2145-CG8 or 2145-CF8 high-speed cable:

Procedure

1. Remove the high-speed SAS adapter from the slot 2 riser-card connector at the rear of the system board, as described in "Removing the high-speed SAS adapter assembly: 2145-CG8 or 2145-CF8" on page 265.
The high-speed SAS cable is shown in Figure 228 on page 274.

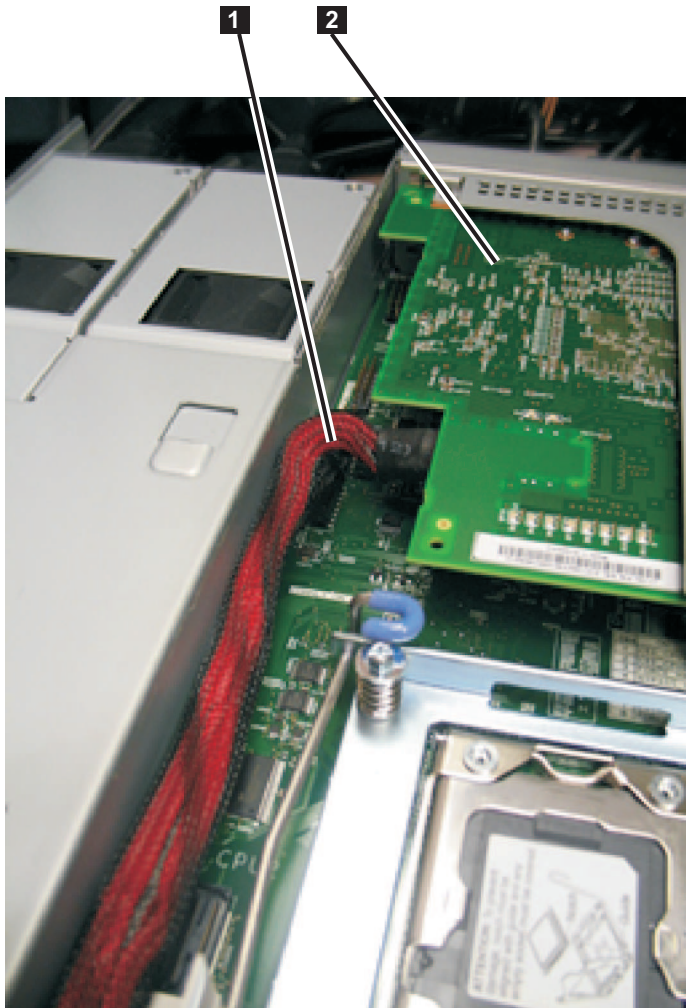


Figure 228. High-speed SAS adapter assembly and high-speed SAS cable in the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1** High-speed SAS cable plugged into the high-speed SAS adapter assembly
 - 2** High-speed SAS adapter assembly
2. Attach the high-speed SAS cable to the high-speed SAS adapter.
Attach the cable so that the end with the label is to the front of the node and the end without the label attaches to the adapter.
 3. Replace the high-speed SAS adapter , as described in “Replacing the high-speed SAS adapter assembly: 2145-CG8 or 2145-CF8” on page 267.
 4. Disconnect the boot-disk SAS cable from the disk controller and move it out of the blue bulkhead clip.
 5. Route the cable from the high-speed SAS adapter through the blue bulkhead clip behind the drive backplane.
 6. Attach the high-speed SAS cable to the SAS connector in the center of the back of the SAS drive back plane. Use the connector that connects to drive bays 0, 1, 2, and 3.
The high-speed SAS cable is shown in Figure 229 on page 275.

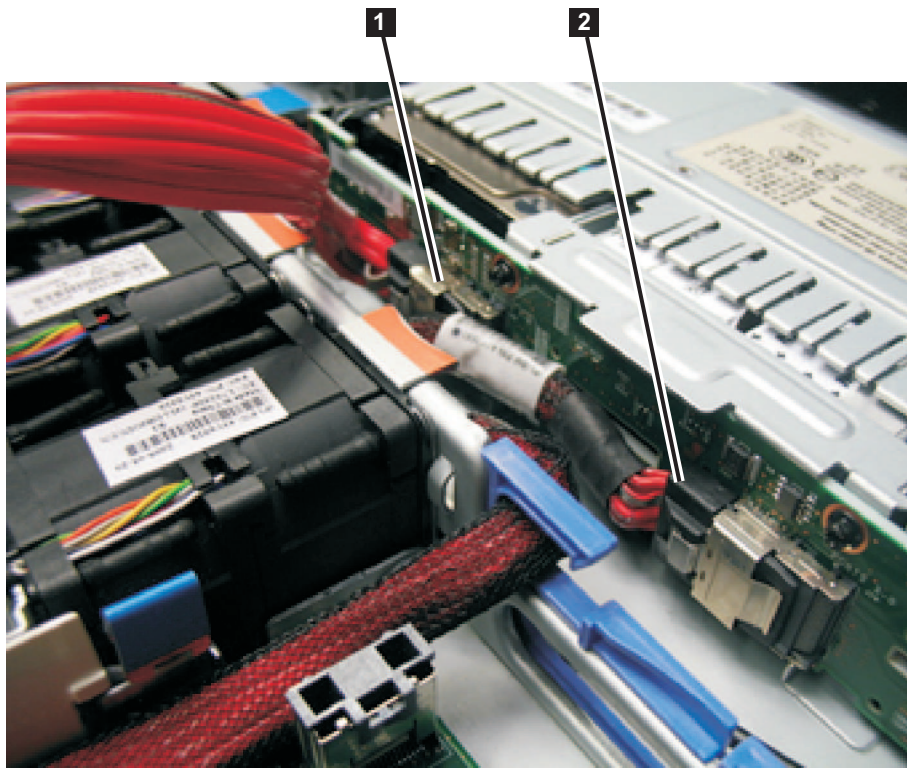


Figure 229. Boot-disk SAS cable and the high-speed SAS cable connected to the disk backplane in the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1** Boot-disk SAS cable that is plugged into the disk-drive backplane to support drive bay 4
 - 2** High-speed SAS-adapter cable that is plugged into the middle of the backplane to support drive bays 0, 1, 2, and 3
7. Reroute the boot-disk SAS cable through the blue bulkhead clip and reconnect the cable to the disk controller.

The high-speed SAS cable is shown in Figure 230 on page 276.

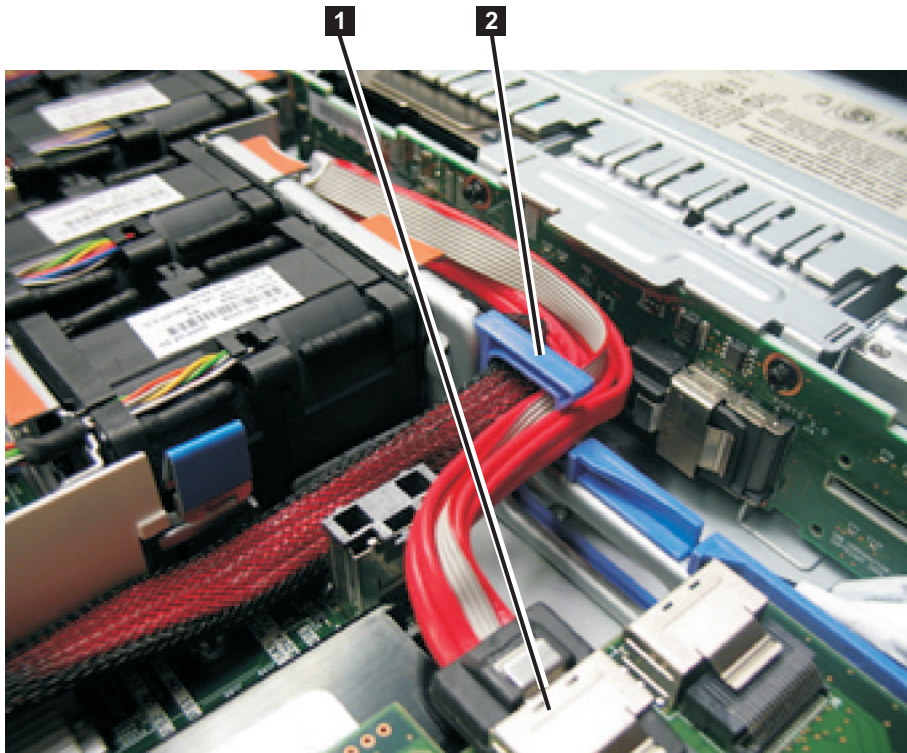


Figure 230. Boot-disk SAS cable routed through the blue bulkhead clip and connected to the SAS disk controller in the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1** Boot-disk SAS cable that is plugged into the disk-controller-and-USB-riser-card assembly
- 2** Blue bulkhead clip with the high-speed SAS-adapter cable and the boot-disk SAS cable

Removing the disk-controller and USB riser-card assembly

You can remove the disk-controller and USB riser-card 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 xxvii.

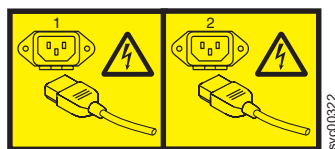
Removing the disk-controller and USB riser-card assembly: 2145-CG8 or 2145-CF8

You can remove the disk-controller and USB riser-card assembly on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

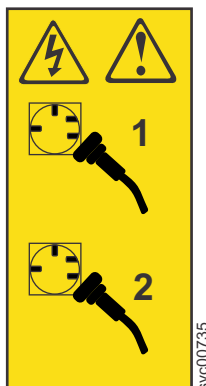
Before you begin

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 requires you to remove the cover and:

- Turn off the node.
- Disconnect the power cables.
- Disconnect the service-controller USB cable, the SAS boot-disk cable, and the SAS cable to disk bays 0, 1, 2, and 3, if the cable is still installed.

To remove the disk-controller and USB riser-card assembly, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. 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.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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 54.

6. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
7. Remove the USB service-controller cable from the USB connection (**1** in Figure 231) on the disk-controller and USB riser-card assembly (**3**), as described in “Removing and replacing the USB service controller cable: 2145-CG8 or 2145-CF8” on page 121.

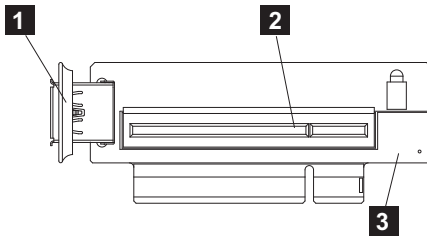


Figure 231. USB riser-card assembly (SAN Volume Controller 2145-CF8 shown)

- 1** USB connector
 - 2** Disk-controller connector
 - 3** USB riser-card assembly (shown without the disk controller)
8. Remove the SAS cable that runs to the boot-drive-bay connector on the left side of the back of the disk backplane, when viewed from the rear, from the connector on the disk-controller and USB riser-card assembly that is closer to the power supply.
 9. If present, remove the SAS cable that runs to disk-drive-bay connector in the center of the back of the disk backplane, when viewed from the rear, from the connector on the disk-controller and USB riser-card assembly that is closer to the front of the node.
 10. Grasp the disk controller near the end next to the power-supply cage while you press the black plastic tab (next to the power supply) toward the power supply.

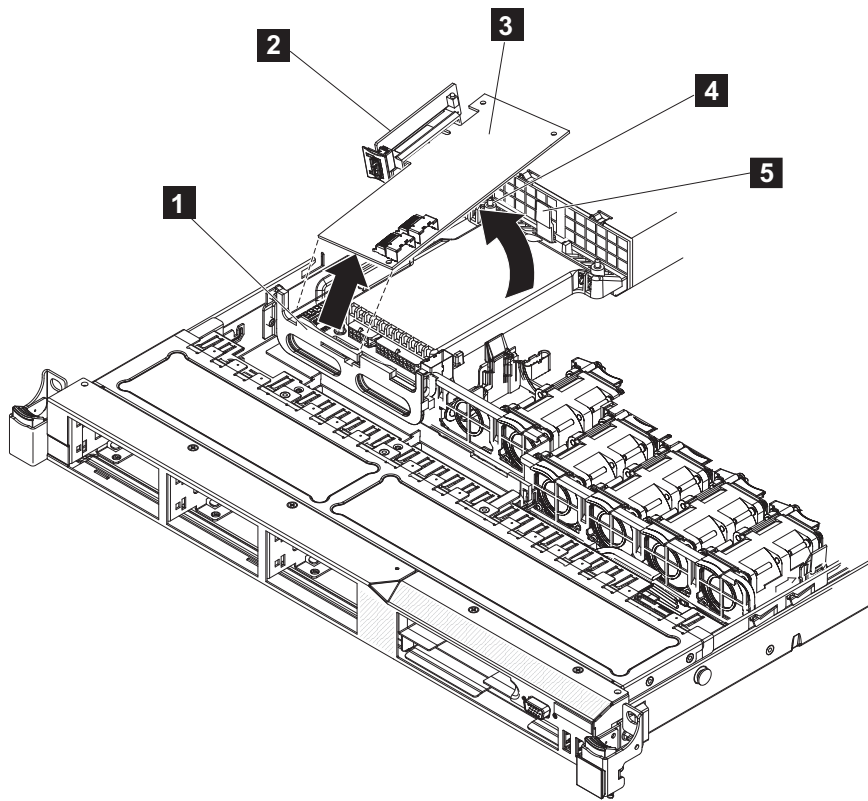


Figure 232. Disengaging the disk-controller front-retention bracket and removing the riser assembly and disk controller

- 1** Disk-controller front-retention bracket
- 2** Disk-controller and USB riser-card assembly
- 3** Disk controller
- 4** Alignment post
- 5** Plastic tab

11. Pull up on the disk controller (**3** in Figure 232) until the disk-controller and USB riser-card assembly (**2**) disengages from the connector on the system board.
12. Place the disk-controller and USB riser-card assembly on a flat, static-protective surface.
13. If you are instructed to return the disk-controller and USB riser-card assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the disk-controller and USB riser-card assembly

You can replace the disk-controller and USB riser-card 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 xxvii.

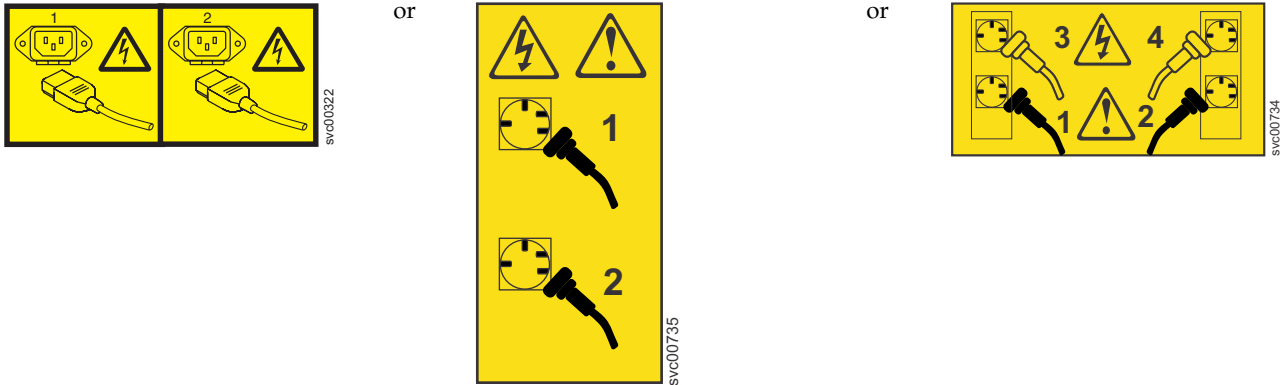
Replacing the disk-controller and USB riser-card assembly: 2145-CG8 or 2145-CF8

You can replace the disk-controller and USB riser-card assembly on a SAN Volume Controller 2145-CG8 or 2145-CF8 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.

To correctly perform this task, you must have alcohol wipes and thermal grease available. If you do not already have them, order these separately.

About this task

To replace the disk-controller and USB riser-card assembly, complete the following steps:

Procedure

1. Turn off the node while ensuring that its data is mirrored and synchronized. See MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* for information.
2. When the node is completely turned off, remove the power cable-retention brackets and remove the power cables from the rear of the node.
3. After labeling the Fibre Channel cables and the Ethernet cables with their locations, remove all of the cables from the node.
4. Optional: Remove the node from the rack and place it on a flat, static-protective surface. See "Removing a node from a rack" on page 54.
5. Remove the top cover, as described in "Removing the top cover: 2145-CG8 or 2145-CF8" on page 96.
6. Remove the disk-controller and USB riser-card assembly from its packaging and place the riser-card assembly on a flat, static-protective surface.
7. Install the disk-controller and USB riser-card assembly.
 - a. Tilt the USB riser-card assembly slightly and insert the end of the disk controller in the slot on the retention bracket as shown in the following illustration.

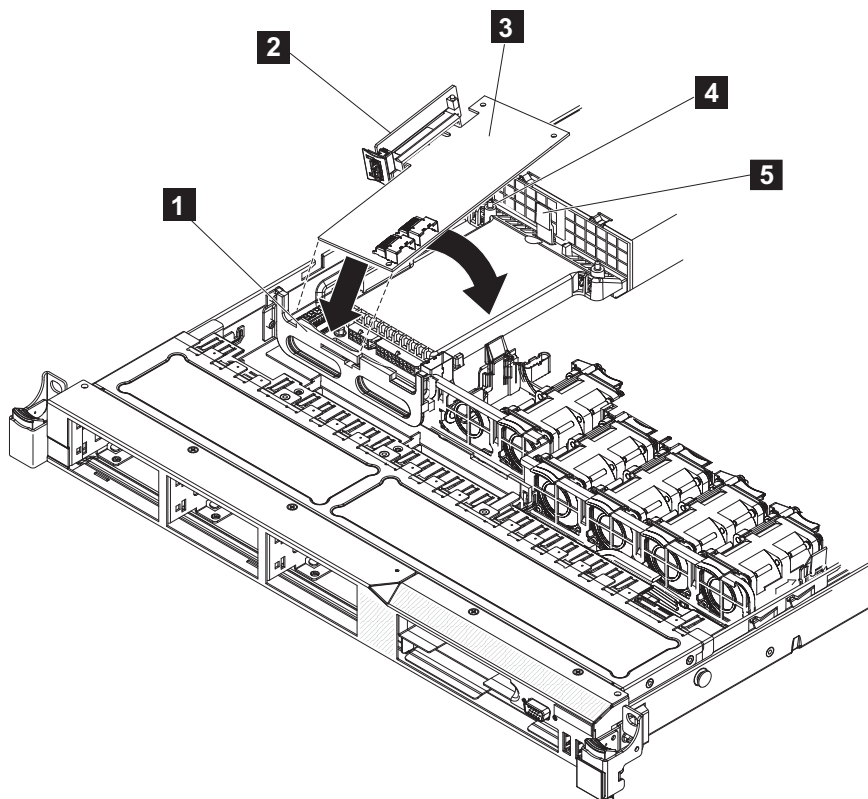


Figure 233. Engaging the disk-controller front-retention bracket and replacing the riser assembly and disk controller

Although the SAN Volume Controller 2145-CF8 is shown in the illustration, the SAN Volume Controller 2145-CG8 also includes the following parts:

- 1** Disk-controller front-retention bracket
 - 2** Disk-controller and USB riser-card assembly
 - 3** Disk controller
 - 4** Alignment post
 - 5** Plastic tab
- b. Align the riser-card assembly keys correctly with the connector on the system board and press down on the assembly until it is seated firmly into the connector on the system board.
8. Connect the USB service-controller cable to the USB connector on the USB riser-card assembly, if the cable is not connected, as described in “Removing and replacing the USB service controller cable: 2145-CG8 or 2145-CF8” on page 121.

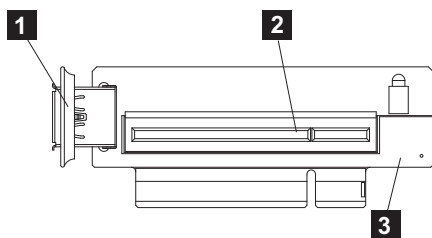


Figure 234. USB riser-card assembly (SAN Volume Controller 2145-CF8 shown)

- 1** USB connector
- 2** Disk-controller connector

3 Disk-controller and USB riser-card assembly

Figure 235 shows the USB service-controller cable connected to the disk-controller and USB riser-card assembly.

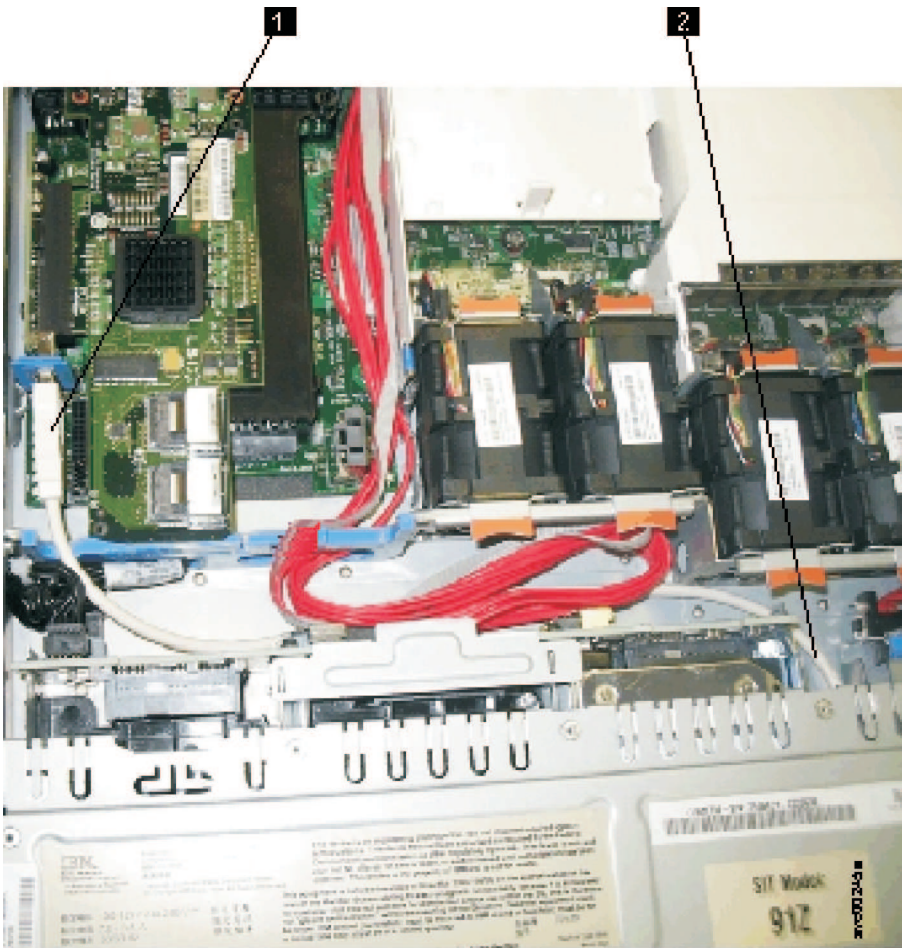


Figure 235. USB service-controller cable connected to the disk controller and USB riser card (SAN Volume Controller 2145-CF8 shown)

1 USB service-controller cable attached to the USB riser card

2 Service controller cable

9. Connect the SAS boot-drive cable to the connector on the disk controller that is closer to the power supplies.

The boot-drive cable is the cable to drive bays 4 and 5 in the SAN Volume Controller 2145-CF8 node or the cable to the boot-disk backplane in the SAN Volume Controller 2145-CG8 node.

Figure 236 on page 283 shows the boot-disk SAS cable connected to the disk backplane.

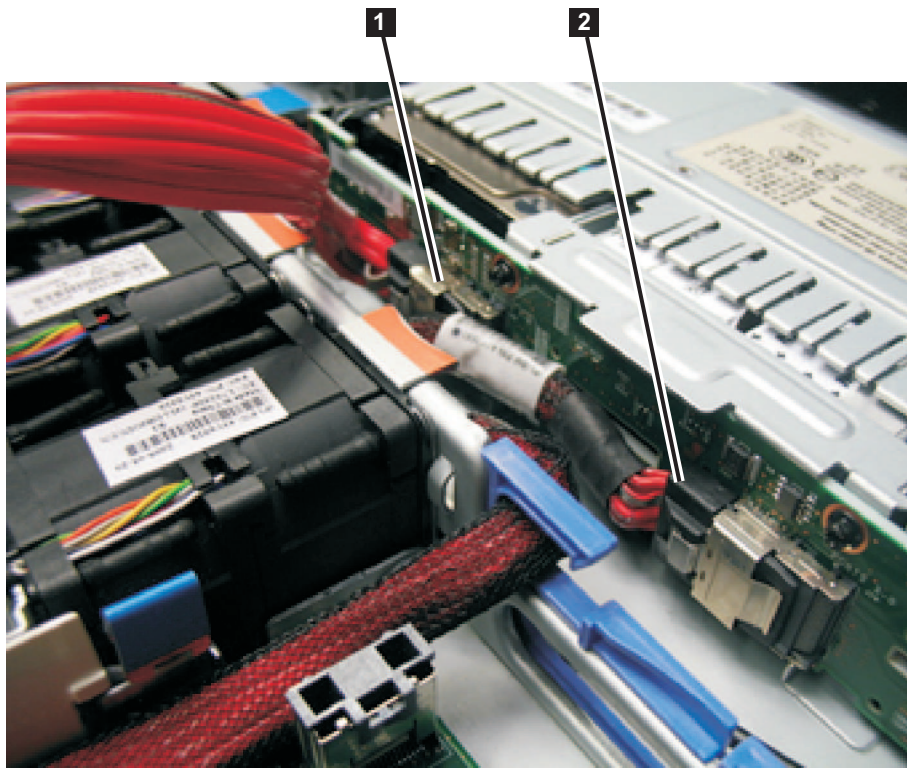


Figure 236. Boot-disk SAS cable and the high-speed SAS cable connected to the disk backplane in the SAN Volume Controller 2145-CG8 or 2145-CF8

The boot-disk cable is shown disconnected from the disk controller so that you can see the connectors on the back of the disk backplane more clearly.

- 1** Boot-disk SAS cable that is plugged into the disk-drive backplane to support drive bay 4
- 2** High-speed SAS-adapter cable that is plugged into the middle of the backplane to support drive bays 0, 1, 2, and 3

Figure 237 on page 284 shows the boot-disk SAS cable connected to the disk controller.

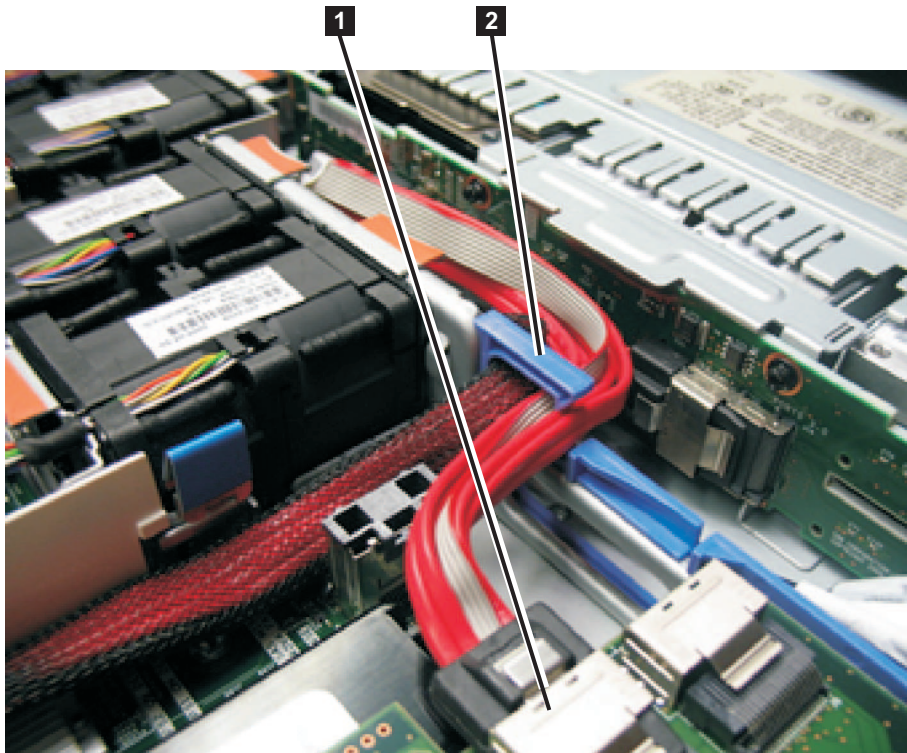


Figure 237. Boot-disk SAS cable routed through the blue bulkhead clip and connected to the SAS disk controller in the SAN Volume Controller 2145-CG8 or 2145-CF8

- 1 Disk-controller cable connected to the disk-controller connector that is closer to the power supplies
 - 2 Blue bulkhead clip with the boot-disk SAS cable and the underlying high-speed SAS adapter cable, if present
10. Replace the top cover. See “Replacing the top cover” on page 98.
 11. Place the node in the rack. See “Replacing a node in a rack” on page 67.
 12. Slide the node into the rack.
 13. Reconnect the power cords and the Fibre Channel and Ethernet cables. Ensure that you replace the Fibre Channel and Ethernet cables in the same ports from which they were removed.
 14. Replace the cable-retention bracket. See “Replacing the cable-retention bracket” on page 53.
 15. Replace the cable-management arm. See “Replacing the cable-management arm” on page 34.
 16. Turn on the node.

Removing a PCI express riser-card assembly

Use these instructions when you are prompted to remove a SAN Volume Controller PCI express riser-card assembly.

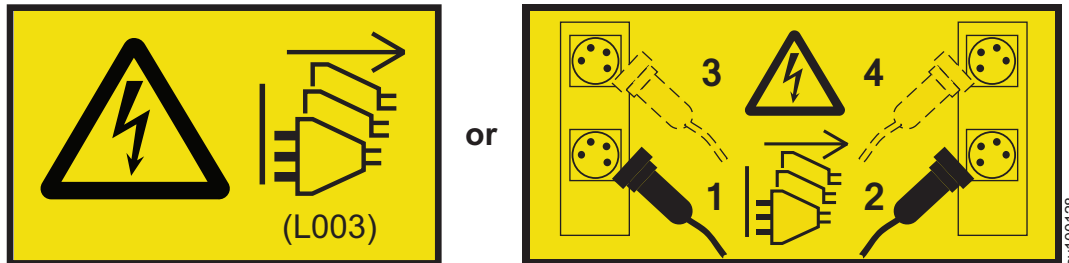
Removing a PCI express riser-card assembly: 2145-SV1

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 93.

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 238 on page 286 shows PCI riser-card assembly 1.



Figure 238. 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 239.



Figure 239. Removing PCI riser card assembly 1

3. Place the riser-card assembly on a flat, static-protective surface.
4. Repeat step 1 on page 285 through 3 to remove the other adapter assemblies, as needed.
For example, Figure 240 shows how to grasp and remove PCI riser-card assembly 2 from the chassis of the 2145-SV1 node.



Figure 240. Grasping and removing PCI riser-card assembly 2

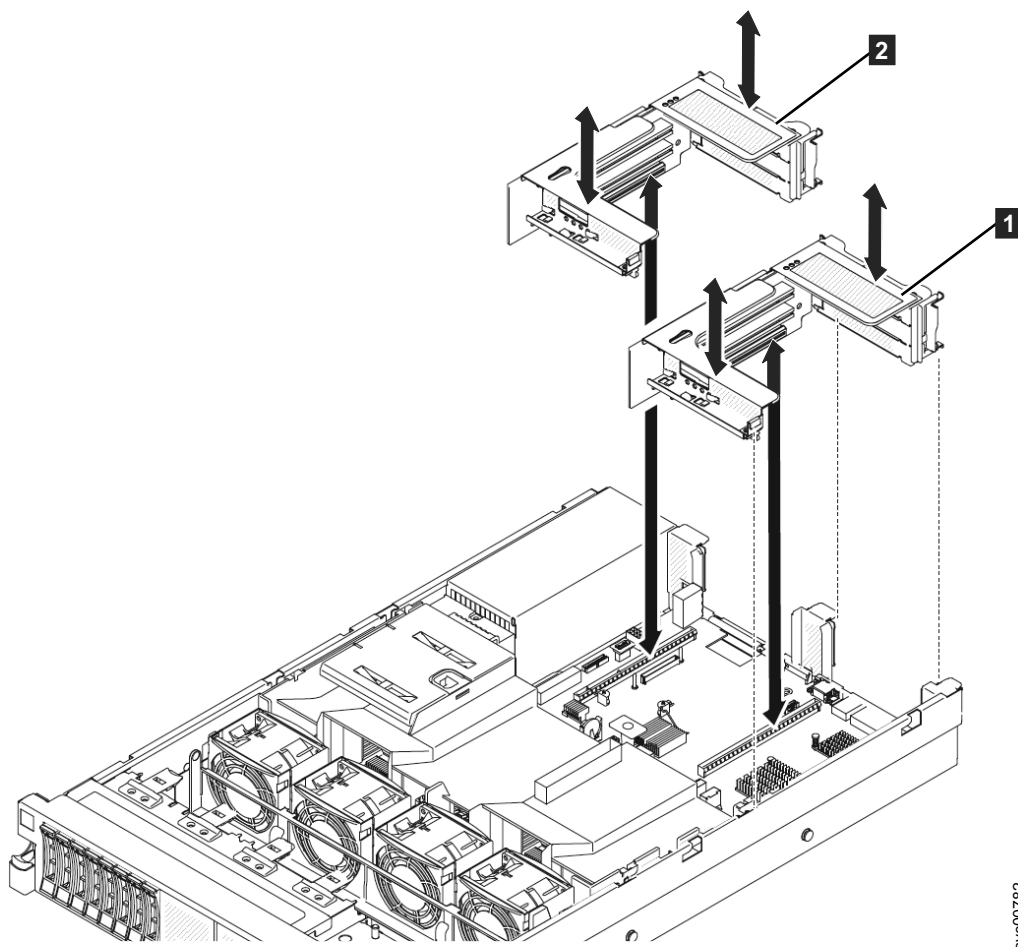
Removing a PCI express riser-card assembly: 2145-DH8

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 241 on page 288.
- 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.



svc00782

Figure 241. 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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 SAN Volume Controller 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 93.
- All PCI express riser-card assemblies are removed, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 284.

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 242.



Figure 242. 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 243 shows.

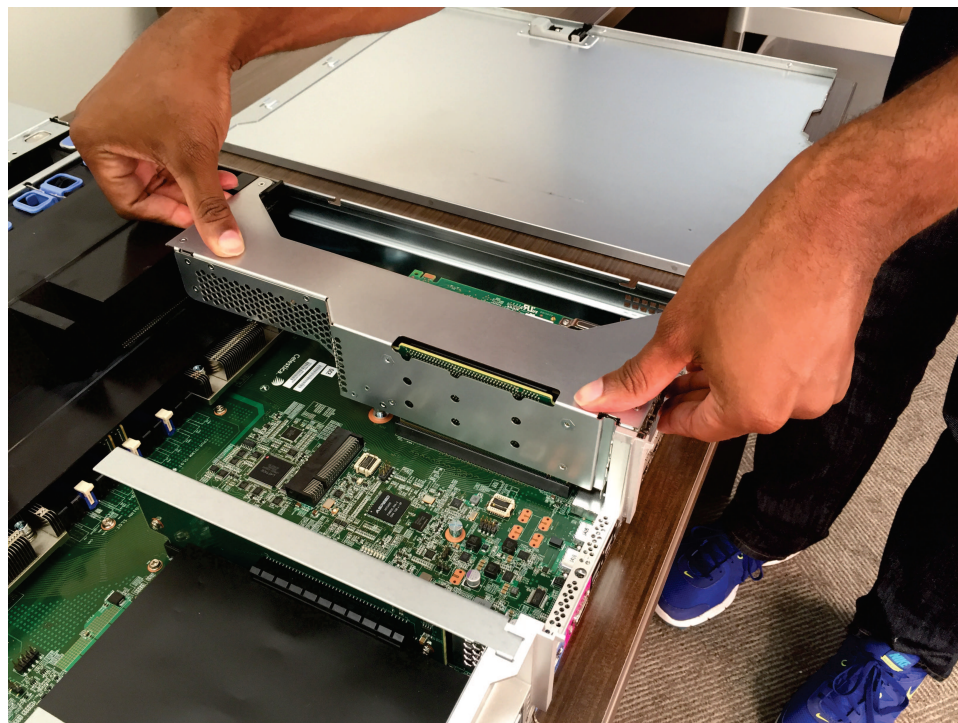


Figure 243. Replacing PCI riser card assembly 1

4. Repeat steps Figure 242 on page 289 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 98.
6. Slide the 2145-SV1 node into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 70.
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 244 on page 291.

- 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.

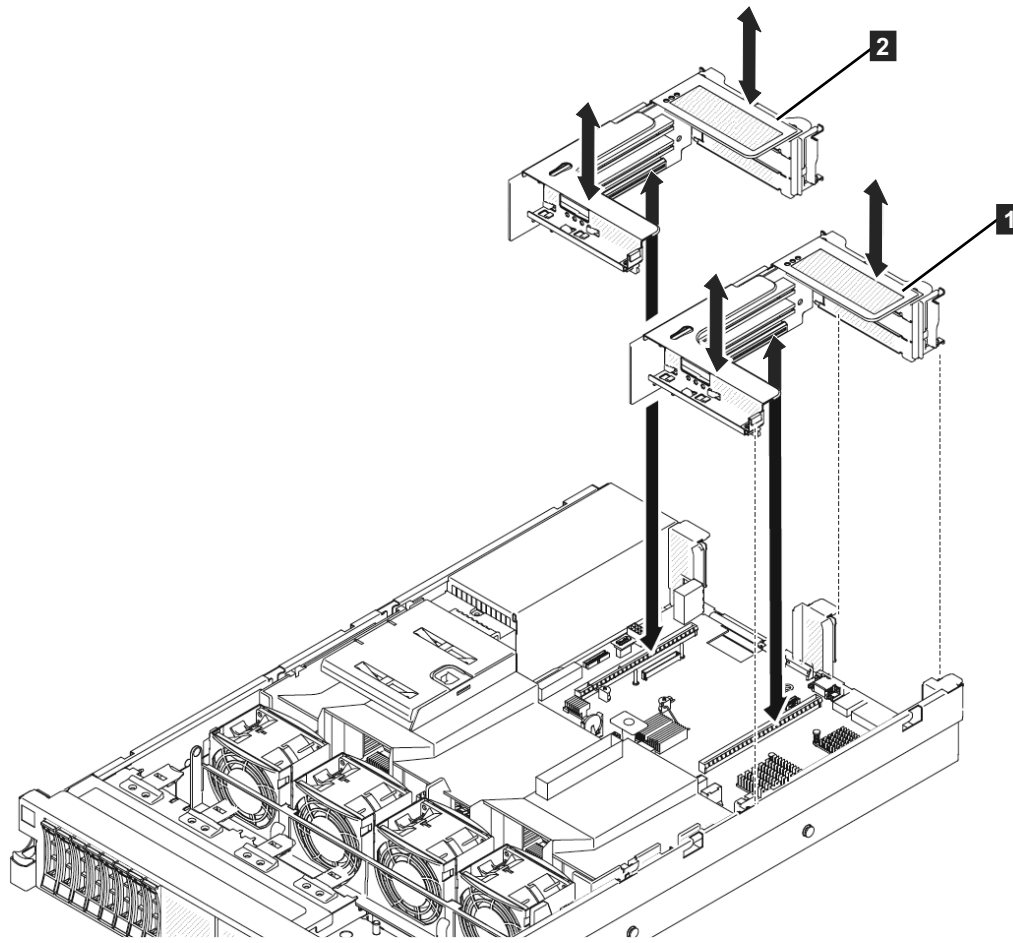


Figure 244. Replacing the 2145-DH8 PCI express riser card assembly

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 may need to remove a PCI express adapter from a SAN Volume Controller node.

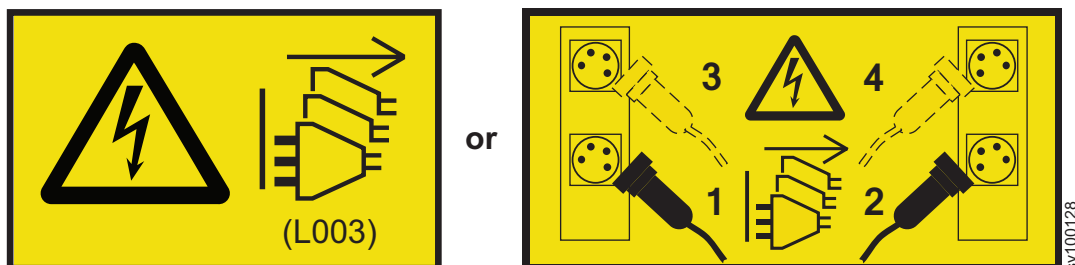
Removing a PCI express adapter: 2145-SV1

You might be prompted to remove a PCI express adapter on a SAN Volume Controller 2145-SV1 node. The removal of this Tier 1 customer replaceable unit (CRU) is your responsibility. If IBM removes a Tier 1 CRU at your request, you are charged for the removal. Service agreements can be purchased so that you can ask IBM to remove these units.

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
- 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 54.
- The top back cover is removed, as described in “Removing the top covers: 2145-SV1” on page 93.

- 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 284.

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 245 shows.

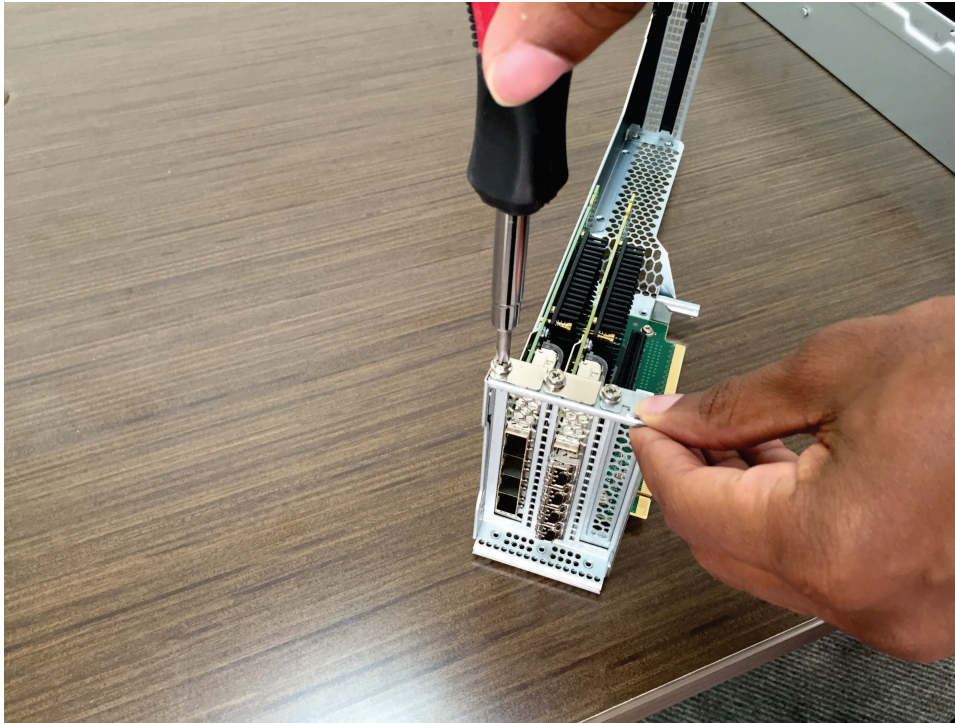


Figure 245. Removing the retaining screw

3. Unseat the adapter from the connector, as shown in Figure 246 on page 294.

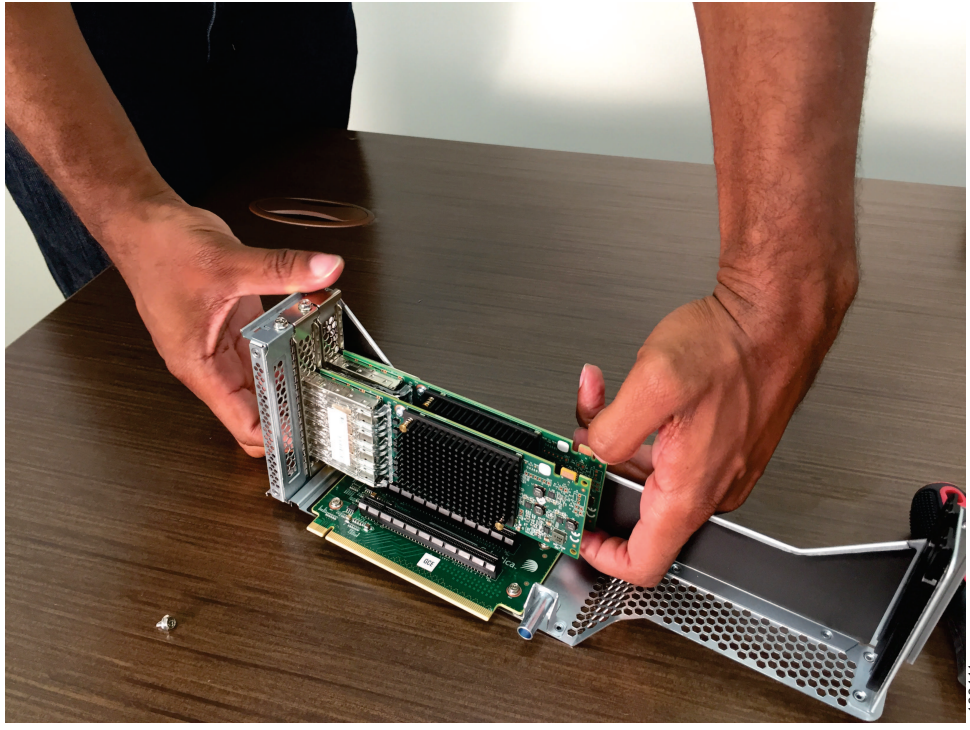


Figure 246. Unseating the adapter

4. Carefully grasp the adapter by its top edge or upper corners. Pull the adapter from the PCI expansion slot, as shown in Figure 247.

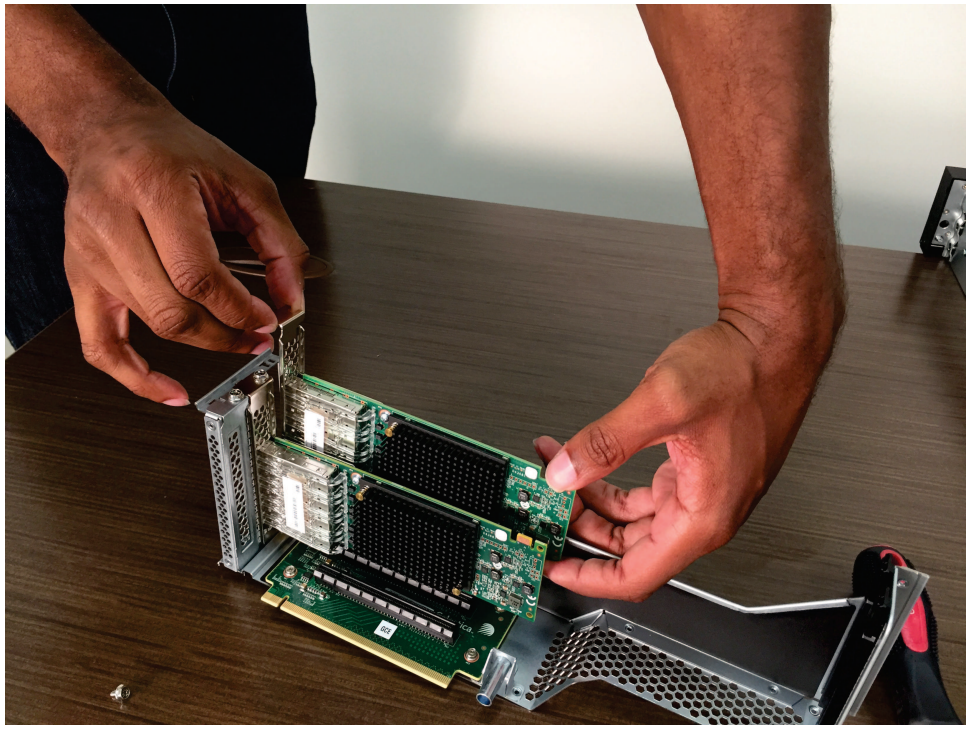


Figure 247. Removing the adapter from the adapter connectors

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. The removal of this Tier 1 customer replaceable unit (CRU) is your responsibility. If IBM removes a Tier 1 CRU at your request, you are charged for the removal. Service agreements can be purchased so that you can ask IBM to remove 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

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 248 on page 296.

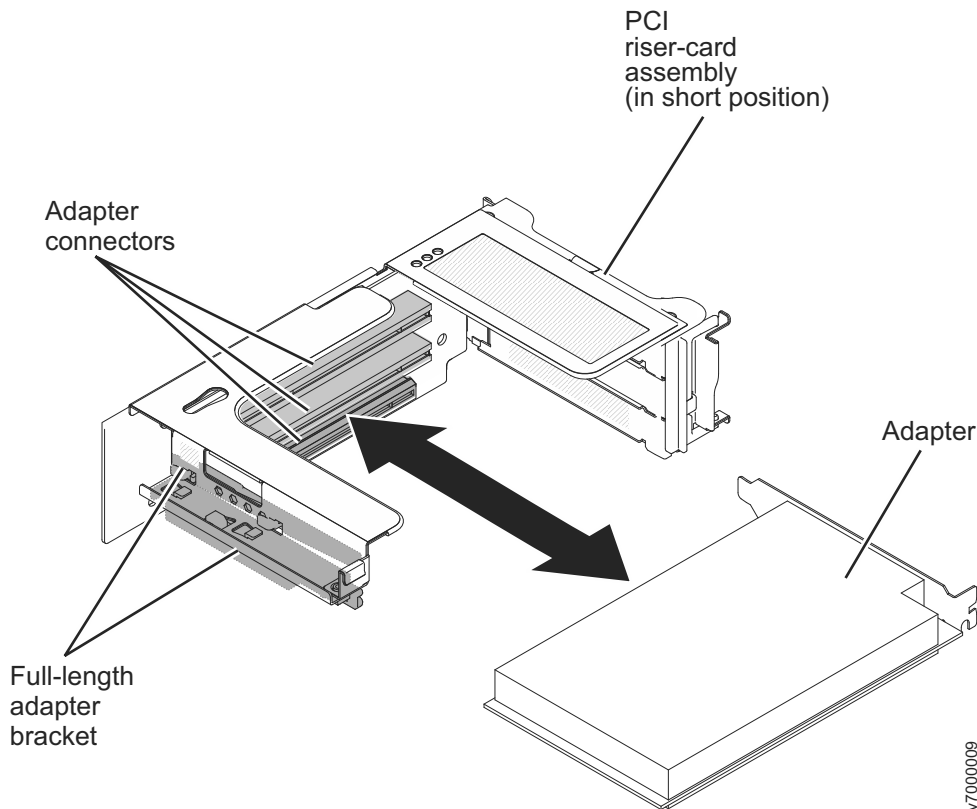


Figure 248. Removing the adapter from the adapter connectors

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 may need to replace a PCI express adapter from a SAN Volume Controller 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. 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 the SAN Volume Controller 2145-SV1 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, 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 249.

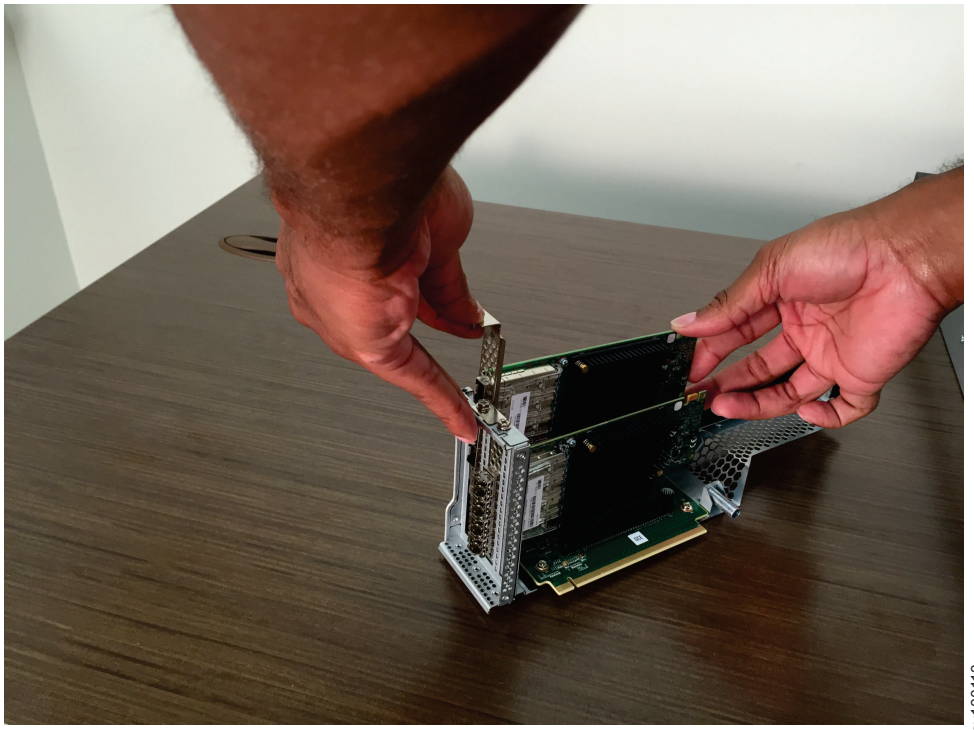
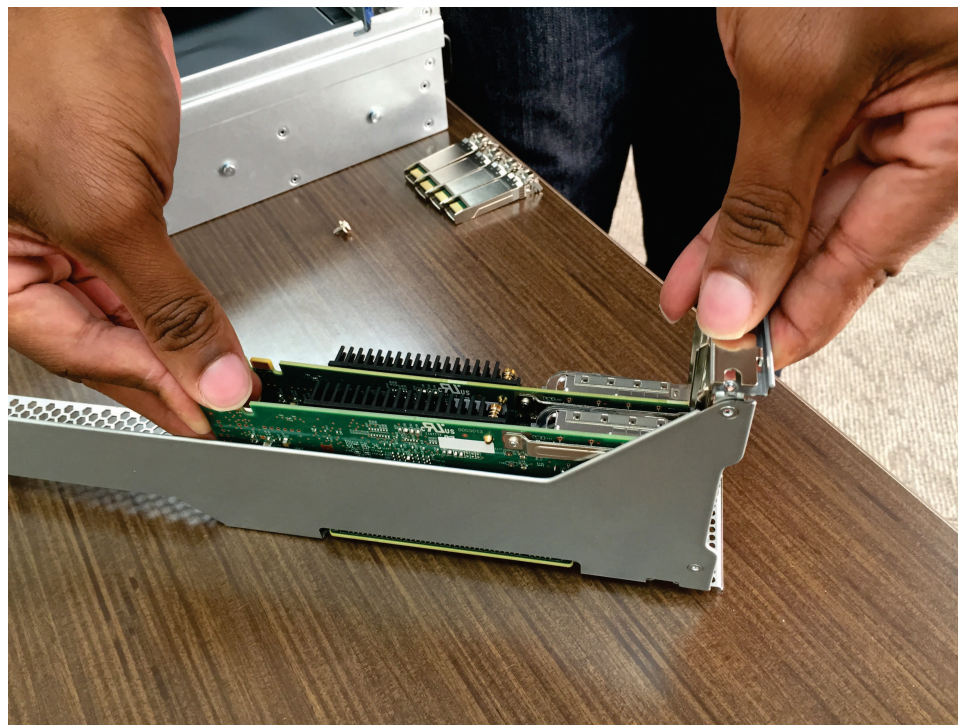


Figure 249. Inserting the adapter into the PCI connector

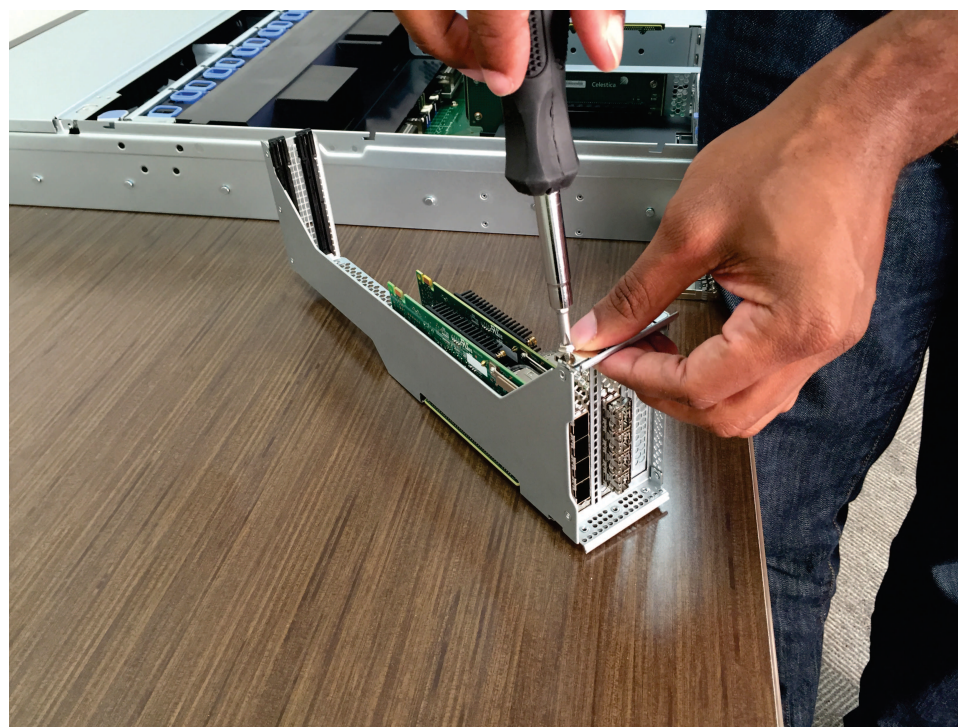
2. Ensure that the slots on the adapter are aligned correctly in to the PCI riser-card assembly, as Figure 250 on page 298 shows.



sv100114

Figure 250. 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 251.



sv100115

Figure 251. 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 98.
7. Slide the node into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 70.
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 252 on page 300.
 - 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.

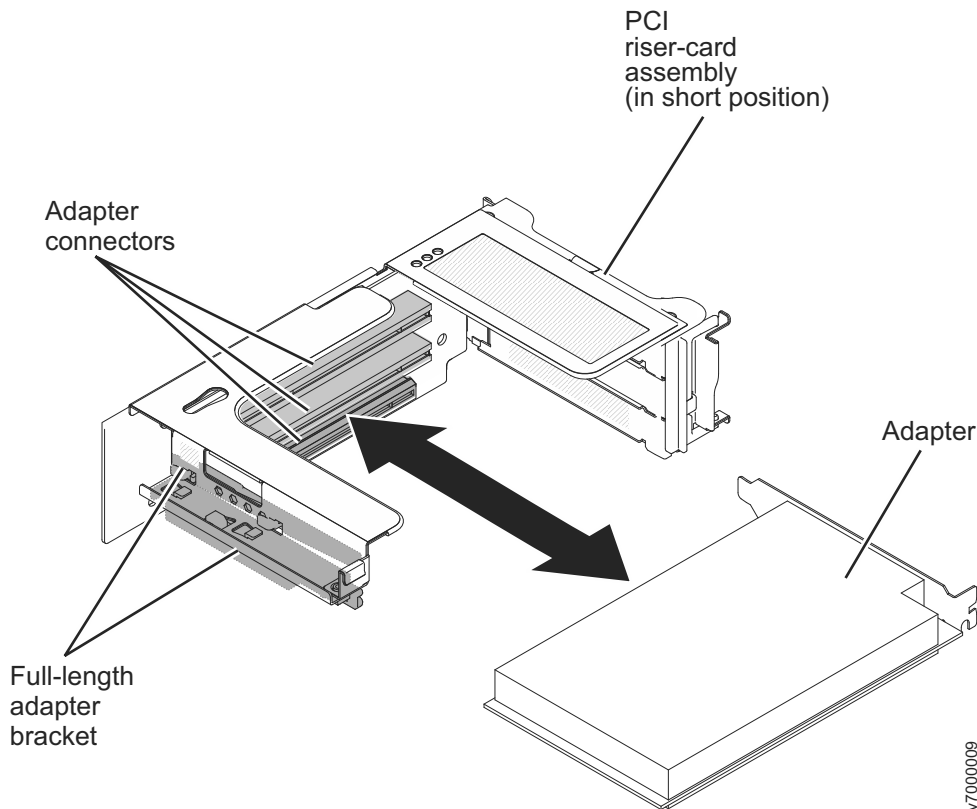


Figure 252. Inserting the adapter into the PCI connector

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 SAN Volume Controller operator-information panel.

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 xxvii.

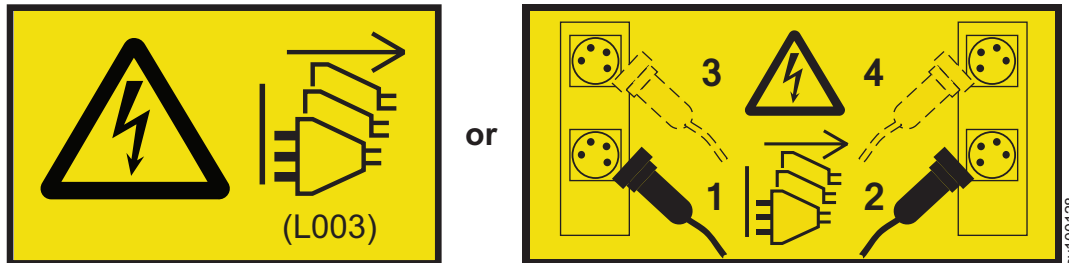
Removing the operator-information panel assembly: 2145-SV1

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 93.

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 253 on page 302.

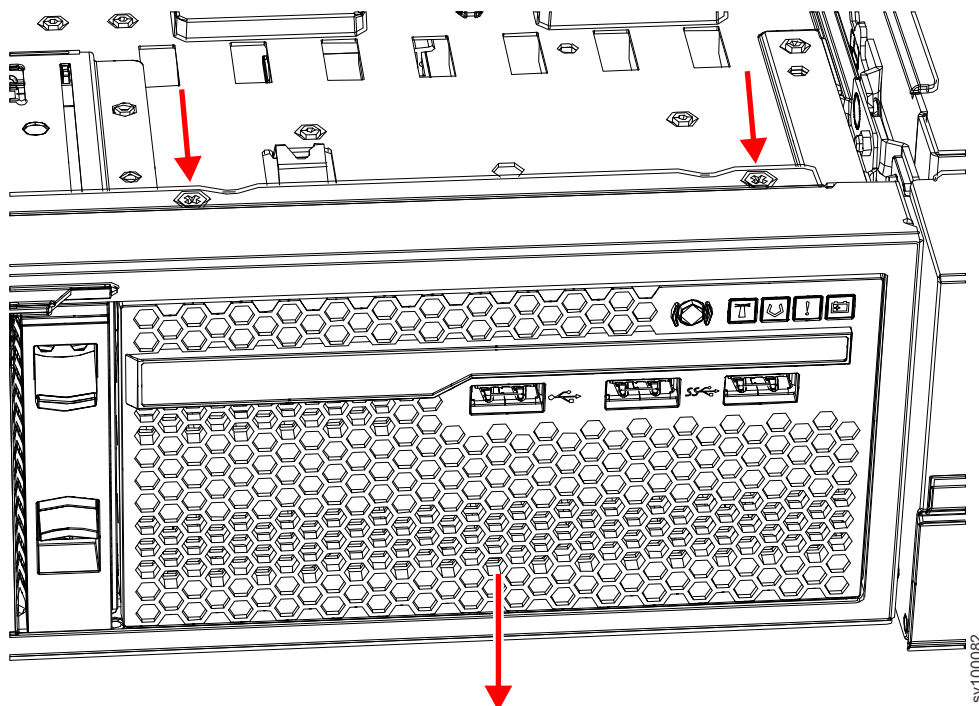


Figure 253. Removing the 2145-SV1 operator-information panel assembly

3. Push the operator-information panel assembly from behind in the direction that is shown in Figure 253 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.

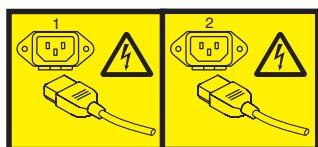
Removing the operator-information panel assembly: 2145-DH8

You can remove the operator-information panel assembly on a SAN Volume Controller 2145-DH8 node.

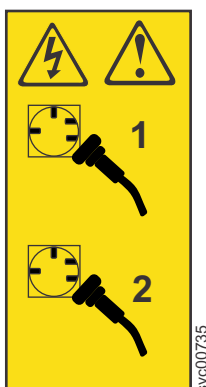
Before you begin

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 254.

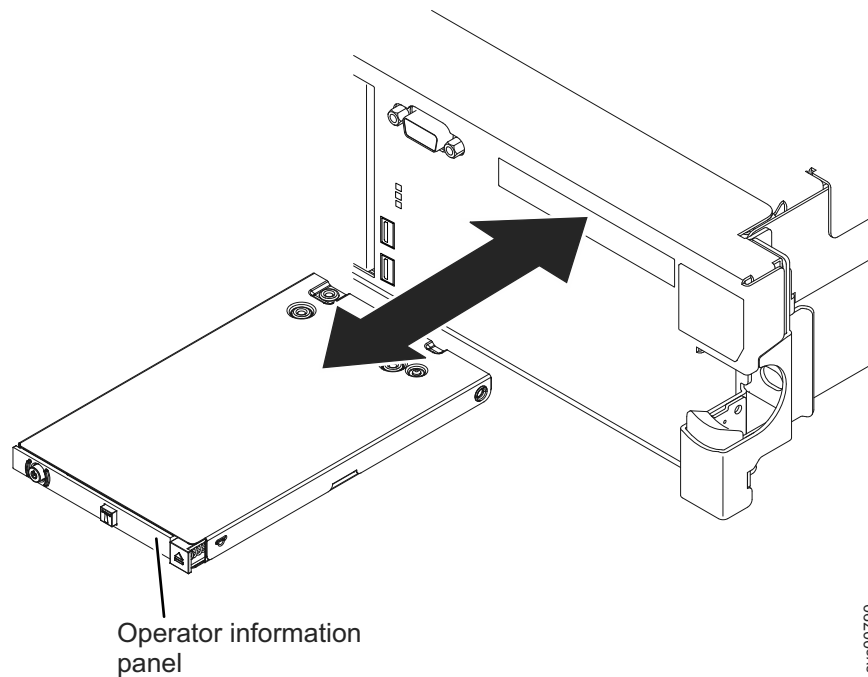


Figure 254. Removing the 2145-DH8 operator-information panel assembly

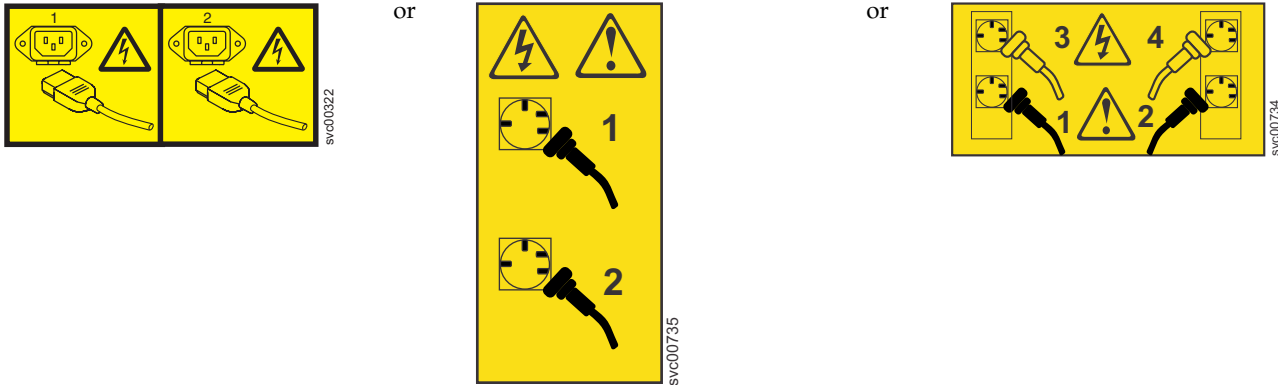
Removing the operator-information panel assembly: 2145-CG8 or 2145-CF8

You can remove the operator-information panel assembly on a SAN Volume Controller 2145-CG8 or 2145-CF8 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 requires you to:

- Turn off the node.
- Disconnect the power cables.

Make careful note of the layout of the cables as you go through this procedure as you must replace them in the same position when you replace the operator-information panel assembly.

Perform the following steps to remove the operator-information panel:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. 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.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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 54.

6. From the rear of the operator-information panel assembly, disconnect the cable.
7. Use an object to push down on the release tab (**2** in Figure 255).
Hold down the release tab and push the blue push point on the rear of the panel toward the front of the node.

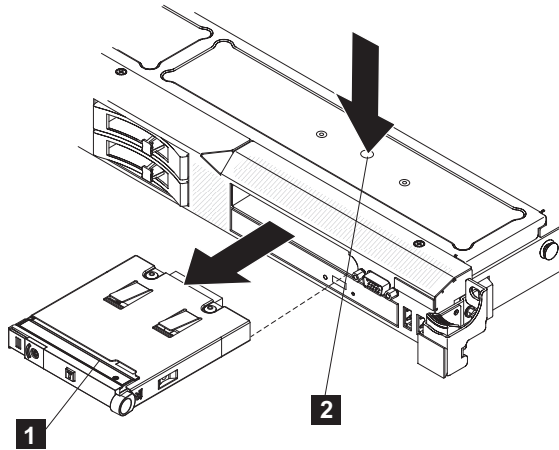


Figure 255. Using the release tab to remove the SAN Volume Controller 2145-CG8 or 2145-CF8 operator-information panel

- 1** Operator-information panel
- 2** Release tab

8. From the front of the node, carefully pull the assembly (**1**) out of the node while you move the assembly slightly from side to side.
9. If you are instructed to return the operator-information panel assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Replacing the operator-information panel assembly

You might be prompted to replace the SAN Volume Controller 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 xxvii.

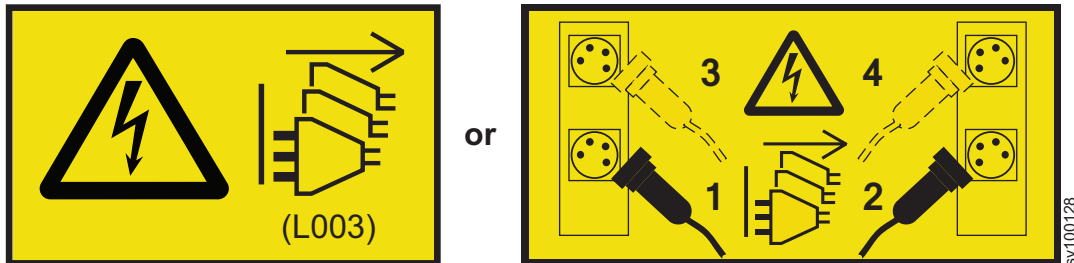
Replacing the operator-information panel assembly: 2145-SV1

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 93.

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 256 on page 307.

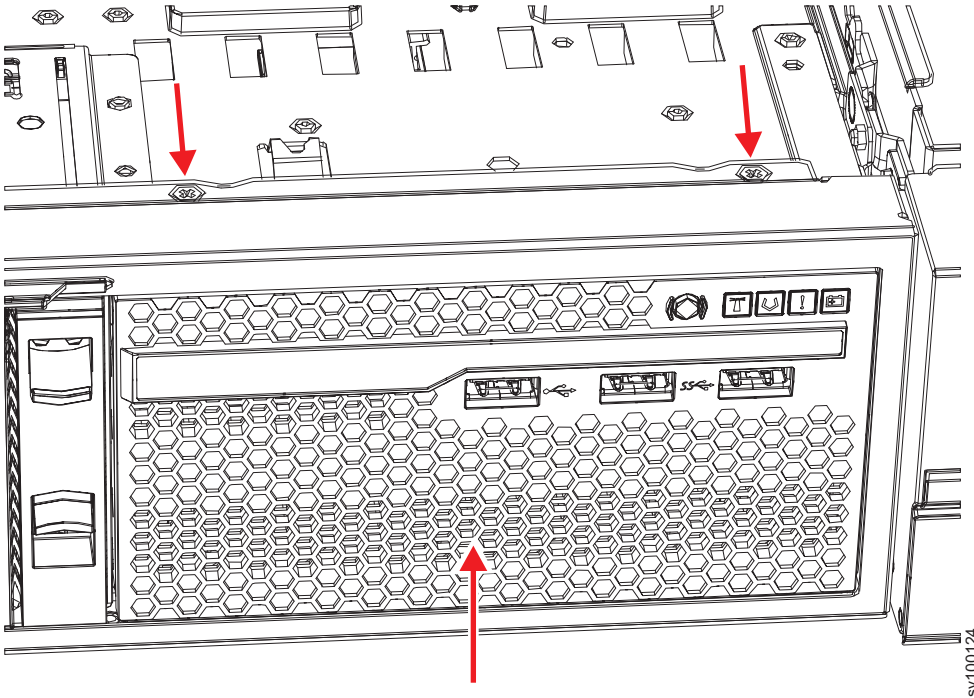


Figure 256. Replacing the 2145-SV1 operator-information panel

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 98.
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 70.
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.

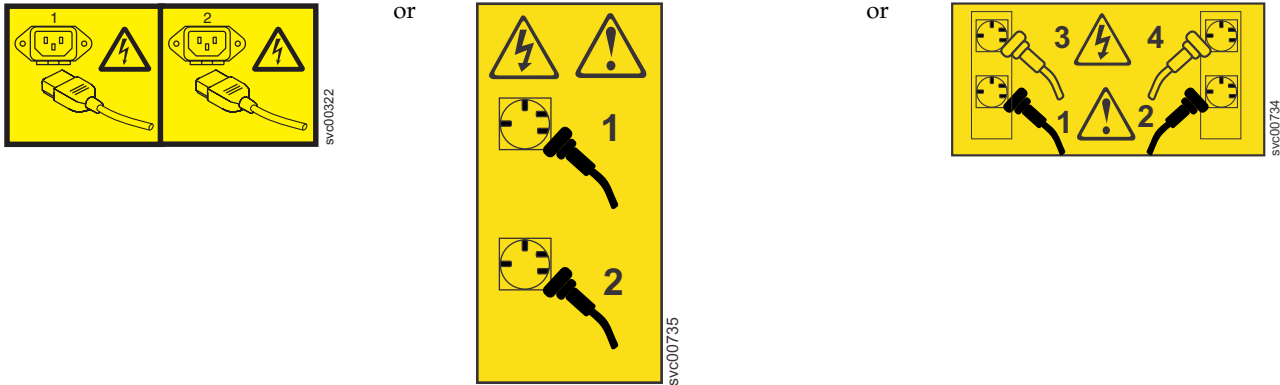
Replacing the operator-information panel assembly: 2145-DH8

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)



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 257 on page 309.
3. Inside the node, connect the cable to the rear of the operator information panel assembly.

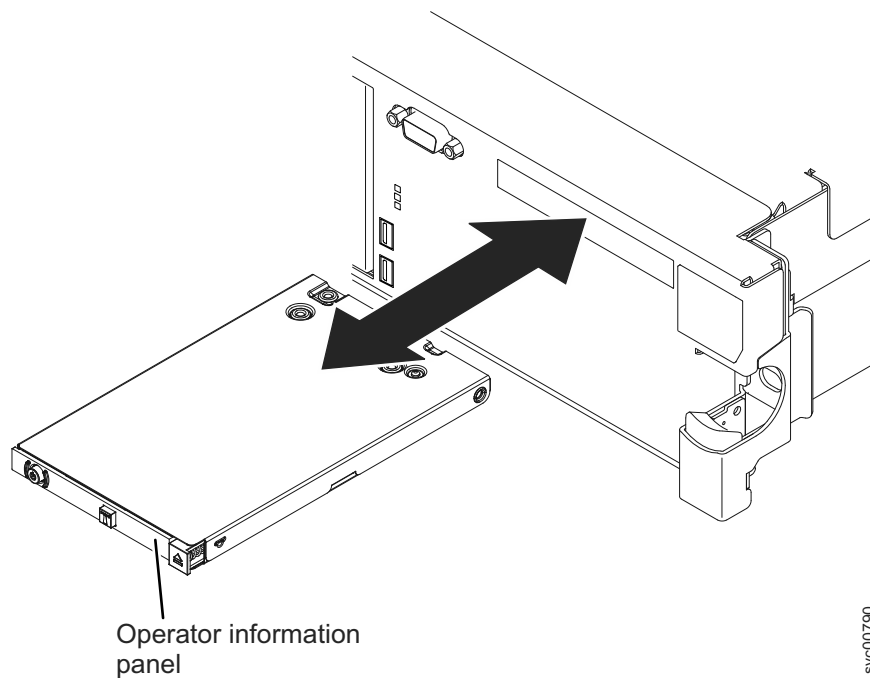


Figure 257. Replacing the 2145-DH8 operator-information panel

4. To connect the operator information panel cable on the system board, press evenly on the cable shown in Figure 258 on page 310. Pressing on one side of the cable might damage the cable or connector.

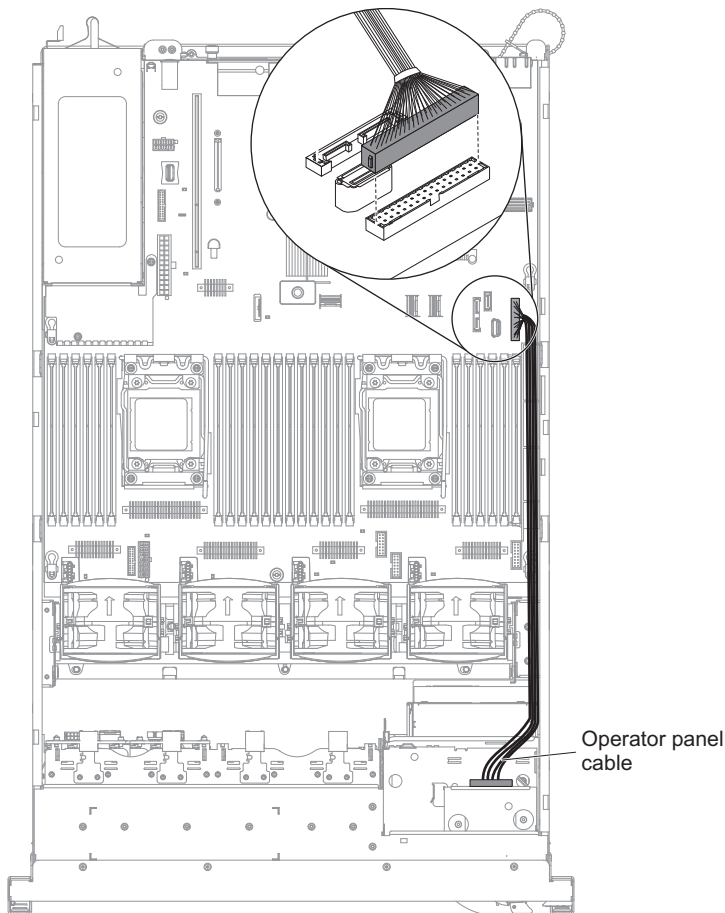


Figure 258. Connecting the 2145-DH8 operator-information panel cable

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 259 on page 311) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

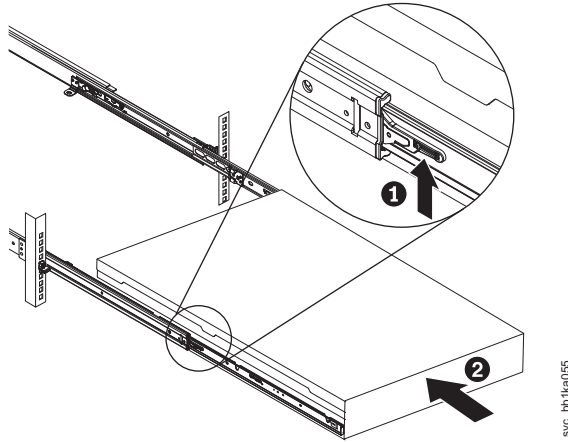


Figure 259. Raising the locking levers of the slide rails of the rack

10. Turn on the node.

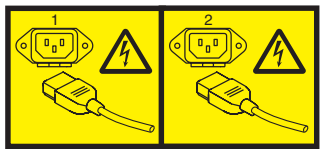
Replacing the operator-information panel assembly: 2145-CG8 or 2145-CF8

You can replace the operator-information panel on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

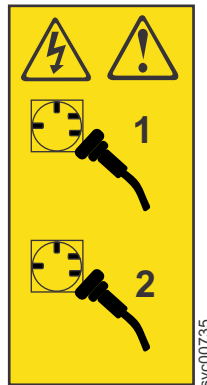
Before you begin

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 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 cover is removed.

Perform the following steps to replace the operator-information panel:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. From the front of the node, slide the operator-information panel into the node until it clicks into place.
3. Inside the node, connect the cable to the rear of the operator information panel assembly.

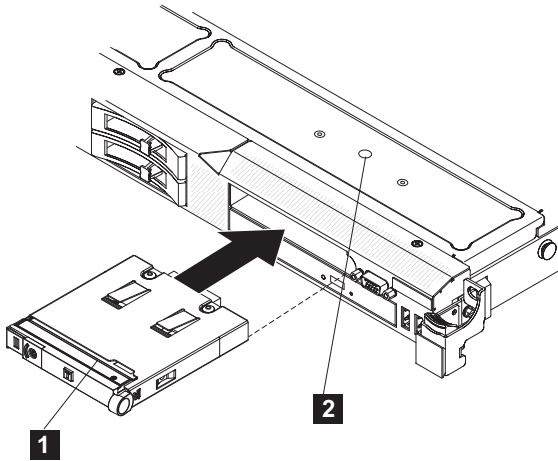


Figure 260. Replacing the SAN Volume Controller 2145-CG8 or 2145-CF8 operator-information panel

- 1** Operator-information panel
- 2** Release tab

The following illustration shows the cable routing for the operator-information panel:

Note: The operation information panel cable should go in above the Video/USB cable in the node.

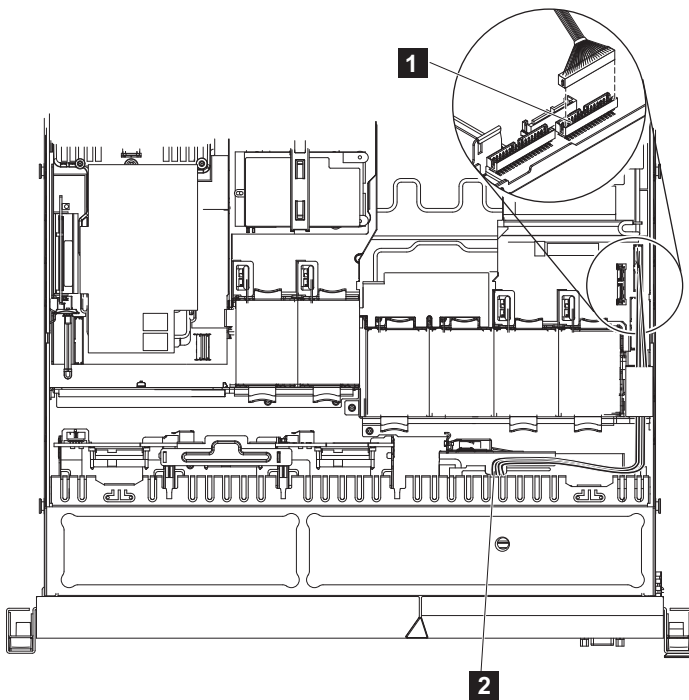


Figure 261. Connecting the SAN Volume Controller 2145-CG8 or 2145-CF8 operator-information panel cable

- 1** Operator-information panel connector
 - 2** Operator-information panel cable
4. Replace the top cover. See “Replacing the top cover” on page 98.
 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 67.
 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. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
 8. Lift the locking levers (**1** in Figure 262) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

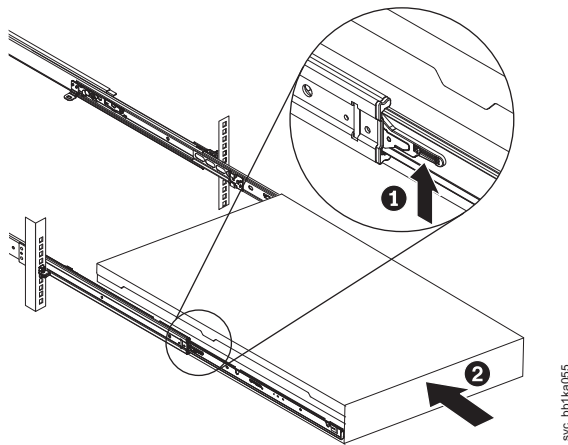


Figure 262. Raising the locking levers of the slide rails of the rack

9. 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 xxvii.

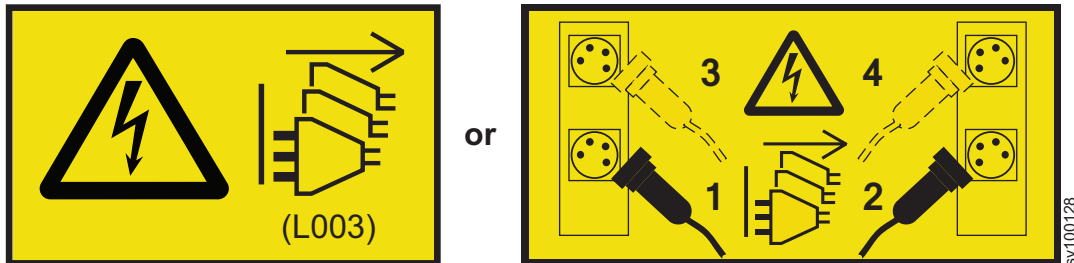
Removing the operator-information panel cables: 2145-SV1

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 93.

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 263 on page 315.

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**.

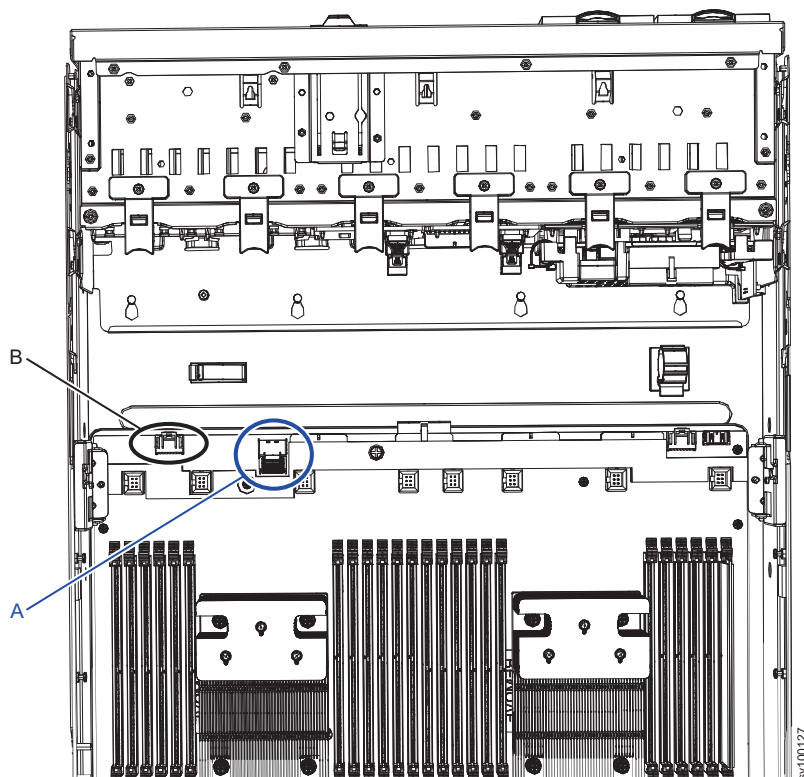


Figure 263. Cable connectors on the main board for the operator-information panel cables

3. Gently remove each cable from the connectors on the rear of the operator-information panel (**A** and **B**), as shown in Figure 264 on page 316.
 - a. Remove the blue USB cable from connector **A**.

- b. Remove the black LED and power button cable from connector **B**.

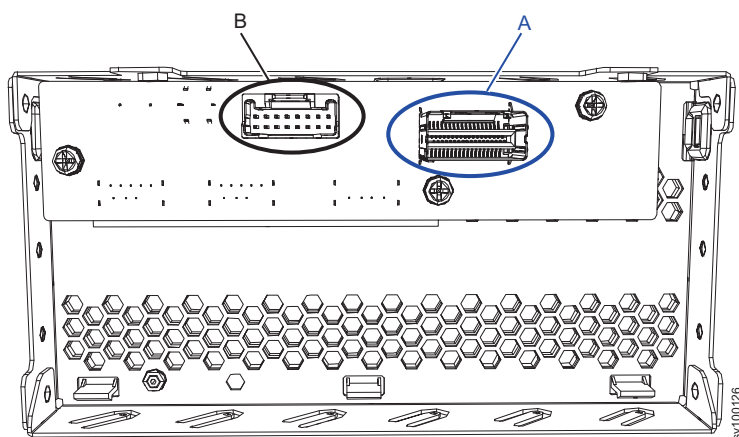


Figure 264. Cable connectors on the back of the operator-information panel

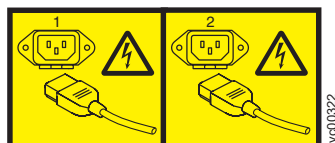
Removing the operator-information panel cable: 2145-DH8

You might need to remove the operator-information panel cable from a SAN Volume Controller 2145-DH8 node.

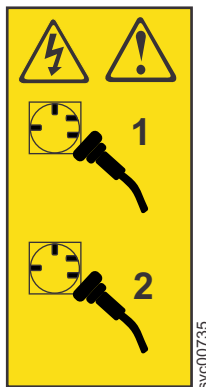
Before you begin

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 265 on page 318.

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.

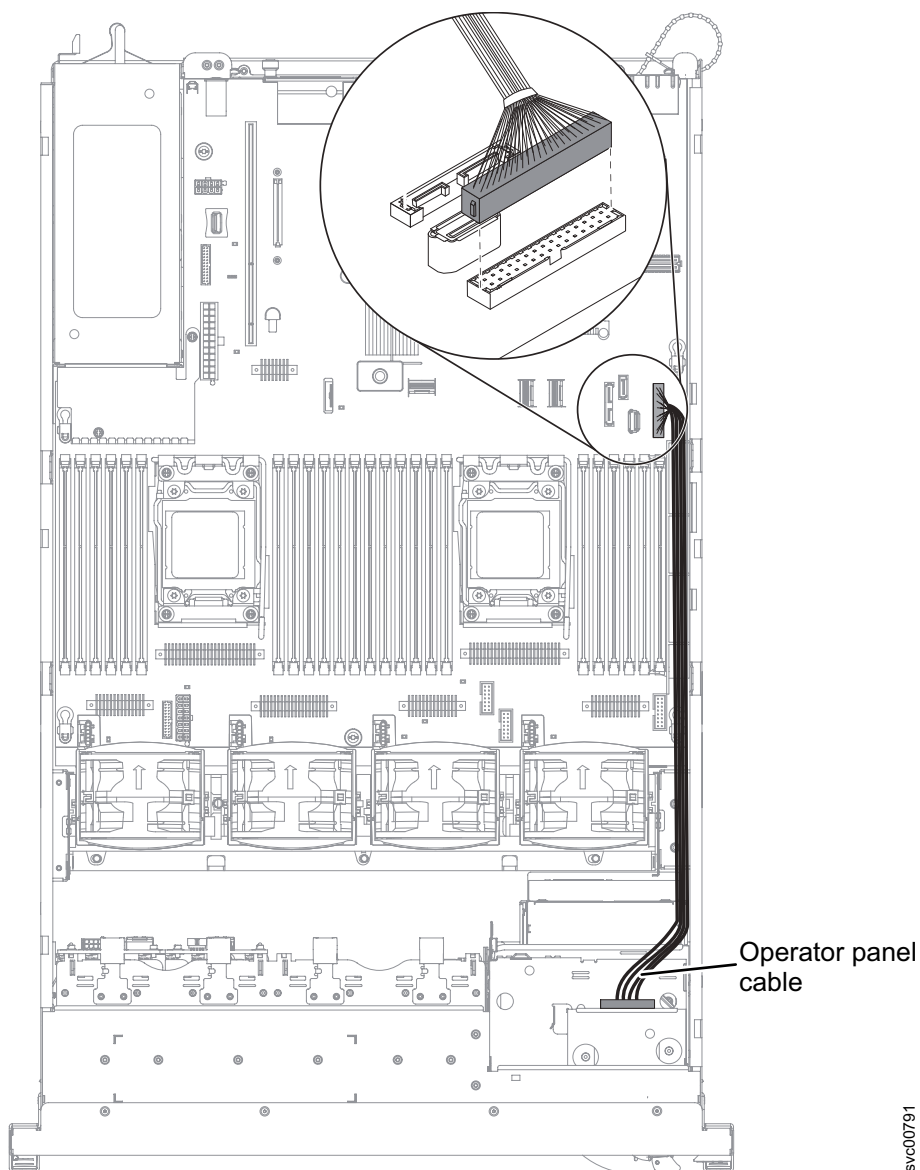


Figure 265. Removing the 2145-DH8 operator-information panel cable

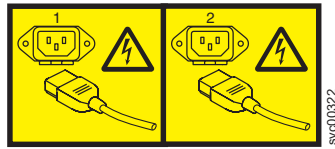
Removing the operator-information panel cable: 2145-CG8 or 2145-CF8

Use these instructions when you are prompted to remove the operator-information panel cable from a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

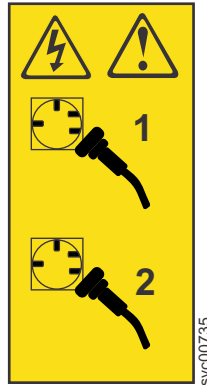
Before you begin

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 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 cover is removed.

Perform the following steps to remove the operator-information panel cable:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Disconnect the cable from the rear of the operator-information panel.
3. Disconnect the cable from the connector above the Video/USB cable connector on the right side of the node, as shown in Figure 266 on page 320.

The following illustration shows the cable routing for the operator-information panel cable.

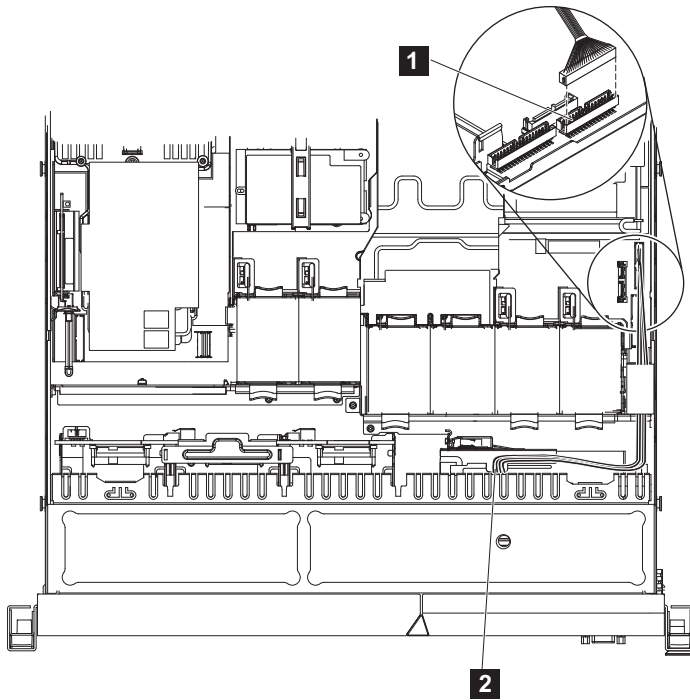


Figure 266. Disconnecting the SAN Volume Controller 2145-CG8 or 2145-CF8 operator-information panel cable

- 1** Operator-information panel connector
- 2** Operator-information panel cable

4. Lift the cable from the node.
5. Replace the cable before proceeding.

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 xxvii.

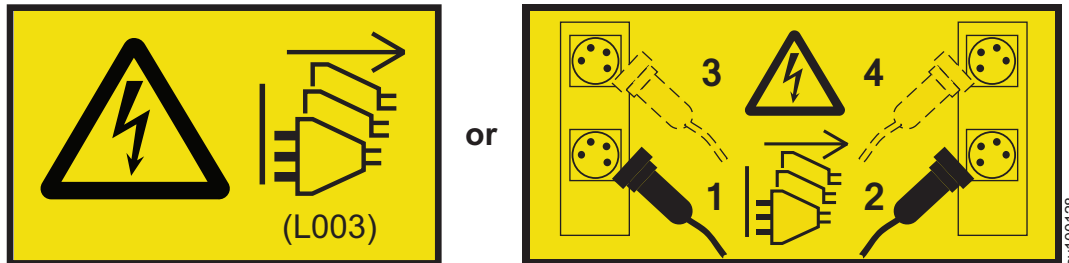
Replacing the operator-information panel cables: 2145-SV1

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 93.

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 267 on page 322.

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**.

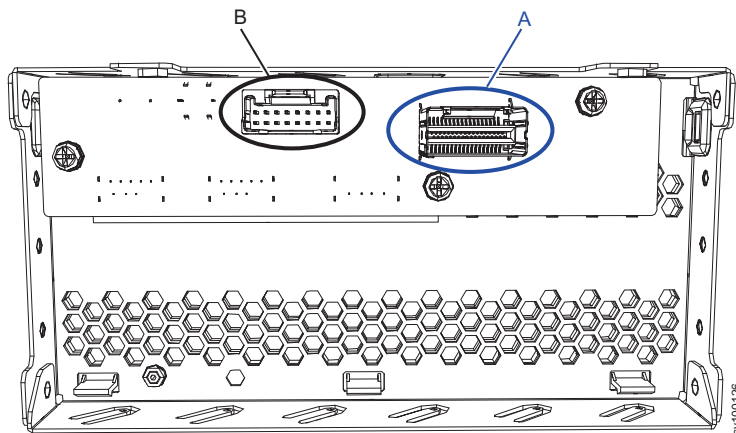


Figure 267. Cable connectors on the back of the 2145-SV1 operator-information panel

3. Connect each cable to the appropriate connector on the main board, as shown in Figure 268 on page 323.
 - a. Connect the blue USB cable to connector **A**.

- b. Connect the black LED and power button cable to connector **B**.

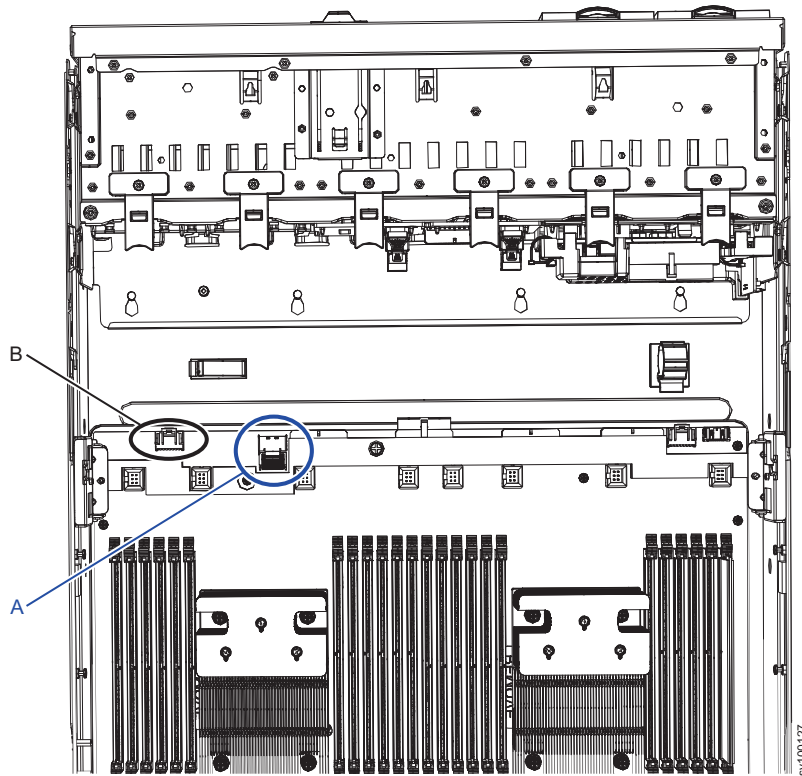


Figure 268. Cable connectors on the 2145-SV1 main board for the operator-information panel cables

4. Replace the top covers, as described in “Replacing the top covers: 2145-SV1” on page 98.
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 70.
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.

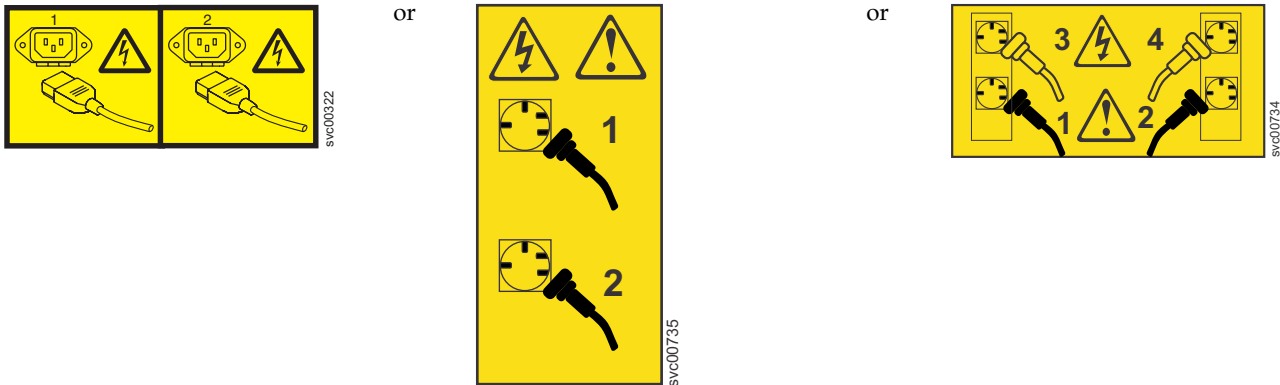
Replacing the operator-information panel cable: 2145-DH8

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)



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:

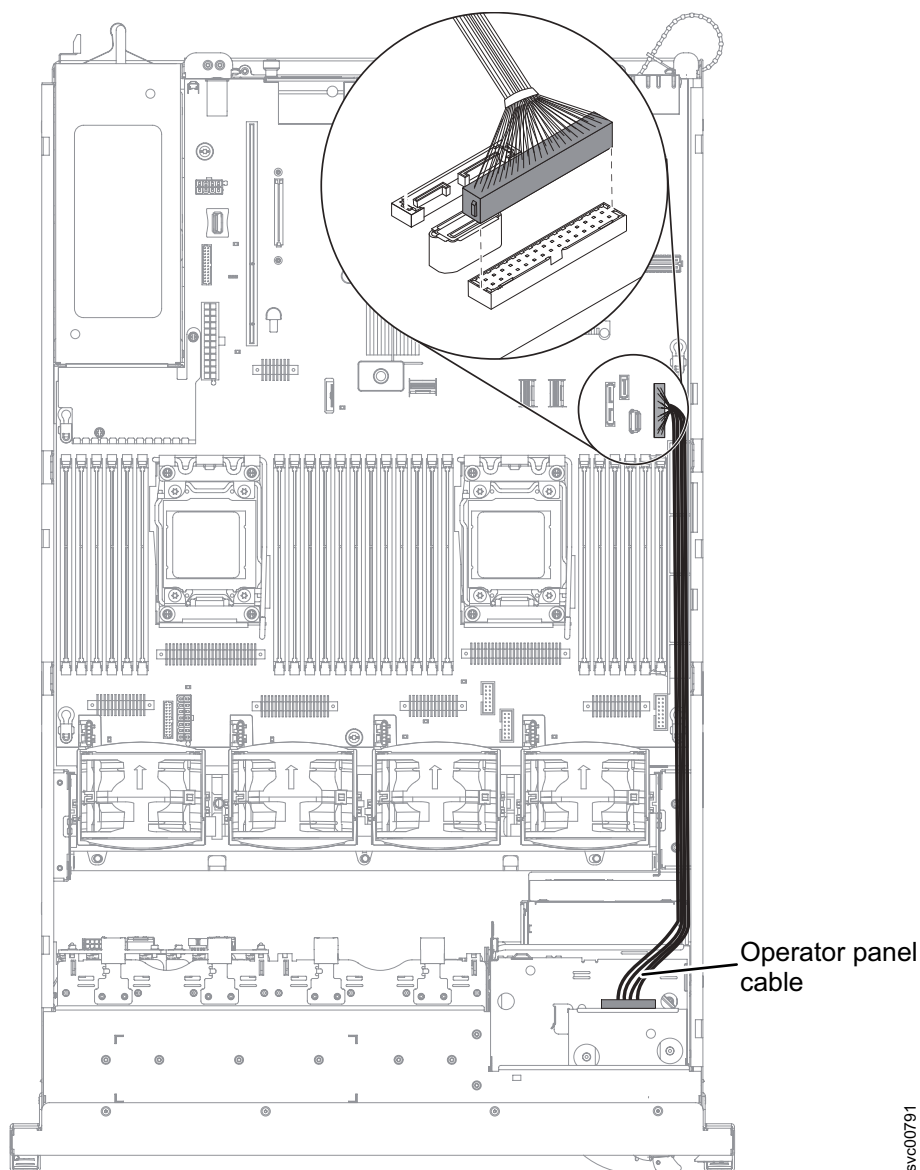
- The node is turned off. If you must turn off the node, ensure that its data is mirrored and synchronized, and that there are no dependent volumes, as described in MAP 5350.
- The power cables are disconnected.
- The top cover is removed.

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 269 on page 325.

The following illustration shows the cable routing for the operator-information panel cable.



svc00791

Figure 269. 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 269.
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 270 on page 326) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

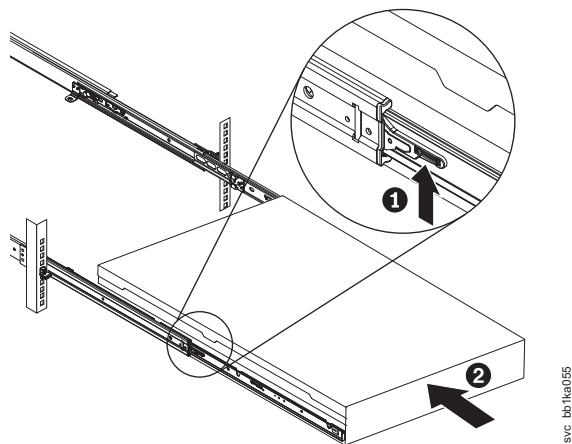


Figure 270. Raising the locking levers of the slide rails of the rack

10. Turn on the node.

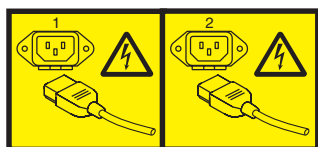
Replacing the operator-information panel cable: 2145-CG8 or 2145-CF8

Use these instructions when you are prompted to replace the operator-information panel cable for a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

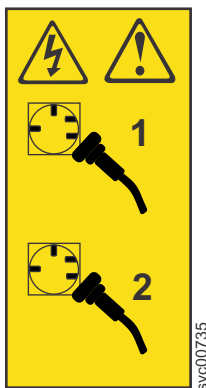
Before you begin

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 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 cover is removed.

Perform the following steps to replace the operator-information panel cable:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Thread the new cable from the operator-information panel to the connector above the Video/USB cable connector on the right side of the node, as shown in Figure 271.

The following illustration shows the cable routing for the operator-information panel cable.

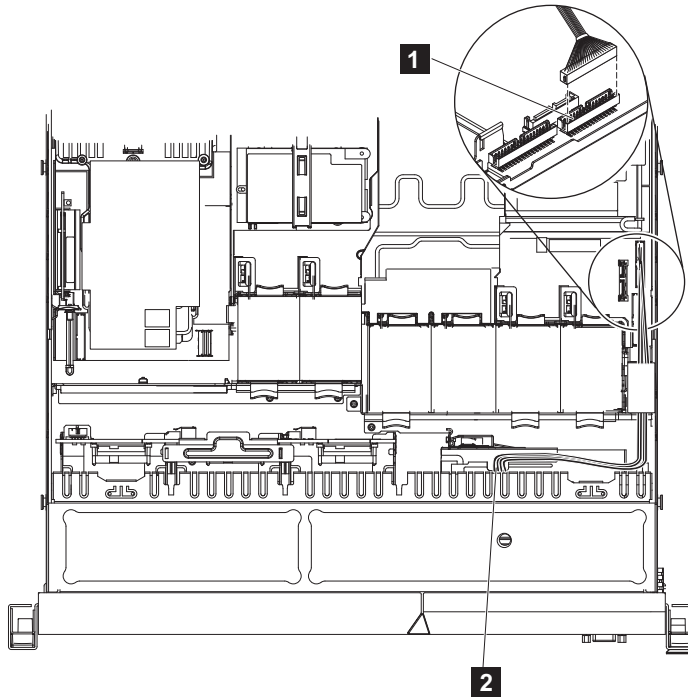


Figure 271. Connecting the 2145-CG8 or 2145-CF8 operator-information panel cable

- 1** Operator-information panel connector
- 2** Operator-information panel cable
3. Connect the cable to the connector above the Video/USB cable connector on the right side of the node, as shown in Figure 271.
4. Connect the cable to the rear of the operator-information panel.
5. Replace the top cover. See “Replacing the top cover” on page 98.
6. 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 67.
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, as described in “Replacing the cable-retention bracket” on page 53.
9. Lift the locking levers (**1** in Figure 272 on page 328) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

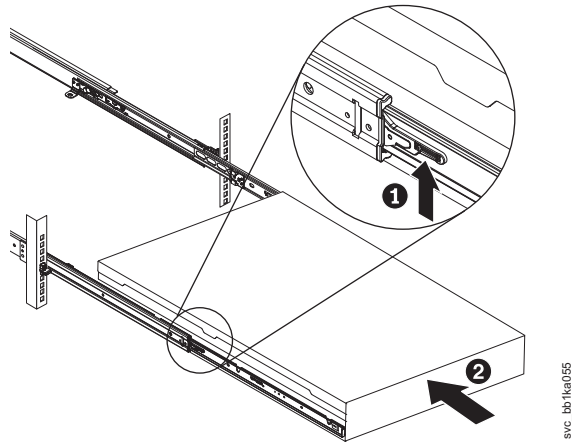


Figure 272. Raising the locking levers of the slide rails of the rack

10. Turn on the node.

Removing the fans

The SAN Volume Controller fans might have to be replaced due to failure.

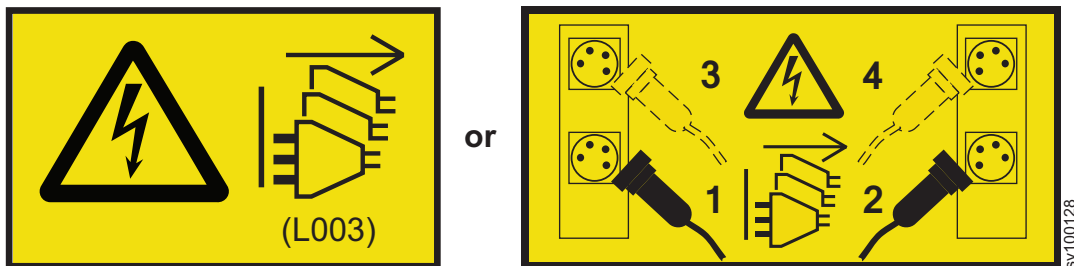
Removing the fans: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide* 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 93.
6. Locate the appropriate fan. The node has six fan positions that are numbered from left to right, as shown in Figure 273.

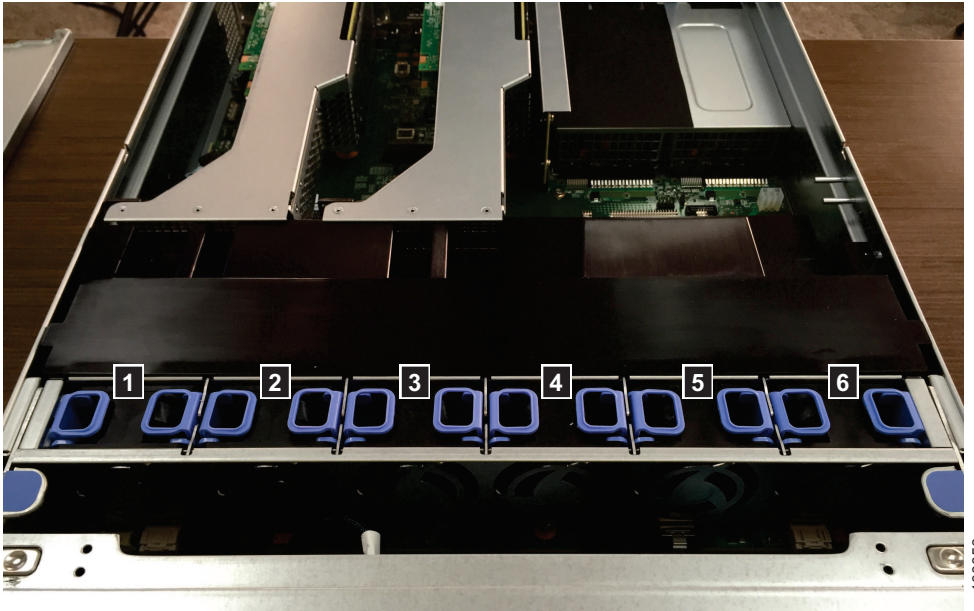
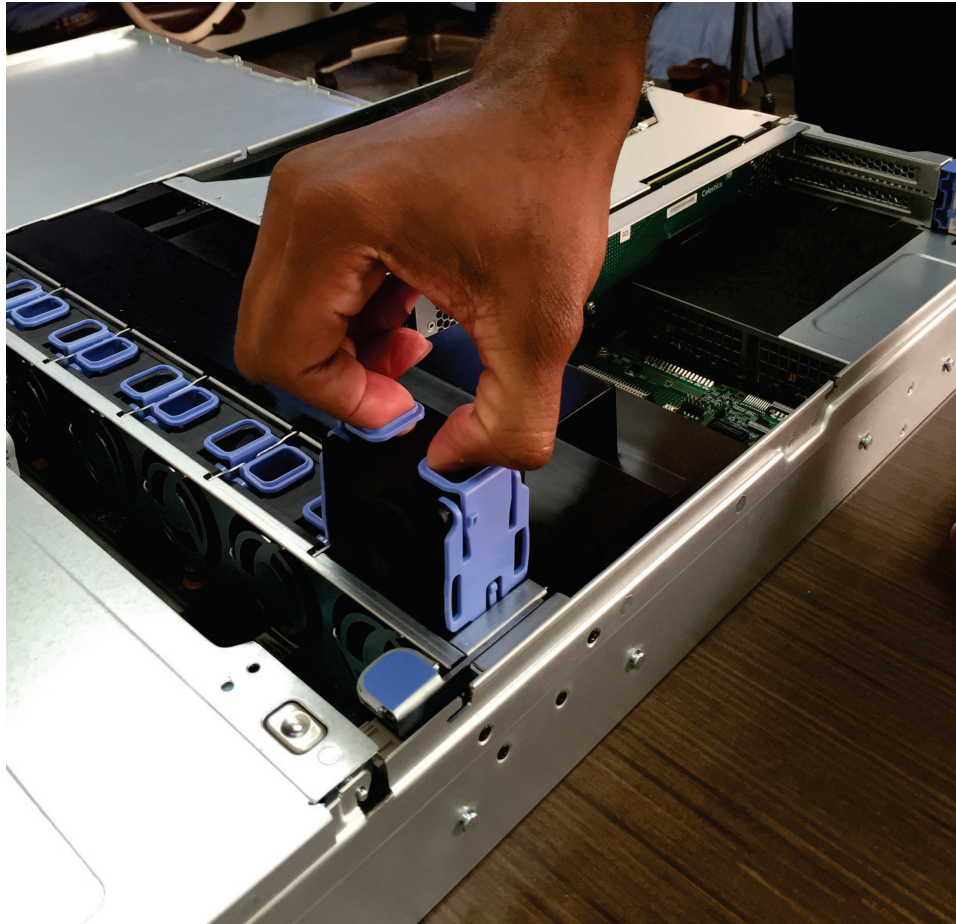


Figure 273. Locating the 2145-SV1 fans

7. Grasp the fan by the finger grips on the sides, as shown in Figure 274 on page 330.



sv100054

Figure 274. 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.

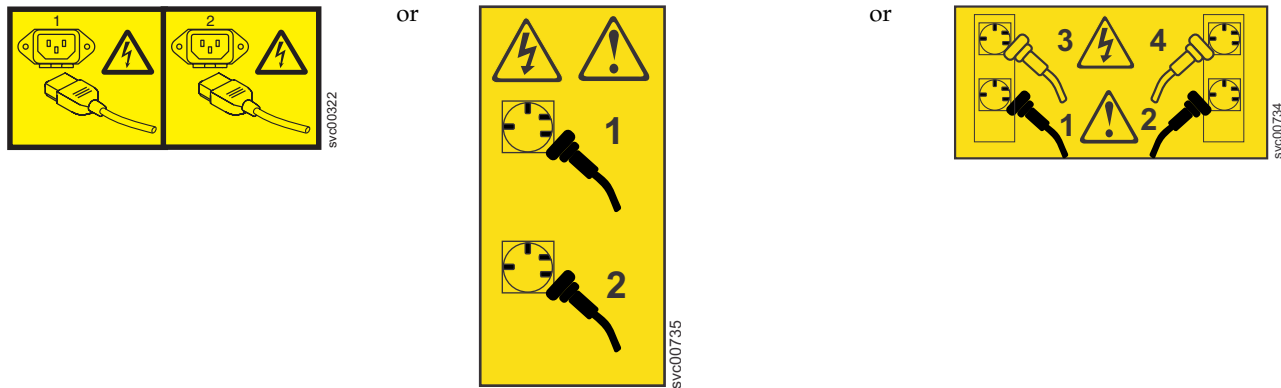
Removing the fans: 2145-DH8

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 can 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 *IBM SAN Volume Controller Troubleshooting Guide* 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 275 on page 332.

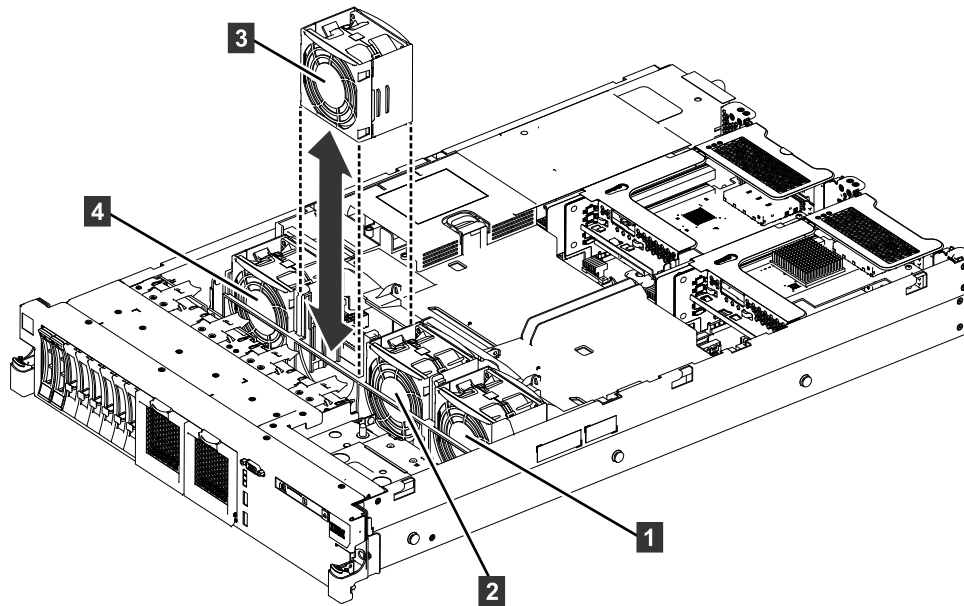


Figure 275. Removing a SAN Volume Controller 2145-DH8 fan

- 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.

Removing the fans: 2145-CG8 or 2145-CF8

You can remove a fan on a SAN Volume Controller 2145-CG8 or 2145-CF8 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 xxvii.

About this task

Important: You can hot swap a fan. However, using to power off the node through proven methods avoids risking an abrupt power failure on the node, which avoids the possible corruption of data.

Perform the following steps to remove a failed fan:

Procedure

1. Read the safety information to which "Preparing to remove and replace parts" on page 20 refers.
2. Optional: Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 that 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 (VDisks) 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. Slide the node forward to remove the cover and expose the fans, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.

Figure 276 shows fan locations within the SAN Volume Controller 2145-CG8 or 2145-CF8 node.

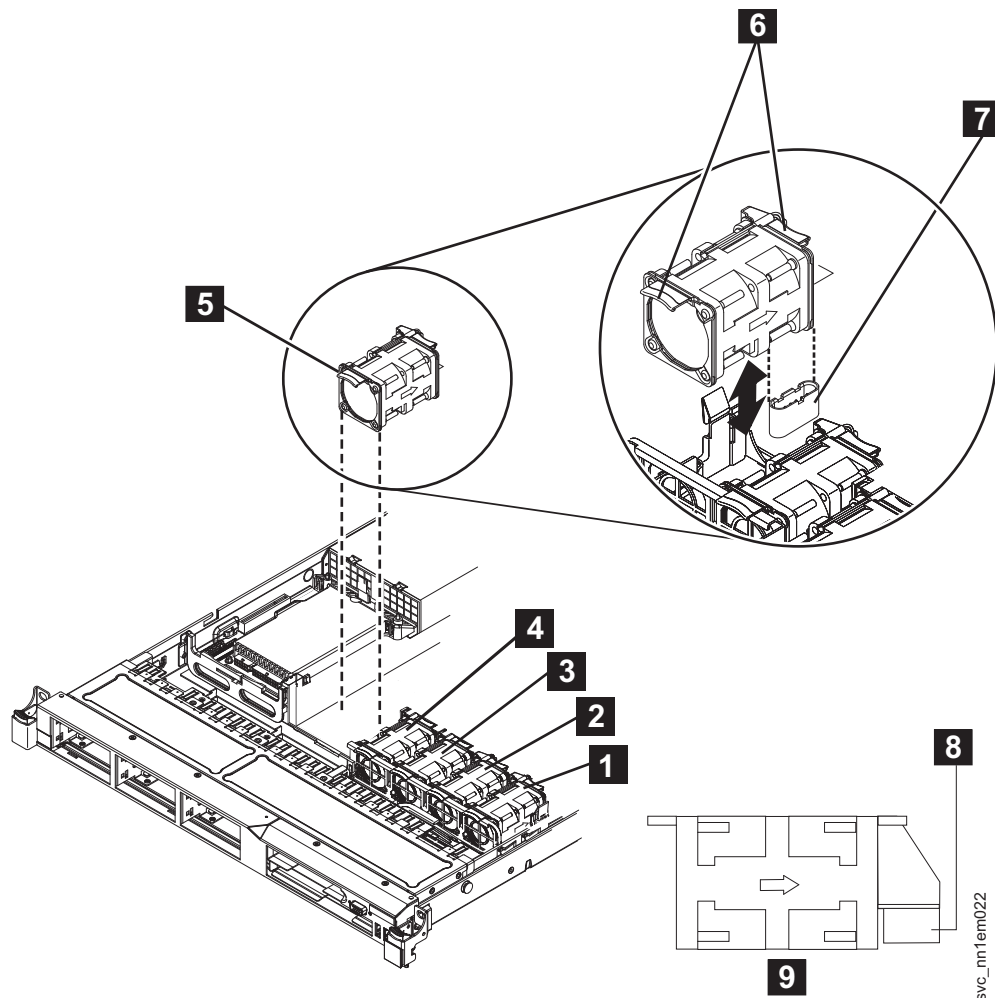


Figure 276. SAN Volume Controller 2145-CG8 or 2145-CF8 fan locations and connectors

- 1** Fan 1
- 2** Fan 2
- 3** Fan 3
- 4** Fan 4
- 5** Fan 5
- 6** Fan 6
- 7** Fan tabs
- 8** Fan connector on the system board
- 9** Fan connector

10 Side view of fan showing air-flow indicator

The node has six fan positions that are numbered right to left. The LED near the connector of the failing fan assembly is lit, unless you remove the power cable.

4. Grasp the orange fan tabs on both ends of the existing fan and pull it up out of the node. If you are removing fans 3 or 4, lift up the clear tab on the DIMM air baffle first.

Figure 277 shows a fan being removed from the node.

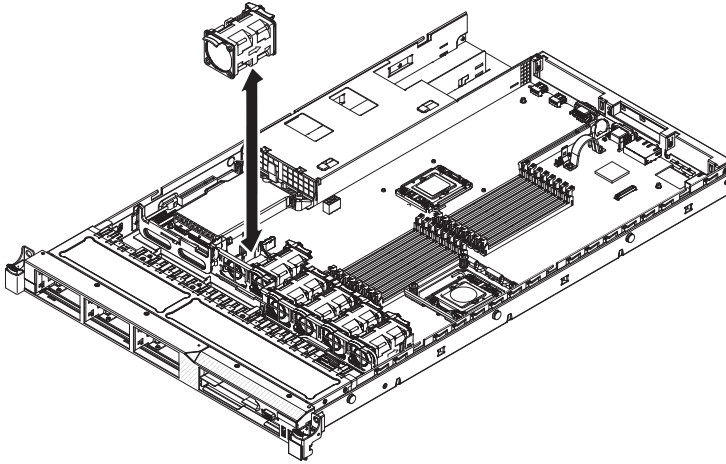


Figure 277. Removing or replacing a fan in the SAN Volume Controller 2145-CG8 or 2145-CF8 node

Attention: To ensure proper operation, replace a failed fan within 30 seconds.

5. 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 SAN Volume Controller node.

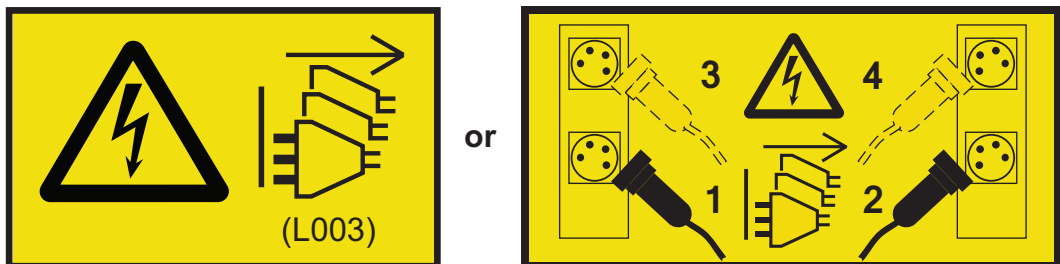
Replacing the fans: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide* 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 278 on page 336.

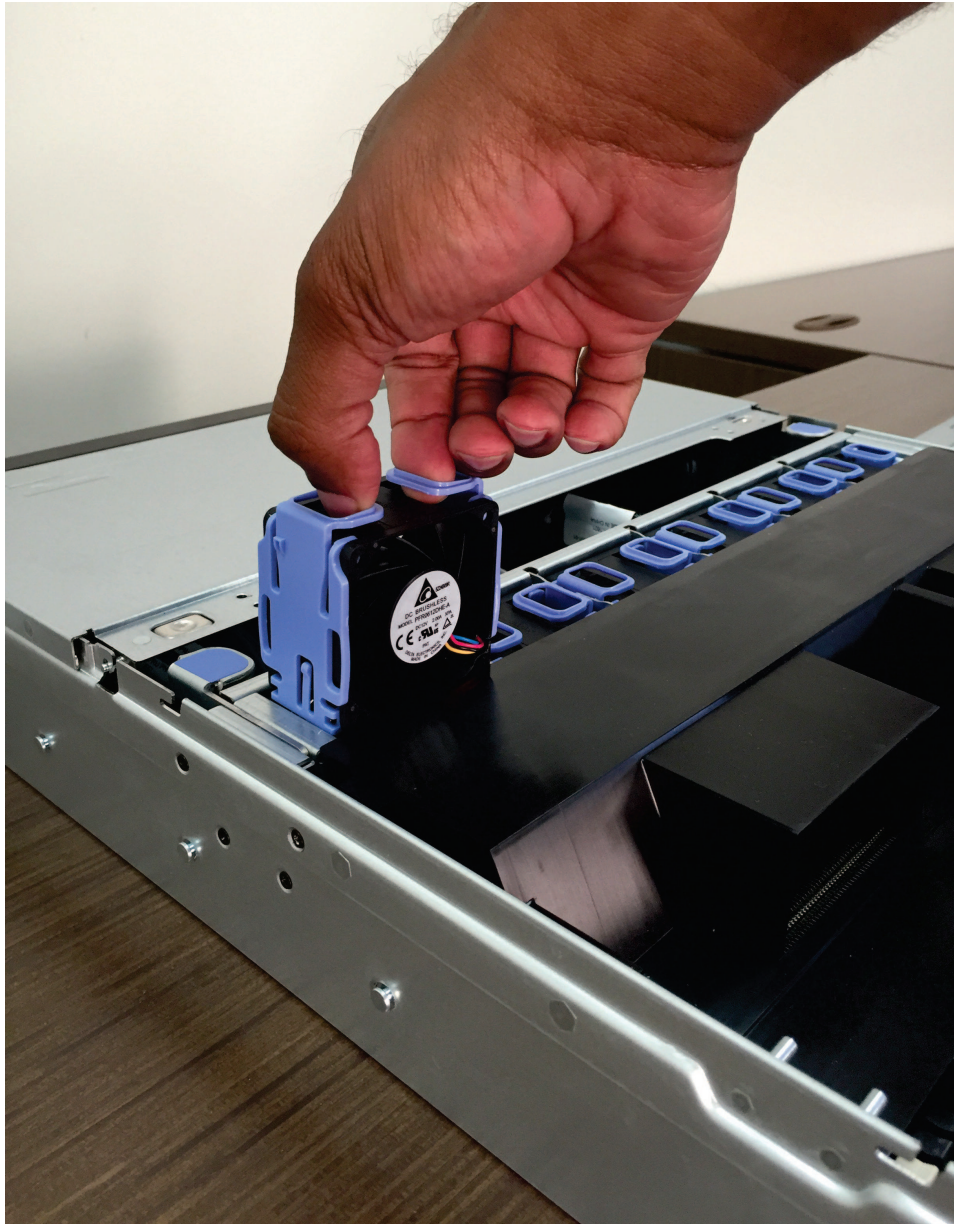


Figure 278. Replacing a 2145-SV1 fan

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 98.
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 70.
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.

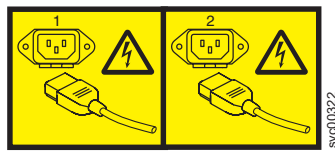
Replacing the fans: 2145-DH8

You can replace any of the four fans on a SAN Volume Controller 2145-DH8 node.

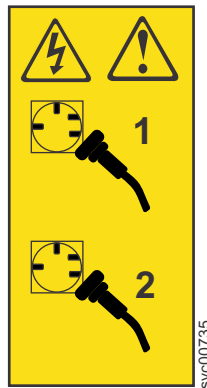
Before you begin

DANGER

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



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

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.

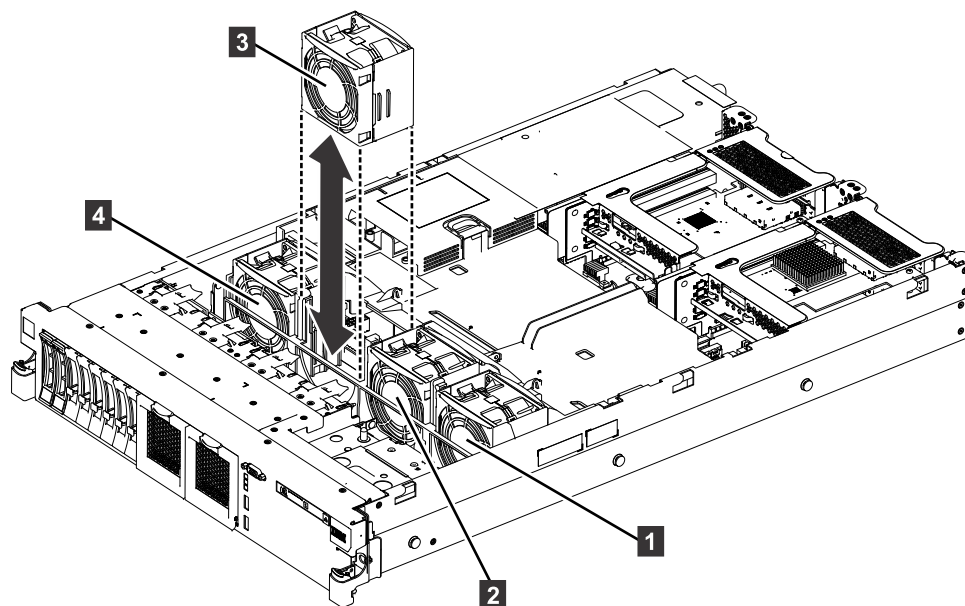
To replace the fans, complete the following steps.

Procedure

1. Read the safety information.
2. Optional: Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 279 on page 338.



svc00897

- 1** Fan 1
- 2** Fan 2
- 3** Fan 3
- 4** Fan 4

Figure 279. 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 280 on page 339) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

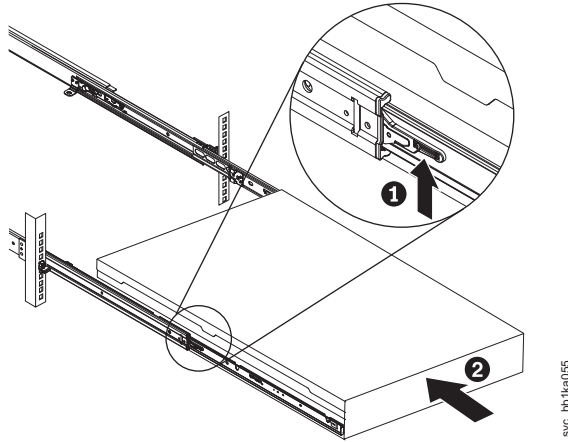


Figure 280. Raising the locking levers of the slide rails of the rack

12. Turn on the node.

Replacing the fans: 2145-CG8 or 2145-CF8

Replace any of the five fans in a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

Before you begin

Attention: To ensure proper operation, replace a failed fan within 30 seconds.

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 xxvii.

About this task

Important: You can hot swap a fan. However, using to power off the node through proven methods avoids risking an abrupt power failure on the node, which avoids the possible corruption of data.

Perform the following steps to replace a fan:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Optional: Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* 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 that 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 VDisks on the node. With the partner node available and no dependent VDisks on the node, you do not lose access to data if this node accidentally powers off.

3. Slide the node forward to remove the cover and expose the fans and fan connectors, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.

Figure 281 on page 340 shows fan locations within the SAN Volume Controller 2145-CG8 or 2145-CF8 node.

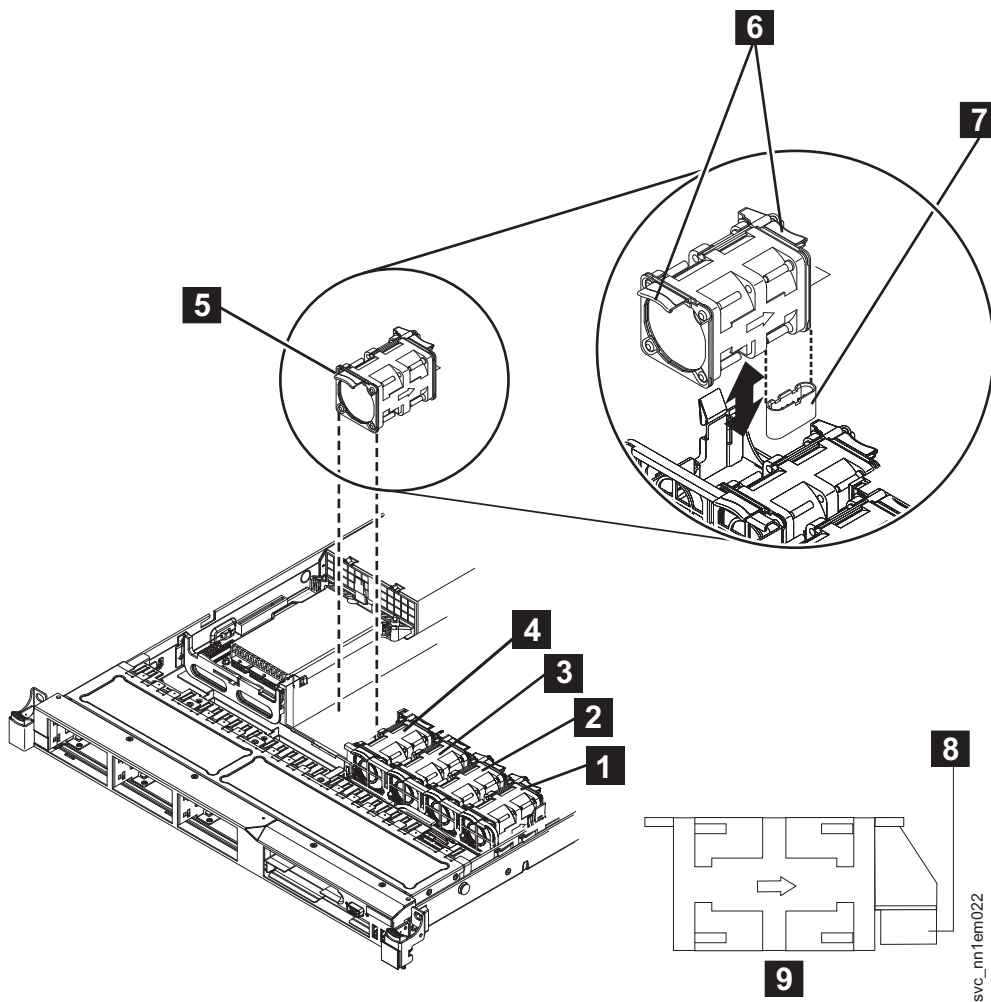


Figure 281. SAN Volume Controller 2145-CG8 or 2145-CF8 fan locations and connectors

- 1** Fan 1
- 2** Fan 2
- 3** Fan 3
- 4** Fan 4
- 5** Fan 5
- 6** Fan tabs
- 7** Fan connector on the system board
- 8** Fan connector
- 9** Side view of fan showing air-flow indicator

The node has five fan positions that are numbered from right to left.

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.

Figure 282 on page 341 shows a fan being replaced.

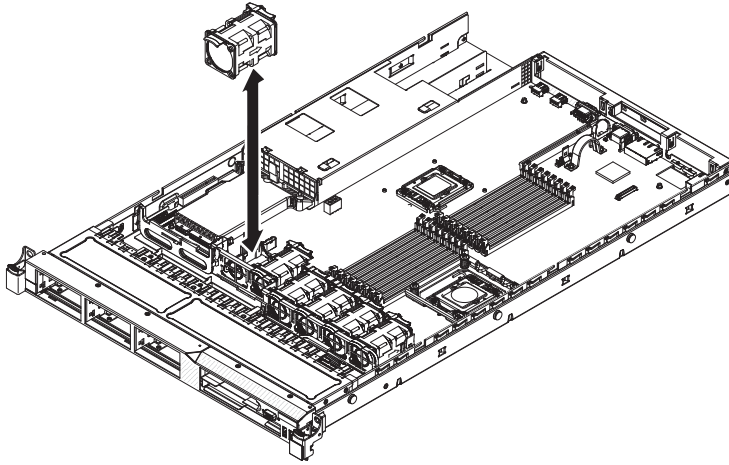


Figure 282. Removing or replacing a fan in the SAN Volume Controller 2145-CG8 or 2145-CF8 node

5. Insert the fan into the fan slot in the fan-assembly bracket and press it down until it is seated correctly in the slot and the fan connector is seated correctly in the connector on the system board.
6. 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.
7. Replace the top cover. See “Replacing the top cover” on page 98.
8. 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 67.
9. 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.
10. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
11. Lift the locking levers (**1** in Figure 283) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

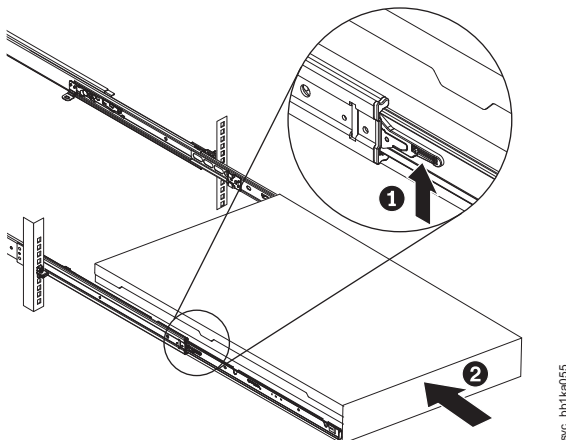


Figure 283. Raising the locking levers of the slide rails of the rack

12. Turn on the node.

Removing the fan bracket

You might need to remove the fan bracket on a SAN Volume Controller 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 xxvii.

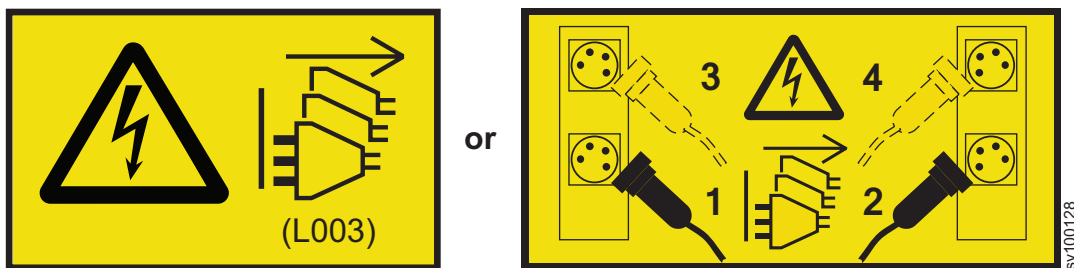
Removing the fan bracket: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 284 on page 343.

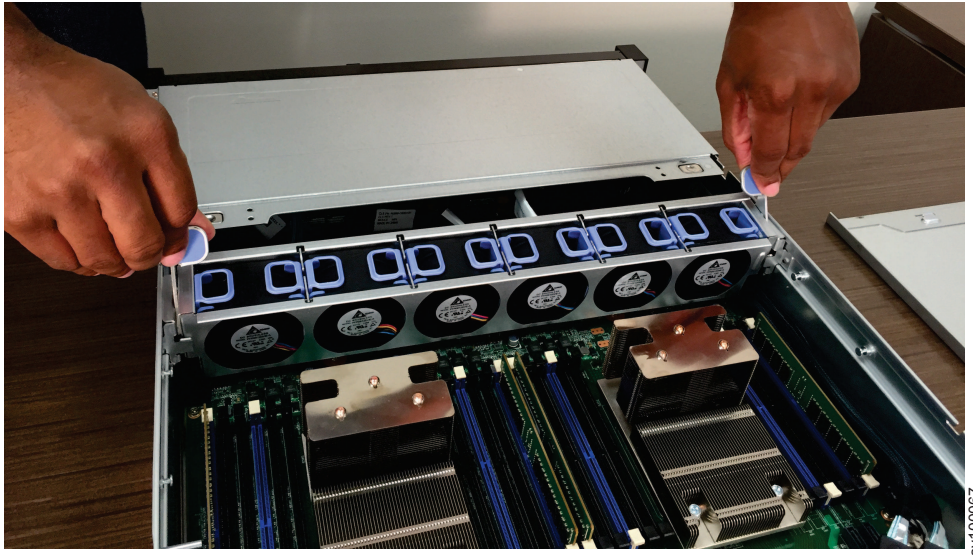


Figure 284. Removing the fan bracket

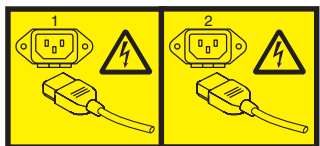
Removing the fan bracket: 2145-DH8

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

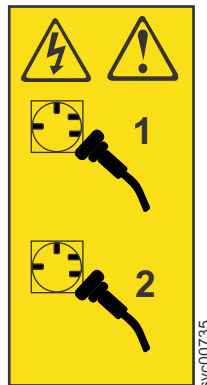
Before you begin

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 *IBM SAN Volume Controller Troubleshooting Guide*.

- 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 285.

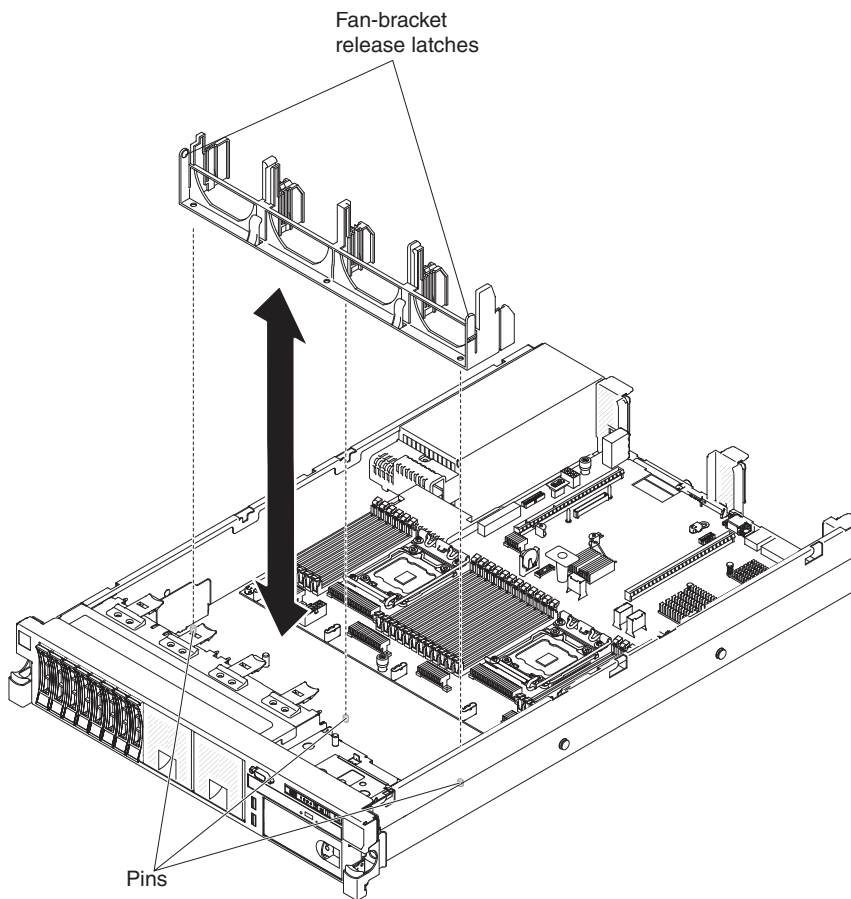


Figure 285. Removing the fan bracket

Replacing the fan bracket

You might need to replace the fan bracket on a SAN Volume Controller 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 xxvii.

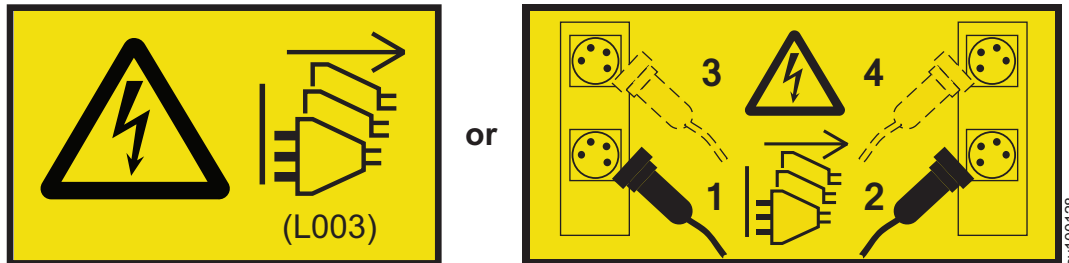
Replacing the fan bracket: 2145-SV1

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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 286 on page 346.



Figure 286. 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 287 on page 347.

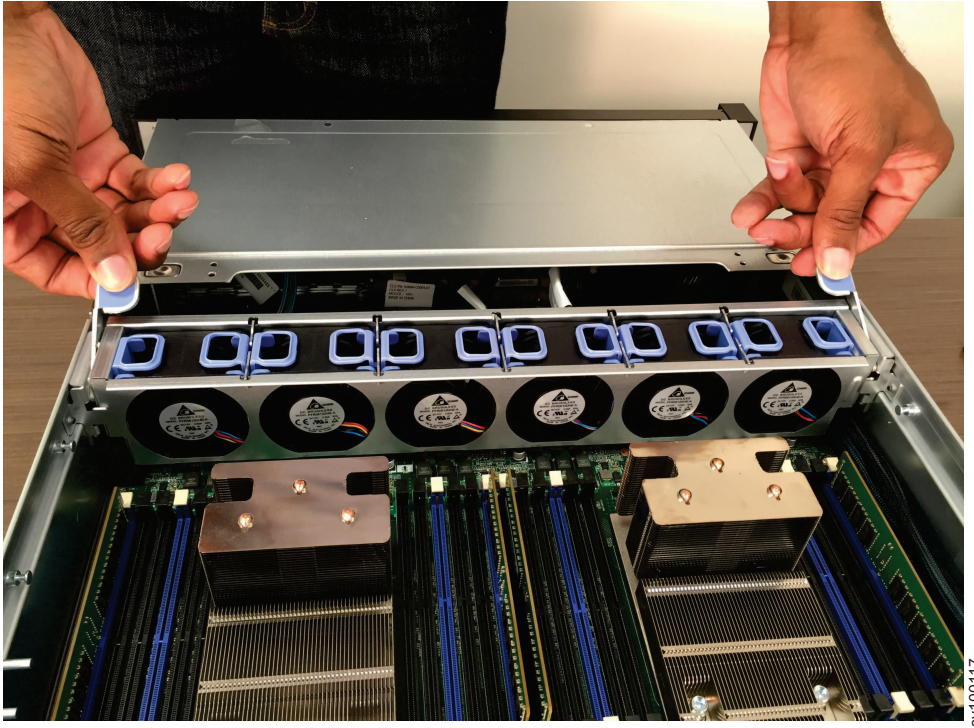


Figure 287. Pressing the fan bracket into position

4. Replace the PCI express rise-card assemblies, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 288.
5. Replace the air baffle, as described in “Replacing the air baffle: 2145-SV1” on page 104.
6. Replace the top cover, as described in “Replacing the top covers: 2145-SV1” on page 98.
7. If you removed the node from the rack, replace it, as described in “Replacing a node in a rack: 2145-SV1” on page 70.
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.

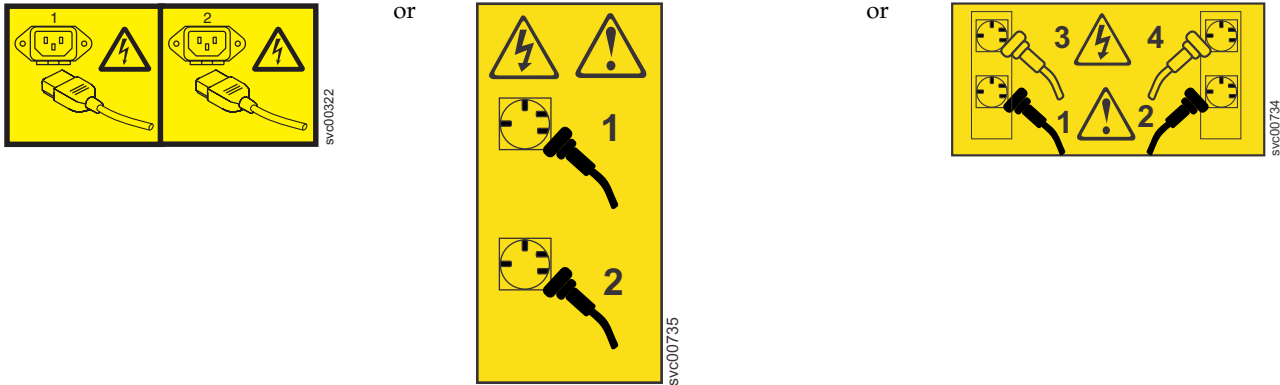
Replacing the fan bracket: 2145-DH8

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)



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 *IBM SAN Volume Controller Troubleshooting Guide*.
- 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 288 on page 349.

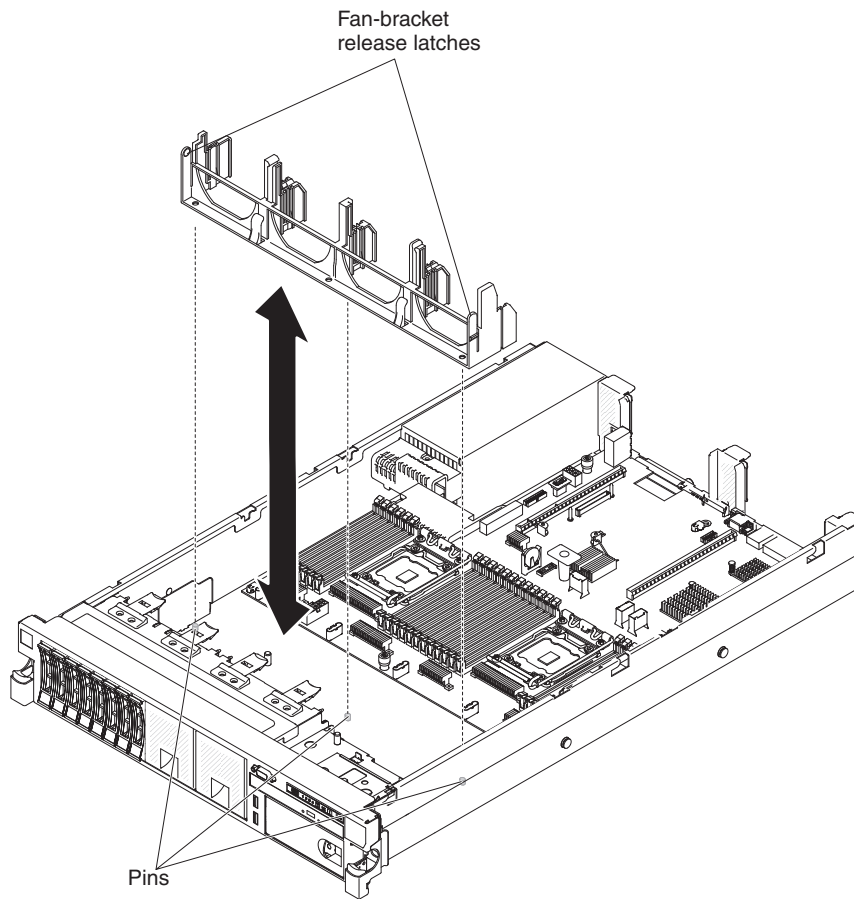


Figure 288. Replacing the fan bracket

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 289 on page 350) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

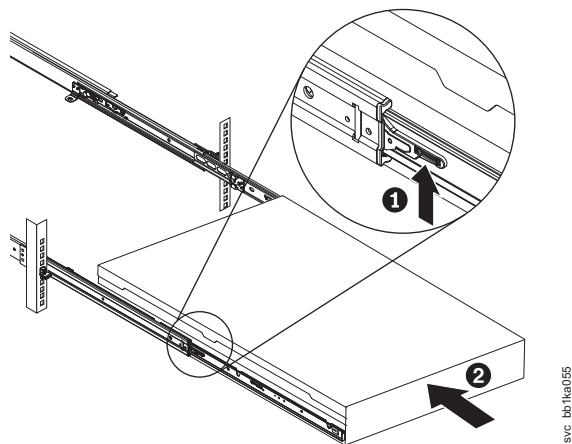


Figure 289. Raising the locking levers of the slide rails of the rack

13. Turn on the node.

Removing the microprocessor

You can remove the microprocessor that is used in the SAN Volume Controller nodes.

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 xxvii.

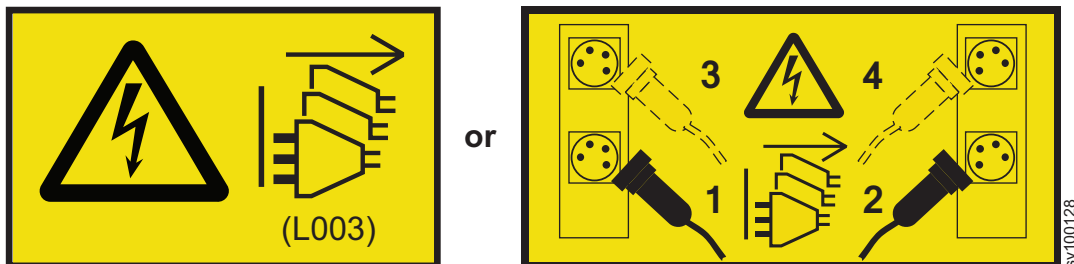
Removing the microprocessor: 2145-SV1

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 290 on page 352.

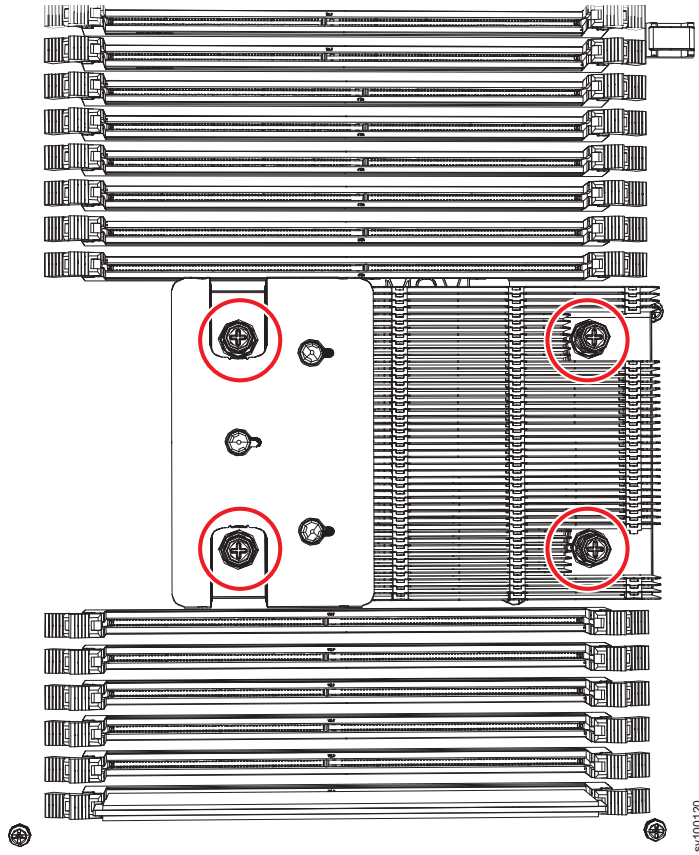


Figure 290. Removing the heat sink

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 291.

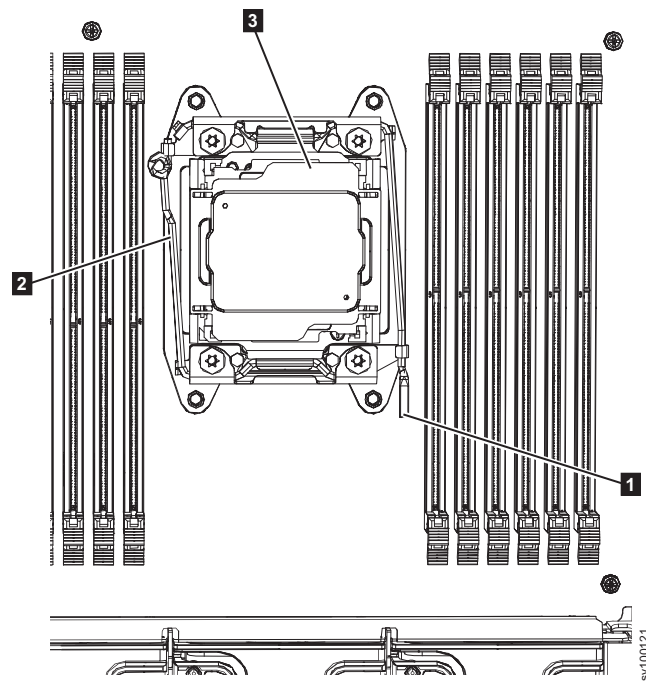


Figure 291. Opening the release levers

- 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.

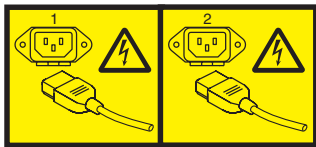
Removing the microprocessor: 2145-DH8

You need to remove the microprocessor before you replace it.

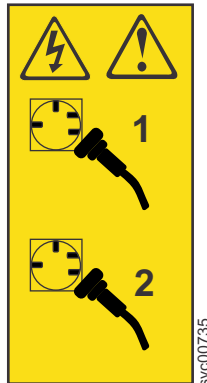
Before you begin

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 292.

1. Open the heat sink retention module release lever to the fully open position.

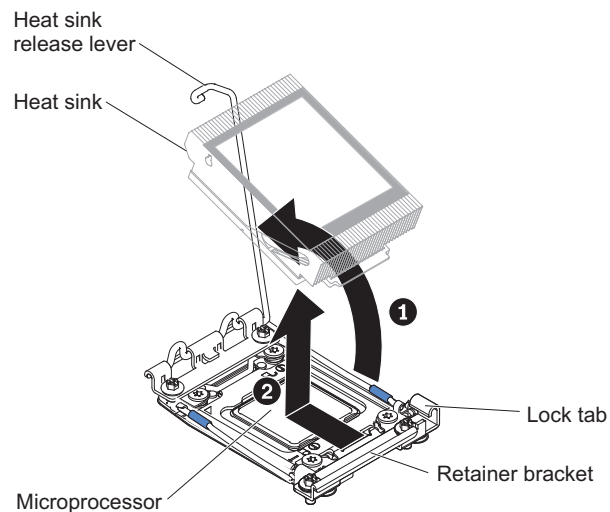


Figure 292. Removing the heat sink

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 293.

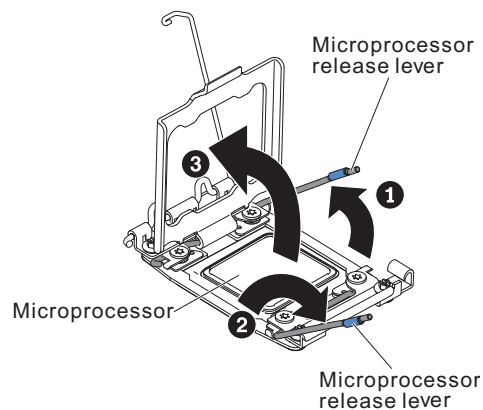


Figure 293. Opening the release levers

- 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 294 on page 356.

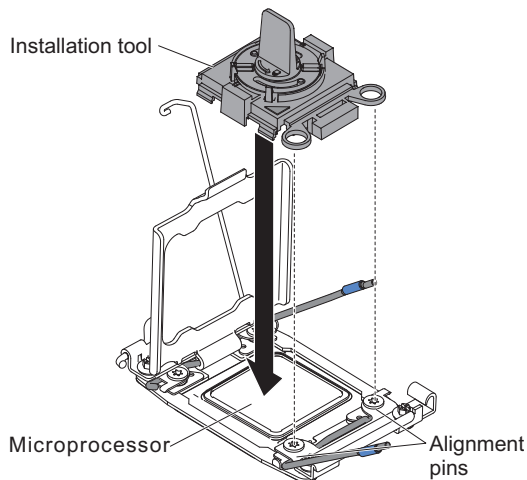


Figure 294. Removing the microprocessor with the installation tool

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.

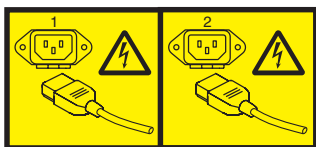
Removing the microprocessor: 2145-CG8 or 2145-CF8

Use this information to remove the SAN Volume Controller 2145-CG8 or 2145-CF8 microprocessor and heat sink.

Before you begin

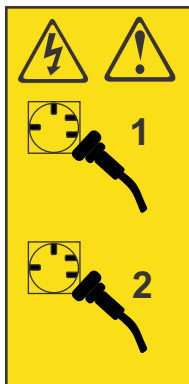
DANGER

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.

To correctly perform this task, you must have alcohol wipes and thermal grease available. If you do not already have them, order these separately.

About this task

This service action requires you to remove the cover and:

- Turn the node off.
- Disconnect the power cables.
- Disconnect the data cables.

Attention:

- Do not permit the thermal grease on the microprocessor and heat sink to come in contact with anything. Contact with any surface can compromise the thermal grease and the microprocessor socket.
- Use great care when handling microprocessors. Dropping the microprocessor during installation or removal can damage the contacts.
- 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.

To remove a microprocessor and heat sink, complete the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. 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.
4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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.
6. Optional: Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.
7. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
8. Disconnect any cables that impede access to the heat sink (**3** in Figure 295 on page 358) and the microprocessor (**1**).

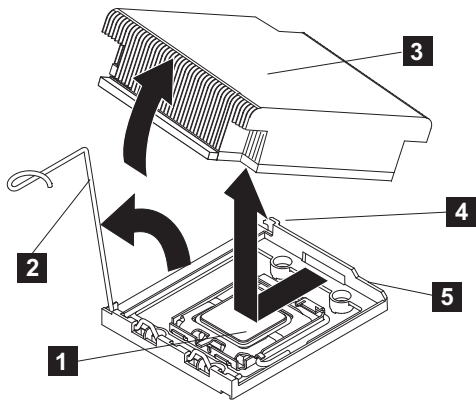


Figure 295. Removing the heat sink from the SAN Volume Controller 2145-CG8 or 2145-CF8 microprocessor

- 1** Microprocessor
- 2** Heat-sink release lever
- 3** Heat sink
- 4** Lock tab
- 5** Retainer bracket

9. Push the heat-sink release lever (**2**) down and away from the processor, then lift the lever until it is perpendicular to the system board.
10. Lift the heat sink from the side nearest the lever, in its upright position and remove. After removal, place the heat sink on its side on a clean, flat surface.
11. Release the microprocessor-release lever (**2** in Figure 296), by pressing down on the curved end of the lever, moving that end away from the middle of the processor, and releasing the lever up to the open position.

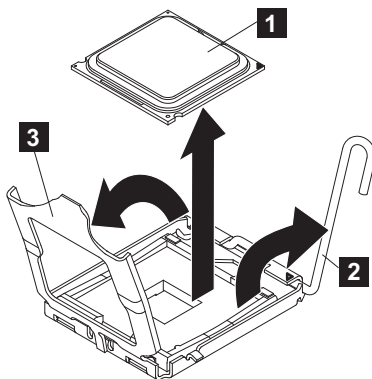


Figure 296. Opening the SAN Volume Controller 2145-CG8 or 2145-CF8 microprocessor-bracket frame

- 1** Microprocessor
- 2** Microprocessor-release lever
- 3** Microprocessor-bracket frame

12. Open the microprocessor-bracket frame by lifting the tab that is on the top edge. Keep the bracket frame in the open position, as shown in Figure 296.
13. Locate the microprocessor installation tool that comes with the new microprocessor.
14. Align the microprocessor installation tool with the screws on the microprocessor bracket and attach the tool to the microprocessor.

Align the holes on the installation tool with the screws on the microprocessor bracket, then place the microprocessor installation tool down over the microprocessor.

Twist the handle clockwise to attach the tool to the microprocessor.

You can pick up or release the microprocessor by twisting the microprocessor installation tool handle.

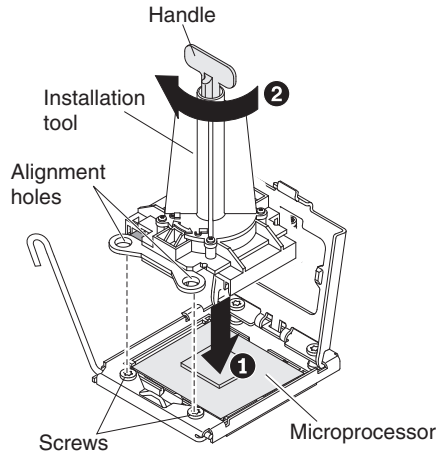


Figure 297. Aligning the microprocessor installation tool

15. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface. Be careful to touch only the edges of the microprocessor. Remove the microprocessor from the installation tool by twisting the handle counterclockwise.

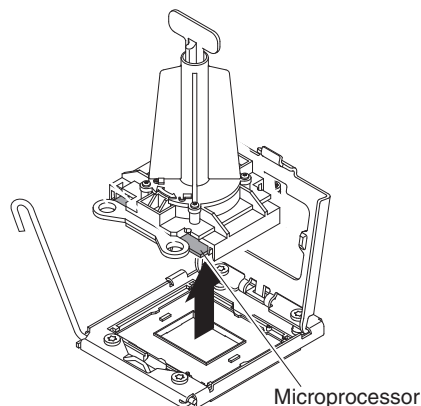


Figure 298. Lifting the microprocessor out of the microprocessor bracket frame

16. 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 xxvii.
- 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.

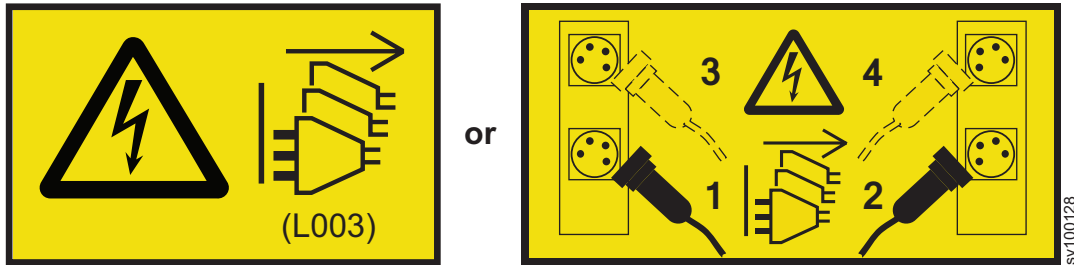
Replacing the microprocessor: 2145-SV1

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 299 on page 361) as you did to remove the microprocessor. Then, lift the microprocessor-release lever 2 (**2**).

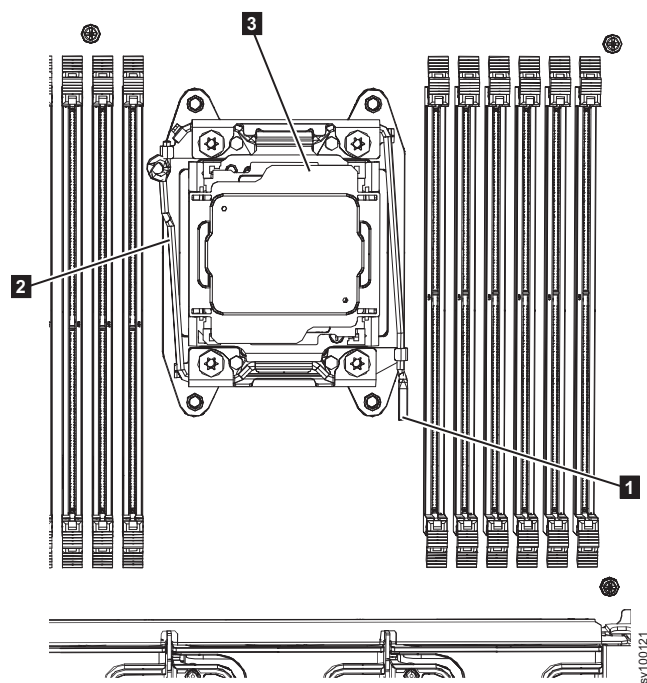


Figure 299. Opening the 2145-SV1 microprocessor bracket frame

- 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 300 on page 363.



Figure 300. Applying thermal grease to the 2145-SV1 microprocessor

8. Align the heat sink on top of the microprocessor, as shown in Figure 301 on page 364. If you are installing a new heat sink, remove the grease cover.

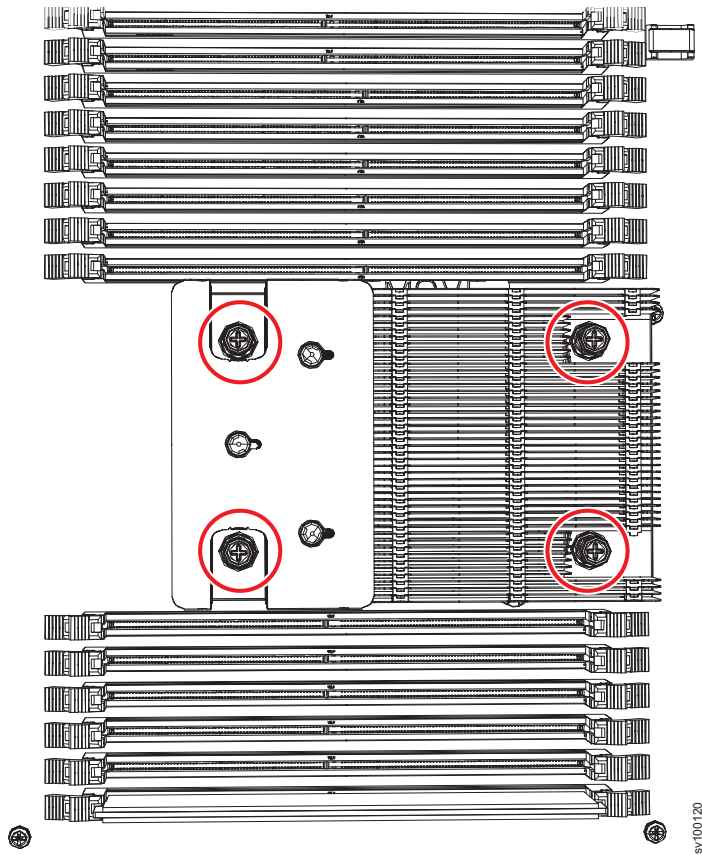


Figure 301. Installing the heat sink on the 2145-SV1 microprocessor

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 104.

11. Replace the PCI express riser assemblies, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 288.
12. Replace the top covers. See “Replacing the top covers: 2145-SV1” on page 98.
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 67.
14. Turn on the node by reconnecting the power cords.

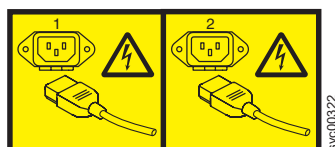
Replacing the microprocessor: 2145-DH8

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

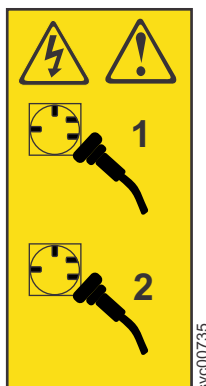
Before you begin

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 302 as you did to remove the microprocessor, and lift the microprocessor-release lever until it stops in the fully open position.

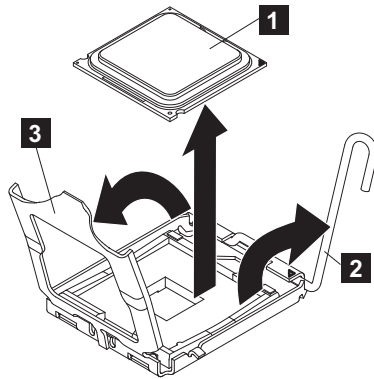


Figure 302. Opening the SAN Volume Controller 2145-DH8 microprocessor bracket frame

- 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 303 on page 367.

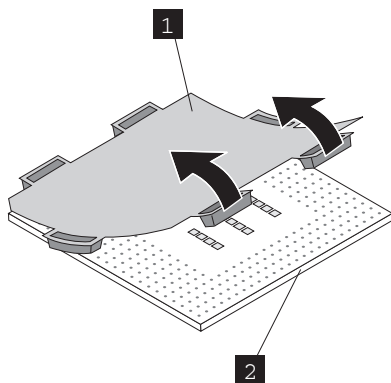


Figure 303. Removing the plastic protective cover from a microprocessor

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 304) 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 305 on page 368) 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.

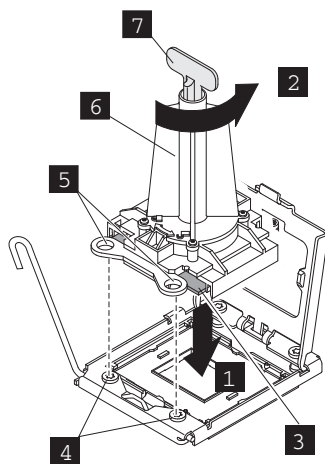


Figure 304. Inserting the microprocessor into the socket

- 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.

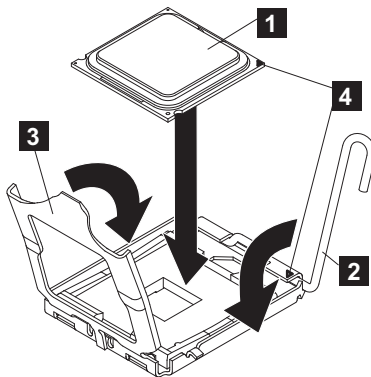


Figure 305. Closing the SAN Volume Controller 2145-DH8 microprocessor-bracket frame

- 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 306. The outermost dots must be within approximately 5 mm of the edge of the microprocessor to ensure uniform distribution of the grease.

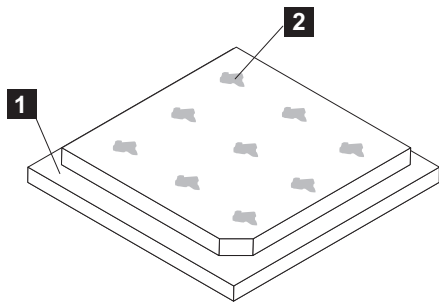


Figure 306. Applying thermal grease to the SAN Volume Controller 2145-DH8 microprocessor

- 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 307.

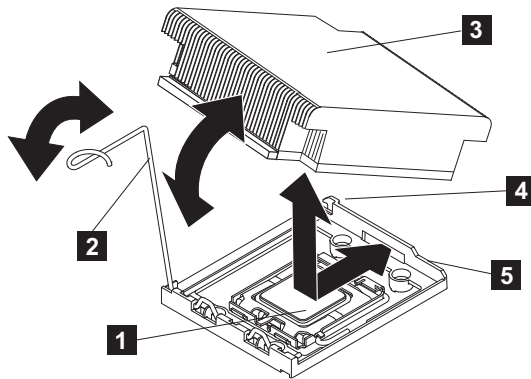


Figure 307. Installing the heat sink on the SAN Volume Controller 2145-DH8 microprocessor

- 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 top cover” on page 98.
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 67.
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. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
14. Lift the locking levers (**1** in Figure 308) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

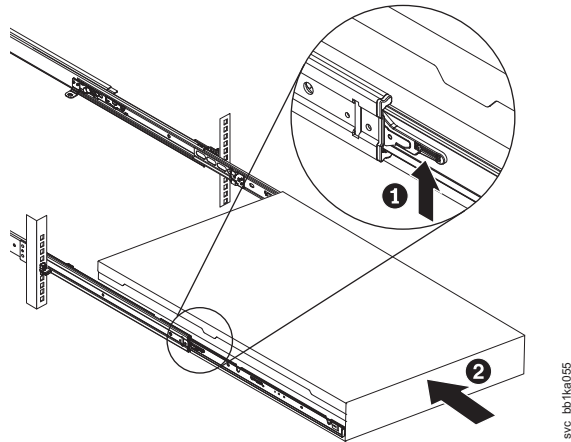


Figure 308. Raising the locking levers of the SAN Volume Controller 2145-DH8 slide rails of the rack

15. Turn on the node.

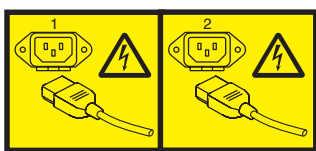
Replacing the microprocessor: 2145-CG8 or 2145-CF8

You can replace the microprocessor on a SAN Volume Controller 2145-CG8 or 2145-CF8 node.

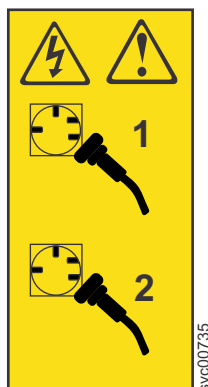
Before you begin

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.

To correctly perform this task, you must have alcohol wipes and thermal grease available. If you do not already have them, order these separately.

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.

Furthermore, always replace the microprocessor in microprocessor socket one.

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 309 as you did to remove the microprocessor, and lift the microprocessor-release lever until it stops in the fully open position.

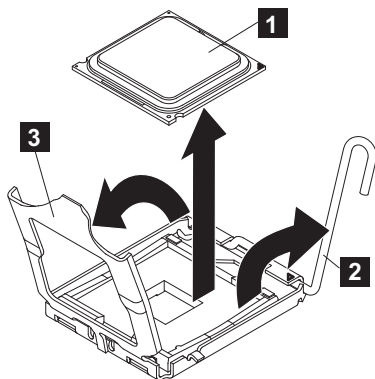


Figure 309. Opening the SAN Volume Controller 2145-CG8 or 2145-CF8 microprocessor-bracket frame

- 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.
 - 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.

- Handle the microprocessor carefully. Dropping the microprocessor during installation or removal can damage the contacts.
- Do not use excessive force when you press the microprocessor into the socket.
- Verify that the microprocessor is oriented, aligned, and positioned in the socket before you try to close the lever.
- If there is a plastic protective cover on the bottom of the microprocessor, carefully remove it.

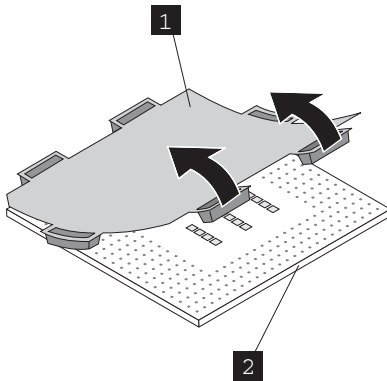


Figure 310. Removing the plastic protective cover from a microprocessor

- 1** Protective cover
- 2** Microprocessor

- Locate the microprocessor installation tool that comes with the new microprocessor.
- Twist the handle of the installation tool counterclockwise so that it is in the open position.
- Align the triangular alignment mark (**4** in Figure 312 on page 373) 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 312 on page 373) on the microprocessor. Also, use the position of the notches to align the microprocessor.

- 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.

- 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 you to replace the system board.

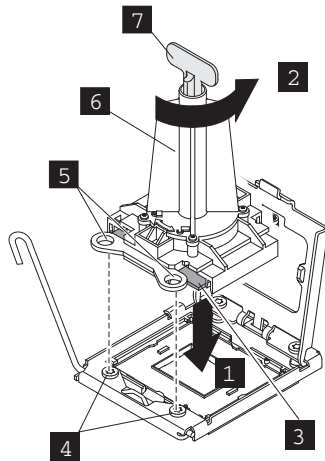


Figure 311. Inserting the microprocessor into the socket

- 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

- Close the microprocessor bracket frame.
 - Carefully close the microprocessor release lever to the closed position to secure the microprocessor in the socket.
- 4.
5. 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.

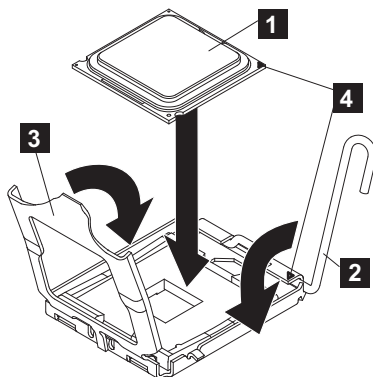


Figure 312. Closing the SAN Volume Controller 2145-CG8 or 2145-CF8 microprocessor-bracket frame

- 1** Microprocessor
- 2** Microprocessor-release lever
- 3** Microprocessor-bracket frame

6. Carefully close the microprocessor-release lever (**2**) to the closed position to secure the microprocessor in the socket.
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.
- 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 313. The outermost dots must be within approximately 5 mm of the edge of the microprocessor to ensure uniform distribution of the grease.

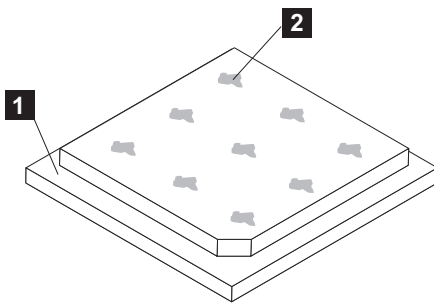


Figure 313. Applying thermal grease to the SAN Volume Controller 2145-CG8 or 2145-CF8 microprocessor

- 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.

8. Align the heat sink on top of the microprocessor, as shown in Figure 314 on page 375.

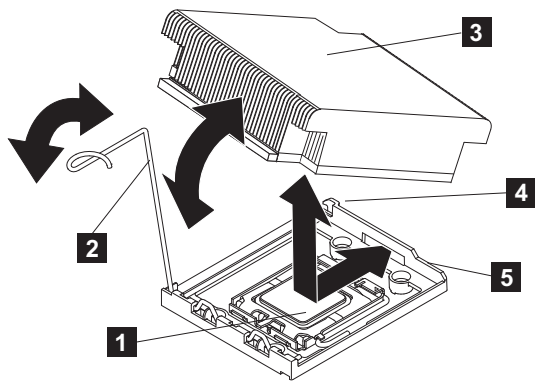


Figure 314. Installing the heat sink on the SAN Volume Controller 2145-CG8 or 2145-CF8 microprocessor

- 1** Microprocessor
- 2** Heat sink release lever
- 3** Heat sink
- 4** Lock tab
- 5** Retainer bracket

9. 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.
10. Rotate the heat sink release lever (**2**) to the closed position and hook the lever underneath the lock tab (**4**).
11. Replace the top cover. See “Replacing the top cover” on page 98.
12. 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 67.
13. 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.
14. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in “Replacing the cable-retention bracket” on page 53.
15. Lift the locking levers (**1** in Figure 315) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

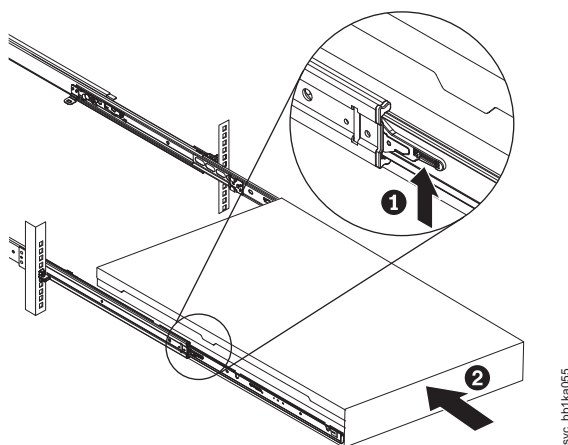


Figure 315. Raising the locking levers of the slide rails of the rack

16. Turn on the node.

Removing the system board

You must remove the system or main board from a SAN Volume Controller node, if you are instructed to replace it with a new field replaceable unit (FRU).

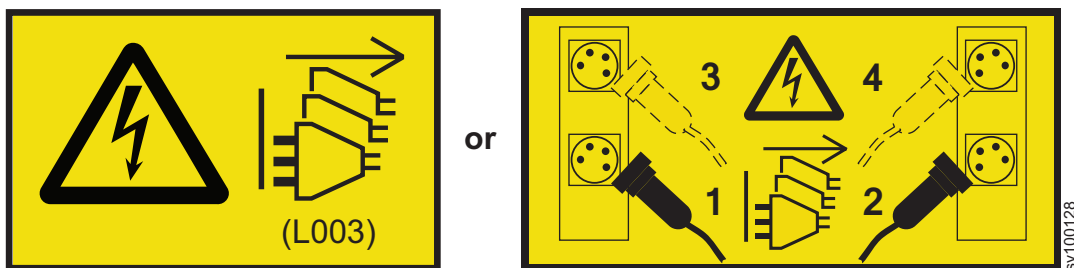
Removing the main board: 2145-SV1

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)



Procedure

Perform the following steps to remove the main board.

1. Read 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. 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 234.
5. Remove the top covers, as described in “Removing the top covers: 2145-SV1” on page 93.
6. Remove all PCI riser-card assemblies, as described in “Removing a PCI express riser-card assembly: 2145-SV1” on page 284.
7. Remove the air baffle, as described in “Removing the air baffle: 2145-SV1” on page 101.
8. Remove the Ethernet edge board, as described in “Removing and replacing the Ethernet edge board: 2145-SV1” on page 401.
9. Remove the memory modules, as described in “Removing the memory modules: 2145-SV1” on page 129. 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.

10. Remove all heat sinks and microprocessors, as described in “Removing the microprocessor: 2145-SV1” on page 350. Set them aside on a static-protective surface for reinstallation.

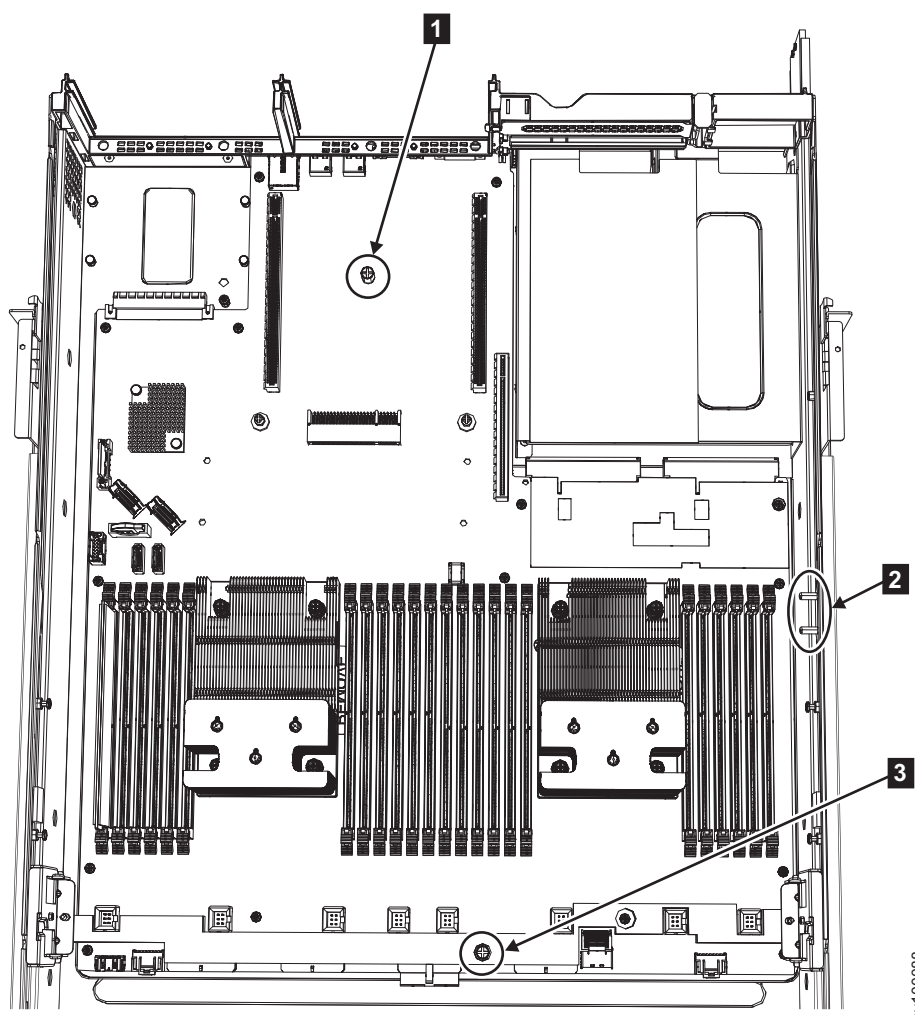
Note: Do not allow the thermal grease to come in contact with anything. Contact with any surface can compromise the thermal grease and the microprocessor socket.

11. Remove the CMOS battery, as described in “Removing the CMOS battery: 2145-SV1” on page 217.

12. Disconnect all cables from the main 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 main board.

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.

13. Remove the fan cage, as described in “Removing the fan bracket: 2145-SV1” on page 342.
14. Release the two screws (**1** and **3** in Figure 316) on the main board.



- 1** Attachment screw 1
- 2** Support pegs for top cover
- 3** Attachment screw 2

Figure 316. Locating the attachment screws on the 2145-SV1 main board

15. Carefully push the main board forward a little to release it. Then, raise the main board at a slight angle, as shown in Figure 317 on page 378.

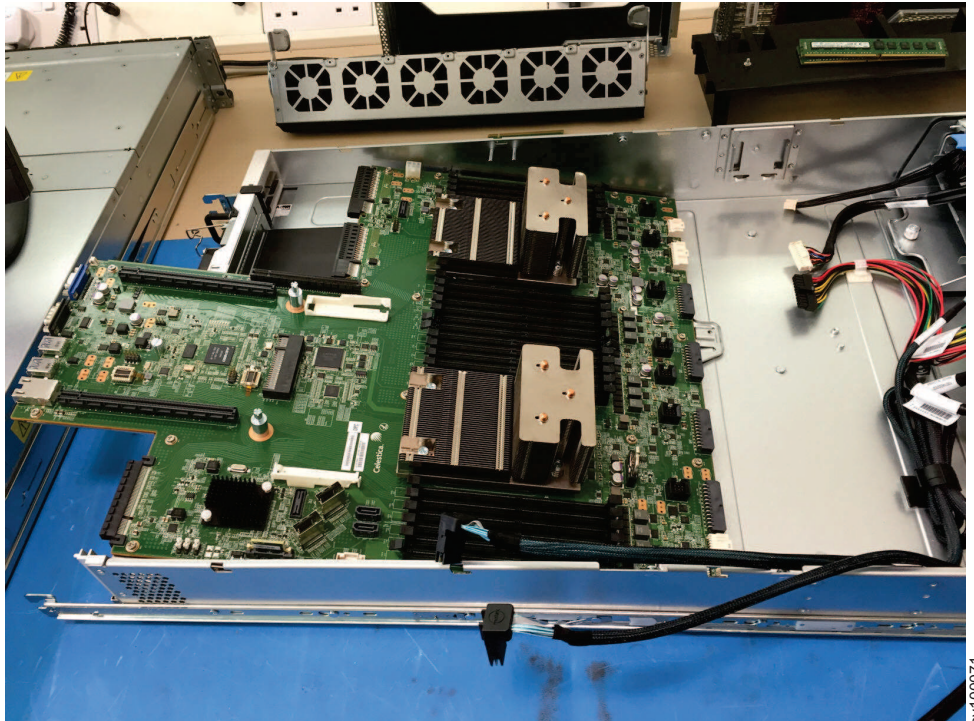


Figure 317. Removing the 2145-SV1 main board

16. 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 316 on page 377).
17. If you are instructed to return the main board, follow all packaging instructions. Use any packaging materials for shipping that are supplied to you.

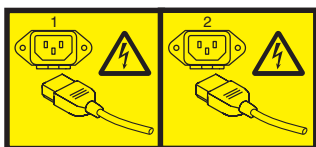
Removing the system board: 2145-DH8

You might need to remove the system board.

Before you begin

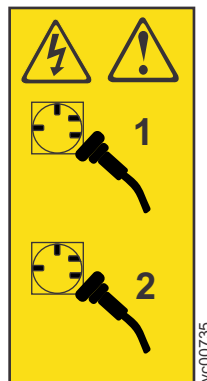
DANGER

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

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.

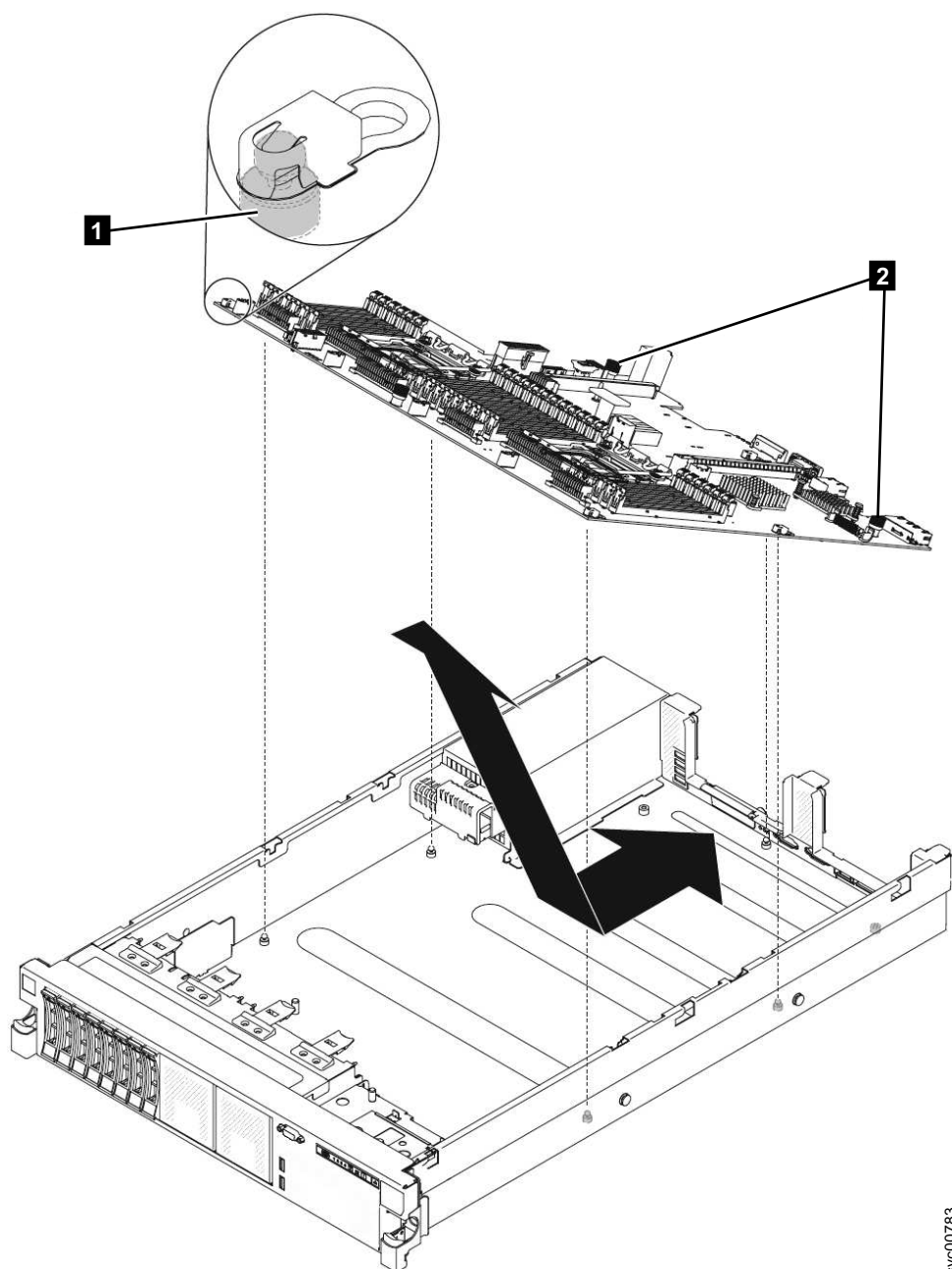
Note: Make a note of the location of each DIMM as you remove it so that you can reinstall it in the same connector.

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 318 on page 380.



svc00783

Figure 318. 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.

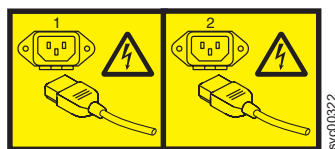
Removing the system board: 2145-CG8 or 2145-CF8

You must remove the system board if you are instructed to replace the SAN Volume Controller 2145-CG8 or 2145-CF8 node system board FRU.

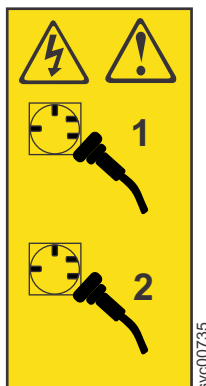
Before you begin

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



You must remove and replace the microprocessor when you replace the system board. Ensure that you have alcohol wipes and thermal grease available to correctly perform this task.

Before you proceed with the system board removal, ensure that you do the following:

- Have a static-protected surface available to hold the components that you remove from the old system board.
- Follow all standard safety and handling instructions. The components that you will be handling are electrostatic-discharge sensitive.

About this task

This service action requires you to remove the cover and:

- Turn the node off.
- Disconnect the power cables.
- Disconnect the data cables.

Notes:

- You must remove a number of components before you can remove and replace the system board. You will reuse all the components with the new system board. Therefore, take care when you remove and store these components.
- Each connector on the system board has its use printed next to it on the board.
- All left or right observations are when you are looking at the front of the unit.

To remove the system board, perform the following steps:

Procedure

1. Read the safety information to which “Preparing to remove and replace parts” on page 20 refers.
2. Follow the procedure in MAP 5350 in the *IBM SAN Volume Controller Troubleshooting Guide* to verify that hosts will not lose access to data in volumes before you power off the node.
3. Slide the node out on its slide rails to the fully extended position.

4. When the node is completely turned off, remove the cable-retention brackets and disconnect the power cables, as described in “Removing the cable-retention bracket” on page 51.
5. 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.
6. Optional: Remove the node from the rack and place it on a flat, static-protective surface. See “Removing a node from a rack” on page 54.

You can accomplish most service actions when the node is fully extended from the rack on its slide rails. 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.
7. Remove the top cover, as described in “Removing the top cover: 2145-CG8 or 2145-CF8” on page 96.
8. Remove the Fibre Channel adapter and riser-card assembly from slot 1. Set the adapter and riser card aside on the static-protected surface. See “Removing the Fibre Channel adapter assembly” on page 252.
9. Remove the high-speed SAS adapter and riser card assembly from slot 2, if it is present, as described in “Removing the high-speed SAS adapter assembly: 2145-CG8 or 2145-CF8” on page 265.
10. Remove the 10 Gbps Ethernet adapter assembly from connector slot 2, if it is present, as described in “Removing the 10 Gbps Ethernet riser-card assembly” on page 259.
11. Remove the disk-controller and USB riser-card assembly, as described in “Removing the disk-controller and USB riser-card assembly: 2145-CG8 or 2145-CF8” on page 276.
12. Remove the power supplies, as described in “Removing a power supply: 2145-CG8 or 2145-CF8” on page 238.
13. Remove the microprocessor in slot 1, as described in “Removing the microprocessor: 2145-CG8 or 2145-CF8” on page 356; then remove the white plastic air baffles by lifting them straight up.
14. Remove the memory modules and set them aside on a static-protective surface, as described in “Removing the memory modules (DIMM)” on page 128.

Note: Make a note of the location of each DIMM as you remove it, so that you can later reinstall it in the same connector.

15. Disconnect all cables from the system board. Make a list of each cable as you disconnect it; you can then use this as a checklist when you install the new system board.
16. Remove the hot-swap fans, as described in “Removing the fans: 2145-CG8 or 2145-CF8” on page 332.
17. Press the fan bracket release latches (one is to the left of fan 6 and one is to the right of fan 1) inward toward the fans and rotate the fan assembly brackets up toward the front of the node.
18. Grasp the system board handle (**1** in Figure 319 on page 383) and slide the system board away from the back of the node. Lift the side of the system board that is nearer to the power supply units slightly so that it disengages from the locator pin; then, slide the system board slightly toward the left of the node, as shown in Figure 319 on page 383.

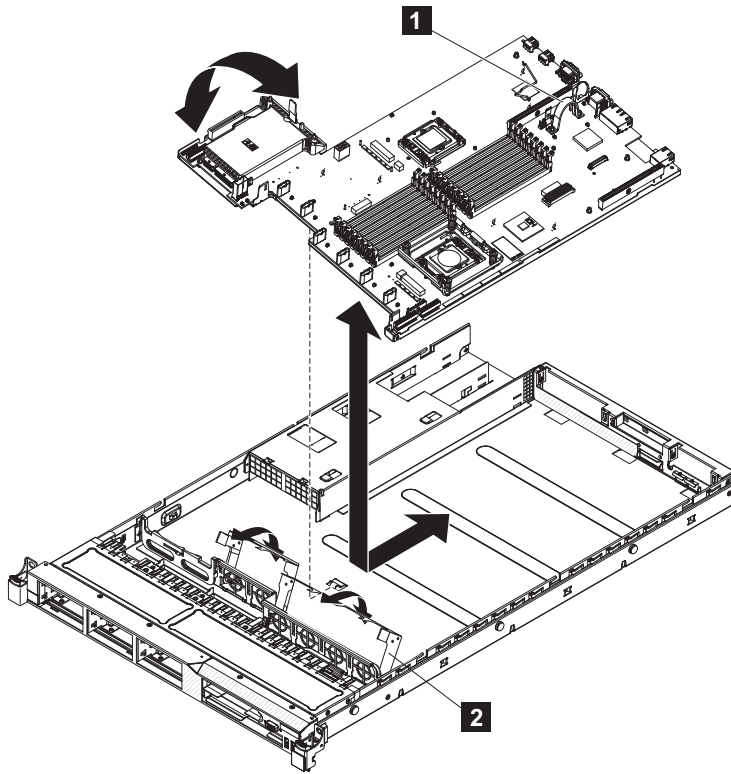


Figure 319. Removing and replacing the SAN Volume Controller 2145-CG8 or 2145-CF8 system board

- 1** System-board handle
- 2** Fan-assembly bracket

19. Lift up the system board and carefully remove it from the node, being careful not to damage any surrounding components.
20. 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.

Replacing the system board

You will reuse all the components from the system board that you are replacing with the new SAN Volume Controller system board field-replaceable unit (FRU).

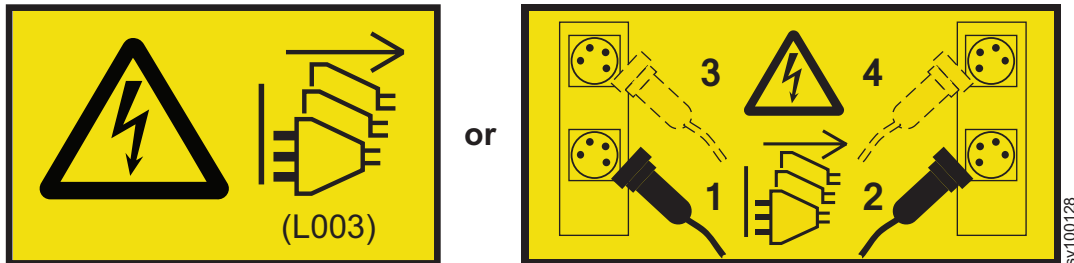
Replacing the main board: 2145-SV1

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 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 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.

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.

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 54.
- The top back cover is removed, as described in "Removing the top covers: 2145-SV1" on page 93.
- The PCI express riser-card assemblies are removed, as described in "Removing a PCI express riser-card assembly: 2145-SV1" on page 284.
- The air baffle is removed, as described in "Removing the air baffle: 2145-SV1" on page 101.

- The cables that connect to the battery backplane are removed, as described in “Removing the battery backplane and cables: 2145-SV1” on page 181.
- The main board is removed, as described in “Removing the main board: 2145-SV1” on page 376.
- 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 320.

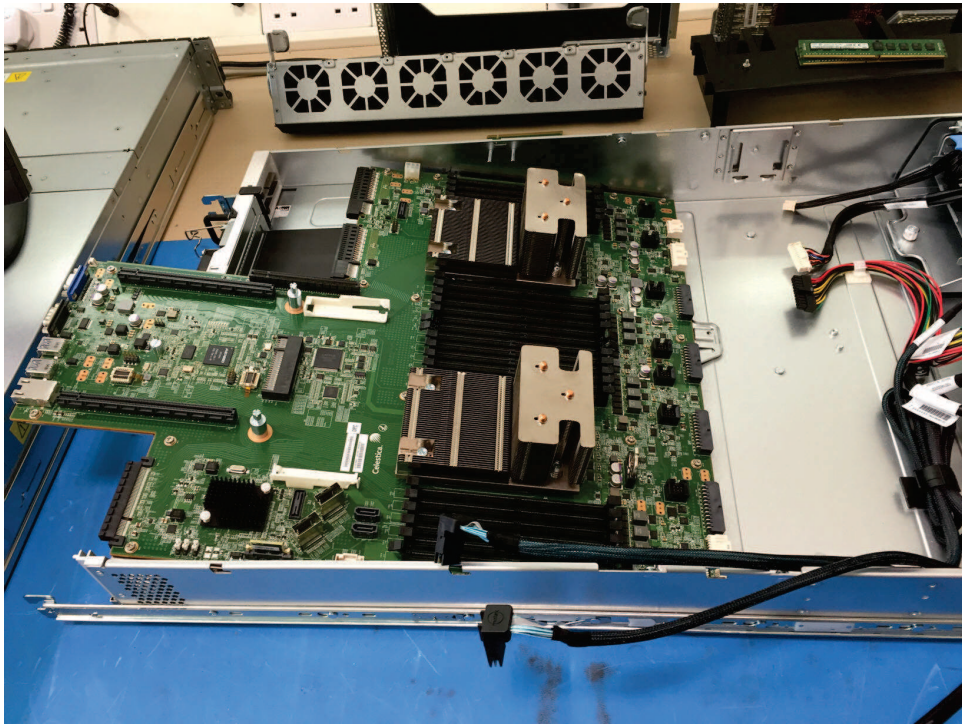
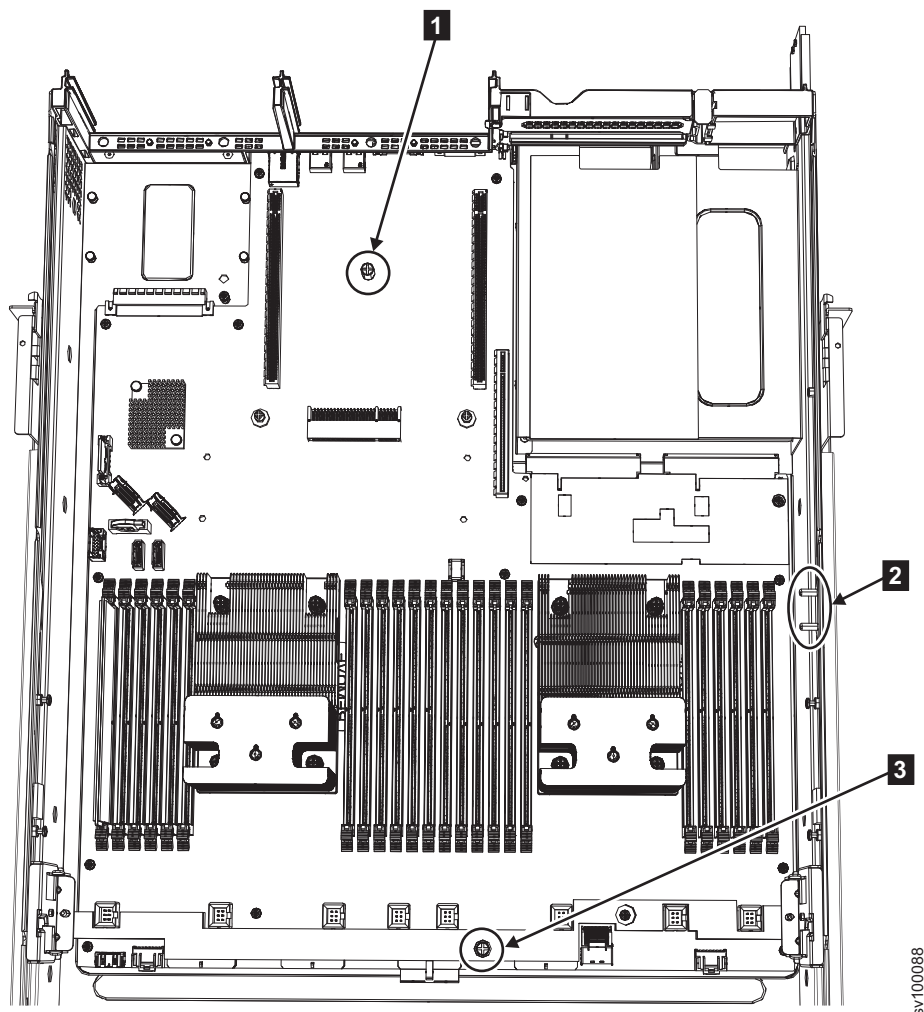


Figure 320. Replacing the 2145-SV1 main board

2. Carefully slide the main board forward until it can lay flat. Be careful to avoid the pegs (**2** shown in Figure 321 on page 386). 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 321 on page 386) to reattach the main board.



- 1** Attachment screw 1
- 2** Support pegs for back cover
- 3** Attachment screw 2

Figure 321. 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 360.
6. Reinstall the DIMMs, as described in “Replacing the memory modules: 2145-SV1” on page 136.
7. Reinstall the fan cage, as described in “Replacing the fan bracket: 2145-SV1” on page 344.
8. Reinstall the air baffle, as described in “Replacing the air baffle: 2145-SV1” on page 104.
9. Reinstall the power supply units, as described in “Replacing a power supply: 2145-SV1” on page 240.
10. Replace the PCI express riser-card assemblies, as described in “Replacing a PCI express riser-card assembly: 2145-SV1” on page 288.
11. 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.
12. Replace the top covers, as described in “Replacing the top covers: 2145-SV1” on page 98.

13. 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 70.
14. 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.
15. Replace the power cords. The node will power on when the cords are reconnected.
16. 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:
 - 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. For example, 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**.

Only use the service assistant GUI or the following CLI command to initialize the uninitialized boot drive 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 the 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 will have a machine serial number of 0000000, and the SAN Volume Controller 2145-DH8 node will have 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 these node errors is described below

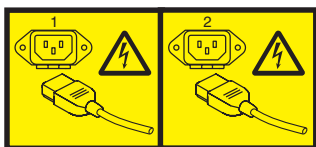
Ensure that the following items available:

- 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.

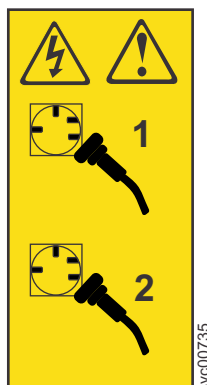
Note: When you reassemble the components in the node, be sure to route all cables carefully so that they are not exposed to excessive pressure.

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

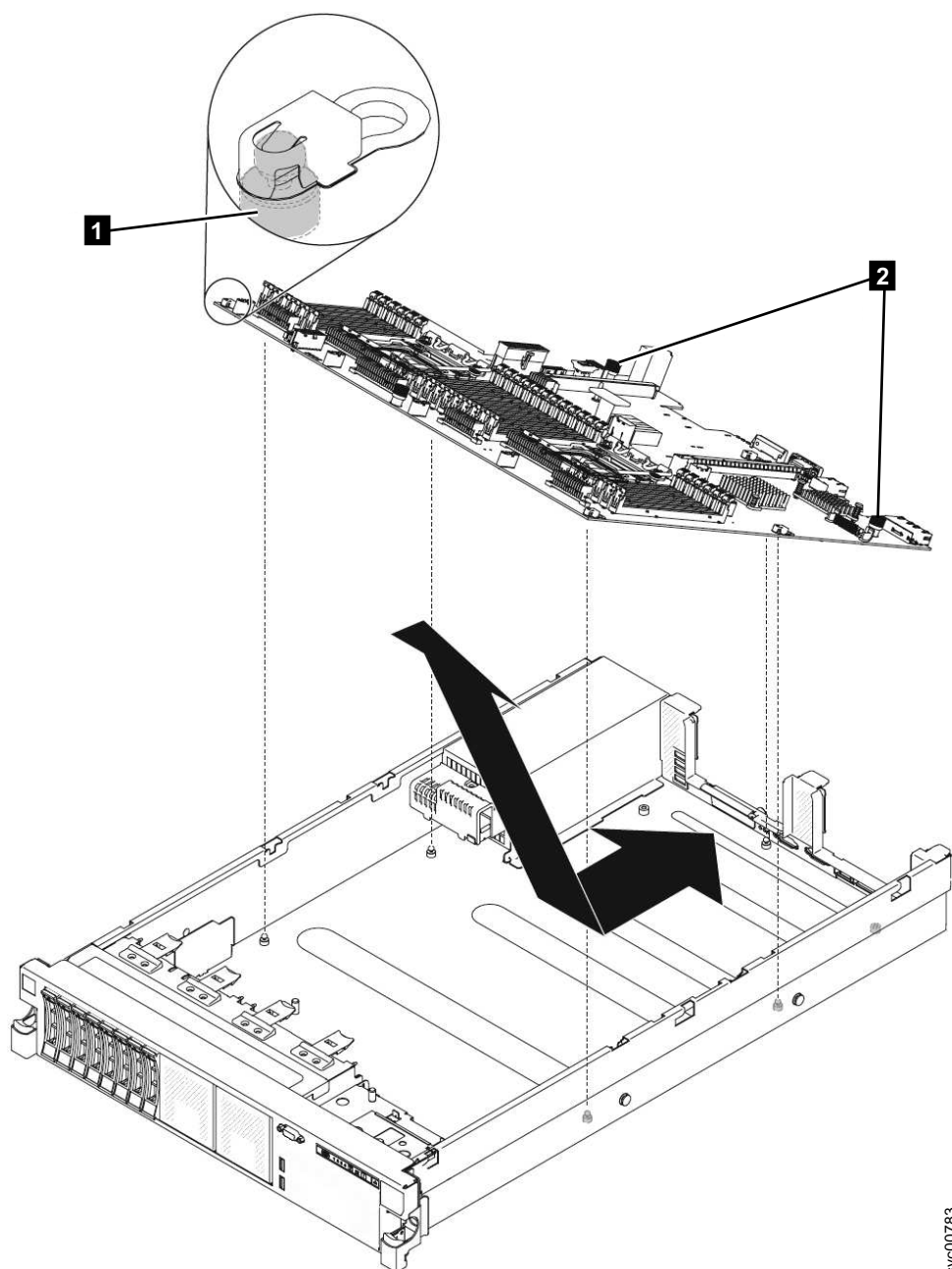
This service action assumes that:

- 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 322 on page 390.
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 322. 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 365.
6. Reinstall the DIMMs, as described in "Replacing the memory modules: 2145-DH8" on page 138.
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 top cover” on page 98.
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 67.
15. If you removed any Fibre Channel, SAS cable or Ethernet cables, use the labels 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 323) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

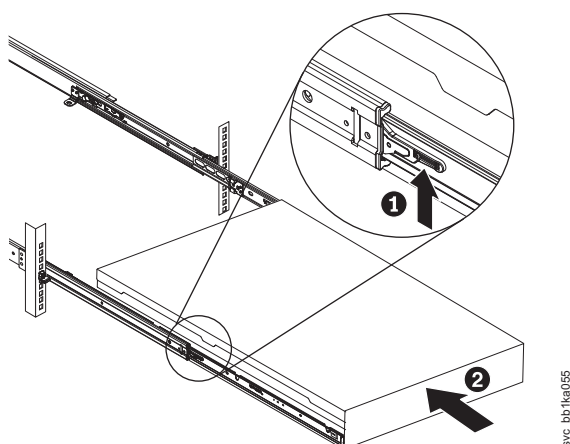


Figure 323. Raising the SAN Volume Controller 2145-DH8 locking levers of the slide rails of the rack

18. Turn on the node. Wait for the node status LEDs to remain stable for at least five minutes before taking any further action.

If you are a service representative completing this procedure, this might take up to two 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 will be on and node error 545 will be 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 will reboot.
- 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 will reboot.
- Node error 545 will be 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 has failed, ensure that the node is added back into its original I/O group.

Replacing the system board: 2145-CG8 or 2145-CF8

You can replace the system board on SAN Volume Controller 2145-CG8 or 2145-CF8 nodes 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

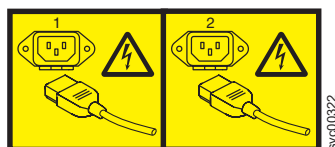
Ensure that you have a monitor and USB keyboard available because they are required during this procedure. You also need a power cable so that you can turn on the node while it is out of the rack, if necessary.

You must remove and replace the microprocessor when you replace the system board. Ensure that you have alcohol wipes and thermal grease available to correctly perform this task.

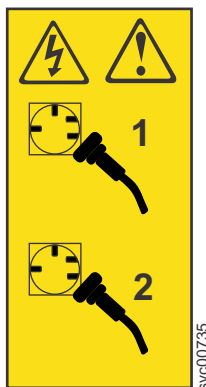
Note: When you reassemble the components in the node, be sure to route all cables carefully so that they are not exposed to excessive pressure.

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 top cover is removed.
- The system board is removed.

Perform the following steps to install the system board:

Procedure

1. Unpackage the new system board and set its jumpers appropriately, as shown in Figure 324 on page 394.

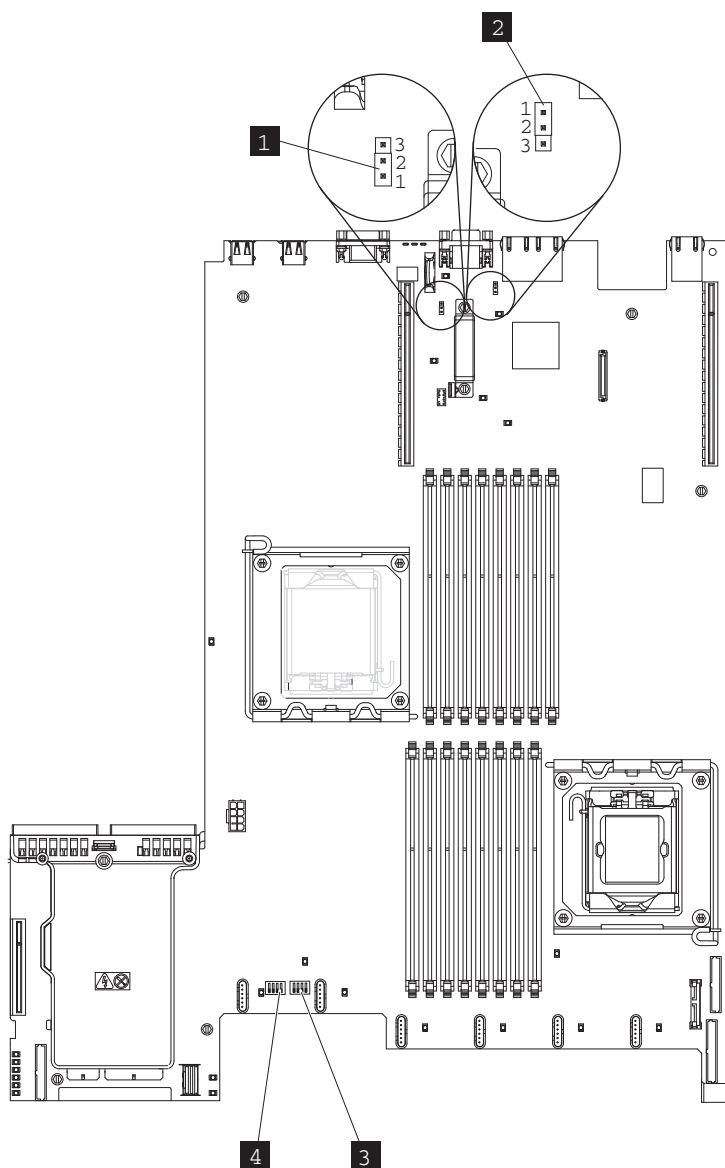


Figure 324. Setting jumpers on the system board

- 1** Jumper J29
- 2** Jumper J147
- 3** SW3 switch block
- 4** SW4 switch block

Set all switches in switch blocks SW3 and SW4 to OFF.

If equipped with a jumper, jump J29 pins 1 and 2. Otherwise, no jumper is required.

If equipped with a jumper, jump J147 pins 1 and 2. Otherwise, no jumper is required.

Tip: Jumpers J29 and J147 number pins from different starting positions.

2. Place the side of the system board assembly that is farther from the power supply units beneath the catches. Lower the opposite side of the system board until it is flat in the chassis. Align the rear connectors with the holes in the rear of the server and slide the system board towards the rear of the node, as shown in Figure 325 on page 395.

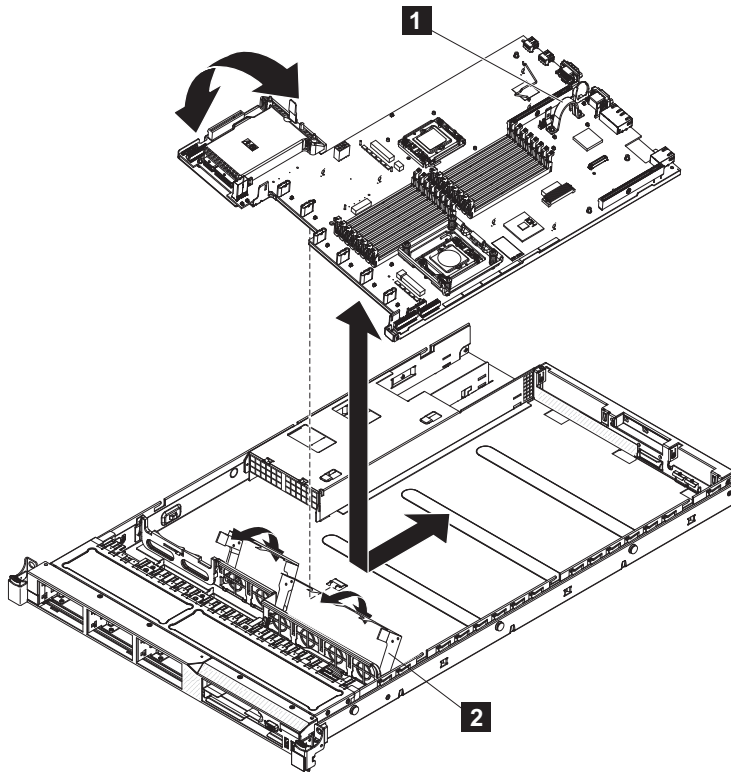


Figure 325. Removing and replacing the SAN Volume Controller 2145-CG8 or 2145-CF8 system board

1 System-board handle

2 Fan-assembly bracket

3. Grasp the fan assembly brackets and rotate them down toward the chassis.
4. Replace all of the cables that were removed previously.
5. Reinstall the hot-swap fans, as described in “Replacing the fans: 2145-CG8 or 2145-CF8” on page 339.
6. Reinstall the microprocessor and heat sink, as described in “Replacing the microprocessor: 2145-CG8 or 2145-CF8” on page 370.
7. Reinstall the DIMMs, as described in “Replacing the memory modules (DIMM)” on page 136.
8. Reinstall the white plastic air baffles.
9. Reinstall the power supply units, as described in “Replacing a power supply: 2145-CG8 or 2145-CF8” on page 245.
10. Replace the disk-controller and USB riser-card assembly, as described in “Replacing the disk-controller and USB riser-card assembly: 2145-CG8 or 2145-CF8” on page 279.
11. Replace the optional high-speed SAS-adaptor and riser-card assembly, as described in “Replacing the high-speed SAS adapter assembly: 2145-CG8 or 2145-CF8” on page 267.
12. Replace the Fibre Channel adapter and riser card. See “Replacing the Fibre Channel adapter assembly: 2145-CG8 or 2145-CF8” on page 255.
13. 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.
14. “Replacing the top cover: 2145-CG8 or 2145-CF8” on page 100
15. 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 67.

16. 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.
17. If you removed the power cords, replace the power cords and the cable-retention brackets, as described in "Replacing the cable-retention brackets: 2145-CG8 or 2145-CF8" on page 53.
18. Lift the locking levers (**1** in Figure 326) on the slide rails and push the server **2** all the way into the rack until it clicks into place.

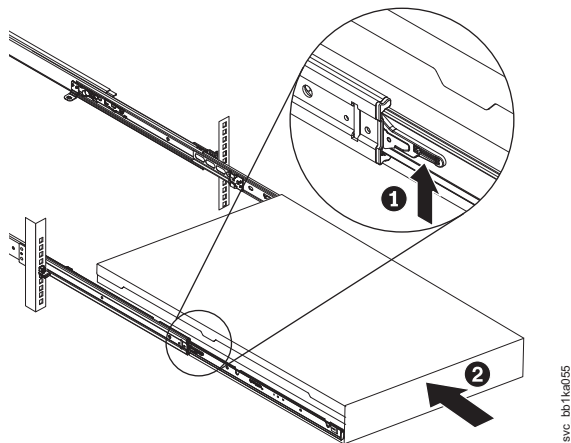


Figure 326. Raising the locking levers of the slide rails of the rack

19. Turn on the node. Wait for the front panel display to remain stable for at least five minutes before taking any further action.

Note: If you are a service representative completing this procedure, this might take up to two hours to complete.

- If the repair has been successful and if the node was able to save its state data before shutting down, the node starts and rejoins the cluster. The front panel displays Cluster: and a cluster name if the node has rejoined a cluster.
- If the repair has been 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 has failed, ensure that the node is added back into its original I/O group.
- If any other message is shown on the front panel, use MAP 5000 to resolve the problem.

Note: It is essential that you accomplish all the stages of the next step to ensure that the replacement system is set to the serial number of the original machine. Failure to do this might invalidate the customer's warranty or service agreement.

20. After you make sure that the node is operating as part of the cluster, perform the following steps to restore the original machine serial number to the new system board:
 - a. Start the command-line interface (CLI).
 - b. Write down the 7-character serial number from the serial number label that is on the front of the node. Ignore any hyphens (-) in the serial number.
 - c. On the front-panel display, press and release the down button until the Node panel is displayed. Write down the node name that is shown on the bottom line.
 - d. Issue the following command, substituting the values for *nodeserialnumber* and *nodename* that you wrote in the previous steps:


```
writesernum -sernum nodeserialnumber nodename
```

where *nodeserialnumber* is the serial number on the front of the node and *nodename* is the name of the node.

For example, to write the machine serial number to the system board when the serial number is "13-FEDCB" and the node name is "ZYXW3," you would issue the following command:

```
writeserenum -sernum 13FEDCB ZYXW3
```

Note: The node will restart as soon as the serial number has been written to it.

Removing and replacing the trusted platform module

You may need to remove and replace the trusted platform module (TPM) in a SAN Volume Controller node.

About this task

Use these instructions when you need to remove and replace the trusted platform module (TPM) in a SAN Volume Controller node, such as a 2145-SV1 node.

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.

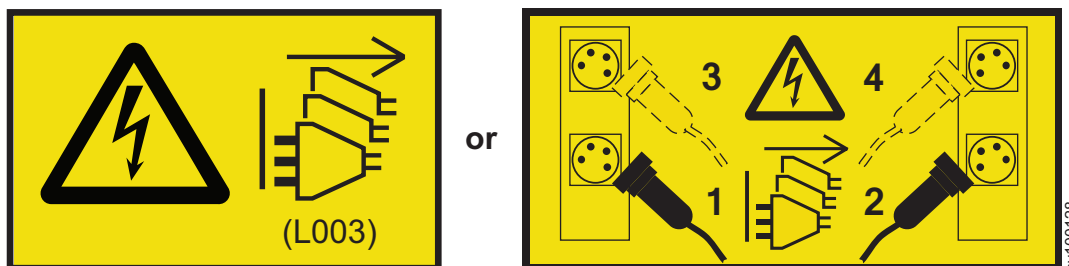
Removing and replacing a trusted platform module: 2145-SV1

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
```

It is best to check that each host has an active path to the volume through the node that will not be powered off.

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.

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 will 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 will 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. Slide the node out on its slide rails to the fully extended position.
5. Remove the top back cover, as described in “Removing the top covers: 2145-SV1” on page 93.
6. Locate the TPM on the main board, as shown in Figure 1 .

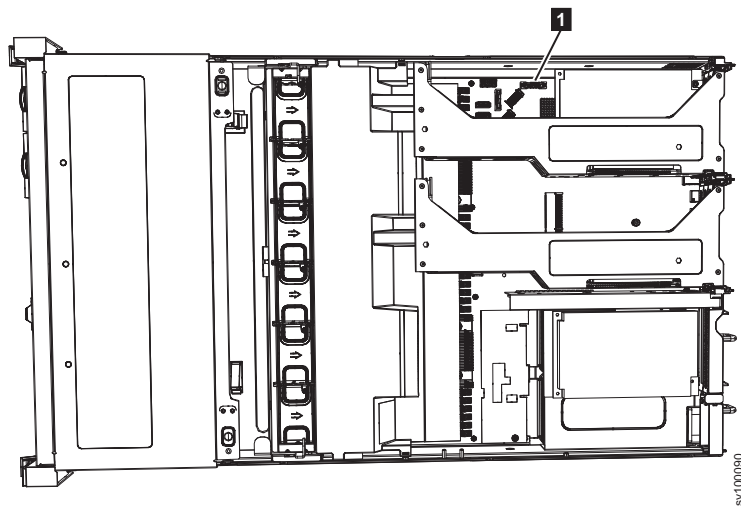


Figure 327. Locating the TPM on the main board of a 2145-SV1 node

7. Push out the locking clips on the side of the TPM to free it, as shown in Figure 328 on page 400.

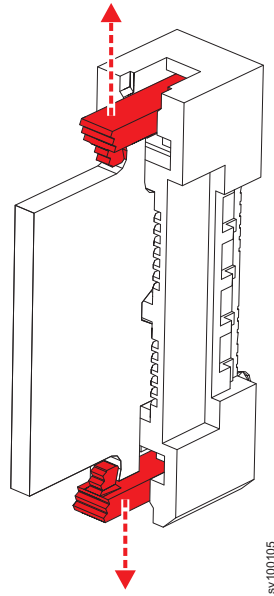


Figure 328. Removing the TPM from the main board of a 2145-SV1 node

8. Lift the TPM up and out of the slot.

Replacing the TPM

9. Insert the new TPM.

10. Push the locking clips in on each side of the TPM socket.
11. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 98.
12. Slide the node back into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 70.
13. Power the node back on by attaching the power cables and reconnecting each power supply unit back to power.

Removing and replacing the Ethernet edge board

You might need to remove and replace the Ethernet edge board in a SAN Volume Controller node.

Use these instructions when you need to apply service to a node, such as a SAN Volume Controller 2145-SV1 node, that is fitted with an Ethernet edge board.

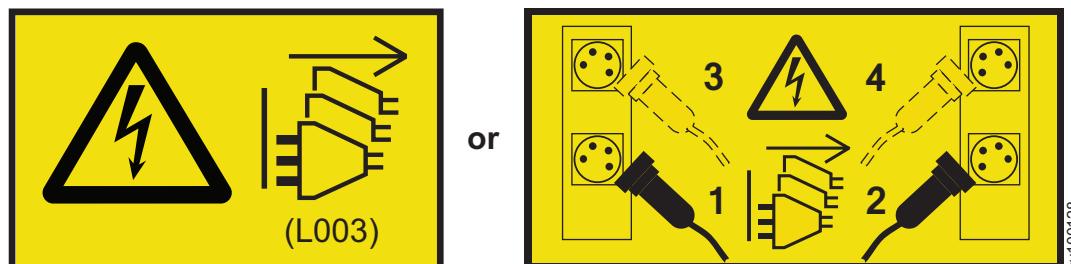
Removing and replacing the Ethernet edge board: 2145-SV1

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 20.

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 329 on page 402.

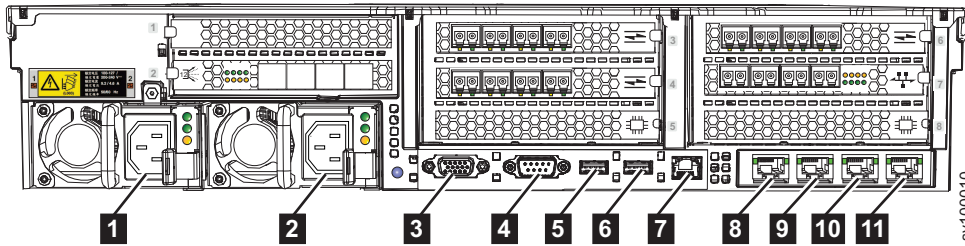


Figure 329. Connectors on the rear of the 2145-SV1 node

- 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 93.
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 330 on page 403.

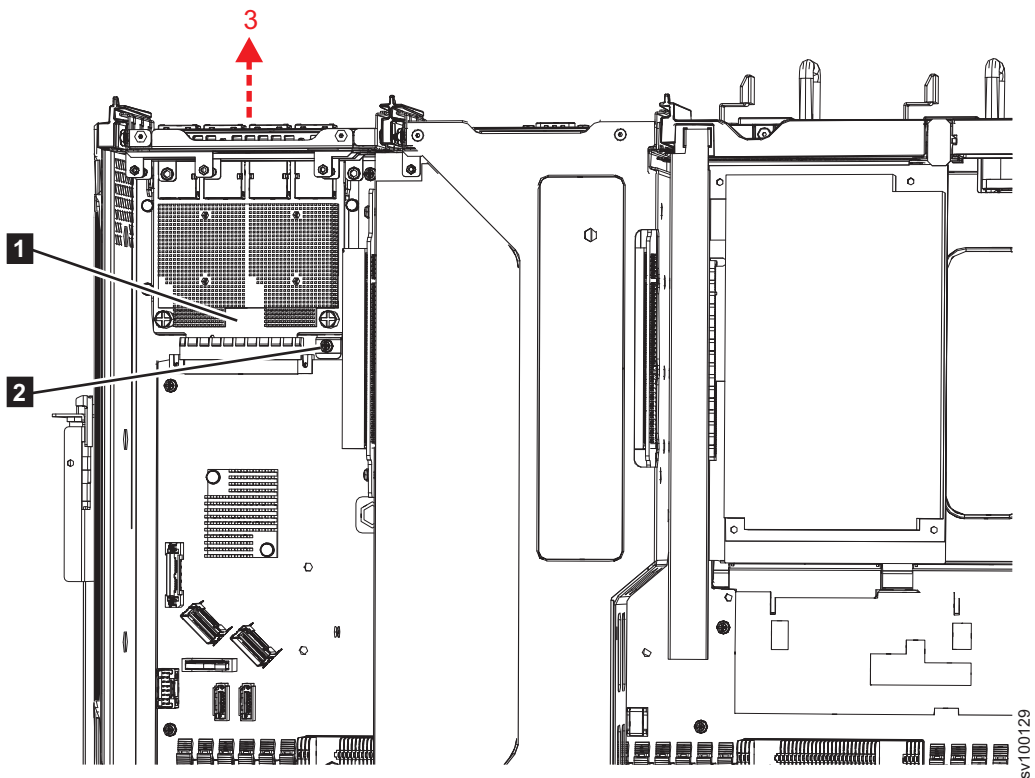


Figure 330. Removing the 2145-SV1 Ethernet edge board

- 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 330).
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 330.

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 331 on page 404.

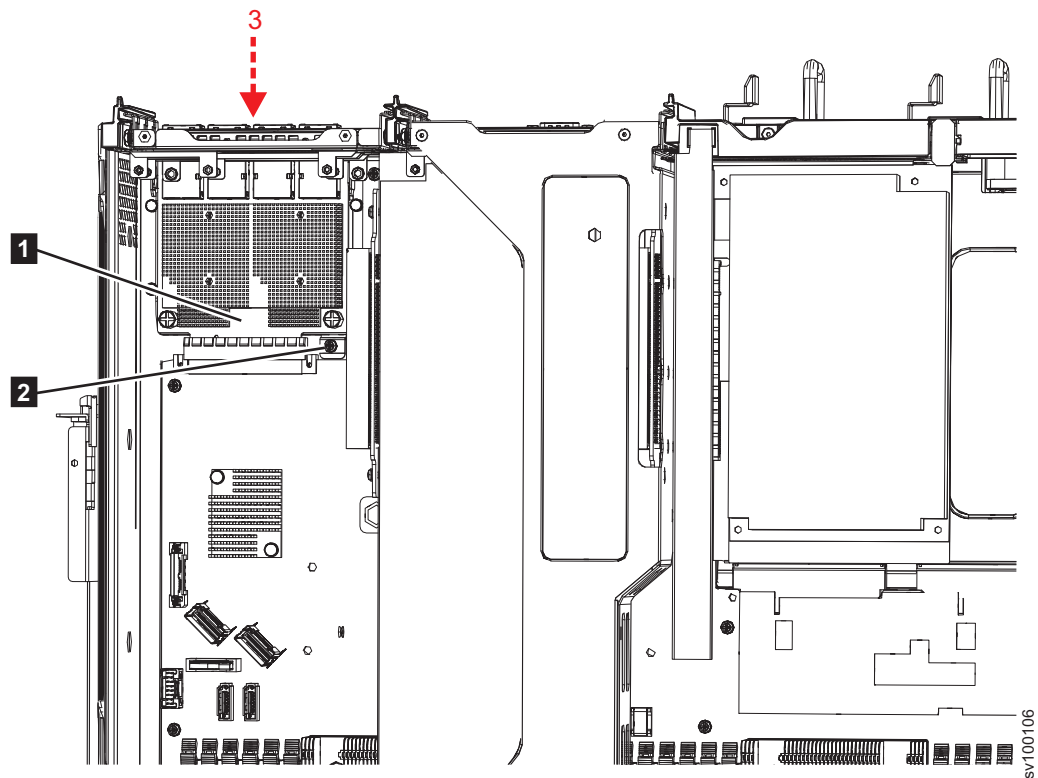


Figure 331. Replacing the 2145-SV1 Ethernet edge board

- 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 332 on page 405) to secure the Ethernet edge board to the chassis.

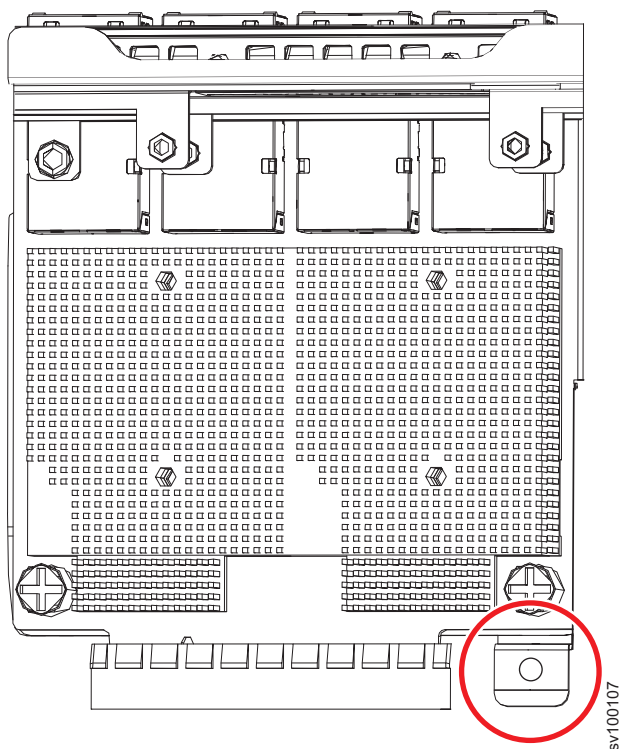


Figure 332. Location of the screw on the 2145-SV1 Ethernet chassis

Figure 330 on page 403 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 288.
15. Replace the top back cover, as described in “Replacing the top covers: 2145-SV1” on page 98.
16. Slide the node back into the rack, as described in “Replacing a node in a rack: 2145-SV1” on page 70.
17. Reconnect the Ethernet cables to the appropriate ports, as noted in step 2 on page 401.
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 333) can be attached only to the most recent versions of the 2145 UPS-1U. Older versions do not have the correct mounting holes.

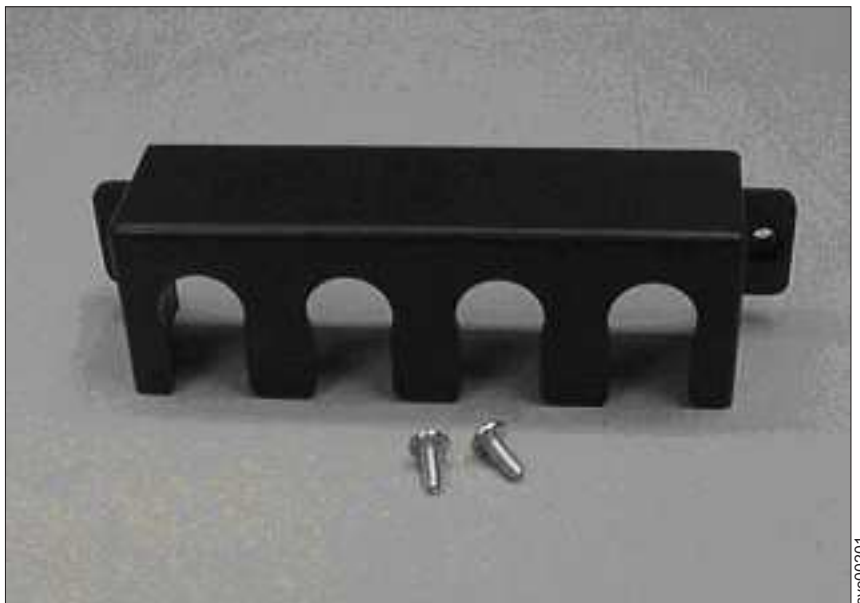


Figure 333. 2145 UPS-1U power cable-retention bracket hardware

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 334. 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 335.



Figure 335. 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 336) until the power light is extinguished (approximately five 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.

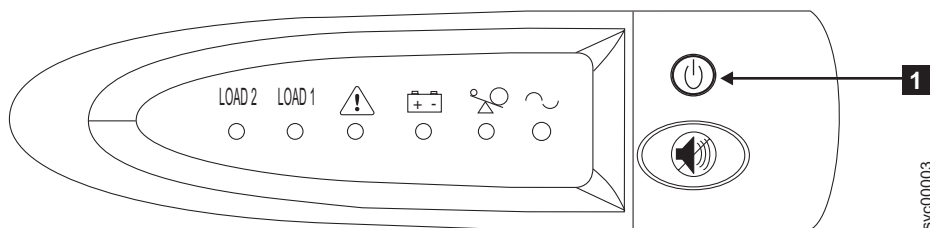


Figure 336. The 2145 UPS-1U front-panel assembly

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 337 on page 410).
3. Disconnect the signal cable from the communication port (**2** in Figure 337 on page 410).
4. Disconnect the main power cable from the main power source (**1** in Figure 337 on page 410).

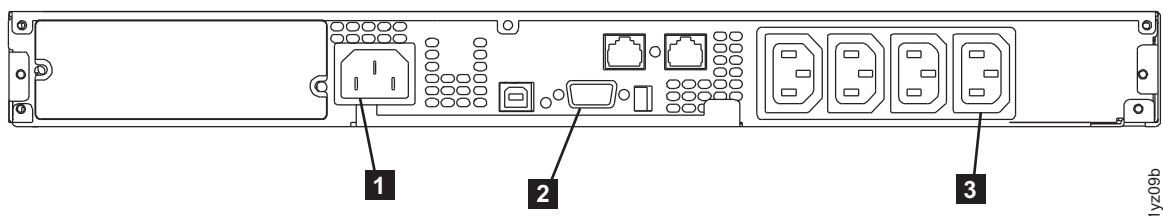


Figure 337. 2145 UPS-1U (rear view)

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 338.

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.

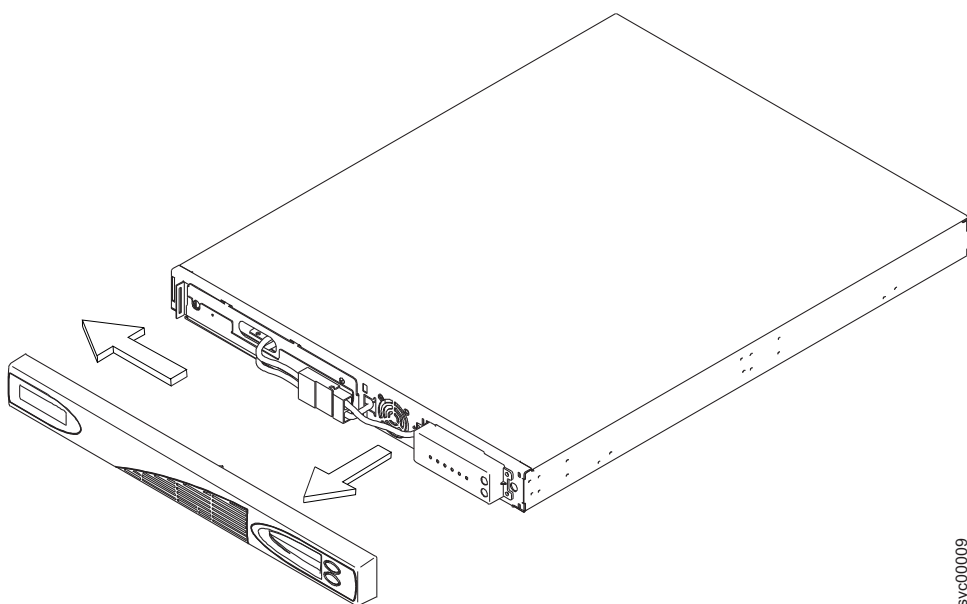
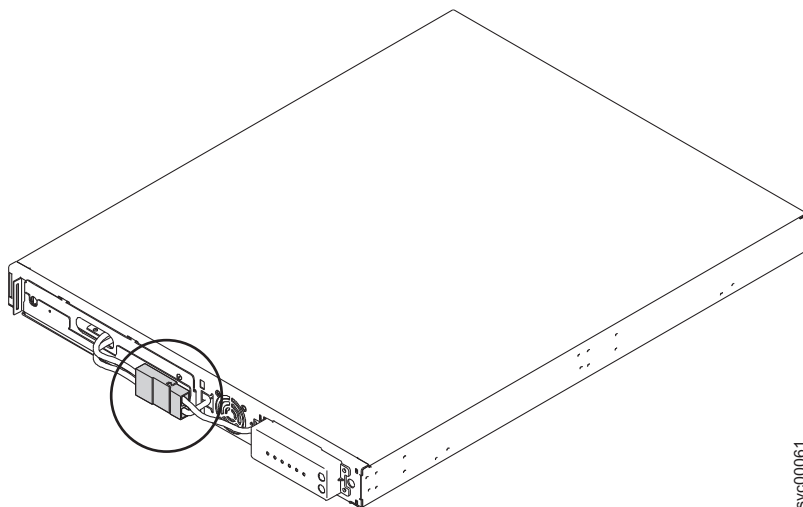


Figure 338. Removing the 2145 UPS-1U front panel

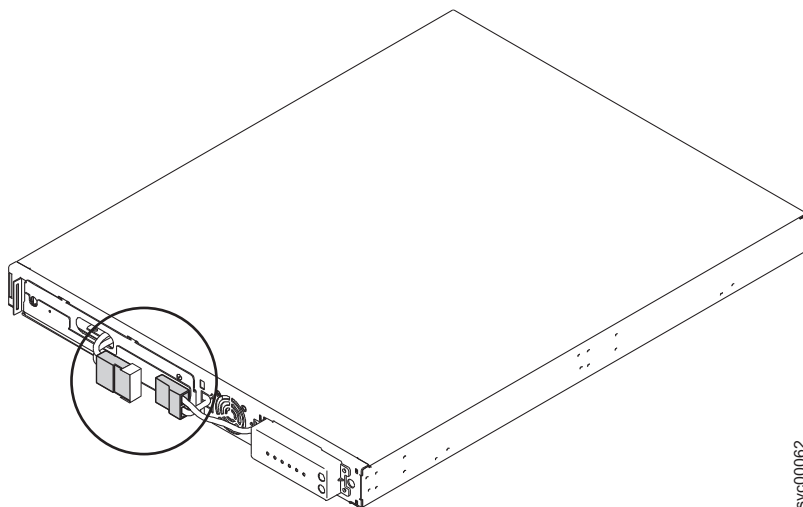
6. Disconnect the internal battery connector, which is circled in Figure 339 on page 411.



svc00061

Figure 339. The 2145 UPS-1U internal-battery connector

7. After pulling the two connectors apart, cover the exposed battery connector (shown in Figure 340) with adhesive tape.



svc00062

Figure 340. 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 341 on page 412.

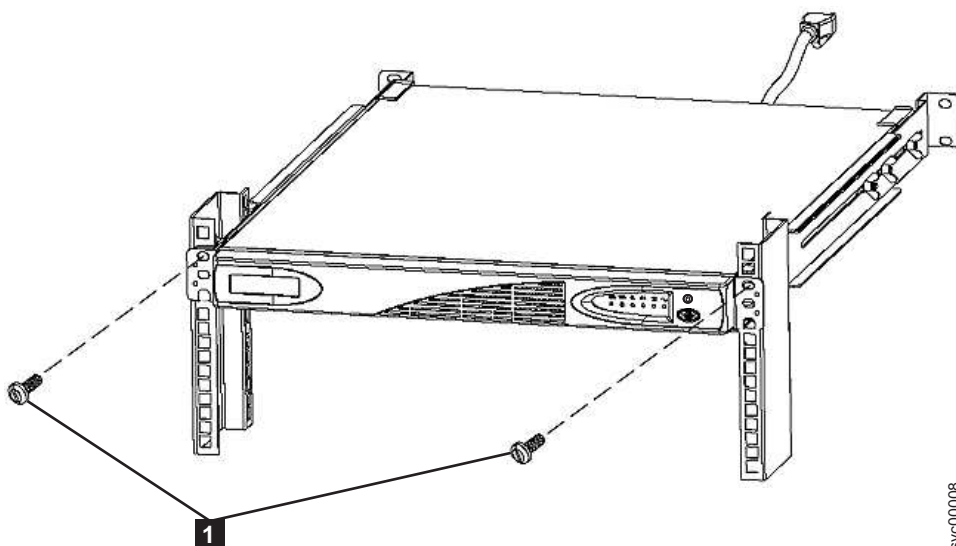


Figure 341. Mounting screws for the 2145 UPS-1U

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 342).

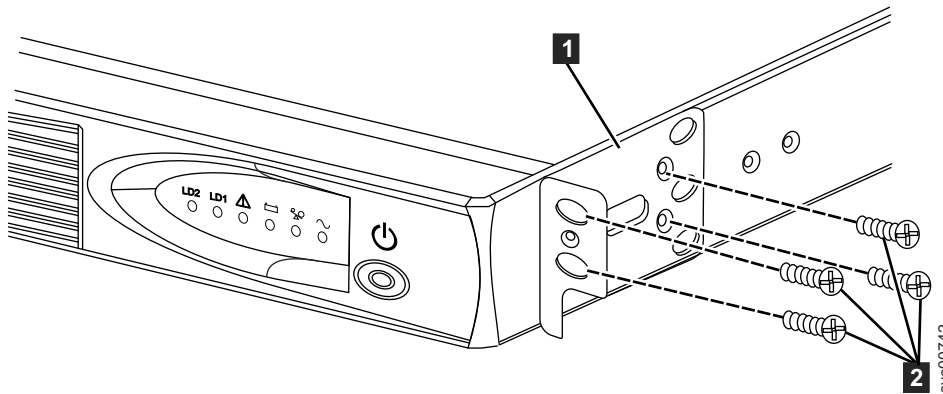


Figure 342. Installing the UPS mounting brackets for the 2145 UPS-1U

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 343).

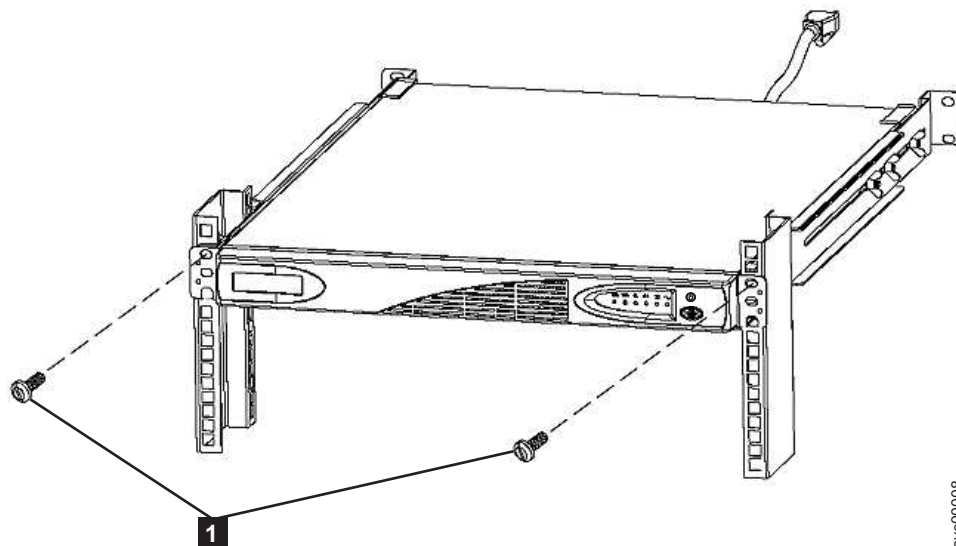
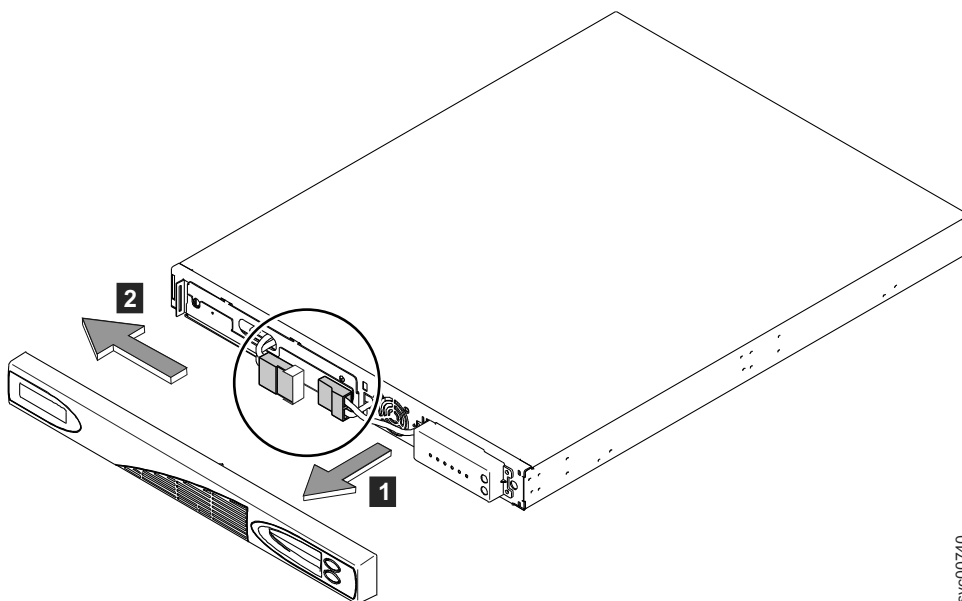


Figure 343. Mounting screws for the 2145 UPS-1U

5. Remove the 2145 UPS-1U front panel by pulling it towards you and to the left, as shown in Figure 344 on page 414.

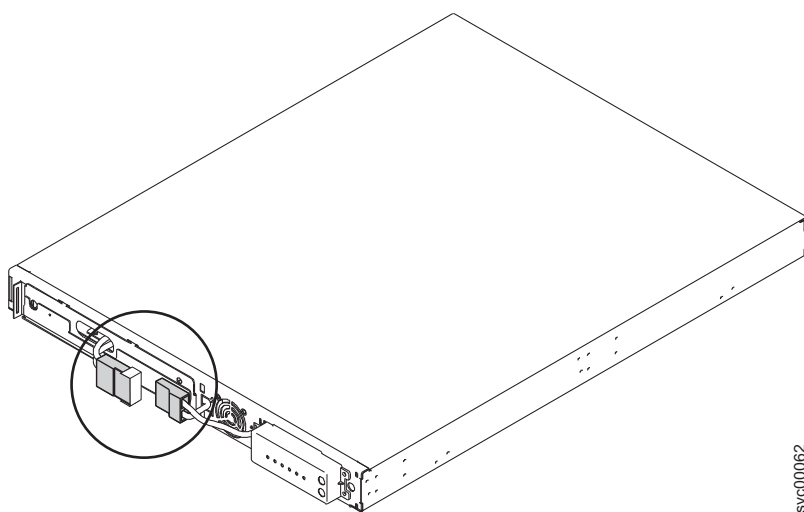
Note: If you are having difficulty pulling the right side of the panel free from the 2145 UPS-1U, insert a flat-blade screwdriver between the right side of the cover and the frame and gently pry it free.



svc00740

Figure 344. Removing the 2145 UPS-1U front panel

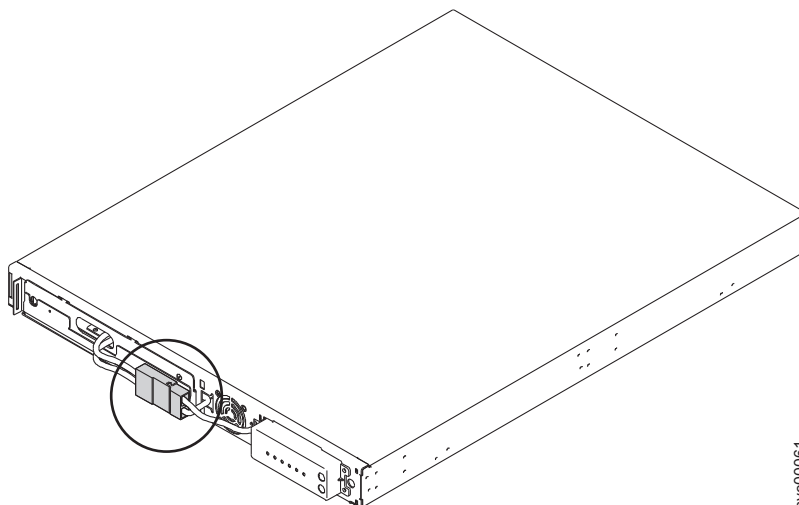
6. Remove the protective tape from the internal battery connector (circled in Figure 345).



svc00062

Figure 345. The 2145 UPS-1U internal battery connector with protective tape

7. Connect the internal battery connector (circled in Figure 346 on page 415).



svc00061

Figure 346. 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 348 on page 416). If applicable, install the power cable-retention bracket (shown in Figure 347).

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 347. 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 348 on page 416).
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 348 on page 416).

Note: If the 2145 UPS-1U does not seem to work, ensure that the power cable is connected properly or reconnect the power cable.

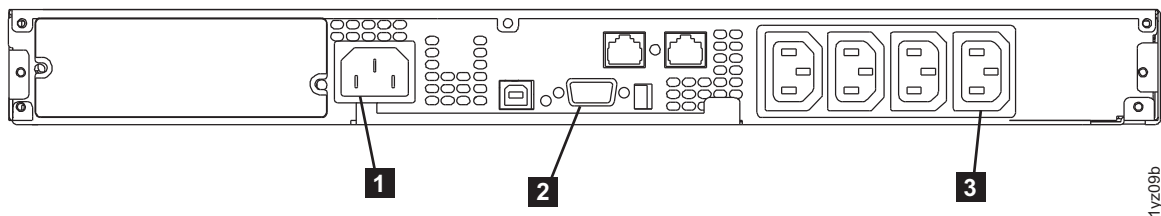


Figure 348. 2145 UPS-1U (rear view)

The 2145 UPS-1U is now in standby mode with the SAN Volume Controller offline. All indicators that are shown in Figure 348 are off.

12. To turn on the 2145 UPS-1U, press and hold the on/off button (**7** in Figure 349). 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.

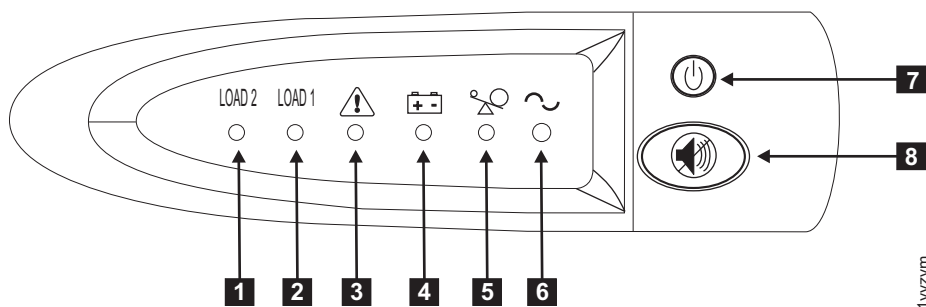


Figure 349. 2145 UPS-1U front-panel assembly

Note: If the 2145 UPS-1U battery is not sufficiently charged, the SAN Volume Controller node will not be able to join the cluster. The node will display Charging on its front panel until the 2145 UPS-1U battery has reached 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

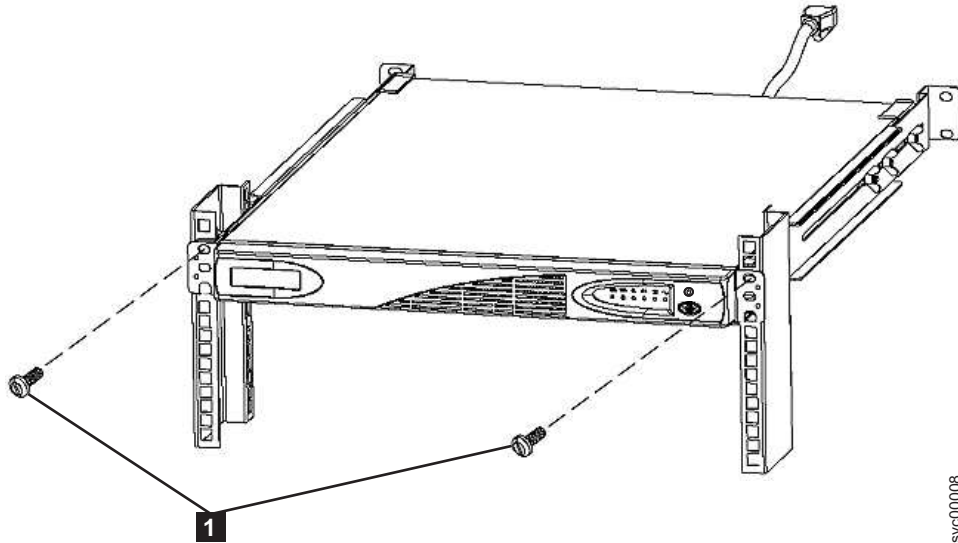
You can remove the support rails for the 2145 UPS-1U.

About this task

Perform the following steps to remove the support rails.

Procedure

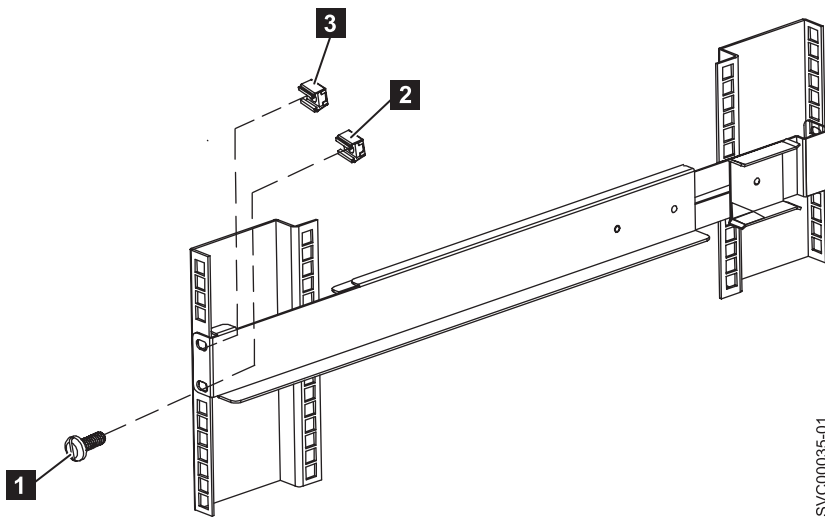
1. Loosen and remove the two M6 × 10 screws from each side of the 2145 UPS-1U (**1** in Figure 350 on page 417).



svc00008

Figure 350. 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 351).



SVC00035-01

Figure 351. 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 352 on page 418) and the two clip nuts (**2**).

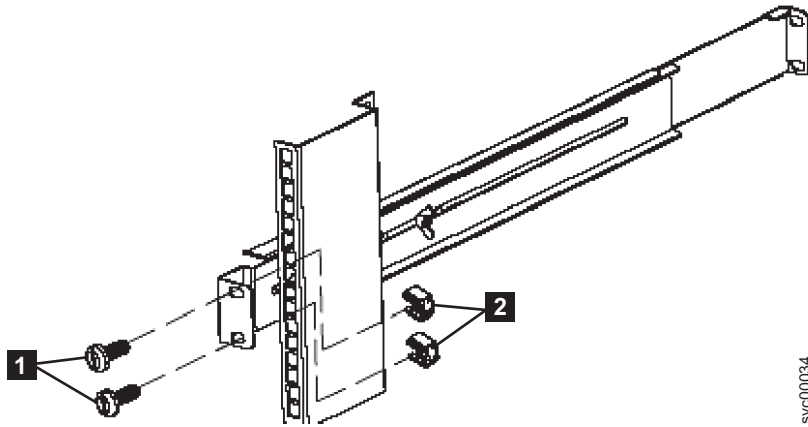


Figure 352. Removing the rear rail on the 2145 UPS-1U

6. Remove the rail from the rack.
7. Repeat steps 3 on page 417 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 353 on page 419.

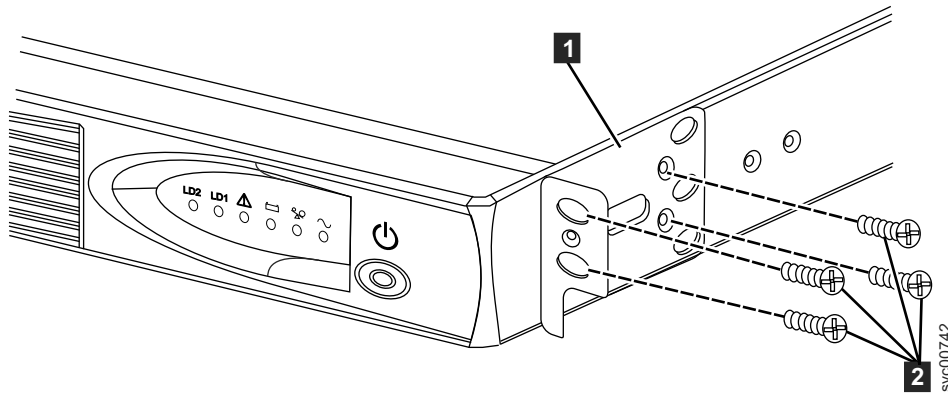


Figure 353. Installing the 2145 UPS-1U mounting brackets for the 2145 UPS-1U

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 354 for information about how to tighten or loosen wing nuts and achieve a desired rail depth.

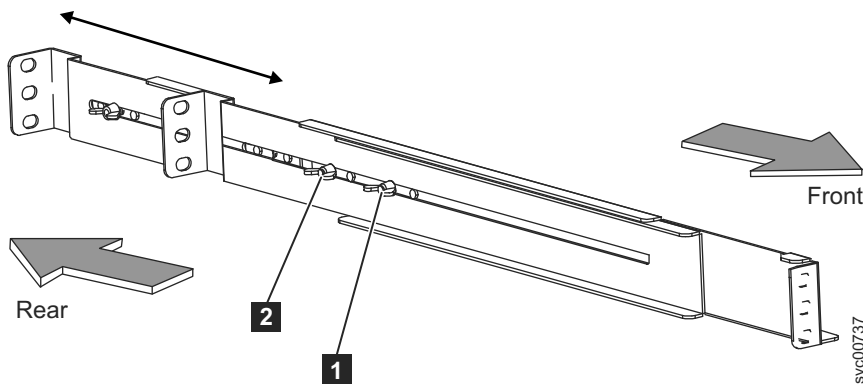


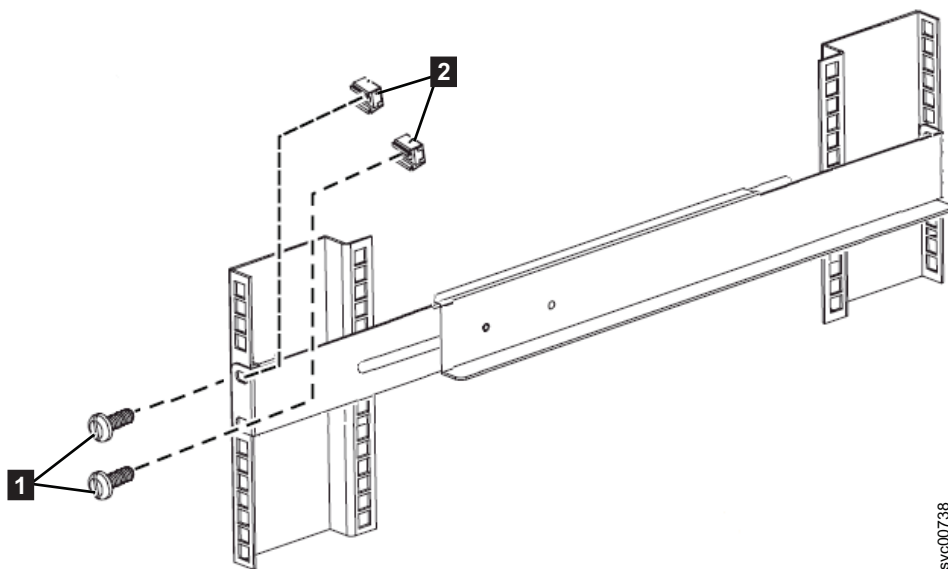
Figure 354. Adjusting the rail depth on the 2145 UPS-1U

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 355 on page 420.

Note: The bottom flange of the support rail must align with the EIA mark on the rack.



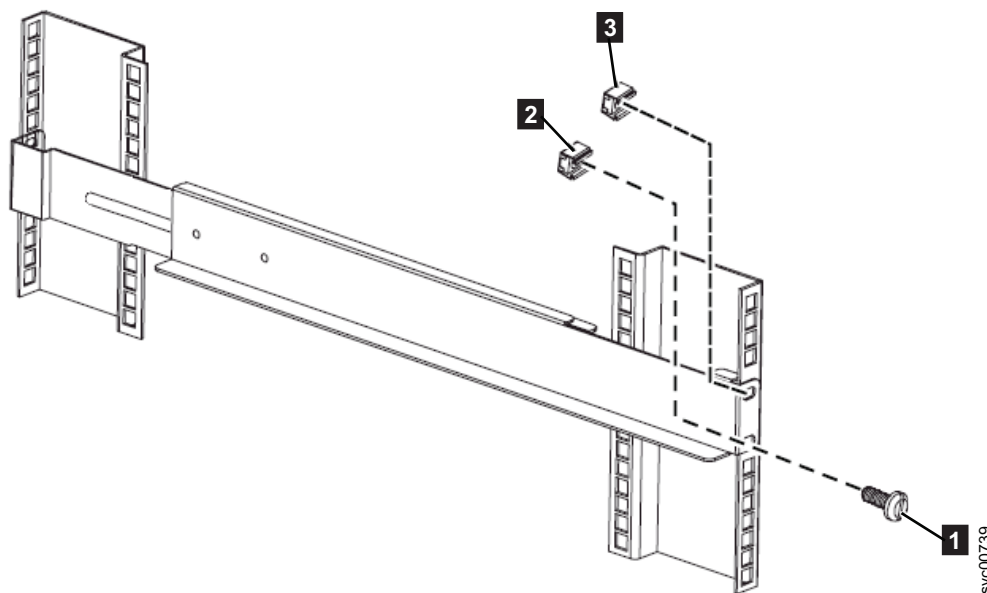
svc00738

Figure 355. 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 356.

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.



svc00739

Figure 356. 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 357 illustrates the front and rear views of the 2145 UPS-1U.

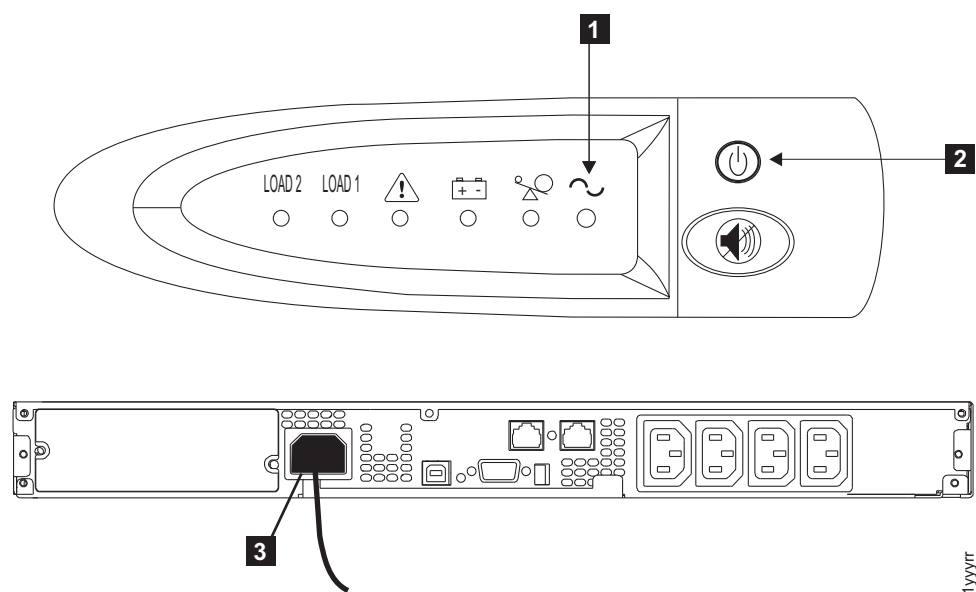


Figure 357. Front and back panels for the 2145 UPS-1U

- 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 358.

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.

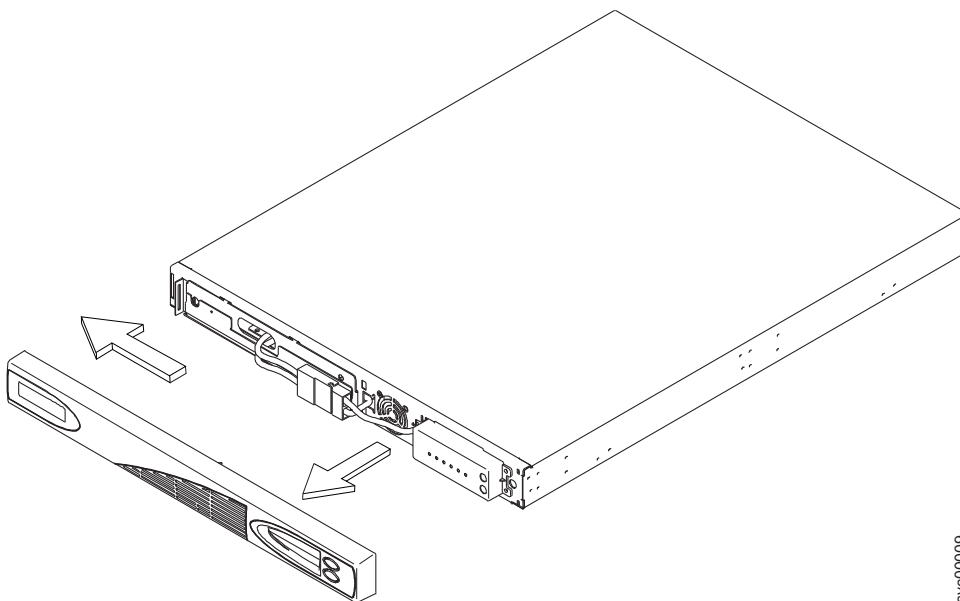
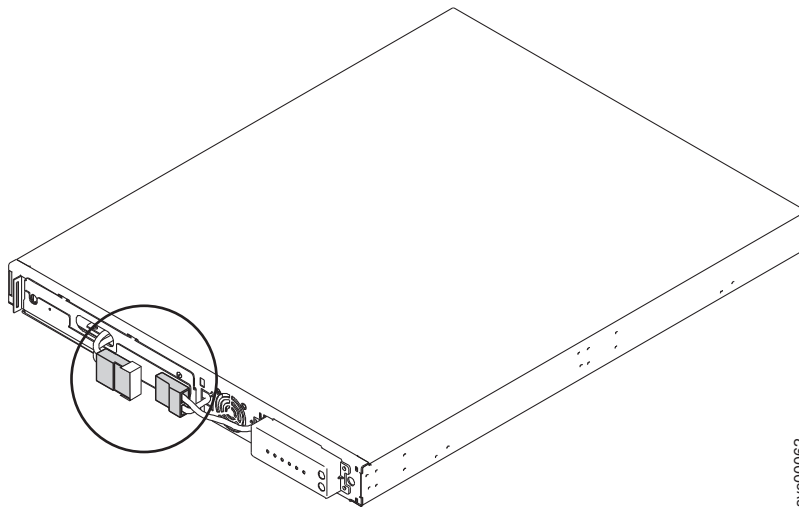


Figure 358. Removing the 2145 UPS-1U front panel

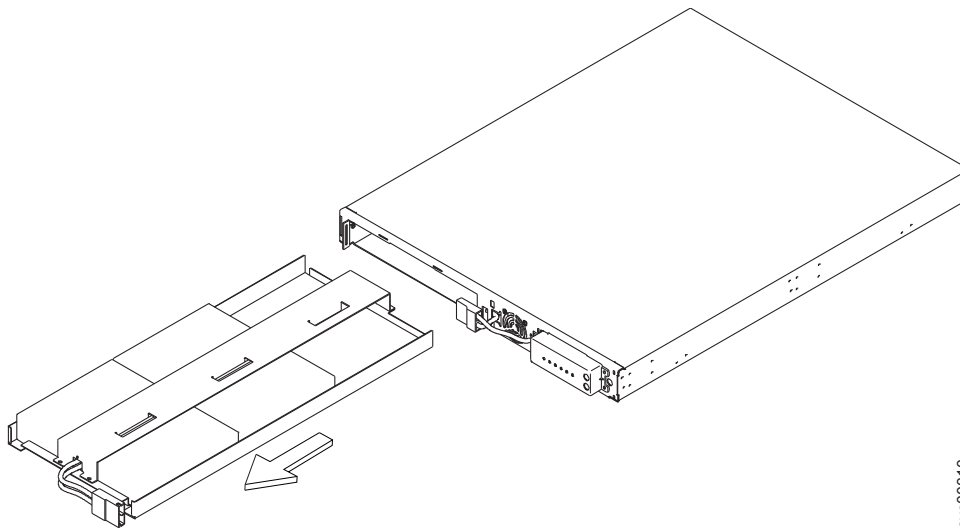
3. Disconnect the internal battery connector, circled in Figure 359 on page 423.



svc00062

Figure 359. 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 360, and remove it, laying it on a flat surface.



svc00010

Figure 360. 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 have disconnected the 2145 UPS-1U battery and have 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 361.

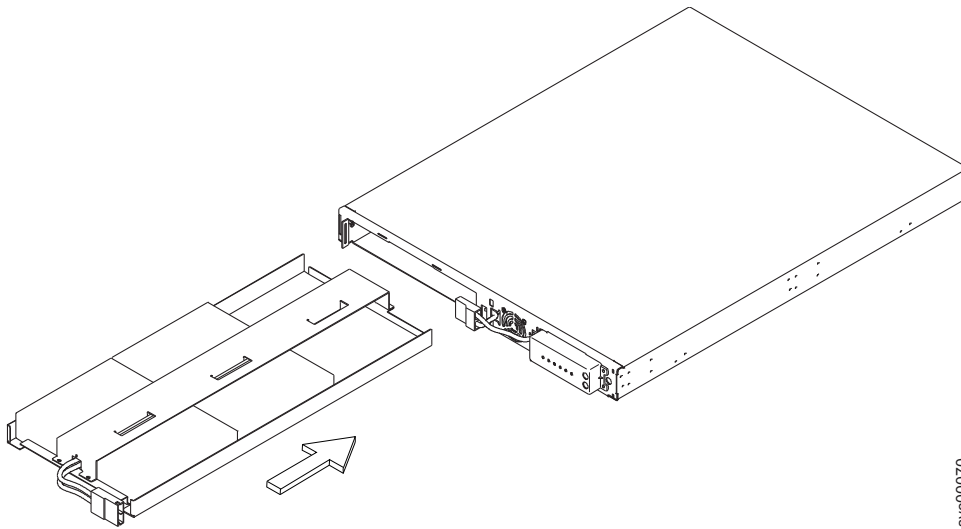


Figure 361. Replacing the 2145 UPS-1U battery

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 363 on page 425. 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.

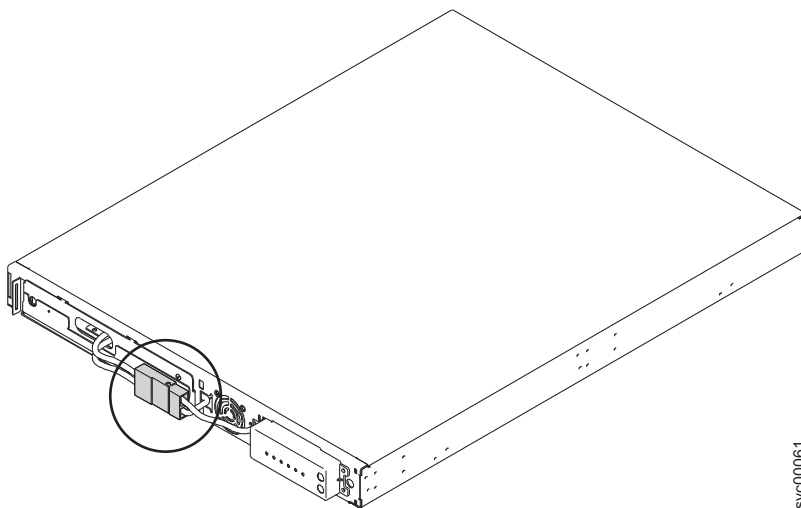


Figure 362. The 2145 UPS-1U internal-battery connector

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 363.

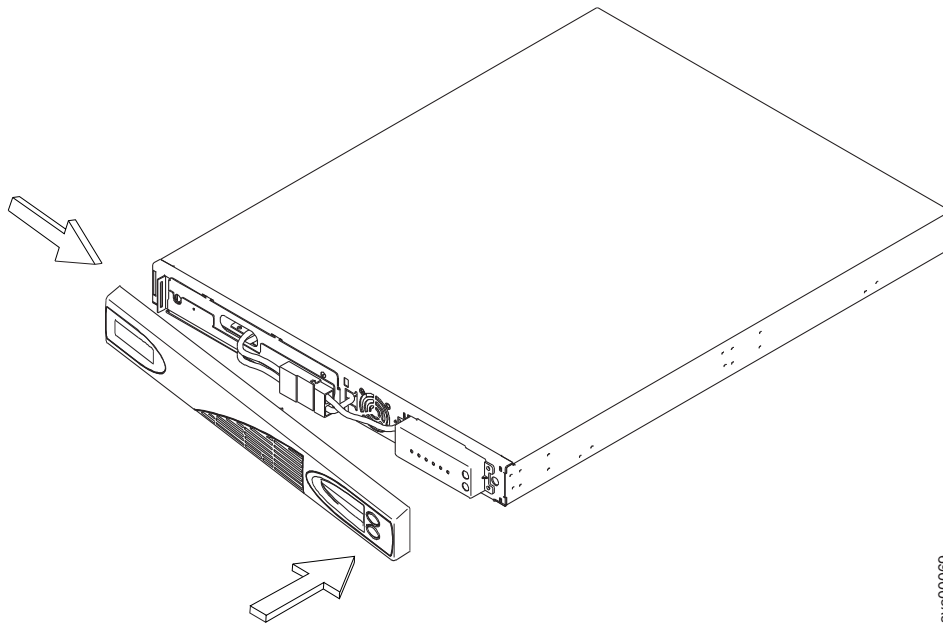


Figure 363. Replacing the 2145 UPS-1U front panel

5. Ensure that the 2145 UPS-1U is turned on. Press and hold the 2145 UPS-1U test button for three 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 SAN Volume Controller

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 SAN Volume Controller:

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen. HTML documents have been tested 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 SAN Volume Controller 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 to perform operations and initiate menu actions that can also be done through mouse actions. You can navigate the SAN Volume Controller online documentation from the keyboard by using the shortcut keys for your browser or screen-reader software. See your browser or screen-reader software Help for a list of shortcut keys 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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Federal Communications Commission (FCC) statement

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, might 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.

Industry Canada compliance statement

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

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

Australia and New Zealand Class A Statement

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

European Union Electromagnetic Compatibility Directive

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

Attention: This is an EN 55022 Class A product. In a domestic environment this product might cause radio interference in which case the user might be required to take adequate measures.

European community contact:

IBM Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 (0) 800 225 5423 or +49 (0) 180 331 3233
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Germany Electromagnetic Compatibility Directive

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

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

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

“Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen.”

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

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

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

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

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

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Technical Regulations, Abteilung M372
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 (0) 800 225 5423 or +49 (0) 180 331 3233
Email: halloibm@de.ibm.com

Generelle Informationen:

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

People's Republic of China Class A Statement

中华人民共和国“A类”警告声明

声明

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

Taiwan Class A compliance statement

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

Taiwan Contact Information

This topic contains the product service contact information for Taiwan.

IBM Taiwan Product Service Contact Information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd., Taipei Taiwan
Tel: 0800-016-888

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

f2c00790

Japan Voluntary Control Council for Interference Class A statement

This explains the Japan Voluntary Control Council for Interference (VCCI) statement.

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

Japan Electronics and Information Technology Industries Association Statement

This statement explains the Japan JIS C 61000-3-2 product wattage compliance.

(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 を参照

This statement explains the Japan Electronics and Information Technology Industries Association (JEITA) statement for products less than or equal to 20 A per phase.

高周波電流規格 JIS C 61000-3-2 適合品

This statement explains the JEITA statement for products greater than 20 A, single phase.

高周波電流規格 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 explains the JEITA statement for products greater than 20 A per phase, three-phase.

高周波電流規格 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

Korean Electromagnetic Interference (EMI) Statement

This explains the Korean Electromagnetic Interference (EMI) statement.

이기는은업무환경에서사용할목적으로적합성평가를받은기기로서
가정용환경에서사용하는경우 전파간섭의우려가있습니다.

Russia Electromagnetic Interference Class A Statement

This statement explains the Russia Electromagnetic Interference (EMI) statement.

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

rusemi

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